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» moving forward

May 29, 2015

RECEIVED
MAY 29 2015
BY:_____

Mr. William P. Scott
Gonzalez Saggio & Harlan LLP
111 East Wisconsin Avenue
Milwaukee, WI 53202

RE: Request for Remedial Action Bid Proposal
Former Express Cleaners Site
3921 – 3942 North Main Street
Racine, Wisconsin
Avantti Environmental Group Proposal No. AEG-58

Dear Mr. Scott:

Avantti Environmental Group together with CABENO Environmental Field Services are pleased to submit this proposal to Gonzalez Saggio & Harlan LLP for the Former Express Cleaners Site Remedial Action project. The proposal has been organized to meet the requirements of your May 5, 2015 Request for Bid (RFB) document and the May 22, 2015 email amendment to the RFB.

We are confident that our project team is highly qualified to successfully complete this project as a result of our:

- Expertise in soil and groundwater remediation utilizing in-situ technologies,
- Familiarity and experience with site-specific issues related to dry cleaning facilities.
- Experience in remedial design and construction management services, and
- Commitment to providing quality services.

In developing our cost estimate to complete this project, AEG has relied on realistic assumptions and our team's experience with similar remediation projects. We encourage you to compare our cost assumptions with those of other firms in your evaluation of our proposal.

We appreciate your consideration of AEG and our project team for this project. Please call Tina Reese at 414-326-4875 (work) or 414.719-1477 (mobile) if you have any questions or need additional information.

Sincerely,

AVANTTI ENVIRONMENTAL GROUP, LLC

Christine A. Reese, P.G
Principal

cc: Nancy Ryan, Department of Natural Resources

RESPONSE TO REMEDIAL ACTION BID PROPOSAL

Former Express Cleaners Site
3921-41 N. Main Street
Racine WI

WDNR FID #25201000
BRRTS 02-52-547631

Wisconsin Department of Natural Resources
2300 N. Dr. Martin Luther King Drive
Milwaukee, WI 53212

Gonzalez, Saggio & Harlan, LLP
111 E. Wisconsin Avenue, Suite 1000
Milwaukee, WI 53202

Prepared by:

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May 29, 2015
Avantti Environmental Group
Proposal No. AEG-58

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1.0 OVERALL QUALIFICATIONS OF FIRM/TEAM

1.1 Project Team

AEG has assembled a Project Team that complements each other to create a powerful, cohesive unit, fulfilling all of the requirements and resources needed for this project. The firms forming the AEG team include:

- Avantti Environmental Group (AEG), and
- CABENO Environmental Field Services, LLC (CEFS)

Avantti Environmental Group (AEG) is a woman-owned small business located in Hales Corners, Wisconsin. AEG provides a broad range of environmental, engineering, and scientific services to industrial, municipal, federal, and state agency clients. We specialize in remediation and redevelopment, building decommissioning and demolition, brownfields assessments, watershed planning, and water quality studies.

AEG's primary service areas include:

- Soil and groundwater investigation and remediation
- Facility decommissioning/demolition bid specification preparation and construction oversight
- Pre-demolition inspection and facility deactivation/decommissioning/demolition
- Implementation of United States Environmental Protection Agency (USEPA) and State Brownfield Site Assessment and Cleanup Grants
- Phase I and II environmental site assessments (ESAs)
- Geographic Information System (GIS) services
- Storm water management
- Construction management
- Compliance assistance
- Waste management

CABENO Environmental Field Services (CEFS) is a privately owned business enterprise that provides environmental and geotechnical field services throughout the United States. They provide cost effective, quality solutions to environmental remediation needs. CEFS's remediation and environmental services include:

- Remediation system installation, operation and maintenance
- Soil and groundwater removal
- Fuel fluorescence detection
- Monitoring well installation

- In-situ chemical injection and mixing
- Cone penetrometer testing
- Down hole video logging
- Test pits and excavation

1.2 Relevant Project Experience

The AEG Team has extensive project experience and references related to providing services similar to the remediation requirements for the Former Express Cleaners Site. In addition, this project team has significant experience working together in a similar capacity.

1.2.1 Remediation Experience Resulting in Site Closure

Remediation projects that have been performed by AEG within the last five years, which resulted in site closure by the WDNR, include the following:

Crucible Materials Corporation Environmental Response Trust (CMERT) – Former Trent Tube Plant No. 3

Client:	**CMERT**
Contact:	**Bruce Keyes, Trustee** **Foley & Lardner LLP** **414-297-5815** **bkeyes@foley.com**
Total Project Costs:	**$3,000,000**
Project Completion Date:	**2015**

Final case closure was approved by the Wisconsin Department of Natural Resources (WDNR) at the Former Trent Tube Plant No. 3 site in January 2015.

Remedial activities conducted at the site included: 1) source control measures, including in-situ chemical oxidation and enhanced bioremediation, were used to reduce the mass and concentrations of chlorinated volatile organic compounds (VOCs) within and immediately downgradient of three known release areas, and 2) design, construction, operations, maintenance, and monitoring of a 10 well groundwater extraction and treatment system.

The performance of the remedial action was documented by collecting groundwater samples from monitoring wells located in the source area. In general, reductions in contaminant concentrations ranged from 78 to 100 percent. The total mass reduction calculated for the source area was approximately 514 pounds 95.6 percent reduction). The photographs below show chemical oxidant and mixing of the solution for remedial injection.

This case closure was completed under the NR700, Wisconsin Administrative Code (WAC) rule series.

1.2.2 Abandonment and Demolition Experience

Abatement and demolition projects performed by AEG within the last five years include the following:

DEMOLITION OR DECONSTRUCTION OF RESIDENTIAL STRUCTURES PURCHASED 30TH STREET CORRIDOR WET WEATHER RELIEF PHASE 1 PROJECT

CLIENT: **MMSD**

Owners Representative: **Dave Fowler**
414-227-6368

Total Project Costs: **$98,258**

Project Completion Date: **Ongoing**

Project tasks include asbestos containing material, lead based paint and other universal waste inspections of several properties, most of which contain multiple structures, prepare environmental assessment reports for each property that provide a description of the general hazards associated with the buildings, development of bid documents for the deconstruction/demolition of the structures, and provide deconstruction/demolition management to track salvaged, recycled, and waste materials, report progress, and assist contractors in salvage and recycling. To date, the project has progressed rapidly with little or no special environmental, political, or technical problems. Based on the results of the deconstruction inspections conducted as part of this project, a minimum salvage/recycling goal of 85 percent by weight or volume was established.

DECOMMISSIONING AND DEMOLITION OF ABANDONED MANUFACTURING FACILITY

Client: **City of West Allis**

Owner Representative: **Ted Atkinson**
414-302-8468

Total Project Costs: **$250,000**

Project Completion Date: **2012**

AEG personnel were retained by the City of West Allis to assist with decommissioning and demolition of an approximately 330,000 square feet (sf) abandoned manufacturing facility. Challenges to completing the project included working under a Milwaukee County demolition order with the responsible party running a business on the property directly to the east, and managing the subsurface environmental conditions that were encountered while removing footings, foundations, and tunnels. Approximately 75 percent of the building materials were managed on-site and/or

recycled. AEG personnel utilized technology tools including GIS applications, electronic field documentation utilizing a mobile tough pad personal computer, and WasteCapTRACE, a waste material audit software program, for efficient management and documentation of site activities.

1.2.3 Former projects completed by the team of AEG and CEFS

AEG and CEFS have worked on many projects together including the highlighted project above (CMERT) that just received closure from the WDNR in January 2015. As noted above the CMERT project was almost identical to the Former Express Cleaners project including, similar geology and identical constituents of concern (COCs).

AEG and CEFS have also just completed a large Phase II ESA for a property transaction that occurred in the Menominee Valley in May 2015. The project sites were very complex with multiple COCs and spill areas.

2.0 PROJECT TEAM

AEG has assembled a highly qualified team to perform the tasks outlined in the Request for Remedial Action Bid Proposal, and has all the qualifications necessary to meet the project objectives and to meet or exceed the client's expectations. The project team members were selected based on the following criteria:

- Strong project management skills,
- Expertise in soil and groundwater remediation utilizing in-situ technologies,
- Extensive knowledge in pre-demolition inspection of building materials and managing hazardous materials, and
- Familiarity and experience with site-specific issues related to drycleaning facilities.

The following sections summarize our project team structure and identify key personnel assignments.

2.1 Project Management

Christine (Tina) Reese will oversee all project activities and staff. Tina has all the right skills and experience to ensure the success of this project – extensive experience in the management of soil and groundwater remediation programs, deconstruction and demolition oversight projects, including preparing specifications and drawings, bid management, and as-built reporting and final documentation. She has a reputation for being forthright, honest, and consistently reliable. Over the past 20 years, Tina has demonstrated her ability to lead, communicate, and facilitate on similar projects. The following table lists projects similar in nature and size to this proposal where Tina has served as project manager.

NAME	DESCRIPTION
MMSD David Fowler 414-277-6368	Demolition/Deconstruction of Multiple Residential Structures to facilitate a reduction in flooding issues along the 30th Street Corridor.
City of West Allis Ted Atkinson 414-302-8468	Demolition/Deconstruction of a 300,000 square foot former manufacturing facility located in the City of West Allis.
Crucible Materials Corporation Environmental Response Trust Bruce Keyes, Trustee 414-297-5815	Plant Deactivation/Deconstruction, Hazardous Materials Management RCRA Closure – Former Trent Tube Plant No. 1 and 3. Source area reduction and the operations, maintenance and monitoring of system performance – Former Trent Tube Plant No. 3

2.2 Key Personnel

Eric Powley, CHMM, has 24 years of experience in the environmental consulting industry. Mr. Powley will be the primary contact for the field personnel and will communicate with the on-site personnel on a daily basis. Mr. Powley will ensure that all tasks are conducted in accordance with the site health and safety plan and project specifications.

Heidi Vigil has 23 years of experience in performing quality assurance and quality control oversight and activities as defined in AEG's Quality Assurance Plan. This includes,

but is not limited to monitoring all processes, performing quality reviews, and making certain project milestones are met. Heidi will also be responsible for the site safety management at the project level.

Karl Schultz has six years of experience as an Environmental Scientist. Mr. Schultz is experienced in soil/sediment logging and sampling, monitoring well installation, air monitoring, landfill gas monitoring, environmental site investigations, groundwater monitoring, spill response, crude pipeline geomorphic assessment, sub-slab vapor sampling and assessment, and operating and maintaining groundwater remediation systems. Karl will serve as Field Task Leader.

Nicholas LaFave, Lee Kimbell, and Benjamin Reese each have over three years of experience as environmental scientists and/or technicians. Nick, Lee, and Ben will be responsible for construction oversight of building slab demolition, implementation of the remedial action, and operating, maintaining, and monitoring of the remedial system.

Tyson Schreiner, GISP will provide data management, CADD and GIS services associated with the demolition/deconstruction and remedial activities. Mr. Schreiner has 15 years of advanced experience in data management utilizing CADD and GIS software tools, such as AutoCAD, ArcGIS 9.0, ArcView GIS 3.2, Spatial Analyst, ArcPad, GISKey, Microsoft Access, Sitepro, Surfer, and GINT. Mr. Schreiner is experienced with many facets of database development and environmental field investigations.

Resumes of key personnel are provided in **Appendix A** – Key Personnel Resumes.

3.0 SITE UNDERSTANDING

3.1 Site Description

The former Express Cleaners site (Site or Property) is located at 3941 North Main Street in Racine, Wisconsin. The Site is in a commercial and residential area of the City of Racine.

A single story 6,800-sf masonry building on a concrete slab currently occupies the Property. The remainder of the Property is covered by asphalt. The Property building is divided into three units, all of which are vacant. The most recent tenants of the building included the Former Express Cleaners (northern unit), a liquor store (middle unit) and a tanning facility (southern unit).

3.2 Summary of Past Activities

Express Cleaners operated from 1971 until approximately 2006 and is listed as an open Environmental Repair Program site on the WDNR Bureau for Remediation and Redevelopment Tracking System (BRRTS) database (BRRTS #02-52-547631). Groundwater and soil contamination have been confirmed at the Site through multiple site investigations completed from 2006 through 2009.

4.0 EVALUATION OF ALTERNATIVES

The purpose of this section is to identify and preliminary evaluate remedial action options for the cleanup of the Former Express Cleaners Property. The primary remedial goal is for the WDNR to award full case closure. A secondary goal is to treat and remove sufficient contaminant mass from the Site so as to substantially reduce future threats posed by vapor intrusion, confirm that the groundwater plume will not expand and ensure that any remaining contamination is naturally attenuated within a reasonable time frame.

The following paragraphs summarize a preliminary technical and economic feasibility evaluation of three alternatives to meet or exceed the remedial goals of the project.

Applicable Regulations and Cleanup Standards

A. Cleanup Oversight Responsibility

In Wisconsin, the WDNR is the regulatory agency responsible for the enforcement of most environmental legislation in the state. Shanna Laube-Anderson of the WDNR is the project manager for the Site and will oversee the cleanup. All cleanup activities will be tracked through BRRTS.

B. Cleanup Standards

Non-Industrial WDNR Residual Contaminant Levels (RCLs) will be used as the soil cleanup standards and Chapter NR140, Wisconsin Administrative Code (WAC) Preventive Action Limits (PALs) and Enforcement Standards (ESs) will be used as groundwater cleanup standards.

The following cleanup objectives are proposed for the Site:

- Soil – 30.7 milligrams per kilogram (mg/kg)
- Groundwater – Enforcement Standard (ES) at the Property Boundary

Although the above stated objectives are proposed for the site, AEG is confident that the remedial option recommended with far exceed these objectives. It is anticipated that the soil concentrations will be reduced to approximately 1 mg/kg and that groundwater concentrations will be reduced to below the PAL.

C. Laws and Regulations Applicable to the Cleanup

Laws and regulations that are applicable to this cleanup include:

- WAC Chapter NR 720 Residual Contaminant Level
- WAC Chapter NR 726 Case Closure
- WAC Chapter NR 140 Groundwater Quality
- WAC Chapter 292 Remedial Action, Wisconsin State Statutes

EVALUATION OF CLEANUP ALTERNATIVES

A. Cleanup Alternatives Considered

Potential cleanup alternatives were evaluated based on effectiveness, implementability, and cost. To address the soil and groundwater contamination at the Site, three different alternatives were considered:

- Alternative #1: No Action.

- Alternative #2: Excavation of all contaminated soils with off-site disposal, natural attenuation (NA), and institutional controls.

- Alternative #3 In-situ chemical injection, enhanced NA, and institutional controls.

B. Cost Estimate of Cleanup Alternatives

Effectiveness

Alternative #1: No Action
No Action is not an effective measure in controlling or preventing the exposure of receptors to contamination at the Site.

Alternative #2: Excavation of all contaminated soils with off-site disposal, NA, and institutional controls.
The complete excavation of all contaminated soils would be highly effective in removing the risks associated with known contamination at the Site. The contamination would be removed and the exposure pathway would no longer exist.

Based on information contained in the RFP and WDNR file review, it does not appear there are any groundwater receptors in the area. The groundwater exposure pathway does not represent a significant concern, as the area is serviced by municipal water. An institutional control restricting groundwater use, and NA would be utilized to address the residual groundwater contamination present at the Site.

It is anticipated that the vapor intrusion pathway would be addressed during the design and construction of any potential buildings.

Alternative #2 would be effective in addressing all known risks associated with the Site by eliminating the soil direct contact and protection to groundwater pathways and restricting groundwater use would eliminate any exposure to groundwater contamination at the Site.

Alternative #3: In-situ chemical injection, enhanced NA, and institutional controls.
In-situ chemical injection of an oxidant in shallow soils produces a reaction that destroys a range of contaminants over an extended period of time of up to 30 days, thus eliminating the direct contact and protection to groundwater pathways.

The groundwater contaminant plume would also be addressed through chemical injection. A chemical cleanser/bioremediation chemical would be injected into the aquifer in the area of the VOC plume to promote the degradation of the contamination. An institutional control and enhanced NA would be utilized to address any residual groundwater contamination, if needed.

It is anticipated that the vapor intrusion pathway will be addressed during the design and construction of any potential buildings.

Implementability

Alternative #1: No Action
No Action is easy to implement.

Alternative #2: Excavation of all contaminated soils with off-site disposal, NA, and institutional controls.
Excavation and disposal of contaminated soil would be moderately easy to implement. Impacted soil would be excavated, temporarily stockpiled (if necessary), loaded onto trucks and transported to a landfill. There would be construction related disturbances (trucks transporting contaminating soils and backfill) to the surrounding neighborhood. The contaminated soils extend laterally across the northern portion of the Site and the depth would extend approximately 11 feet below ground surface (bgs). An excavation of this size would

take considerable time and generate a large amount of waste requiring proper disposal. Clean backfill from off-site sources would be needed to raise the grade.

NA involves the reduction in concentrations of COCs through naturally-occurring processes, which can be evaluated through monitoring of the groundwater chemistry. The WDNR requires two years of quarterly monitoring of groundwater to utilize NA.

Although the groundwater monitoring well network is easy to access, the duration of the remedy is long (at least 2 years). However, NA, when combined with institutional controls restricting the installation of water supply wells, can provide protection of human health and the environment.

Alternative #3: In-situ chemical injection, enhanced NA, and institutional controls.
In-situ chemical injection is easily implemented and significantly reduces the mass and concentration of COCs in soil and groundwater in a relatively short period of time. This technology also reduces the exposure risk considerably, as the COCs are chemically and or biologically destroyed in the process.

NA involves the reduction in concentrations of COCs through naturally occurring processes which can be evaluated through monitoring of the groundwater chemistry. NA in groundwater requires two years of quarterly monitoring.

Although the groundwater monitoring well network is easy to access, the duration of the remedy is long. However, NA, when combined with institutional controls restricting the installation of water supply wells, can provide protection of human health and the environment.

Costs

Alternative #1: No Action
There are no associated costs for this alternative.

Alternative #2: Excavation of all contaminated soils with off-site disposal, NA, and institutional controls.
The associated cost for excavating the contaminated soils assumes that 60 to 80 percent of all material excavated between 0 and 11 feet bgs will require off-site disposal. The costs associated with the implementation of Alternative #2 are summarized in the table below.

Activity	Price
Slab Removal and Disposal (assumes 25percent contaminated to be disposed at landfill)	$25,500
Soil Excavation and Restoration	$300,000
Soil Disposal – Including Hazardous Area	$365,000
Groundwater Remediation – Assumes removal of approximately 100,000 gallons (NA monitoring)	$240,000
Site Closure	$32,000
Total	**$962,500**

Alternative #3: In-situ chemical injection, enhanced NA, and institutional controls.

The costs associated with the implementation of Alternative #3 are summarized in the table below.

Activity	Subtotal
Alternatives Evaluation	$6,000
Slab Removal	$25,500
Soil and Groundwater Remediation	$294,600
System Performance Monitoring	$97,700
Site Restoration and Closure (GIS Registry)	$39,500
Total	**$463,300**

C. Recommended Cleanup Alternative

Based on Alternative #1 not being a viable closure strategy for this Site, and Alternative #2 being cost-prohibitive with potential unknown remaining groundwater issues, the recommended cleanup alternative is Alternative #3: In-situ chemical injection, engineered barrier, enhanced NA, and institutional controls addresses all of the known environmental liability associated with the Site, at a reasonable cost.

5.0 REMEDIAL APPROACH

AEG understands that a dry cleaning facility (Former Express Cleaners) was located in the northern most unit of a strip mall located at 3921 – 3941 North Main Street, Racine, Wisconsin. It has been confirmed through multiple site investigations that the Site is contaminated with dry cleaning solvents. Concentrations of tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2 dichloroethene (DCE), and vinyl chloride in groundwater all exceed their respective enforcement standards. Impacted soils are present in some locations directly beneath the paved surfaces and building slab and extend beneath the water table to a depth of approximately 11 feet bgs. Impacted soils within 4 feet of the ground surface exceed direct contact RCLs for select contaminants.

The following sections summarize AEG's remedial approach for each of the following:

- Soil (0 to 4 feet bgs).
- Groundwater.
- Vapor Intrusion.

The proposed remedial approach will be completed in two phases; the first phase will include the injection of an oxidant in the shallow soils (vadose zone) followed by the second phase, enhanced reductive dechlorination for groundwater.

Because of the extensive experience by the Project Team in the implementation of in-situ chemical oxidation and enhanced reductive dechlorination, AEG cannot justify the cost and time to conduct a pilot test of the remedy for the Site. A detailed summary of CEFS's experience with the installation of similar systems is contained in **Appendix B**.

Vapor intrusion will be addressed during the construction phase of the redevelopment activities through the use of a vapor barrier or installation of a vapor mitigation system, if required.

5.1 Soil Flooding /Soil Mixing (0 to 4 Feet)

AEG is proposing to remediate select areas of the Site where shallow soils (0 to 4 feet bgs) have concentrations of COCs that exceed their respective direct contact non-industrial RCLS. AEG is proposing two remedial technologies "Soil Flooding" and/or Soil Mixing, one of which will be used to remediate unsaturated soil.

Soil flooding is a distribution technique that allows an oxidant to come in contact with COCs in the vadose zone. This will be accomplished using chemical injection and "flooding". Small diameter (1-inch) injection wells that are connected to above-grade header lines that gravity feed from a large storage tank and distribute the liquid oxidant to the desired location(s). The oxidant will flow from the well screens (1 to 4 feet bgs) thought the soil until the oxidant daylights, which will cause the oxidant to spread out laterally. Once the flow of oxidant is stopped it will naturally seep through the soil pores to depth. This flooding method will ensure even distribution of the oxidant vertically from ground surface to the target depth of 4 feet bgs. Flooding and daylighting will be controlled so the oxidant will not flow laterally along the ground surface to areas outside the target zone.

Once injected in the subsurface, the oxidant produces a reaction that destroys a range of contaminants over an extended period of time (generally up to 30 days).

Soil mixing (alternative shallow soil remedial method) is a process of physically blending and mixing soil, contaminant, and reagent using

specialized equipment to facilitate treatment. This would involve the use of an excavator to turn the soils and mix them while adding remediation reagents.

Soil remediation using mixing techniques is highly compatible with the use of in-situ chemical oxidation reagents and bio remediation products. Overall, this approach allows the client to save time and money by treating the contaminants in place, thus avoiding off-site disposal costs of hazardous soils.

Similar to soil flooding, once emplaced in the subsurface, the oxidant produces a reaction that destroys a range of contaminants over an extended period of time (generally up to 30 days).

This method is effective, and faster than soil flooding, but it can cause the soils to be relatively unstable for future construction. Stabilization amendments can be added (fly ash, Portland cement, etc.) to the mixed soils; however, adding amendments to the soil will increase the cost of the approach and may affect future construction activities due to very hard soils/digging conditions. Therefore, this method is not viewed as the best solution for this particular Site, but remains an option for expedited completion if that becomes a stronger consideration.

5.2 Groundwater - Enhanced Reductive Dechlorination

AEG is proposing to utilize an in-situ enhanced reductive dechlorination (ERD) process to remediate groundwater impacted with PCE and its associated degradation compounds using an innovative remedial distribution technique called SlowRem™. The SlowRem™ process uses vertical head pressure (within a well) and gravity for distribution of the ERD injectate from the well screen into the aquifer formation. Well screens are placed exactly where the ERD injectate is needed in the subsurface. This method has proven successful on projects with shallow/near surface target zones as well as fine grained and cohesive soil conditions.

The premise behind the SlowRem™ process is that the COCs have likely traveled over time via preferential pathways; the SlowRem™ approach capitalizes on those same pathways. The screened zones will remain saturated with weekly visits to the site. The wells will be filled via gravity from a mix tank staged nearby and elevated several feet above grade. The saturation of the soil creates a mounding effect. The mounding effect and the relatively close grid spacing (approximately 7-feet) between wells advances the horizontal distribution. The weekly visits to fill the wells and the mounding effect also keep formerly unsaturated soils – saturated, which is extremely important for vadose zone remediation.

ERD is the primary anaerobic biological process by which problematic chlorinated solvents, such as PCE in groundwater, are biologically transformed into less harmful end products such as ethane. The ERD injectate ingredients will consist of: 3-D Microemulsion (3DMe), Bio-Dechlor Inoculum Plus (BDI+), and Chemical Reducing Solution (CRS).

3DMe is an injectable liquid material designed to provide three unique electron donor materials in a single product. This occurs in a sequential, staged release over a 3 year window. BDI+ is an enriched, natural microbial consortium containing species of Dehalococcoides (DHC) that are capable of completely dehlorinating contaminants during in-situ anaerobic processes; BDI+ offers a solution to accelerate the complete dechlorination of otherwise recalcitrant contaminants. CRS is an iron-based amendment for in-situ chemical reduction of chlorinated compounds. CRS is a soluble, food-

grade source of ferrous iron. The incorporation of iron can enhance chlorinated contaminant remediation by enabling various chemical reduction pathways.

Application - AEG is proposing to install approximately 66 shallow injection wells for flooding the oxidant into the soil vadose zone. Thirty-nine wells are proposed for the on-site flooding areas and 27 wells for the eastern area. Wells will be screened from 1 to 4-feet bgs to treat the 0 to 4 foot vadose zone. **Figure 1** presents the *"Proposed Shallow Soil Remediation System Layout"*

Following complete oxidation of the vadose zone PCE, AEG is proposing to install 66 deep injection wells on-site for introduction of the ERD injectate to groundwater. Wells will be screened from 4 to 11-feet bgs. **Figure 2** presents the *"Proposed Groundwater Remediation System Layout"*

Injection wells will be installed using a track mounted Geoprobe rig, 6610 series or larger using 3.25-inch O.D. dual tube rods. The rods will be blind pushed to depth using an expendable point. A 1-inch PVC screen and riser will be placed inside the rods; the rods will then be removed from the hole. A 40-slot screen opening is used to ensure minimal clogging of the screen over time. A pea-gravel filter pack is used around the screen, approximately 1-foot of granular bentonite is placed atop the filter pack; the remaining portion of the annulus is backfilled with Portland cement. Each row of wells will then be connected to a single horizontal header line which will run back to a manifold system near the supply tank. Each row/series of wells will be controlled by a valve at the manifold.

The header lines will be installed in 36-inch deep trenches, bedded with limestone screenings or pea gravel, insulation laid atop the gravel, and the top 18-inches covered with clean trench soils.

System Performance - Quarterly soil and/or groundwater sampling will be conducted to document the effectiveness of each remedy. This sampling strategy will also provide information on where additional ERD injectate is needed to complete the remedy in the proposed timeframe, and to reduce the number of injection wells as the soil and groundwater areas meet the remedial goals, thus reducing the remediation costs over time, which is a key component of a successful SlowRem™ system. The slow feed injectate process into the subsurface does take time; however, the advantages are:

- Know exactly where injectate is delivered
- Know how much injectate introduced
- No waste on the ground surface.

By following these steps, this process has been extremely successful.

Mass Calculations - The results of the groundwater and soil data collected as part of the system performance monitoring will be analyzed to estimate the change in mass in the saturated and unsaturated zones of the soil column for TCE, TCA, and total VOCs. Equation 1 will be used to calculate the mass of each constituent in the saturated zone. For the total VOCs the masses will be summed.

Equation 1: Mass of each constituent - Groundwater

$$M = \frac{(V \times n) \times C}{1 \times 10^9 \frac{\mu g}{Kg}} \times 2.20462 \frac{lb}{kg}$$

Where:

M = estimated mass of specific constituent in groundwater (Kg)

V = Vol of aquifer within designated area (L)

n = porosity

C = average concentration of constituent detected within designated area (mg/L)

1 Kg = $1x10^9$ µg

1 Kg = 2.20462 lbs

Mass of COCs in the unsaturated (vadose) zone will be calculated in general conformance with WDNR's publication RR-614, *Guidance on Natural Attenuation for Petroleum Releases,* (January 2014).

Case Closure - Based on the Project Team's experience utilizing the same technology in similar geologic materials, it is anticipated that the proposed remedial action will result in case closure within two to three years, or less. According to NR 726, WAC the following criteria will be used to evaluate case closure using natural attenuation:

- MNA is effectively protecting receptors. *As documented in various Site Investigation reports, it does not appear that there are receptors between the downgradient edge of the plume and the closest water supply well.*
- There have been no new sources or releases of contamination. *The known source of PCE at the Site, Express Cleaners, ceased operating in 2007.*
- The contaminant plume is stable and receding. *Based on the results of similar projects completed in similar geologic materials it is anticipated that the contaminant plume will become stable and recede as the remedial action proceeds.*
- The remedy is performing as predicted to reduce contaminant concentrations. *An assessment of field and analytical data associated with the remedial action will be compiled for a period of up to three years. It is anticipated that biotic and abiotic transformation of VOCs will occur across the Site thus reducing the mass and concentrations of all COCs.*
- Contaminant mass is being reduced. *Based on the results of similar projects completed in similar geologic materials using the same technology, it is anticipated that the contaminant plume will become stable and recede as the remedial action proceeds.*
- The conditions necessary for natural attenuation continue to be present at the Site. *An assessment of field and analytical data will be compiled and evaluated to document that both biotic and abiotic transformation of VOCs are occurring across the Site.*
- Cleanup goals have been achieved in locations at the site in a reasonable period of time.
- Site closure is supported using monitored natural attenuation.

Redevelopment Activities

AEG has proposed the SlowRem™ technology to facilitate the redevelopment of the Site prior to the completion of the remedy. Site development can occur at any time subsequent to the installation of the Slow Rem™ distribution system(s). The remedy can be operated and maintained without interruption of business operations. As areas of the Site are cleaned up, sections of the system can be turned off, thus reducing the product being utilized to meet the Sites remedial goals.

Finished Grade

Subsequent to the installation of the remedial system all excavated areas of the Site will be backfilled with verified-clean materials. All such backfilled areas on the North Main Street portion of the Site must be finished with six-inches of verified-clean #6 crushed stone. All excavated areas on the North Bay Drive portion of the Site will be finished with verified-clean, topsoil fill and seeded with a high quality, week free grass seed mix.

5.3 Soil Vapor

Based on the information from previous investigations by others, COC soil concentrations are the highest in the northeast quadrant of the Property; additionally, the east central section of the adjacent property to the east has an area where the COC soil concentrations are higher.

Based on AEG's experience using this remedial approach, on similar COCs and similar geology, we are confident that the proposed remedy will prevent vapors in excess of vapor screening risk levels from migrating off-site.

However, additional soil gas investigation will be conducted following the implementation of the remediation alternative to document the performance of the remedial approach. The soil gas investigation approach is summarized in the following paragraphs.

Soil Gas Investigation

In order to document the performance of the remedial approach following remediation, vapor screening will be conducted using soil gas probes after completion of remedial measures but before the final round of groundwater monitoring needed for case closure; gas probes will be placed along the northern property boundary to monitor any potential off-site movement. In addition, soil gas probes will be placed along the eastern and northern property boundaries of the adjacent eastern property to monitor any potential off-site migration of soil gas into the adjacent residential area.

The shallow soils at the Site are primarily comprised of sands and silty sands. The water table in the northeast quadrant of the Site is shallow and ranges between approximately 2.0 and 5.5 feet bgs (January 2008 through April 2011). The water table at the adjacent property to the east, where soil concentrations are higher, ranges from approximately 5 to 7 feet bgs (January 2008 through April 2011).

Soil gas probes will be installed using a GeoProbe and advanced to just above the water table in both areas. The probes will be finished with a concrete pad and a protective cover.

Vapor Intrusion Investigation

A vapor intrusion assessment may be completed, as a contingency, following remediation, at the Former Pugh Oil Property, located immediately north of the Site. AEG would likely conduct sub-slab vapor sampling using the vapor pin (VP) sampling methodology. VP sub-slab sampling essentially provides a point measurement for a specific time-frame for the soil gas immediately below the slab. As the building is approximately 3,200 square feet, three VPs would be installed and sampled. The sub-slab samples would be analyzed for chlorinated VOCs using method TO-15.

5.4 Assumptions Made During Preparation of the Proposal

Assumptions made during preparation of this proposal include the following:

- All business activities at the Site have ceased and the Site is available for remedial activities.
- The Site is zoned as "Commercial Shopping District"; upon completion of remedial activities, the Site will be redeveloped for commercial use.
- The adjacent site to the east is zoned "office/institutional"; upon completion of remedial activities, the site will be redeveloped for commercial use.
- The floor slab area that contains contaminants (approximately 25 percent of the slab) has been given a "contained out" designation and can be disposed of as a non-hazardous material in a licensed solid waste landfill. The remaining floor slab is assumed to be clean, based on the provided analytical results.
- The building structure will be demolished by others prior to initiation of remedial activities; removal and disposal (or reuse), as appropriate, of the concrete slab and abandonment of the utilities will be the responsibilities of the consultant. As such, utilities will be disconnected and capped at the property boundary.
- Slab demolition and foundation removal can be completed in three (3) days.
- Water utility lines will be maintained by the demolition contractor.
- Electrical costs will be paid by the owner of the property.
- No soil investigation derived waste (IDW) will be generated as part of the remedial activities.
- Groundwater IDW will be treated on-Site, sampled, and discharged to the ground at the Site following analytical confirmation.
- The building will be demolished by others prior to the mobilization of the remediation contractor. However, it is assumed that the building slab will have remained to act as a cap to protect groundwater from infiltration.
- AEG will need to remove the building slab as part of the remedial approach prior to the installation of the remedial system(s).
- Up to five additional NR141-compliant groundwater monitoring wells will need to be installed to document the performance of the remedial approach; four wells along the center line of the groundwater plume located on the dry cleaner facility property and one well at the eastern margin of the groundwater plume affecting the North Bay Drive portion of the Site.
- No monitoring wells will be abandoned during the installation of the remedial approach.
- One round of pre-remedial groundwater monitoring and eight quarters of post-remedial monitoring and reporting will be required prior to submittal of case closure.
- All monitoring wells will be abandoned as a condition of closure.
- No environmental insurance is anticipated due to proposed remedial approach relying on active remediation and not NA.

6.0 COST ESTIMATE

In accordance with NR 169(6)(c), the following table lists the subconsultant and subcontractor services utilized for the proposed remedy.

Subconsultant and/or Subcontractor	**Services Provided**
CABENO	Drilling; Remediation System Installation
TestAmerica INC.	Laboratory Analytical Services.

In accordance with NR 169(6)(e), a total cost estimate for all consultant and contract services and subtotal for each component service itemized in the proposal is provided in the table included in **Appendix C**.

In accordance with NR169.23(6)(f), the following information is included in the cost estimate:

- Price per hour or per unit of service.
- Reasonable good faith estimate of number of hours or units of service to be provided.
- Total estimated price for service.

7.0 SCHEDULE

A preliminary schedule for project completion based on AEG's Project Approach detailed in Section 5.0 is presented below. Currently, AEG does not have any limitations on when the project is awarded or the proposed start date.

- **NOTICE TO PROCEED: 6/15/15**
- **MOBILIZATION TO THE SITE: 6/22/15**
- **SLAB DEMOLITION ACTIVITIES**
  6/23/15 – 6/25/15
- **REMEDIATION ACTIVITIES (2 years)**
  - Remediation System Installation
    6/26/15 – 7/31/15
  - Slow Rem – Shallow Soils
    8/3/15 – 10/2/15
  - Slow Rem ERD - Groundwater
    11/2/15 – 12/31/15
- **MONITORING ACTIVITIES (2 years)**
  - Benchmark Soil and Groundwater quality monitoring
    6/22/15 – 6/26/15
  - Post Shallow Soil Remediation Soil Quality Sampling
    10/19/15 – 10/20/15
  - Groundwater Quality Monitoring:
    - Week 1 – 10/9/15
    - Week 2 – 10/16/15
    - Week 3 - 10/23/15
    - Week 4 – 10/30/15
  - Post Remediation Groundwater Monitoring
    - Quarter 1 - 12/4/16 – 12/5/16
    - Quarter 2 – 4/4/16 - 4/6/16
    - Quarter 3 – 7/4/16 – 7/6/16
    - Quarter 4 – 10/3/16 -10/5/16
    - Quarter 5 – 1/9/17 – 1/11/17
    - Quarter 6 – 4/3/17 – 4/5/17
    - Quarter 7 – 7/3/17 – 7/5/17
    - Quarter 8 – 10/9/17 – 10/11/17
- **CLOSURE ACTIVITIES (3 months)**
  - Prepare Closure Request
    12/4/2017 – 12/18/17
  - Submit Closure Request
    1/2/18
  - Address Closure Committee Conditional Closure Requirements
    3/5/8 – 3/16/18
  - Obtain Conditional Closure
    3/30/18
  - Off-site property owner Notification; Monitoring Well Abandonment; Remedial System Decommissioning
    4/2/18 – 4/30/18

8.0 CERTIFICATION STATEMENTS

CONSULTANT'S QUALIFICATION STATEMENTS - NR169.23(3)(b) & NR169.23(9)(a)

1) AEG is fully informed about the project scope and has the expertise to analyze alternatives and design the most suitable response action.

2) AEG can provide necessary staff and facilities for all phases of planning, design, construction, and operation.

3) AEG can provide qualified technical reviewers to advise the owner and work toward remedial goals.

4) AEG will perform all services in an ethical, professional, and timely manner.

5) The Project Team will comply with NR700 – 754.

6) Upon request, AEG will make available to the WDNR for inspection and copying of all documents and records related to the contract services.

7) AEG did not prepare this proposal in collusion with any other consultant submitting a bid on the Site

9.0 CERTIFICATE OF INSURANCE

In accordance with NR 169.23(9)(b)(1), AEG's Certificate of Insurance is included in **Appendix D**.

AEG's COI has the following coverages:

- Error and Omissions of $3M/claim and minimum of $3M/year aggregate.
- Policy is an occurrence based policy.
- Professional Liability Deductible - $2,500/incident.
- Contractors Pollution Liability Occurrence Deductible $2,500 Each Pollution Condition.

Should AEG be awarded the contract, proof of financial responsibility for the amount of the deductibles ($5,000) will be furnished upon request.

FIGURES

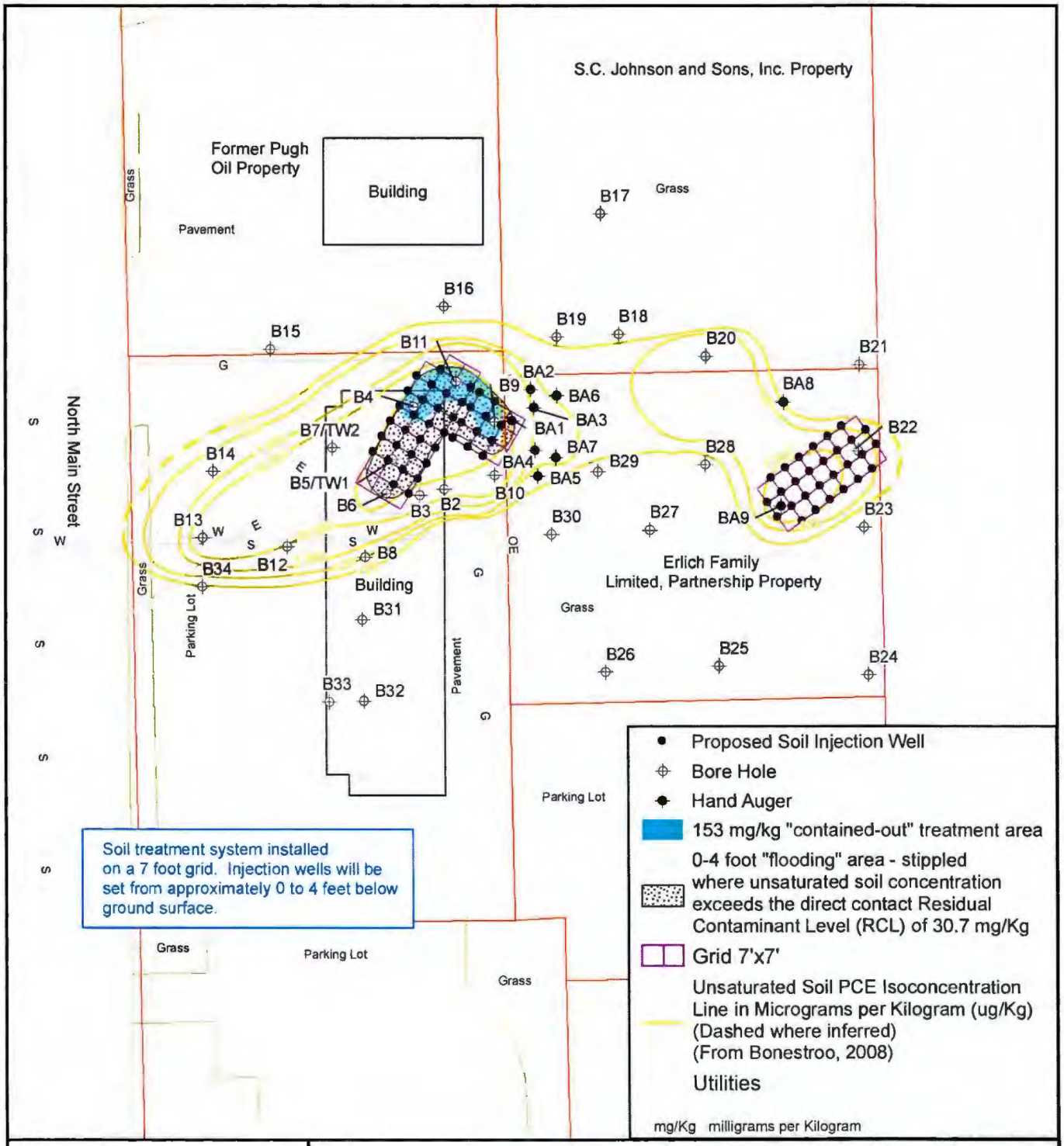

FIGURE 1
PROPOSED SHALLOW SOIL REMEDIATION SYSTEM LAYOUT

FORMER EXPRESS CLEANERS, INCORPORATED
3941 N. MAIN STREET
RACINE, WISCONSIN

aeg avantti environmental group
9415 W. Forest Home Avenue, Suite 200
Hales Corners, WI 53130
414.326.9800

5/29/2015 C:\GIS_Projects\AEG_ExpressCleaners_Racine\Grid_Soil.mxd

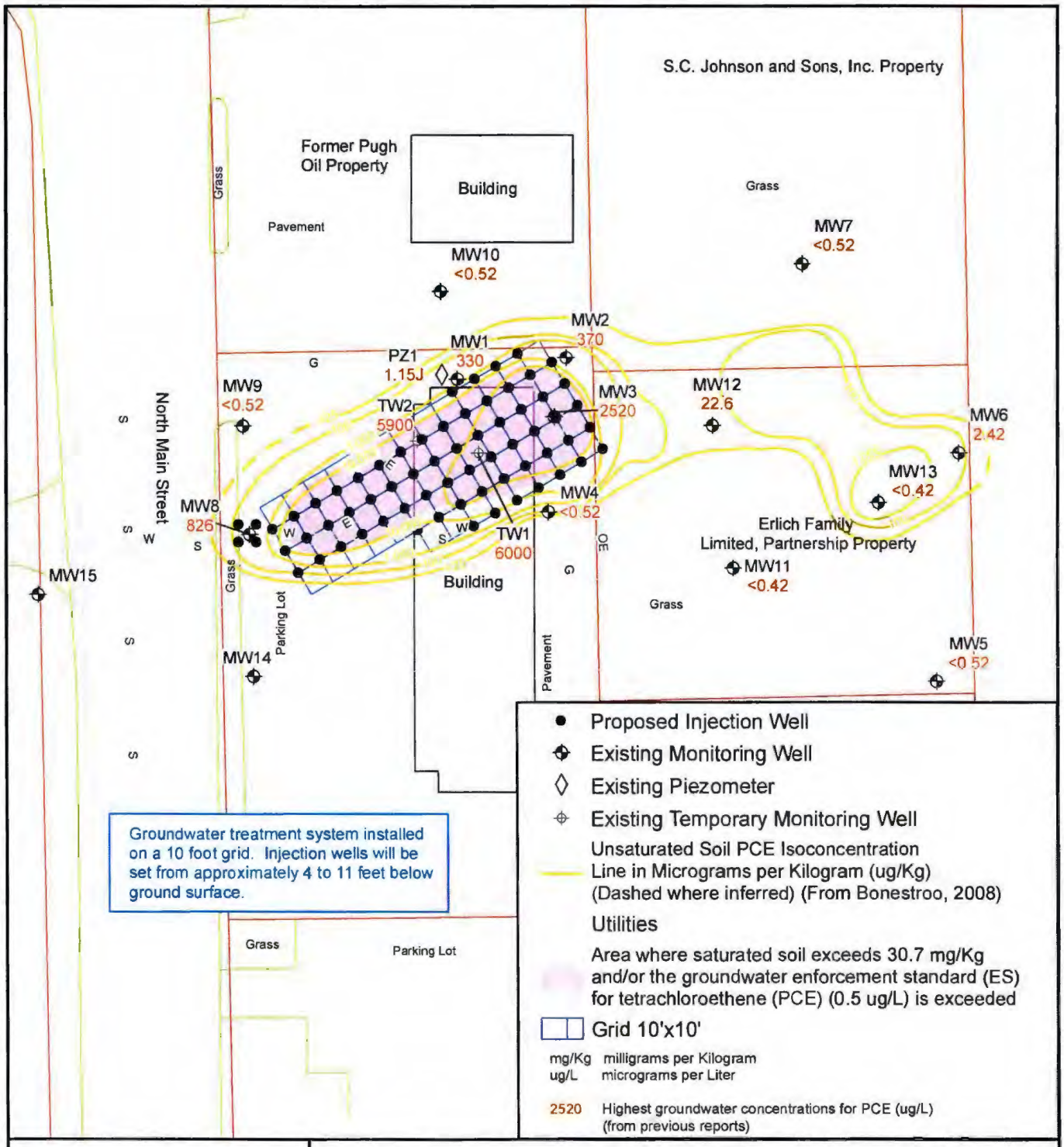

FIGURE 2
PROPOSED GROUNDWATER REMEDIATION SYSTEM LAYOUT

FORMER EXPRESS CLEANERS, INCORPORATED
3941 N. MAIN STREET
RACINE, WISCONSIN

aeg avantti environmental group
9415 W. Forest Home Avenue, Suite 200
Hales Corners, WI 53130
414.326.9800

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APPENDIX A

Key Personnel Resumes

CHRISTINE REESE, P.G.

Principal

EDUCATION //

Master of Science
Geology/Hydrology
University of Wisconsin

Bachelor of Science
Biology/Microbiology
University of Wisconsin

REGISTRATIONS //

Professional Geologist
State of Wisconsin #1281-13

CERTIFICATIONS //

OSHA 40-hour Hazardous Waste Site Worker Trained

Wisconsin State Certified Hydrogeologist

OSHA 8-hour Confined Space Entry Training

CPR and First Aid Certification

AFFILIATIONS //

Wisconsin Women Environmental Professionals

Wisconsin Groundwater Association

Federation of Environmental Technologists

Responsibilities

Ms. Reese is responsible for leading the Avantti Environmental Group's (AEG's) client management, business development and marketing efforts, and has direct responsibility for all environmental projects. She also has the overall responsibility for the quality of work products delivered to each client. Her approach is to help clients operate efficiently, assess risks, meet or exceed regulatory standards and protect the environment. AEG combines in-depth technical understanding with practical experience in industrial operations, environmental regulatory affairs and remedial design.

Background

Christine (Tina) is a professional geologist with 18 years of experience as an environmental consulting professional. Her areas of expertise include resource management, environmental investigation and fate and persistence of contaminants in the environment. Ms. Reese has demonstrated both project management and technical expertise in subsurface and sediment remedial investigations for private industries and state governmental agencies, environmental site assessments, facility decommissioning, wetland investigations, and storm water and surface water quality analysis. Tina has also designed and implemented soil and groundwater remediation systems related to petroleum, chlorinated solvent, cyanide and heavy metal contamination. She has obtained closure from regulatory agencies for large complex multi-year projects using both conventional and innovative remedial technologies for both soil and groundwater affected sites, including "Green" remediation techniques such as Phytoremediation, enhanced bioremediation and chemical oxidation.

Project Experience

Brownfields

Courteen Seed – Milwaukee, Wisconsin
Non Time Critical Hazardous Waste Removal Phase I Environmental Site Assessment, Phase II ESA

- Senior Project Manager for the removal of building contents as a first phase to facilitate redevelopment of the site.
- The removal action consisted of the disposal of approximately 178 tons of general refuse and debris and approximately 12 one-yard lab pack boxes, 3,600 gallons of liquid and 70 pounds of gases of hazardous materials.
- ASTM 1527-13 compliant Phase I ESA was completed
- Phase II ESA scope of work developed and redevelopment grant funding pursued.

Forest County Potawatomi Community – Milwaukee, Wisconsin
Site Investigation and Case Closure

- Project Manager for the completion of site investigation of a Parking Lot structure at the Potawatomi Bingo Casino. The activities included data analysis and report preparation.
- Project Manager for Case Closure at the Parking Lot Structure and Potawatomi Hotel property.

Forest County Potawatomi Community – Milwaukee, Wisconsin
Environmental Site Assessment

- Project Manager for an Environmental Site Assessment (ESA) at a former Division of Motor Vehicle (DMV) property that was developed on a former Manufactured Gas Plant.
- Multiple Phase II ESAs and Site Investigation had previously been completed. The Phase I ESA was conducted utilizing Phase I ESA industry standards in general conformance with ASTM Standard

Practice E 1527-05 and in conformance with the final All Appropriate Inquiry (AAI) standards and practices. To facilitate commercial redevelopment of the site, a review was conducted of reports/correspondences contained in Wisconsin Department of Natural Resources WDNR files and reports that described and characterized residual impacts to soil that may complicate or significantly restrict redevelopment of the property. Based on information obtained from the file review, Tina delineated areas of the site likely to require significant material management during the redevelopment process. Maps prepared by others illustrating the location(s) of residual impacts were digitized and georeferenced into a Geographic Information System (GIS) database and comprehensive maps focused on the site were included in the Phase I ESA.

City of Racine, Wisconsin
Implementation of Two USEPA Brownfield Grants for Hazardous Substances and Petroleum

- Senior Quality Assurance/Quality Control Officer for the implementation of two United States Environmental Protection Agency (USEPA) Brownfield Grants awarded in 2012 for Hazardous Substances and Petroleum for the City of Racine, Wisconsin. The grants will be utilized to inventory Brownfield properties, perform environmental assessments on select sites, conduct remedial planning and assist with community involvement activities. All data will be managed utilizing Geographic Information System (GIS).

City of Manitowoc, Wisconsin
Implementation of Two USEPA Brownfield Grants for Hazardous Substances and Petroleum

- Project Manager for the implementation of two USEPA Brownfield Grants for Hazardous Substances and Petroleum awarded in 2012 for the City of Manitowoc, Wisconsin. The grants were utilized to develop a GIS geodatabase to manage large quantities of soil, groundwater, surface water and sediment data as well as construction, survey, land use/cover, sewer, zoning, population density, hydrology, stratigraphy, elevation, watershed, infrastructure, digital orthophotos, digital raster graphics, digital elevation models, and database entities, perform Phase I and II Environmental Site Assessments on select sites, conduct remedial planning and assist with community involvement activities. The grants were also utilized to conduct area-wide planning activities for two underutilized malls. These activities included compiling demographic, socioeconomic and site-specific infrastructure and utilization data to determine the highest and best use for the properties.

City of Muncie, Indiana
Implementation of USEPA Brownfield Grants for Hazardous Substances

- Project Manager for the implementation of a USEPA Brownfield Grant for Hazardous Substances for the City of Muncie, Indiana. The grant was utilized to inventory brownfield properties, perform Phase I and II Environmental Site Assessments on select sites, conduct remedial planning and assist with community involvement activities.

Crucible Materials Corporation – East Troy, Wisconsin
Site Investigations of Former Industrial Manufacturing Facility

- Project Manager for site investigations of a former industrial manufacturing facility in Wisconsin.
- Responsibilities included completion of a phased subsurface site investigation to determine a final remedial closure plan for the site. The project also included writing and performing tasks set for a stream sediment investigation. Tasks included performing a bathymetric survey, soft sediment mapping, establishing a sediment sampling network, data reduction and evaluation, source control, sediment management strategies and evaluation of remedial options. Subsequent to manufacturing activities ending, building decommissioning was completed.

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Facility Deactivation and Decommissioning

Milwaukee Metropolitan Sewerage District – Milwaukee, Wisconsin
Deconstruction and Demolition, 30th Street Corridor

- Project Manager for deconstruction and/or demolition of a structures located on seven properties.
- Scope of services included preparation of detailed plans and specifications for deconstruction and/or demolition of the structures, which included the removal and proper disposal of hazardous materials, asbestos-containing materials and building materials containing lead-bearing paint, as well as bid management and construction management oversight.
- Provided asbestos abatement oversight.

City of West Allis – West Allis, Wisconsin
Demolition and Decommissioning of Former Manufacturing Facility

- Project Manager for demolition and decommissioning of a 330,000 sf building associated with a former manufacturing facility.
- Scope of services included preparation of detailed plans and specifications for demolition/decommissioning of the manufacturing facility, which included the removal and proper disposal of hazardous materials, asbestos-containing materials and concrete, brick and block containing lead-bearing paint, as well as bid management and construction management oversight.

Southwest Wisconsin Community Action Program – Dodgeville, Wisconsin
Demolition of Fountain Street Garage

- Senior Project Manager for the demolition of a former garage.
- Project consisted of completing a Phase I Environmental Site Assessment (Phase I ESA), Phase II ESA, Site Investigation (SI), Remedial Action Plan; prepare deconstruction contract documents, as well as providing deconstruction oversight at the former Fountain Street Garage property, City of Dodgeville, Wisconsin.
- Pre-demolition work included lead and asbestos assessment and remediation, waste characterization of material encountered in several pits/items of environmental concern (hydraulic lifts, drain tiles).

Muncie –Delaware County Economic Development Corporation – Muncie, Indiana
Phases I and II Environmental Site Assessment

- Project Manager for the development of a contract documents to perform Phase I ESA, Phase II ESA, pre-demolition building assessment, and remedial action planning for a 1,000,000 sf manufacturing facility located in Muncie Indiana.

Crucible Materials Corporation – East Troy, Wisconsin
Deactivation and Remediation of Manufacturing Facility

- Project Manager for the deactivation and remediation of an approximate 200,000 sf stainless steel tubing manufacturing facility.
- Scope of services included site investigation, waste characterization, decontamination and demolition of structures and a retaining wall adjacent to a creek, design construction and operation and maintenance of two groundwater recovery and treatment systems and soil, sediment and wetland remediation.
- Work included developing bid documents, plans and specification, contractor procurement and oversight, construction oversight and permit compliance monitoring.

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Sustainable Remediation

Coltec Industries – East Troy, Wisconsin
Operations, Maintenance and Monitoring

- Project Manager for the operations, maintenance and monitoring of a 28-well groundwater extraction and treatment system; monitor system effluent quarterly; operate and maintain a phytoremediation system; prepare and submit a quarterly Discharge Monitoring Reports (DMR); perform hazardous waste drum inspections; coordinate the disposal of hazardous waste drums, and conduct lawn mowing and maintenance activities.

Crucible Materials Corporation Environmental Response Trust – East Troy, Wisconsin
Implementation of Final Remedial Closure Strategy

- Project Manager for the implementation of a final remedial closure strategy for an 11-acre Brownfield property that is regulated under the Resource Conservation and Recovery Act (RCRA).
- Final closure consisted of designing and building one of the largest phytoremediation systems in the state. The system was comprised of 2,750 hybrid poplar tree plantings and 300 hybrid willow tree plantings over an area of approximately 5.2 acres. Phytoremediation is a passive green remediation technology that will replace an energy and labor-intensive groundwater extraction and treatment system. The plantings took place in four Management Units (MUs), each of which is managed as separate.

Crucible Materials Corporation – East Troy, Wisconsin
Consolidation of Chlorinated Solvent-Impacted Soil and Sediment

- Project Manager for on-site consolidation of approximately 10,000 cys of chlorinated solvent-impacted soil and sediment excavated from the bank of a water way.
- The hazardous soil and sediment was managed on-site under an approved soil management plan in an Area of Contamination (AOC). A supplemental remedial action (phytoremediation) was initiated upon completion of the consolidation. At the time, this phytoremediation system was the largest implemented in the State of Wisconsin.

Crucible Materials Corporation – East Troy, Wisconsin
Innovative Site Closure

- Project Manager for the implementation of innovative site closure activities to accelerate source mitigation, by utilizing oxidants to chemically degrade chlorinated solvents, followed by enhanced bioremediation. These techniques are projected to decrease the existing remedial action from 30 years to approximately 5 years.

General Site Investigations

United State Environmental Protection Agency Region V START Program
Subcontracted to Tetra Tech

- Project Manager to provide technical support for emergency response, removal actions, prevention and preparedness activities, site assessment activities, training activities and data management activities for Superfund Technical Assessment and Response Team IV (Region 5).

United State Army Corp of Engineers – McCook Reservoir, McCook, Illinois
Groundwater Monitoring Well Installation
Subcontracted to RCD Raimonde Drilling Corporation

- Senior Project Manager for the installation of seven deep groundwater wells around the perimeter of the McCook Reservoir, the abandonment of one existing well, and initial chemical sampling of the newly installed wells.
- Preparation of a Quality Management Plan, Site-Specific Health and Safety Plan, Environmental Protection Plan, geologic logging, groundwater sampling and data analysis.

Milwaukee Metropolitan Sewerage District
Kinnickinnic River Reach 2

- Senior Project Manager to assist the MMSD in assessing environmental impacts to the KK River Reach 2 project limits in relation to Recognized Environmental Conditions (RECs) identified in previously performed Phase I ESA reports.
- Evaluate the soils and determine groundwater levels necessary to provide engineering information to be used in the civil, geotechnical, and structural design of the project

Crucible Materials Corporation – East Troy, Wisconsin
Groundwater Monitoring

- Project Manager for groundwater monitoring at four site locations of an industrial manufacturing company in Wisconsin.
- Tasks included establishing a groundwater monitoring network consisting of over 95 monitoring locations, performing quarterly groundwater monitoring, evaluation and management of groundwater data, and provided quarterly technical reports on the data.

Allsteel – Aurora, Illinois
Site Investigation and Groundwater Monitoring

- Project Hydrogeologist for a manufacturing facility in Illinois.
- Tasks included managing field activities associated with a site investigation and semi-annual groundwater sampling events. The field activities included soil boring and monitoring well installations, well development and groundwater sampling of 27 monitoring wells.
- Administrative tasks included writing work plans and remedial investigation and semi-annual groundwater monitoring reports.

General Mitchell International Airport – Milwaukee, Wisconsin
Site Investigation

- Project hydrogeologist for a site investigation at a county-owned airport in Wisconsin.
- Work included reviewing past remedial investigation reports to assess what additional investigation may be needed at the site to determine an effective and cost-efficient remedial action plan. Field activities included collecting biological data to evaluate natural attenuation, groundwater sampling, and the installation of an additional groundwater monitoring well. Also assisted in writing the remedial action plan.

Ocean Spray – Kenosha, Wisconsin
Site Investigation

- Project Manager for a site investigation at a food manufacturing facility in Southeastern Wisconsin.
- Work included interim remedial actions and an accelerated site investigation. Interim remedial activities included excavation, removal and capping of below-grade product piping associated with above ground storage tanks containing No. 2 fuel oil, excavation of impacted soil, installation of two recovery sumps for free product removal and installation of a passive free-product recovery system.

Chrysler Corporation, Kenosha, Wisconsin
Remedial Investigation Activities

- Project Hydrogeologist providing administrative and technical support on a variety of tasks associated with remedial investigation activities at a former automobile manufacturing facility in Wisconsin.
- Participated in quarterly groundwater sampling field activities (over 40 monitoring wells), and monitoring well installations. Other activities included the reduction and evaluation of laboratory and field data and writing the semiannual Remedial System Performance Monitoring reports.

Water Resources

Crucible Materials Corporation, Inc. – East Troy, Wisconsin
Sediment Remedial Action

- Project Manager for design and implementation of a bid package to perform a sediment remedial action in a stream located adjacent to a brownfield property where historically stainless steel tubing was manufactured. The stream sediments were impacted with dense non-aqueous phase liquid (DNAPL) chlorinated volatile organic compounds (VOCs) and light NAPL.
- The remedial action consisted of rerouting stream flow through pipes for discharge downstream of the area of highest impacts, dewatering the stream bed and adjacent wetland, excavating the impacted sediment, consolidating 8,000 cys of sediment into an on-site Area of Contamination (AOC) and restoring the stream bed and bank.

Indiana Department of Environmental Management – Indianapolis, Indiana
Nonpoint Source Guidance Manual

- Technical Project Manager for the development of a Nonpoint Source Guidance Manual for the State of Indiana.
- The manual will be utilized by various groups across the State of Indiana, and will include private and public entities such as local watershed groups, industries, and municipalities, as well as select programs and partnerships within the state government. The manual will provide guidance to the various entities on the state's long-term goals and short-term objectives related to nonpoint source management, funding mechanisms available, management measures evaluated, and prioritization of projects requesting state funding.

City of Rock Island – Rock Island, Illinois
Water Quality Study

- Project Manager for a water quality study on the Mississippi and Rock Rivers.
- The study includes preparing and implementing a water quality monitoring plan that will be utilized to describe baseline conditions for the receiving waters of the City of Rock Island's wastewater treatment plant and to determine their compliance status with Illinois water quality standards during various flow regimes. A dye study will also be performed to determine plume mixing and dispersion during CSOs.

City of Warsaw - Warsaw, Indiana
Stream Condition Assessment

- Project Manager for a stream condition assessment of an urban stream in Northern Indiana.
- The assessment included evaluation of the existing quality of soft sediment, determine the lateral and vertical extent of a highly enriched organic layer, evaluate the potential impact to water quality in the overlying water column, identify impairments caused by sediment with respect to designated uses, and develop appropriate response actions.

City of Warsaw - Warsaw, Indiana
CERCLA Remedial Investigation and Feasibility Study

- Project Manager for the development and implementation of a State of Indiana-led CERCLA Remedial Investigation (RI) and Feasibility Study (FS).
- RI activities were performed to delineate the nature and extent of previously observed impacts to sediment and surface water in a 1.4 mile reach of a creek downstream of the City's Wastewater Treatment Plant.
- · Developed a sediment transport model to evaluate suspended and bed load transport of fine and coarse-grained materials and to better define the stream's re-suspension and deposition process
- · Compiled and analyzed data on contaminant exposure pathways; human and biotic community receptors; and site-specific and regional data such as geology, hydrogeology, ecology, demographics, threatened and endangered species, sensitive areas and critical habitat.

Indiana Department of Environmental Management – Indianapolis, Indiana
Total Maximum Daily Load (TMDL) Development for Trail Creek

- Project Manager for the development of a TMDL for Trail Creek located in Northern Indiana.
- Responsibilities include project administration associated with cost tracking for federal grant money and coordination of data collection between multiple IDEM offices. Ms. Reese also coordinates project communication between multiple project team offices located in three different states.

Badger Alloy – Cedar Grove, Wisconsin
Sediment Investigation

- Project Manager for a sediment investigation of a creek that discharges directly to Lake Michigan. The sediment investigation was conducted in response to a Stipulation and Order for Judgment.
- Ms. Reese was responsible for developing a sampling network to determine the extent of potential impacts to sediment.

SPX Contech – Dowagiac, Michigan
Phase II Investigation

- Project Manager for a Phase II investigation of a machining coolant release to a wetland area.
- Responsible for developing an investigation and remedial strategy to define the extent of release and to determine appropriate future action to mitigate the release.

Great Lakes Commission – Ann Arbor, Michigan
Remedial Action Plan (RAP) Update

- Project Manager to complete a Remedial Action Plan (RAP) update for the Manistique Harbor and River Area of Concern (AOC).
- Responsibilities included attending public meetings to address the concerns of the public regarding the restoration activities that had been completed in the AOC since 1997. Coordinated data mining of multiple regulatory agencies, such as Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR) and U.S. EPA, Region V, to obtain needed information to complete the RAP update. Administrative tasks included cost tracking for federal grant money. In-kind services were also tracked for the project team and the Public Advisory Council.

Storm Water

City of Chesterton – Chesterton, Indiana
Storm Water Quality Management Plan (SWQMP)

- Project Manager for the preparation of SWQM) for multiple municipal separate storm sewer system (MS4) communities.
- The SWQMPs detail the objectives and measurable goals for each of the six minimum control measures (MCMs) set forth in state and federal Phase II National Pollutant Discharge Elimination System (NPDES) permitting program.

Elkhart County - Elkhart, Indiana
Storm Water Quality Management Plan (SWQMP)

- Project Manager for the implementation of a county-wide SWQMP, which included facilitating the formation of the largest county-wide Storm Water Utility in the State of Indiana.

Indiana Department of Environmental Management (IDEM) – Indianapolis, Indiana
Phase II NPDES Part B: Baseline Characterization and Report and Part C: Program Implementation Reviews

- Project Manager for the Phase II NPDES Part B: Baseline Characterization and Report and Part C: Program Implementation reviews for the Wet Weather Branch of the Indiana Department of Environmental Management (IDEM), which included evaluating approximately 75% of the 150 Phase II MS4 community's submittals for compliance with Rule 13 of the Indiana Administrative Code.

Geographic Information System (GIS)

Milwaukee Metropolitan Sewerage District – Milwaukee, Wisconsin
CMMS Database

- Project Manager for design and development of a CMMS database for a large municipal sewerage district in southeastern Wisconsin to provide efficient coordination of the various aspects of watercourse maintenance through the use of a custom application database.
- The CMMS database establishes system-wide inspection and maintenance protocols, and promotes safe and environmentally secure watercourses.

City of Chesterton – Chesterton, Indiana
GIS-Integrated Database

- Project Manager for design, development, and implementation of a GIS-integrated database to assist National Pollutant Discharge Elimination System (NPDES) Phase II program managers, technical staff and field personnel to capture, store, manipulate, present and manage spatial (storm sewer infrastructure, water quality monitoring data, best management practice (BMP) locations, potential pollutant sources locations, etc.) data cost effectively.
- The database allows the communities to track the amount of resources and budget needed to run the program on an annual basis for each of the six required minimum control measures and their corresponding programmatic indicators, as well as the auto fill monthly and annual report forms to comply with state regulations.

Indiana Department of Environmental Management – Indianapolis, Indiana
Permit Review Database

- Project Manager for design, development, and implementation of a permit review database for use by a state regulatory agency.
- The database tracked NPDES Phase II community compliance with the state's storm water regulations.

PUBLICATIONS AND PRESENTATIONS

Reese, Christine, P.G. Remediation Workshop, Incorporating Sustainable Environmental Practices into the Investigation and Remediation of an 11-acre Wisconsin Brownfields Site, October 16, 2014.

Reese, Christine, P.G., Site Evaluations, Demolitions and Reuse, Federation of Environmental Technologists, *How to Navigate the Demolition Process Seminar"*, September 18, 2014.

Reese, Christine, P.G. Girls interested in Engineering, Mathematics and Science (GEMS) Workshops: A Plume of Contamination, Introduction to Fate and Transportation of Contaminates in Groundwater, April 2012.

Reese, Christine, P.G., Webinar: Remediation Case Study: Chlorinated Solvent Remediation Using Sequential *In Situ* Chemical Oxidation and Enhanced Anaerobic Biodegradation Treatment Methods, Regenesis, March 29, 2012.

Grundl, Tim, and Reese, Christine, "Laboratory Study of Electrokinetic Effects in Complex Natural Sediments", Journal of Hazardous Materials, 55 (1997) 187-201.

Reese, Christine, P.G. and Mark Augustine, P.E. RLS, CHMM, Presentation: Sediment Removal/Remediation Services conducted at a RCRA Site located in Southeastern Wisconsin, American Society of Civil Engineering's, March 2010.

Reese, Christine, P.G. and Stephanie Hinz, P.G., Poster: Incorporating Sustainable Environmental Practices into the Remediation of a 50-Acre Brownfield Site, Best Overall Poster Award, Brownfields 2009: Sustainability Communities Start Here, New Orleans, Louisiana, November 2009.

Reese, Christine, Presentation "Contaminant Transport and Hydraulic Control of DNAPL and LNAPL from a Former Industrial Site through Low Permeability Soils to an Adjacent Stream", Federation of Environmental Technologists, Inc., March 2007.

Reese, C. and Eckdale-Dudley, R., Presentation, "Enhancing a Community's existing GIS with a Powerful Web-based Software Application (STORM) to Efficiently Manage a Storm Water Management Plan", GITA, April 2006.

Reese, Christine, Presentation, "Creating and Maintaining a Storm Water Utility", Indiana Storm Water Permit Seminar, June 2005.

Reese, Christine, Presentation, "Implementation of Storm Water Runoff Best Management Practices", Indiana Storm Water Permit Seminar, June 2005.

Reese, Christine, Presentation, "Minimum Control Measures (MCM's): Ordinance and Reporting Requirements", Indiana Storm Water Permit Seminar, June 2005.

Reese, Christine and Harris Byers, Presentation, "Water Quality in the Mississippi and Rock Rivers", 2005 Wastewater Treatment & Collection Seminar, February 2005.

Reese, Christine, Presentation "Watershed", Quad Cities Wet Weather Seminar, December 2003.

Whittemore, R. et al. "Handbook on Sediment Quality", Water Environment Federation, 2002.

ERIC R. POWLEY, CHMM

Operations Manager

EDUCATION //

Bachelor of Science
Biochemistry
Polytechnic State University

CERTIFICATIONS //

Certified Hazardous Materials Manager, CHMM (#13121); 2004

OSHA 40-hour Health and Safety Training; 1988-Current

CPR and First Aid; 1988-Current

AFFILIATIONS //

National Brownfield Association

Alliance of Hazardous Materials Professionals

Illinois Development Council

Illinois Association of Environmental Professionals

U.S. Green Building Council (USGBC) – Leadership in Energy and Environmental Design (LEED)

Summary

Eric has professional experience in the environmental consulting and engineering fields since 1990. His responsibilities include remedial investigations, remedial project design, implementation, and operation/maintenance, and hazardous materials management. He is responsible for proposal and bid preparation, management and coordination of investigative and remedial field work and staff, and general environmental engineering.

Eric performs risk-based evaluations for numerous environmentally impacted sites. He has successfully applied risk-based corrective action objectives for sites through various state environmental agencies.

Eric has managed site remediation projects including the investigation and remediation phases to obtain site closure. He has expertise in underground storage tank assessment and closure, design of new storage tank facilities, implementation of Brownfields redevelopment programs, and environmental permitting and compliance.

Eric's technical background also includes construction management as it pertains to environmental issues. Services supervised include waste characterization, disposal and documentation, construction worker risk evaluations, and contractor coordination to incorporate applicable environmental regulations and requirements into the development and/or construction project.

Project Experience

MMSD – 30th Street Corridor Wet Weather Relief Phase I Project
Project Management for the Demolition/Deconstruction
Project Manager for the performance of environmental assessments, preparation of bid specifications and management of the deconstruction/demolition of multiple residential structures purchased for the Wet Weather Relief Phase I Project.

United States Army Corps of Engineers, Rock Island District
Chicago Sanitary and Ship Canal (CSSC) – Lockport, Illinois
Drilling Exploration, Sediment Sampling, and Analysis

- Project Manager for the environmental evaluation of the sediments from the CSSC adjacent to the concrete canal wall and the performance of permeability testing of the approach dike.
- Tasks were implemented under a Corps approved Site Safety and Health Plan (SSHP), prepared by Mr. Powley. The objective of the sediment sampling was to analyzed sediment samples for chemical parameters for potential disposal characterization purposes.

United States Army Corps of Engineers, Rock Island District
Blackberry Creek – Yorkville, Illinois
Geotechnical Investigation, Sediment Sampling and Analysis

- Project Manager for the characterization of sediment bed materials located upstream of the Blackberry Creek Dam.
- Project was performed to obtain geotechnical data for engineering design purposes and obtain bulk chemistry, TCLP, and hazardous analyses to determine the downstream impacts of sediment deposition. All analytical testing and data quality were documented in a prepared Quality Assurance Project Plan (QAPP) and were performed using the guidance provided by the Dredge Material Testing and Evaluation Manual (USEPA/USACE, 1998) and EM 200-1-10 Guidance for Evaluation

- Performance-Base Chemical Data (USACE, 2005). Mr. Powley prepared a Sediment Sampling and Analysis Plan and a Site Safety and Health Plan (SSHP) for the project that was approved by the Corps prior to initiating the sampling activities.

Sears Holdings National – Chicago, Illinois
Environmental Consulting Compliance Services

- National Account Manager for all environmental related consulting and compliance services nationwide for Sears.
- Managed deconstruction/store closures and renovations of multiple property locations.
- Property environmental impact and risk assessments for real estate acquisition/transactions.
- Environmental construction oversight at automotive and product repair facilities, retail stores, distribution centers and service centers.
- Phase I Environmental Site Assessments (ESA); Phase II ESA services; underground storage tank closure; remedial design and implementation.
- Provide management of on-site personnel during environmental/construction activities and maintained communication with the site client managers as well as the corporate client environmental managers.
- Managed the closure of four USTs at the Sears hanger located at Midway Airport in Chicago.

Wisconsin Department of Natural Resources (WDNR)
Groundwater Remediation System Design and Operation

- Project Manager for large scale in-situ groundwater remediation of chlorinated solvents utilizing injection of potassium permanganate (KMnO4).
- Installation of injection wells; procurement, transport, storage and handling of 134,000 lbs. KMnO4 in crystalline form to be mixed with water to produce an approximate 3 percent solution; design, construction and operation of a chemical injection conveyance system to deliver KMnO4 solution into the subsurface. Project also included registering and managing the site through the Department of Homeland Security (DHS) for the handling, storage and use of the large quantity of KMnO4.

United Airlines – Chicago, Illinois
O'Hare International Airport Project Coordinator

- Project Manager for the completion of multiple environmental related projects performed by United at O'Hare Airport (ORD).
- Managed several due diligence and compliance audits of United operated terminal areas.
- Managed and performed turn-key services including subsurface investigations near fueling systems at active terminals and UST installations to evaluate environmental impacts.
- Other services included UST removals that were enrolled in the IEPA Leaking Underground Storage Program and achieved a NFR; impacted soil characterization, removal and disposal documentation for terminal expansion; and providing coordination for subcontractors, UAL personnel, Department of Aviation, and UAL corporate environmental.

Illinois Department of Transportation
Remediation/Construction Management Illinois Route 30 and Illinois Route 45 Expansion Projects

- Performed project management to oversee environmental issues for the IDOT Route 30 and Route 45 roadway expansion project.
- Services performed on the project included management of PCB impacted soil and special waste disposal and performance of post remediation confirmation testing and evaluations to document the proper removal of impacted material from the project site. As part of the pre-removal activities, characterization of the PCB-impacted soil due to a waste oil tank release was approved at a Subtitle D landfill for disposal.

City of Zion – Zion, Illinois
Demolition and Site Restoration of Former Industrial Building/Site

- Project Manager for Phase I Environmental Site Assessment (Phase I ESA), Phase II ESA, Site Investigation (SI), Remedial Action Plan.
- Prepared deconstruction contract documents and managed deconstruction oversight. Pre-demolition work included lead and asbestos assessment and remediation, waste characterization of material encountered in several pits/pipelines of environmental concern (hydraulic lifts, USTs, pipelines, drain tiles).

City of Zion – Zion, Illinois
Brownfields Redevelopment (IEPA Site Remediation Program)

- Managed several Brownfields sites for the City of Zion. The investigation activities were funded through the Illinois Brownfields Redevelopment Grant Program.
- Services included the evaluation of historically impacted sites to provide the City and prospective developers with a characterization of site conditions to determine the options for site re-development.

Village of Morton Grove – Morton Grove, Illinois
Brownfields Redevelopment (IEPA Site Remediation Program)

- Senior Program Manager for the redevelopment of 144 Brownfields parcels in downtown Morton Grove.
- Preparation, submittal and approval of the Brownfields Grant Application, Site Remediation Program (SRP) enrollment, SRP investigation and reporting and site closure activities.

Southwest Airlines – Chicago, Illinois
Midway Airport Hanger Expansion Project

- Project Manager for Southwest Airlines for turnkey environmental management services during the expansion/construction of a hanger facility at Midway Airport in Chicago, Illinois.
- During excavation activities, impacted soils were encountered as a result of a former City of Chicago underground storage tank farm located adjacent to the Southwest hanger.
- Tasks performed included waste characterization and disposal of the impacted soil generated during construction, and obtaining a No Further Remediation Letter from the IEPA for two City owned USTs that were removed during the construction project.

Chicago Transit Authority – Chicago, Illinois
Environmental Remediation/Construction Management - CTA Brown Line and Blue Line Railway Improvement Projects

- Senior Project Manager for CTA Brown Line improvement/construction project. The project included sampling and characterization of construction-generated materials, managing disposal manifests and communication with the landfill. Total construction budget exceeded $12M.
- Managed environmental oversight services to document the removal of impacted soils and other construction-generated material during the CTA Brown Line improvements project.
- Performed construction worker safety evaluations.
- Maintained communication between the general contractor and the CTA pertaining to environmental related issues.
- Performed similar services for the CTA Blue Line Improvements project that has since been completed.

KARL SCHULTZ

Environmental Scientist

EDUCATION //

Bachelor of Science
Environmental Science, 2010
University of Wisconsin, Green Bay

Master of Science
Freshwater Science & Technology, Anticipated 2018
School of Freshwater Sciences
University of Wisconsin-Milwaukee

CERTIFICATIONS //

OSHA 40-hour Hazardous Waste Health & Safety Course (29CFR 1019.120)

Wildlife First Aid Certified

CPR Certified

Summary

Karl has four years of professional experience as an Environmental Scientist with experience in spill response, crude pipeline geomorphic assessment, sub-slab soil gas sampling and assessment, soil/sediment logging and sampling, monitoring well installation, air monitoring, landfill gas monitoring, environmental site investigations, groundwater monitoring and operating and maintaining groundwater remediation systems.

Project Experience

Enbridge, Inc. – Midwest USA
Pipeline Corridor Assessment

- Environmental Scientist for geomorphic assessments at river and slope crossing where petroleum and natural gas pipelines ran beneath flowing bodies of water and critical slopes.
- Responsibilities included gauging erosion potential, stream bank stability, channel velocity, anthropogenic impacts, recent slope/bank failures, and environmental impacts of pipelines as well as implementing a more scientific and statistical approach to maintenance schedules and upkeep of corridors.
- Assisted in development of physical Depth of Cover measurement procedures to compliment smart Pig data.
- Utilized sub-centimeter accuracy GPS unit to QC smart pig data, confirm pipeline location, and to obtain bathometry profiles for water crossings.

Enbridge, Inc. – Marshall, Michigan
Pipeline 6B

- Field team lead for submerged oil recovery over approximately 40 miles of the Kalamazoo River.
- Responsibilities included coordination of a crew comprised of EPA, MDEQ, and other contractors to efficiently delineate contaminated stretches of river. Utilized Leica GPS unit to coordinate hot zones, locate previous collection points, and gather significant data.

Appleton Paper Company – Green Bay, Wisconsin
Fox River Sediment Remediation Clean-Up Project

- Environmental Scientist for the Fox River Clean-up project.
- Responsibilities included vibrocore, piston core, and Russian peat-borer sediment sample collection; sediment core logging; and performed audits on hydrographic surveys and verification sand cap sampling.

Grand Calumet – Hammond, Indiana
Dredge/Sand Cap and Wetland Restoration

- Environmental Scientist for dredging, sand capping, and wetland restoration
- Responsibilities included oversight on dredging, dewatering, geotube storage, and hazardous waste removal from sight; completed sediment coring, sediment grab samples, piezometer installation and sampling; compiled a database to provide for the local community to better understand air quality within the community in regards to any operations being completed; and tracking and invoicing of any material moved from site to landfills.

PPG Industries – New Martinsville, West Virginia
Ohio River Sediment Assessment and Analysis

- Environmental Scientist for 2-mile stretch of the Ohio River to assess industrial impacts.
- Responsibilities included collection and analyzing sediment samples.

Machine Tool Services Property – Terre Haute, Indiana
Remedial Investigation/Feasibility Study - Elm Street

- Environmental Scientist for screening and sampling of soil and groundwater for volatile organic compounds that have contaminated the area from industrial practices
- Responsibilities included completion of soil screening/logging/sampling and vertical aquifer ground water sampling to delineate a contaminant plume spanning multiple parcels of land.
- Provided oversight on both geoprobe and roto-sonic drilling, monitored wells installed at depths between 50 and 150 feet below ground surface.
- Continuous core sampling was completed for a complete lithologic log of where monitoring wells were installed.

Clark County Closed Landfill – New Carlisle, Ohio
Remedial Investigation

- Environmental Scientist for remedial investigation of the Clark County closed landfill
- Responsibilities included completion of soil screening/logging/sampling and vertical aquifer ground water sampling to delineate a contaminant plume spanning multiple parcels of land.
- Provided oversight on both geoprobe and roto-sonic drilling, monitored wells installed at depths between 50 and 150 feet below ground surface.
- Continuous core sampling was completed for a complete lithologic log of where monitoring wells were installed.

Hydrite Chemical – Oshkosh, Wisconsin
Property Expansion– Phase II Site Assessment

- Environmental Scientist for screening and sampling at soil boring locations and monitoring well install locations.
- Responsibilities included sampling for VOCs, PAHs, and metals as part of a Phase II site assessment to clear a parcel of land for purchase; ground water monitoring well construction and development forms, and soil boring logs and abandonment forms.

Illinois Tool Works – West Bend, Wisconsin
Former West end Company Brownfield Redevelopment

- Environmental Scientist for the installation of 20 sub-slab soil gas probes within the proposed retail build-out portions of two buildings that were formerly part of the West Bend Company manufacturing facility.
- Responsibilities included collection of sub-slab soil gas samples from the soil gas probes to assess the potential for the residual VOCs impacts found in the soil and groundwater beneath the buildings.

Quad/Graphics, Inc. – Pewaukee, Wisconsin
Site Investigation

- Environmental Scientist for the site investigation of the Pewaukee facility to determine whether the property was a potential source of tetrachloroethene (PCE) impacts discovered in several private water supply wells by the WDNR in a residential subdivision east of the Pewaukee facility.
- Responsibilities included sampling of monitoring wells and multi-level monitoring wells along with private well sampling, and also aided in monitoring the flow and pumping rates of two extraction

wells for on-site treatment of the impacted groundwater using granular activated carbon drums. Also conducted 24-hour Indoor Air Sampling.

Cooper Industries – Albion, Michigan
Groundwater Sampling

- Environmental Scientist for the semi-annual groundwater sampling of Tier 1 and Tier 2 wells.
- Responsibilities included groundwater sampling for Target Compound List (TCL) VOC analysis. The samples were collected using low-flow sampling techniques. Additionally, a round of water levels were taken from all wells during each quarterly event.

Hydrite Chemical Company – Cottage Grove, Wisconsin
Groundwater Monitoring

- Environmental Scientist to perform groundwater monitoring, operations and maintenance, and stream flow measurements to better understand the movement of contaminants within groundwater amongst Hydrite's property
- Responsibilities included groundwater monitoring, and assisted in monitoring the hydraulic barrier system that was used to prevent the down gradient migration of highly impacted groundwater coming off the DNAPL source area in permeable bedrock.

Sta-Rite Industries – Deerfield, Wisconsin
Groundwater Sampling/Monitoring

- Environmental Scientist to perform groundwater monitoring and operations & maintenance
- Responsibilities included groundwater monitoring and operations and maintenance of the groundwater pump & treat system

Crucible Materials Corporation – East Troy, Wisconsin
Trent Tube Plant 3, High Purge Extraction Sub-Slab Vapor Analysis

- Environmental Scientist for ongoing operation, maintenance and monitoring services.
- Responsibilities include sub-slab soil vapor sampling and analysis.

Schneider Electric – Milwaukee, Wisconsin
Vapor Intrusion Assessment

- Environmental Scientist to assess the potential for the residual VOCs impacts found in the soil and groundwater beneath the building
- Responsibilities included installation of sub-slab soil gas vapor pins to assess the potential for the residual VOCs, ran indoor air samples to assess potential correlation between sub-slab soil vapor chemistry vs. ambient air chemistry within the 8-hour occupied portions of the building, and implemented sub-slab vapor extraction system.

Jacobsville Neighborhood Soil Contamination, Evansville, Indiana
Residential Lead Remediation

- Environmental Scientist for lead remediation of the Jacobsville Superfund site.
- Responsibilities included oversight and air monitoring for the lead remediation including dry excavation, hazardous material removal, safe work practices dealing with zones of exclusion, and level C PPE in 90+ degree temperatures.

Winnebago County – Oshkosh, Wisconsin
Sunnyview Landfill

- Environmental Scientist for groundwater monitoring and sampling to meet compliance regulations and to eliminate surface emissions/odor issues at an active, high producing landfill equipped with a gas-to-energy system

- Responsibilities included monthly LFG monitoring, quarterly groundwater sampling, and LFG extraction well maintenance.

Outagamie County – Appleton, Wisconsin
Landfill Construction Oversight

- Environmental Scientist for landfill cell construction oversight
- Responsibilities included oversight on new cell construction including excavation, liner installation, drainage installation, and grading.

Brown County – Green Bay, Wisconsin
East and West Landfills Gas Well Maintenance and Landfill Upkeep

- Environmental Scientist for gas well maintenance and landfill upkeep
- Responsibilities included LFG monitoring with 4 gas meter; tuned gas wells, flushed gas well pumps, replaced clogged pumps, and assembled new gas well heads, provided surface emissions monitoring with flame ionization detector.
- The East landfill is equipped with a gas-to energy facility, which required tuning of over 100 extraction wells to maximize CFM without compromising gas quality.

Brown County and Outagamie County – Wisconsin
Household Hazardous Waste Collection and Sorting

- Environmental Scientist for a two-county initiative to collect household hazardous wastes.
- Responsibilities included collection of household hazardous wastes on a weekly basis and properly labeling, sorting, and containment of hazardous materials.

NICHOLAS LAFAVE

Mechanical/Design Engineering Technician

EDUCATION //

Associates Degree
Environmental Health & Water Quality Technologies
Milwaukee Area Technical College

CERTIFICATIONS //

General Introduction to Wastewater Operator Certification on 11/11

Commercial Pesticide Applicator Category 7.1 Structural

OSHA 40-hour HAZWOPER Training

OSHA 8-Hour Refresher training

USGS Safety and Occupational Health Program Overview

NSC Defensive Driving II

USGS Safety Program Requirements

DOI Safety and Occupational Health Overview

Federal Information Systems Security Awareness + Privacy and records Management (FISSA+)

Introduction to Incident Command System ICS-100,200,300,400,700,800

Summary

Nicholas's responsibilities include remedial investigations, remedial project design, implementation, and operation/maintenance, and hazardous materials management. He is responsible for proposal and bid preparation, management and coordination of investigative and remedial field work and staff, and general environmental engineering.

Nicholas's primary duties are responsibilities include operating and maintaining a ground water pump and treat remediation system which includes the maintenance of 24 recovery wells, air sparging, carbon filtration and media filtration equipment. Nicholas also completes quarterly effluent sampling and prepares associated discharge monitoring reports for submission to the Wisconsin Department of Natural Resources. In addition, Nicholas also maintains a 2,100 unit phytoremediation system.

PROJECT EXPERIENCE

Crucible Materials Corporation Environmental Response Trust – East Troy, Wisconsin
Operation and Maintenance

- Operation and Maintenance of 24 recovery wells
- Quarterly discharge monitoring reports
- Monitored and maintained a 2,100 unit phytoremediation system
- Record test data prepare reports, summaries, or charts that interpret test results
- Maintain files, like hazardous waste databases, chemical usage data, personnel exposure information, or diagrams showing equipment locations

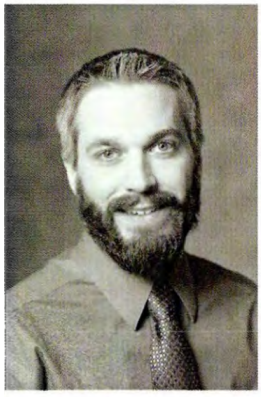
United States Geological Survey, Great Lakes Science Center
Seasonal Beach Monitor (Milwaukee/Waukegan/Sheboygan/Madison)

The primary objective of this project is to conduct intensified monitoring of selected beaches and associated coastal waters to provide state-of-the-art models and data to predict and prevent beach closings and develop solutions to prevent beach fouling by Cladophora (green algae) and reduce botulism outbreaks. The data collected by intensified monitoring will allow a much more detailed understanding of how physical and environmental factors affect beach health and will provide valuable data on the arrival timing and location of fish and bird carcasses during botulism outbreaks.

- Collect data to assist in a basin wide assessment of beach health in an effort to understand the relationship between Cladophora, pathogens such as E. coli and Botulism, and environmental variables.
- Collected data and samples including physical characteristics of beaches and nearby waters.
- Collected water, algae, and sediment samples.
- Travel to field sites and to deliver samples to a central location for analysis.
- Maintained and calibrated field equipment and testing supplies.
- Retained records of field data in hard copy and in digital form.

Project oversight for the demolition or deconstruction of residential structures purchased for the 30th street corridor wet weather relief phase 1 project

- Coordinated with contractors for sight work scheduling
- Oversaw Lead/Asbestos contractors within properties conducting field reports
- Oversight with entry and boarding up of properties
- Asbestos sampling oversight
- Environmental inspection oversight



TYSON SCHREINER, GISP

GIS Analyst

EDUCATION //

Bachelor of Science
Natural Resources and
Environmental Studies
University of Minnesota

CERTIFICATIONS //

Geographic Information Systems
Professional

Summary

Mr. Schreiner is a hardworking, efficient and dependable Certified GIS Professional with 14 years of experience creating, converting, analyzing and displaying spatial data using various software programs. He has demonstrated excellent organization skills and the ability to give and accept responsibilities as project manager, project lead and supervisor. He has coordinated GIS support for numerous multi-faceted natural resources, cultural resources and planning projects in order to exceed client expectations on time and under budget.

Project Experience

Bureau of Land Management – Vernal Utah
Resource Management Plan for 5,421,376 acres of BLM land

- Data management for all resources analyzed for the resource management plan and EIS alternatives analysis. Data sets included oil and gas wells; access roads; big game ranges; threatened and endangered species; visual resources; cultural resources; soils; and recreation.

Bureau of Land management – Monticello Utah
Resource Management Plan for 4,582,958 acres of BLM land

- Data management for all resources analyzed for the resource management plan and EIS alternatives analysis. Data sets included oil and gas wells; access roads; big game ranges; threatened and endangered species; visual resources; cultural resources; soils; and recreation.

Kern River Pipeline
Environmental Impact Statement for

- Data management for all resources analyzed for the EIS alternatives analysis. Data sets included cultural resources, wetlands, raptor nests, big game ranges; land status; vegetation; access roads and pipeline alignments.

Utility Company in Southeastern Wisconsin
Environmental Department Internal Web Mapping Application

- Responsible for the compilation and processing of Environmental Department data such as wetlands, waterways, flood hazard, soils, cultural resources, threatened and endangered species, landfill ground water monitoring wells, landfill property boundaries, landfill deposition status, landfill invasive species locations and treatment areas.

Utah Department of Transportation
Legacy Parkway

- Data management for piezometer data; noxious weed monitoring; wetland delineations and drainage improvement alternatives.

APPENDIX B

CEFS's Remedial System Installation Experience

CABENO ENVIRONMENTAL FIELD SERVICES
CHEMCIAL INJECTION AND SLOW REM™ SYSTEM PROJECT EXPERIENCE

Client	Contaminants	Initial Concentrations	Final Concentrations	Remedial Approach
Betty Brite Cleaners, Chicago, IL	PCE & degradation products in tight clay soils.	~5,000 ppm	<350 ppm	ISCO Installed ~35 injection wells & header system underground & above ground inside active dry cleaner. System setup in back of cleaners. RegenOx Parts A & B. Achieved cleanup objectives for 1/2 of the area in 9-months, another 1/4 of the area achived cleanup objectives after 15-months. Source area under large dry cleaning machine was the most recalcitrant, required installation of injection wells at 45-degree angles under machine and took an additional 9-months to achive cleanup objectives in source area.
BB Chemical, LaGrange, IL	Free Product Hydrocarbon atop water table and dissolved phase TCE in groundwater. Silty clay soils.	Free Product Hydrocarbon (5· inches in several wells). ~2,000 ppm TCE in groundwater.	Site Closed. Achieved Cleanup Objectives. free product was completely removed and TCE in GW is below IL GW Cleanup Standards	LNAPL Hydrocarbon: Installed five 4" recovery wells with LNAPL skimmers, all product lines underground running to tank system in adjacent room, facility remained active. Once free product LNAPL was depleted to ~1/16 inch in recovery wells after 12-months switched to enhanced bio-remediation Installed 12 injection wells. Injected Biological Oxygen Compound (oxygen & nutrients) with Environoc101 (aerobic bacteria) over a period of 3-weeks. Within 3-months of injection, free product completely gone. IEPA Project Manager came to visit site and inspected each well and couldnt believe the speed of degradation with process used. TCE in groundwater was degraded by injecting Regenesis PersulfOx oxidant into 8-injection wells over 4-events. Remedial cleanup objectives met after 9-months.
WW Henry, Bourbonnais, IL	TCE & degradation products in groundwater. Silty clay and weatherd bedrock, cohesive conditions.	~3,500 ppm	~1,000 ppm & ongoing	Installed ~20 injection wells & some direct injection points. Enhanced Reductive Dechlorination using 3DMe & BDI+ (anerobic bacteria). Initial injection was along site property line to stop offiste migration of contaminants. 2nd and 3rd round of injections was in source area and body of plume respectively. Downgradient (offsite) of fence line concentrations are non-detect. Onsite TCE parent product concentrations are decreasing, slight increase in degradtion products (cis & trans isomers, vinyl chloride, etc.) onsite showing active ERD. 1st injection event at fence line ~2-years ago, onsite injections about 1.5 years ago.
Carroll Street, Chicago, IL	TCE & degradation products. 5'bgs to 15'bgs. Tight clay soils.	High of 48,800 ppm, average 15,000ppm	Achieved non-detect for 2/3rds area after 9-months. While quarterly sampling recalcitrant 1/3rd portion 6-months ago found previously unknown source area (48,800ppm). Last months (April 2015) sampling event 700ppm!!!	ISCO using PersulfOx oxidant. Initially installed 14 injection wells, weekly site visit for injection into wells in small courtyard. After 9-months identified previously unknown source area. Added 6-additioanl injection wells and increased injection volumes/concentrations. After additioanl 6-months hot spot concentrations have reduced from 48,800 ppm to 700ppm. Currently below CSAT cleanup objective. Waiting for 2nd round of verification sampling.
North Shore Cleaners, Glencoe IL	PCE & degradation products. 5'bgs to 20'bgs. Tight clay cohesive soils.	9,500 ppm	ongoing/active in operation for 1.3 years. (quarterly soil sampling event shows reduction below site specific CSAT of 1,000ppm over 75% of site)	ISCO using RegenOx Parts A & B oxidants. Installed 35 injection wells both inside active cleaners & outside in public courtyard, all wells connected to underground header system, tank, automated control panel and system setup in back of cleaners. Weekly site visits for O&M to fill tank and inspect system.
Norman's Cleaners	PCE & degradation products . 0'bgs to 12'bgs, tight clay/cohesive soils.	~6,000 ppm	~<650 ppm	ISCO using Persulfate. Soil mixed then followed with 12 injection wells. Total time from start to finish was 9-months. Inside dry cleaner in strip mall. Dry cleaner unit was empty, cut alley/back wall and brought mini-excavator into store unit. Cut out concrete floor slab, performed soil mixing inside. Followed up treatment of recalcitrant hotspots with injection wells.. SlowRem due to tight clay soils over 6-months, once weekly injections. Cleanup goals achieved after 9-months.
Pipeline Facility, Cahokia, IL	Gasoline & Diesel LNAPL 5'bgs to 25'bgs. Fine grained sand & silt. GW at 5'bgs	5,000 ppm to 25,000ppm	ongoing/active	ISCO using RegenOx Parts A & B oxidants and ORC Advanced. Installed 25 injection wells. Working on 2nd round of injections. No quarterly progress sampling yet. 6-months ongoing due to slow gravity feed requireements. Shallow water table and shallow contamination. Do not want to push contaminants to surface. So slow feed fine grained Mississippi River sand & silt deposits. 5' - 25' bgs
Rockford, IL	Free Product Hydrocarbon (heating & machine Oil) 7'bgs to 13'bgs. Sand, gravel, cobbles, boulders, and former building debris.	Free Product	Complete, free product degraded	ISCO using PersulfOx oxidant. Installed 25 injection wells inside active office and factory. Injected for 2-weeks at a time, once a month for 3-months until cleanup objectives achieved. Outside front of facility installed 15-injection wells as well as horizontal near surface injection lines. Connected headers and ran to enclosed trailer containing tanks, mixers, heaters, etc. Twice weekly visits for 6-months. Free product degraded.
-Melrose Park, IL	TCE & degradation products Fine grained cohesive clay soils. Most areas 5' to 15'bgs, one area is 0' to 11'bgs.	~15,000 ppm	Ongoing/active Just started system in May 2015	First SlowRem Injection project approved by Illinois RCRA program. ISCO using PersulfOx oxidant. Facility is closed, former solvent recycler. Soil mixed 5' to 10' in three hot spot source areas. Installed 190 injection wells. In three seperate treatment areas. One area is a rail spur at back of building, contaminants are 0'to 11'bgs. Installed well screens from 1'bgs to 11'bgs and simultaneously injecting at depth as well as flooding surface of the rail spur area.
St James Hospital, Chicago Heights, IL	Free product heating oil 7'bgs to 20'bgs, cohesive clay soils	Free Product Heating Oil	Client & property owner approved, construction starting August 2015	Free product recovery and enhanced bio-remediation. Installation of 11-6" recovery wells outside in courtyard. Installation of 37 injection wells inside bulding basements and outside in courtyard. Weekly injections of Biological Oxygen Compound, Environoc101 (aerobic bacteria), and hydrocarbon degrading enzymes. Weekly vac truck extraction from recovery wells. Anticipated to occur over 2-year period.
Scott Cleaners, Glenview, IL	PCE and degradtion products in soil and groundwater. Cohesive soils: silts & clays. Source area behind cleaners was 0' bgs to 6'bgs. GW plume adjacent to building up to river bank 6' to 20'bgs.	5,000 ppm to 7,000 ppm	PCE in soil source/mixing area below CSAT for site ~350ppm. PCE and degradation products in groundwater are decreasing significantly in less than 1-year.	Used PersulfOx oxidant for soil mixing in source area. Followed up with ERD in several source area hot spots. Within 3-months hotspot was below CSAT for site specific cleanup goals. Source area Installed 20 injection wells between building and river bank for Enhanced Reductive Dechlorination in groundwater. Two injection events over 1-month. Injected 3DMe and BDI+. In less than 1-year significant degredation of PCE and degradation products. Active degradation still ongoing.

Note:
ISCO - in-situ chemical oxidation
PCE - tetrachloroethene
CSAT -
ppm - parts per million
bgs - below ground surface
IL - Illinois
GW - groundwater

APPENDIX C

Cost Estimate

Site Name: *Former Express Cleaners*
BRRTS #: *02-52-547631*
Type of Action: *Soil and Groundwater Remedial Actions and Site Closure*

TASKS	BUDGET				INVOICES					
Bid / Budgeted Description	Bid / Budgeted Amount	INSERT	Total Approved Budget	Previous Claims (If applicable)	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	INSERT	Total Invoiced Costs
Consultant Costs										
Evaluation of Remedial Alternatives	$ 5,822.00		$ 5,822.00							$ -
Remedial Actions - System Installation	$ 52,588.00		$ 52,588.00							$ -
System Performance Monitoring	$ 55,340.00		$ 55,340.00							$ -
Site Restoration and Closure (GIS Registry)	$ 26,248.00		$ 26,248.00							$ -
Supplies, Travel, Equipment, PPE	$ 26,371.14		$ 26,371.14							$ -
DNR Registry Fees	$ 1,700.00		$ 1,700.00							$ -
Contingency Soil Vapor Assessment - Former Pugh Oil Building and Contingency Supplies, Equipment, Travel & PPE	$ 6,465.00		$ 6,465.00							$ -
			$ -							$ -
			$ -							$ -
			$ -							$ -
			$ -							$ -
			$ -							$ -
Consultant Cost Total	$ 174,534.14	$ -	$ 174,534.14	$ -						$ -
Sub-Contractor Costs										
Building Slab Removal and Disposal Remedial Actions - System Installation	$256,086		$ 256,086.17							$ -
System Performance Monitoring	$ 29,335.35		$ 29,335.35							$ -
Site Restoration and Closure (GIS Registry)	$ 9,752.00		$ 9,752.00							$ -
Contingency Soil Vapor Assessment - Former Pugh Oil Building	$ 690.00		$ 690.00							$ -
			$ -							$ -
			$ -							$ -
			$ -							$ -
Sub-Contractor Cost Total	$ 295,863.52	$ -	$ 295,863.52	$ -						$ -
DERF ELIGIBLE SUB-TOTALS	**$ 470,397.66**	**$ -**	**$ 470,397.66**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Non-DERF Eligible Expenses								
								$ -
								$ -
Non-DERF Cost Total	$ -	$ -	$ -	$ -	$ -	$ -		$ -
INVOICE GRAND TOTAL	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Check Numbers

Dry Cleaner Environmental Response Program
Reimbursement Cost Detail Linking Spreadsheet Form 4400-214D (R 08/12)

DERF COST BREAKOUT (this claim)									
A Soil Investigation	B Soil Remediation	C Groundwater Investigation	D Groundwater Remediation	E Air/Vapor Investigation	F Air/Vapor Remediation	G Lab & Other Analysis	H Miscellaneous Costs	Budget Remaining Use (-) to indicate cost over-run	% Task Complete, Remarks
								$ 5,822.00	
								$ 52,588.00	
								$ 55,340.00	
								$ 26,248.00	
								$ 26,371.14	
								$ 1,700.00	
								$ 6,465.00	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ 174,534.14	
								$ 256,086.17	
								$ 29,335.35	
								$ 9,752.00	
								$ 690.00	
								$ -	
								$ -	
								$ -	
								$ 295,863.52	
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 470,397.66**	

Total DERF Eligible Costs This Claim **$ -**

Site Remediation and Closure Cost Estimate
Former Express Cleaners
Racine, Wisconsin

TASK	LABOR HOURS							COST	REIMBURSABLE EXPENSES		SUBCONTRACTOR EXPENSES		TOTAL COSTS
	Sr. Project Mgr. $158	Project Mgr. $140	Sr. Hydrologist $100	Scientist $86	Field Tech II $65	Field Tech I $55	GIS $75		ITEM	COST	ITEM	COST	
Evaluation of Remedial Alternatives													
Evaluation of Alternatives	8	8	6					$2,984	Travel	$91			$3,075
Write-up	4	4	4				6	$2,042					$2,042
DNR Correspondence	2	2	2					$796	Office Expenses	$100			$896
Total Hrs	14	14	12	0	0	0	6	46					
Total Costs	$2,212	$1,960	$1,200	$0	$0	$0	$450	$5,822		$191		$0	$6,013
Remedial Actions - System Installation													
Building Floor Slab and Foundation Removal (assumes 3 days, includes disposal of approx. 25% of slab as non-hazardous)		3			30			$2,370			Subcontractor	$23,087	$25,457
Flooding Remediation System Installation		6		8	20			$2,828	Supplies (including security fencing)	$9,046	Cabeno	$232,999	$244,873
Flooding System O&M (3x per week for 8 wks)	10	18			192			$16,580	Travel	$1,966			$18,546
Monitor Groundwater Parameters for Oxidation Completion (assumes 1x per week for 4 weeks)	2	4			24			$2,436	Office Expenses	$450			$2,886
Groundwater Remediation System Installation		8		8	30			$3,758					$3,758
Slow Feed System O&M (2x per week for 8 wks)	10	18			128			$12,420					$12,420
Contingency System O&M (8 visits)	6	8			64			$6,228					$6,228
DNR Correspondence	16	16	12					$5,968					$5,968
Subtotal Hrs	44	81	12	16	488	0	0	641					
Subtotal Costs	$6,952	$11,340	$1,200	$1,376	$31,720	$0	$0	$52,588		$11,462		$256,086	$320,136
System Performance Monitoring													
Installation of 5 New Monitoring Wells and Repair of 1 Existing Well		2			16			$ 1,320	Travel	$61	Cabeno - New GW Well Install	$5,362	$6,742
Quarterly GW Sampling (assumes 1 baseline and 8 qtrs @ existing 15 wells plus 5 new each event for VOCs by Method 8260)	16	16	16		108	108		$ 19,328	Travel	$726	Subcontractor - TA Lab	$16,974	$37,028
Low-flow Purge Groundwater On-Site Treatment and Analysis for On-Site Discharge (assumes 9 events)	4	9	9		18			$ 3,962	Low-Flow Sampling Supplies	$1,294	Subcontractor - TA Lab	$621	$5,877
Soil Gas Sampling (assumes 10 Summa canister samples for VOCs by Method TO-15)	6	6	4		20	20		$ 4,588	Soil Gas Sampling Supplies	$1,380	Subcontractor - TA Lab (soil gas)	$2,530	$8,498
Soil Sampling (1 baseline and 2 post remediation @ 15 samples each event for VOCs by Methos 8260)	4	4	2		30	30		$ 4,992	Soil Sampling Supplies	$6,910	Cabeno - Soil Gas	$2,300	$14,202
Data Evaluation Soil and GW (9 events)	16	20	20		9	9		$ 8,408	Supplies/PPE	$2,588	Soil Confirmation Sampling Geoprobe Equip.	$6,910	$17,906
Data Reports and Transmittal to DNR	18	20	38	38			18	$14,062	Office Expenses	$100			$14,162
Total Hours	64	75	89	38	185	167	18	636					
Total Costs	$ 10,112	$ 10,500	$ 8,900	$ 3,268	$ 12,025	$ 9,185	$ 1,350	$55,340		$12,998		$29,335	$ 97,673
Site Restoration and Closure (GIS Registry)													
Data Evaluation	10	12	10	12				$5,292	Travel	$121			$5,413
Abandonment of System and Groundwater Monitoring Wells and Preparation of DNR Well Closure Forms (assumes remediation system and 20 monitoring wells)	2	2	6		12	12		$2,636	Expenses	$150	Cabeno	$3,910	$6,696
Closure Report Preparation	12	18	24	16			12	$9,092	Office/DNR	$1,000			$10,092
Site Restoration	3	4			12	6		$2,144	Supplies/PPE	$450	Subcontracor - Backfill and Grass Seed	$5,842	$8,436
GIS Registry	8	18	24				12	$7,084	DNR Registry Fees	$1,700			$8,784
Total Hrs	35	54	64	28	24	18	24	247					
Total Costs	$5,530	$7,560	$6,400	$2,408	$1,560	$990	$1,800	$26,248		$3,421		$9,752	$39,421
TOTAL PROJECT HOURS	157	224	177	82	697	185	48	1,570					
TOTAL PROJECT COSTS	$24,806	$31,360	$17,700	$7,052	$45,305	$10,175	$3,600	$139,998		$28,071		$295,174	$463,243

Site Remediation and Closure Cost Estimate
Former Express Cleaners
Racine, Wisconsin

TASK	LABOR HOURS							COST	REIMBURSABLE EXPENSES		SUBCONTRACTOR EXPENSES		TOTAL COSTS
	Sr. Project Mgr. $158	Project Mgr. $140	Sr. Hydrologist $100	Scientist $86	Field Tech II $65	Field Tech I $55	GIS $75		ITEM	COST	ITEM	COST	
Contingency Soil Vapor Assessment - Former Pugh Oil Building													
Sub-Slab Soil Vapor Assessment (assumes 3 Vapor Pin/Summa canister samples for VOCs by Method TO-15)	1	2	2	12				$1,670	Travel	$271	Subcontractor - TA Lab (soil vapor)	$690	$2,631
Report Preparation	4	6	8	12			4	$3,604	Supplies/PPE	$920			$4,524
Total Hrs	5	8	10	24	0	0	4	51					
Total Costs	$790	$1,120	$1,000	$2,064	$0	$0	$300	$5,274		$1,191		$690	$7,155

APPENDIX D

AEG's Certificate of Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 5/8/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER HNI Risk Services PO Box 510187 New Berlin WI 53151	CONTACT NAME: PHONE (A/C, No, Ext): 262-782-3940 FAX (A/C, No): 262-782-4198 E-MAIL ADDRESS: certs@hni.com
INSURED Avantti Environmental Group 9415 W. Forest Home Avenue Hales Corners WI 53130	INSURER(S) AFFORDING COVERAGE / NAIC # INSURER A : CNA Ins. Co (Valley Forge Ins Co) / A INSURER B : Rockhill Insurance Company / A- INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC			6016967215	02/01/2015	02/01/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS			6016967246	02/01/2015	02/01/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
A	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $ 10,000			6016967229	02/01/2015	02/01/2016	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? Y/N (Mandatory In NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		6016967232	02/01/2015	02/01/2016	X WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 500,000 $ 500,000 $ 500,000
B	Professional Liability Contr Pollution Liability			ENVP012406	02/01/2015	02/01/2016	General Aggregate Each Occurence	3,000,000 3,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, If more space is required)

Professional Liability Deductible $2,500 Each Incident
Contrs.Pollution Liability Occurrence Deductible $2,500 Each Pollution Condition

CERTIFICATE HOLDER

To Whom It May Concern

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Proposal for

Remedial Action

Former Express Cleaners Site

Racine, Wisconsin

Submitted to:

Ehrlich Family Limited Partnership
c/o Bill Scott, Attorney
Gonzalez Saggio & Harlan LLP
111 E. Wisconsin Avenue, Suite1000
Milwaukee WI 53202

Submitted by:

Huntoon Environmental Consulting, llc
P.O. Box 259927
Madison WI 53725
608-886-7245

29 May 2015

CONTENTS

1. PROJECT TEAM QUALIFICATIONS

Huntoon Environmental Consulting, llc and DeepEarth Technologies, Inc. are pleased to provide this response to the Request for Remedial Action Bid Proposal for the Former Express Cleaners Site (Site) located at 3921-41 N. Main Street in Racine, Racine County, Wisconsin. We respectfully submit the proposal response to Nancy Ryan, Project Manager with the Wisconsin Department of Natural Resources (WDNR) and the Ehrlich Family Limited Partnership through their representative, Attorney Bill Scott of Gonzalez, Saggio & Harlan, LLP.

Huntoon Environmental Consulting, llc (hereinafter referred to as HEC or Huntoon Environmental) is a woman-owned business incorporated in the State of Wisconsin with an office in Beloit, Wisconsin. The company is a Wisconsin registered professional geologist firm (#74-##) and qualifies as a small business enterprise (SBE). Principal and owner of the company, Ms. Huntoon is a registered professional geologist with the State of Wisconsin (#13-008) and has over 25 years of professional experience. For more than two years, the firm has provided expert environmental consulting services to municipalities, law firms, small businesses, and citizen's groups involving a wide array of environmental concerns.

DeepEarth Technologies, Inc. (hereinafter referred to as DET or DeepEarth Technologies) is a women-owned technology development and field services company specializing in the remediation of toxic and hazardous chemical contaminants in soil and groundwater. The company has developed and marketed a new patented concept of in-situ chemical oxidation that has harnessed classical hydrogen peroxide chemistry so that the oxidation reaction can be controlled, which has opened the door to treating a broad spectrum of contaminants under complex conditions. The company has designed and managed projects throughout the country, achieving site closure at many previously-contaminated sites.

1.1 Project Understanding

The Project Team consisting of Huntoon Environmental and DeepEarth Technologies has a strong understanding of the project history, scope and objectives. The objectives of remediation activities at the Racine site are understood to be as follows:

1) to contain and reduce the groundwater plume;

2) to substantially reduce the threats posed by vapor intrusion;

3) to ensure remaining on-site contamination is attenuated within a reasonable time;

4) to conduct all activities in compliance with appropriate legislation and WDNR guidance; and,

5) to achieve case closure from the WDNR.

The team is fully informed regarding the project scope. It is understood that the source of the majority of contamination in soil and groundwater beneath the site was an on-going release of solvent utilized in dry cleaning operations. These solvents, and in particular PCE, sorb to soil particles and are held as residual contaminants in soil and groundwater pores. Denser than water, constituents migrate below the water table and can be transported significant distances with groundwater flow. The subsurface distribution of contaminants has been defined based on several site investigations conducted in the past.

1.2 Expertise in Evaluation of Alternatives

The consultant and contract service provider have significant expertise to analyze remedial alternatives at the Former Express Cleaners Site and determine the most suitable response action. Ms. Huntoon has conducted remedial action alternatives analyses and feasibility evaluations on hundreds of contaminated sites, the majority of which were located within the State of Wisconsin. Of this vast experience, a significant number of projects included former or current drycleaning sites, and chlorinated hydrocarbon contaminants.

1.3 Relevant Capabilities of the Project Team

The proposed project team is accomplished in the completion of similar remedial programs.

With over 20 years of experience with soil and groundwater investigation and remediation, Ms. Huntoon will provide project management and technical oversight for all activities related to site remediation, monitoring, data evaluation and associated reporting. An extremely qualified technical reviewer, she has the experience and credentials to advise the owner and the owner's representatives on all aspects of the project to achieve the remedial goals.

Huntoon Environmental, DeepEarth Technologies, and the additional contractors selected for the Project Team will provide the necessary experienced and qualified staff and sufficient facilities for completion of each task described herein. Professional and dependable, the Project Team will perform all work in an ethical, professional, and timely manner.

A company summary and corporate qualifications for Huntoon Environmental and DeepEarth Technologies are included as Attachments C and D, respectively. References are available upon request. Each member of the team has outstanding qualifications and significant experience to implement the relevant aspects of the remedial action plan.

2. TECHNICAL & ECONOMIC FEASIBILITY EVALUATION OF ALTERNATIVES

An initial evaluation of alternatives has been conducted for the Site, per Chapter NR 722.07 Wisconsin Administrative Code (WAC) and based partly on the recent publication Understanding Chlorinated Hydrocarbon Behavior in Groundwater: Guidance on the Investigation, Assessment and Limitations of Monitored Natural Attenuation (WDNR, RR-699, October 2014). This evaluation process has been used to determine which remedial action option constitutes the most appropriate technology to restore the environment, to the extent practicable, within a reasonable period of time and to minimize the harmful effected of contaminants to the air, land, and waters of the State; to address the exposure pathways of concern; and, to effectively and efficiently address the source of the contamination.

Alternatives have been evaluated for technical and economic feasibility as provided in NR722.07(4) WAC. This assessment included the evaluation of a range of remedial action options suitable for the Site, to determine the practicability of implementing these options at the Former Express Cleaners Site. An initial screening of remedial technologies reasonably likely to be feasible for the Former Express Cleaners Site included the following remedial action options:

2.1 Natural Attenuation

Monitored natural attenuation may be an appropriate and effective remedy at chlorinate-contaminated groundwater sites given the appropriate conditions. As summarized by WDNR (RR-699, October 2014), "availability of a carbon source along with the proper geochemical and microbial conditions necessary for degradation determine whether chlorinated contaminants will degrade naturally. Effectiveness of MNA is based on fully defining the plume, documenting conditions for natural attenuation throughout the plume, and long-term monitoring data that documents natural attenuation processes will continue to be effective until standards are met".

For the Former Express Cleaners Site, an active remedial action that will reduce the contaminant mass and concentration has been deemed necessary. Natural attenuation is not expected to actively reduce contaminant mass and concentrations of chlorinated compounds (in particular, PCE).

2.2 Enhanced MNA

Monitored natural attenuation (MNA) will address the residual groundwater contamination remaining upon completion of active remedies, which will remove the majority of contamination. "Most sites contaminated with chlorinated hydrocarbons will require active remediation for source reduction and perhaps for plume control. MNA is more likely to be successful when used as one part of a comprehensive site cleanup, rather than as a sole remedy, at most chlorinated hydrocarbon sites" (WDNR, RR-699, October 2014).

Based on the contaminant source and type, extent of soil and saturated material that contain residual contamination, and potential for continuing source release, an assessment and determination of effectiveness of NA processes has determined the need for active remediation at the Site.

2.3 Insitu Chemical Oxidation

In-situ chemical oxidation would involve advancement of borings to apply the reagent in source areas, as well as areas of higher groundwater concentrations which include the central portion of the former S.C. Johnson property located east of the Site. Cool-Ox™ Technologies would be the reagent of choice for the in-situ chemical oxidation. Borings would be advanced for the application of reagent below the groundwater, which would stimulate the biodegradation of chlorinated VOCs. In addition, impacted soil throughout the area of concern would be excavated and blended with reagent to treat soil in the area from the surface to directly above the water table.

Comparison of pre- and post-treatment soil samples on similar sites utilizing the Cool-Ox™ in-situ chemical oxidation technology, including a PCE-contaminated site in Wisconsin, demonstrated a decrease in PCE concentrations from approximately 500 mg/kg to less than 3 mg/kg.

2.4 Excavation and Disposal

Excavation and landfill disposal of contaminated soil and groundwater is not deemed an appropriate methodology for the Site. Per chapter NR722(07)(am) WAC, "Responsible parties shall document their evaluation of a remdial option or combination of options which would use recycling or treatment technologies that destroy or detoxify contaminants, rather than transfer the contaminants to other media."

3. PROPOSED REMEDY AND ABILITY TO ACHIEVE CLOSURE

In-situ chemical oxidation is proven to be effective in remediating the substances present at the Site and has meet all of the following requirements:

- Is proven to be effective in remediation the type of hazardous substances present at the Site based on experience gained at other sites with similar site characteristics and conditions;
- Can be implemented in a manner that will not pose a significant risk of harm to human health, safety, welfare or the environment; and,
- Is likely to result in the reduction or control, or both, of the hazardous substances present at the site to a degree and in a manner that is in compliance with the requirements of chapter NR722.09 WAC

Therefore, based on an assessment and determination of the effectiveness of the natural attenuation processes occurring at the Site, in addition to an evaluation of the extent and degree of chlorinated contaminants, the site geologic and hydrogeologic setting, site geochemistry, and redox potential, **it is determined that In-situ chemical oxidation, combined with enhanced RNA, is the most effective and efficient remedial option for the Site.**

3.1 Description of In-Situ Chemical Oxidation Remedy

The patented Cool-Ox™ process is an in-situ remediation technology that combines controlled chemical oxidation with accelerated biodegradation subsequent to the oxidation phase. The process is based upon the use of hydrogen peroxide as the generator of oxidizing radicals. However, unlike the Fenton-like processes which use liquid hydrogen peroxide, the Cool-Ox™ Technology generates hydrogen peroxide from solid peroxygens that are injected into the soil or groundwater in an aqueous suspension. Once in place, the peroxygens react with water to produce hydrogen peroxide, a reaction which is well understood.

The distinguishing feature of the Cool-Ox™ technology is that it does not require the injection of metal catalysts to activate the production of oxidizing radicals in the substrata; thus, the creation of heat is eliminated and the volatilization of VOCs is eliminated. This is an extremely important safety factor when dealing with compounds having low toxicity thresholds. Rather than remedial applications that create odor problems, the Cool-Ox™ process oxidizes the contaminant molecule, converting it to an alcohol or polyol. These reaction products are converted to wetting agents and are actually converted to odor control agents.

A very important characteristic of the Cool-Ox™ technology is that the chemical reaction is controllable and self-initiating, as the reaction starts when the oxidizer comes into contact with organic contaminants. Because peroxygens are only sparingly soluble in aqueous solutions, the dissolution rate is quite slow. Once the oxidation reactions of the remedial work have begun taking place, the oxidation by-products create an environment ideal for the proliferation of intrinsic microbial degraders. Therefore, once injected, the reagent remains in the contaminated media for an extended period of time before becoming soluble. This low solubility feature also allows peroxygens to be hydraulically distributed by the injection equipment, increasing the

radius of influence from the injection point, which significantly increases the potential for the oxidizer to come into contact with the contaminants.

Site-specific Cool-Ox™ Technology remedial action at the Former Express Cleaners Site in Racine will involve injection of reagent into groundwater, and blending of contaminated soil with reagent material for remediation of the impacted area above the water table.

Activities will include the advancement of soil borings at multiple locations across the most highly contaminated area of the site, with injection of reagent material several feet into the groundwater to stimulate the biodegradation of chlorinated VOCs in groundwater. An illustration of the estimated treatment area is provided as Figure 1.

Soil blending of contaminated soil with reagent material will be completed above the water table throughout the area of concern. Concentrations of soil contaminants will be reduced through the blending of reagent material with impacted soil, which will create the reduction of chlorinated VOCs on soil particles. An estimated 1070 cubic yards of impacted soil will be treated throughout an area 5760 ft^2 in size. The estimated areal extent of soil blending is provided as Figure 2.

Specialized application procedures developed by the DeepEarth Technologies field crew will ensure that the reagent is delivered to maximize contact with the contaminants.

3.2 Successful Applications at Similar Sites

DeepEarth Technologies has demonstrated successful oxidation of a broad range of organic chemical constituents in groundwater and soil at multiple similar sites using the patented Cool-Ox™ technology. Significant contaminant reductions have been achieved at nearly every site treated with concentrations of Cool-Ox™ reagents that are significantly lower than the stoichiometric ratios that would be expected to be necessary.

At nearly all sites treated with the Cool-Ox™ reagents, the proliferation of indigenous aerobic microbes increased by as much as six orders of magnitude. Upon visual inspection of samples collected from numerous sites, including sites similar to the Former Express Cleaners Site, observations indicated a decrease in contaminant concentrations in groundwater downgradient from the injection zones by orders of magnitude.

Cool-Ox™ Techology was implemented at a Wisconsin site where industrial processes impacted soil and groundwater on offsite properties. In-situ chemical oxidation was used to remediate impacted soil and groundwater. Comparison of pre- and post-treatment soil samples indicate that PCE concentrations decreased from greater than 500 mg/kg to less than 3 mg/kg.

Additional case studies for similar sites are included as Attachment B.

3.3 Proposed Closure Objectives

3.3.1 Groundwater Restoration Goals

Remedial goals for the groundwater remediation include reduction of concentration and mass of contaminants. Groundwater contamination beneath the Site is determined to be originating from several source areas, including the location of the former dry cleaning operations, an area outside the northeast corner of the building, and the area of the former dumpster at the northeast corner of the site.

As part of the remedial action activities, groundwater remediation will be conducted at each of these source areas in order to obtain case closure for the Site. Both the source control and the groundwater restoration components will be designed to minimize the concentration of the chlorinated compounds in groundwater and maintain compliance with the Enforcement Standard. It is anticipated that the groundwater injection will reduce the concentrations of groundwater contaminants by 80 to 90 percent within 30 days. The reaction will last in the subsurface for a total estimate of 90 days. Groundwater remediation followed by MNA for two years is expected to achieve a stable or shrinking groundwater plume. The estimated treatment area is provided as Figure 1.

3.3.2 Soil Remediation Goals

Soil remediation goals for the site include the reduction of concentration and mass of contaminants in shallow soils extending from the surface into the upper level of the water table. It is anticipated that one application of the in-situ chemical oxidation treatment, Cool-Ox™, will achieve the reduction of soil concentrations by 95 to 99 percent within the first 30 days. The reaction will last in the subsurface for a total estimate of 90 days. The estimated areal extent of soil blending is provided on Figure 2.

3.4 Estimated Remedial Action Schedule

The project schedule is controlled by the requirement for the completion of eight rounds of groundwater samples upon completion of remedial activities, which puts an estimate closure submittal date of August 2017.

The estimated schedule for the completion of on-site remedial action is three months. This includes the completion of in-situ chemical oxidation through injection and soil blending in mid July through early August. Confirmation soil samples will be collected two to three months after conclusion of on-site remedial activities. Vapor intrusion assessment and site restoration will be completed during this timeframe (two to three months after conclusion of on-site remedial activities).

The proposed schedule is provided in detail in Section 6.

4. DESCRIPTION OF TASKS ASSOCIATED WITH PROPOSED REMEDY

4.1 Groundwater Monitoring

Collection and analysis of groundwater from the existing monitoring well network will be completed in June, prior to the initiation of remedial activities. Groundwater samples will be submitted to a WDNR-certified laboratory for the analysis of VOCs (EPA Method 8260C).

Based on laboratory results, the need for the installation of an additional monitoring well will be evaluated east of the Site. If deemed appropriate, the well (MW-16) will be installed prior to the next round of quarterly samples.

Based on an evaluation of historic groundwater sampling results, the abandonment of several monitoring wells within the existing monitoring well network is recommended upon completion of groundwater sampling in June; these include an estimate of five to eight monitoring wells to be negotiated with WDNR. If approved by the WDNR, these wells will be abandoned prior to the September quarterly groundwater sampling event.

Upon completion of remedial activities, eight rounds of quarterly groundwater samples will be collected and analyzed for VOCs (EPA Method 8260C).

4.2 In-Situ Chemical Oxidation – Groundwater Injection

Rationale for Selecting Treatment Area & Vertical Injection Interval: DTI has learned from conducting field applications at numerous sites with TCE and PCE that it is next to impossible to remediate groundwater so long as contaminants adsorbed to the soil matrix are present. Therefore, it is our primary objective to mitigate soil sources as the first phase of overall site remediation. To locate soil sources, DTI searches the available site data in effort to find the highest PID concentrations either in the boring logs or contaminant tables. High PID readings almost always signal the presence of a source of contaminants sufficient to adversely impact groundwater. It should also be noted that because these remain immobile and unaffected by fluctuations in groundwater levels. Based upon this knowledge, DTI turned to the information contained in the site information sheet, soil borings and analytical data, in effort to determine the areal extent as well as the vertical treatment interval appropriate for this site and pursuant to the nuances of the *Cool-Ox®* technology.

Based upon the information provided and pursuant to the conversation between DTI and HEC, we have designed a remedy for the site as follows. The treatment area is approximately 3,375 ft^2 with a vertical interval of 8 feet to 14 feet below ground surface (bgs). The area contains 750 cubic yards and 94 injection points. A total of 4512 gallons of *Cool-Ox®* will be injected over the course of 4 days.

Health and Safety: DTI has adopted a health and safety policy that has been developed over a period of 13 years. DTI has a tremendous understanding for the importance of a detailed health and safety plan and has been able to implement that in the field. Prior to the start of a job, DTI will send our Job Safety Analysis (JSA) Form to HEC for review. Upon commencement of the

job, a tool box health and safety meeting will be held each morning, where the JSA's can be reviewed and safety topics can be touched on from the previous day.

DTI's field crew also inspects the equipment daily (each piece of equipment has a safety inspection sheet which is filled out daily) to assure that everything is in safe working order. This prevents production delays as well as insures a safe working environment for DTI employees and the over-site personnel as well.

DTI will forward the JSA's, Health and Safety plans, Equipment Inspection Sheets and MSDS Sheets if HEC wishes for review. DTI will also adapt to HEC's site specific health and safety plan.

Work Scope: DTI will mobilize to meet HEC and complete the primary health and safety meeting where all safety topics will be explained and understood by both. DTI will than position equipment, take delivery of *Cool-Ox®* and lay out the treatment area. Once the area is laid out the injection activities will begin.

DTI will inject approximately 48 gallons into each injection point (IP). DTI will complete a minimum of 25 IP's a day to ensure a project duration of no more than 4 days. DTI expects the project to be completed within 4 days.

Once the site is free of contaminants there are no traceable reagent by-products thus, our *Cool-Ox®* Technology is the only truly Green technology available to date.

4.3 In-Situ Chemical Oxidation – Soil Blending

Rationale for Selecting Treatment Area & Vertical Injection Interval: DTI has learned from conducting field applications at numerous sites with TCE and PCE that it is next to impossible to remediate groundwater so long as contaminants adsorbed to the soil matrix are present. Therefore, it is our primary objective to mitigate soil sources as the first phase of overall site remediation. To locate soil sources, DTI searches the available site data in effort to find the highest PID concentrations either in the boring logs or contaminant tables. High PID readings almost always signal the presence of a source of contaminants sufficient to adversely impact groundwater. It should also be noted that because these remain immobile and unaffected by fluctuations in groundwater levels. Based upon this knowledge, DTI turned to the information contained in the site information sheet, soil borings and analytical data, in effort to determine the areal extent as well as the vertical treatment interval appropriate for this site and pursuant to the nuances of the *Cool-Ox®* technology.

Based upon the information provided and pursuant to the conversation between DTI and HEC, we have designed a remedy for the site as follows. The treatment areas are proximately 6,550 ft^2. One area is 3950 square feet with a soil blending interval of 0 to 5. The second area is 2600 square feet with a soil blending vertical of 0 to 8 feet below ground surface (bgs). The two areas contain 1501 cubic yards. A total of 15000 gallons of *Cool-Ox®* will be blended into the areas over the course of 4 days.

Health and Safety: DTI has adopted a health and safety policy that has been developed over a period of 13 years. DTI has a tremendous understanding for the importance of a detailed health

and safety plan and has been able to implement that in the field. Prior to the start of a job, DTI will send our Job Safety Analysis (JSA) Form to HEC for review. Upon commencement of the job, a tool box health and safety meeting will be held each morning, where the JSA's can be reviewed and safety topics can be touched on from the previous day.

DTI's field crew also inspects the equipment daily (each piece of equipment has a safety inspection sheet which is filled out daily) to assure that everything is in safe working order. This prevents production delays as well as insures a safe working environment for DTI employees and the over-site personnel as well.

DTI will forward the JSA's, Health and Safety plans, Equipment Inspection Sheets and MSDS Sheets if HEC wishes for review. DTI will also adapt to HEC's site specific health and safety plan.

Work Scope: DTI will mobilize to meet HEC and complete the primary health and safety meeting where all safety topics will be explained and understood by both. DTI will than position equipment, take delivery of *Cool-Ox®* and lay out the treatment area. Once the area is laid out the soil blending activities will begin.

DTI will blend approximately 10 gallons of Cool-Ox into each cubic yard. DTI will blend an average of 500 yards per to complete the soil blending activities in approximately 4 days. DTI expects the project to be completed within 4 days.

Once the site is free of contaminants there are no traceable reagent by-products thus, our *Cool-Ox®* Technology is the only truly Green technology available to date.

4.4 Confirmation Soil Sampling

Confirmation soil samples will be collected 8 to12 weeks after remedial action is completed. It is estimated that twenty shallow soil borings will be advanced and samples collected from previous areas of significant contamination. Samples will be submitted to a DNR-certified laboratory for analysis of VOCs (EPA Method 8260C).

4.5 Vapor Intrusion Assessment

It has been documented that no exposure pathways exist for the movement of contamination offsite, other than potential migration of groundwater contamination to utility corridors which will be corrected through the proposed remedial action, and the potential for vapor migration offsite which will be evaluated as part of the proposed effort described herein.

The closest water supply well is a water supply well for a local day care center located more than one mile from the Site. Racine Waterworks uses surface water from Lake Michigan as the source of drinking water; contaminant discharges to surface waters have not been documented from the Site. There are no private wells within 1200 feet of the property boundary.

Vapor migration of chlorinated solvents to buildings impacted by contaminant plumes will be evaluated as part of the Remedial Action Plan for the Site to determine whether this exposure pathway is "complete". Soil gas samples will be collected and evaluated based on the protocals established in the WDNR publication "Assessing Vapor Intrusion at Remediation and

Redevelopment Sites in Wisconsin" (WDNR, RR-800, July 2012). In addition, results of sub-slab vapor concentrations collected beneath the existing building have determined that further site development should include the installation of passive or active venting to mitigate contaminant vapors.

Soil gas samples will be collected in summa canisters and submitted to the Wisconsin State Laboratory of Hygiene for the analysis of VOCs; specifically, the "dry cleaner list" which includes PCE, TCE, cis- and trans-DCE, and Vinyl Chloride (Method TO15). It is estimated that two samples will be collected from the northern property boundary of the Site. Sample results will be evaluated and compared with WDNR's vapor intrusion guidance.

4.6 Applicability of Pilot Test

Given the successful implementation of the Cool-Ox™ Technology on similar sites and similar geologic conditions, a pilot test prior to the implementation of remedial action is not determined to be warranted.

5. ESTIMATED COSTS

Cost estimates for the remedial action at the Former Express Cleaners Site are provided on the attached EXCEL SPREADSHEET as well as DNR Form 4400-212.

ESTIMATED COSTS FOR FORMER EXPRESS CLEANERS REMEDIAL ACTION UTILIZING COOL-OX™ INJECTION AND SOIL BLENDING TECHNOLOGY

	Huntoon Environmental				DeepEarth Technologies	Laboratory		Drilling Contractor	Site Work Contractor
	geologist $100/hr	clerical $40/hr	expenses & fees	estimated costs	per activity	# samples	$/sample	per mobe	per activity
REMEDIAL ACTION AND SITE CLOSURE TASKS									
MANAGEMENT									
client communication	90			9000					
regulatory communication/meetings	50			5000					
workplan preparation	8			800					
health and safety plan preparation	8			800					
permitting (if required)	4			400					
administrative support		50		2000					
project oversight (cost and schedule tracking)	100			10000					
MONITORING									
one round of pre-remedial groundwater monitoring	10		1050	1000		15+3 QA	1400		
well abandonment and forms	10			1000					
post-remedial soil monitoring for VOCs	24			2400		20	1400		
eight rounds post-remedial VOC groundwater monitoring	80		8400	8000		8 X 20	11,200		
disposal of investigation derived waste (IDW)	4		500	400					
data quality control	15			1500					
REMEDIAL ACTION									
slab and utility removal/slab coring	20			2000					7500
injection utilizing Cool-OxTM technology					70,000				
soil blending utilizing Cool-Ox™ technology	60			6000	118,000				
site restoration									1000
VAPOR INTRUSION ASSESSMENT									
vapor assessment / north boundary	5			500		2	450	2	1800
REPORTING									
data evaluation	10			1000					
quality control	10			1000					
remedial action documentation report WDNR review fee			350						
report preparation	40	12		4480					
SITE CLOSURE									
GIS registry package preparation	12	10		1600					
WDNR closure and GIS fees (soil and groundwater)			1800						
closure request submittal	15	5		1700					
well abandonment and documentation	4	4		560				17 wells	3500
DERF reporting and reimbursement request	12	10		1600					
CONTINGENCY PLANNING									
monitoring well installation (one)	4			400				1 well	1500
	consultant hours				remedial	groundwater		well install and	slab and utility
NOTE: costs are based on a good faith estimate of the project tasks as stated in the attached proposal.	595	2480	$12,100	$ 63,140	action $ 188,000	and soil analysis	$ 14,450	abandonment	$6,800 removal $ 8,500

TOTAL PROJECT COSTS (without contingencies) = $ 292,990

Revised Form 4400-214d - Huntoon Environmental Consulting, llc June 8, 2015

Site Name: *Racine Former Express Cleaners*
BRRTS #: *02-52-547631*
Type of Action: *Remedial Action*

TASKS	BUDGET				INVOICES					
Bid / Budgeted Description	**Bid / Budgeted Amount**	INSERT	**Total Approved Budget**	**Previous Claims (If applicable)**	***Provider Name, Invoice #, Billing Date***	***Provider Name, Invoice #, Billing Date***	***Provider Name, Invoice #, Billing Date***	***Provider Name, Invoice #, Billing Date***	INSERT	**Total Invoiced Costs**
Consultant Costs										
Project Management/Field Oversite	$ 28,000.00	$ -	$ 28,000.00							$ -
Groundwater Monitoring	$ 14,300.00		$ 14,300.00							$ -
Remedial Action	$ 8,000.00		$ 8,000.00							$ -
Vapor Intrusion Assessment	$ 500.00		$ 500.00							$ -
Reporting	$ 6,480.00		$ 6,480.00							$ -
Site Closure	$ 5,460.00		$ 5,460.00							$ -
Permitting	$ 400.00		$ 400.00							$ -
Expenses	$ 12,100.00		$ 12,100.00							$ -
			$ -							$ -
			$ -							$ -
			$ -							$ -
Consultant Cost Total	*$ 75,240.00*	*$ -*	$ 75,240.00	$ -						*$ -*
Sub-Contractor Costs										
Remedial Contractor	$ 170,910.00	$ -	$ 170,910.00							$ -
Laboratory	$ 13,140.00		$ 13,140.00							$ -
Drilling Contractor	$ 6,180.00		$ 6,180.00							$ -
Contractor for Site Work	$ 7,725.00		$ 7,725.00							$ -
			$ -							$ -
			$ -							$ -
			$ -							$ -
Sub-Contractor Cost Total	*$ 197,955.00*	*$ -*	*$ 197,955.00*	$ -						*$ -*
DERF ELIGIBLE SUB-TOTALS	**$ 273,195.00**	**$ -**	**$ 273,195.00**	$ -	$ -	$ -	$ -	$ -	$-	$ -
Non-DERF Eligible Expenses										
										$ -
										$ -
Non-DERF Cost Total				$ -	$ -	$ -	$ -	$ -		*$ -*
INVOICE GRAND TOTAL				$ -	$ -	$ -	$ -	$ -	##	$ -
Check Numbers										

Dry Cleaner Environmental Response Program
Reimbursement Cost Detail Linking Spreadsheet Form 4400-214D (R 08/12)

DERF COST BREAKOUT (this claim)									
A Soil Investigation	B Soil Remediation	C Groundwater Investigation	D Groundwater Remediation	E Air/Vapor Investigation	F Air/Vapor Remediation	G Lab & Other Analysis	H Miscellaneous Costs	Budget Remaining Use (-) to indicate cost over-run	% Task Complete, Remarks
								$ 28,000.00	Task % Complete
								$ 14,300.00	
								$ 8,000.00	
								$ 500.00	
								$ 6,480.00	
								$ 5,460.00	
								$ 400.00	
								$ 12,100.00	
								$ -	
								$ -	
								$ -	
								$ 75,240.00	
								$ 170,910.00	
								$ 13,140.00	
								$ 6,180.00	
								$ 7,725.00	
								$ -	
								$ -	
								$ -	
								$ 197,955.00	
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 273,195.00**	

Total DERF Eligible Costs This Claim **$ -**

6. PROPOSED SCHEDULE

Assuming a contract is signed in the first half of June 2015, the following schedule is proposed:

PROJECT MANAGEMENT: Project management will continue throughout the duration of the project and will include consistent communication with the client, regulatory discussions and meetings with the WDNR, and oversight of all project tasks.

GROUNDWATER MONITORING: Groundwater samples will be collected through low flow sampling technique from the existing monitoring well network in June. Laboratory results will be evaluated, and installation and sampling of an additional groundwater monitoring well completed prior to September if deemed necessary. If approved by the WDNR, selected monitoring wells will be abandoned upon evaluation of results and prior to the September sampling event. Eight quarters of groundwater monitoring will be conducted, to be completed in June 2017. Results will be submitted to WDNR upon receipt and after completion of data evaluation and QA/QC.

REMEDIAL ACTION: In-situ chemical oxidation tasks will extend three weeks during July and August, with completion of on-site remedial activities to be completed midAugust 2015.

SOIL MONITORING: Confirmation soil samples will be collected from the area of concern in September and October 2015. Soil samples will be collected from soil above the water table at twenty (20) locations and submitted for laboratory analysis of VOCs.

VAPOR INTRUSION ASSESSMENT: Soil vapor will be collected at the northern boundary of the Site to evaluate the potential for migration of potentially hazardous vapors offsite. Three (3) samples are proposed to be collected and submitted for laboratory analysis of VOCs.

REPORTING: Report submittals will be prepared throughout the duration of the project and will include reporting of remedial action results and confirmation sampling, data analysis and quality control, and laboratory results upon completion of quarterly sampling.

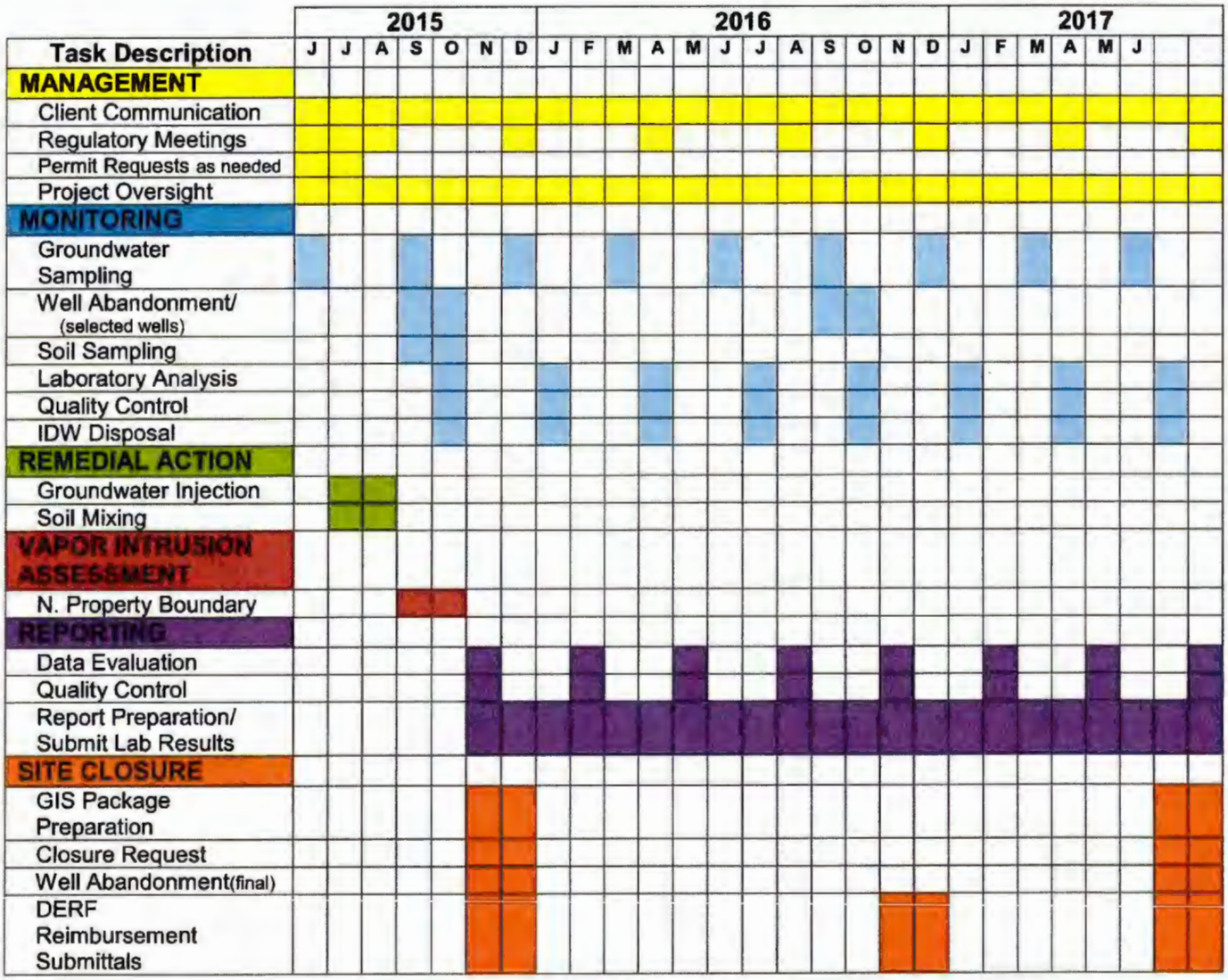
SITE RESTORATION: The site will be restored to conditions that allow the property to be redeveloped. There are no restrictions of future site use or building placement anticipated after September 2015 from the remedial action implemented.

WDNR CLOSURE SUBMITTAL: Upon completion of remedial action, documentation of effectiveness, and eight rounds of groundwater sampling, a closure submittal and GIS Registry Package will be submitted for the site.

DERF REIMBURSEMENT: Reimbursement for applicable costs will be submitted to the WDNR Dry Cleaner Environmental Response Fund (DERF) Program. Costs will be submitted for reimbursement at various steps throughout the completion of the remedial action project utilizing the Reimbursement Cost Detail Worksheet (WNDR Form 4400-214D).

PROPOSED SCHEDULE
FOR REMEDIAL ACTION TASKS

Former Express Cleaners Site, Racine, Wisconsin



7. ASSUMPTIONS

As provided in the RFP, the following assumptions are understood and were considered in the preparation of this proposal for remedial action implementation at the Former Express Cleaners site in Racine, Wisconsin:

- The site is vacant and will be made available for remedial action activities.

- Upon completion of remediation activities, redevelopment will occur on both the Main Street property (Former Express Cleaners site to be redeveloped for commercial use and zoned as Commercial Shopping District) and the North Bay Drive Property (Former Gardens to be redeveloped for commercial use and zoned Office/Institutional).

- If concentrations of foundation elements are not higher than the 'contained out' values for contaminated soil, the contaminated concrete can be disposed of in a solid waste landfill as non-hazardous waste.

- As demolition of the building and slab is determined to be necessary to complete remediation of the site, the superstruction of the building at the Former Express Cleaners site will be demolished by others and costs are not assumed as part of this proposal; removal and disposal of the concrete slab is included herein.

- Utilities will be disconnected and capped at the property boundary.

In addition, based on the RFP, we understand the following:

- For purposes of achieving soil goals, samples collected beneath the water table are not to be considered to represent soil conditions, but are considered a result of groundwater conditions.

8. CERTIFICATION STATEMENTS

Per requirements of Chapter NR 169(3)(b) WAC, I certify that the project team of Huntoon Environmental and DeepEarth Technologies meet the following:

- The team is fully informed of the aspects of the project scope and objectives, and has the expertise to analyze all remedial alternatives and to design the most suitable response action for the Site.

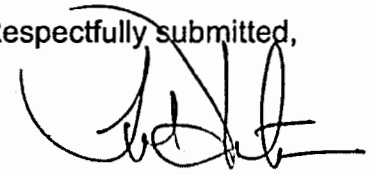
- The team can provide the necessary staff and facilities for all phases of the remedial action planning, design, construction and operation.

- The team will provide qualified technical reviewers to advise the owner and work toward the stated remedial goals.

- All services will be performed in an ethical, professional, timely manner.

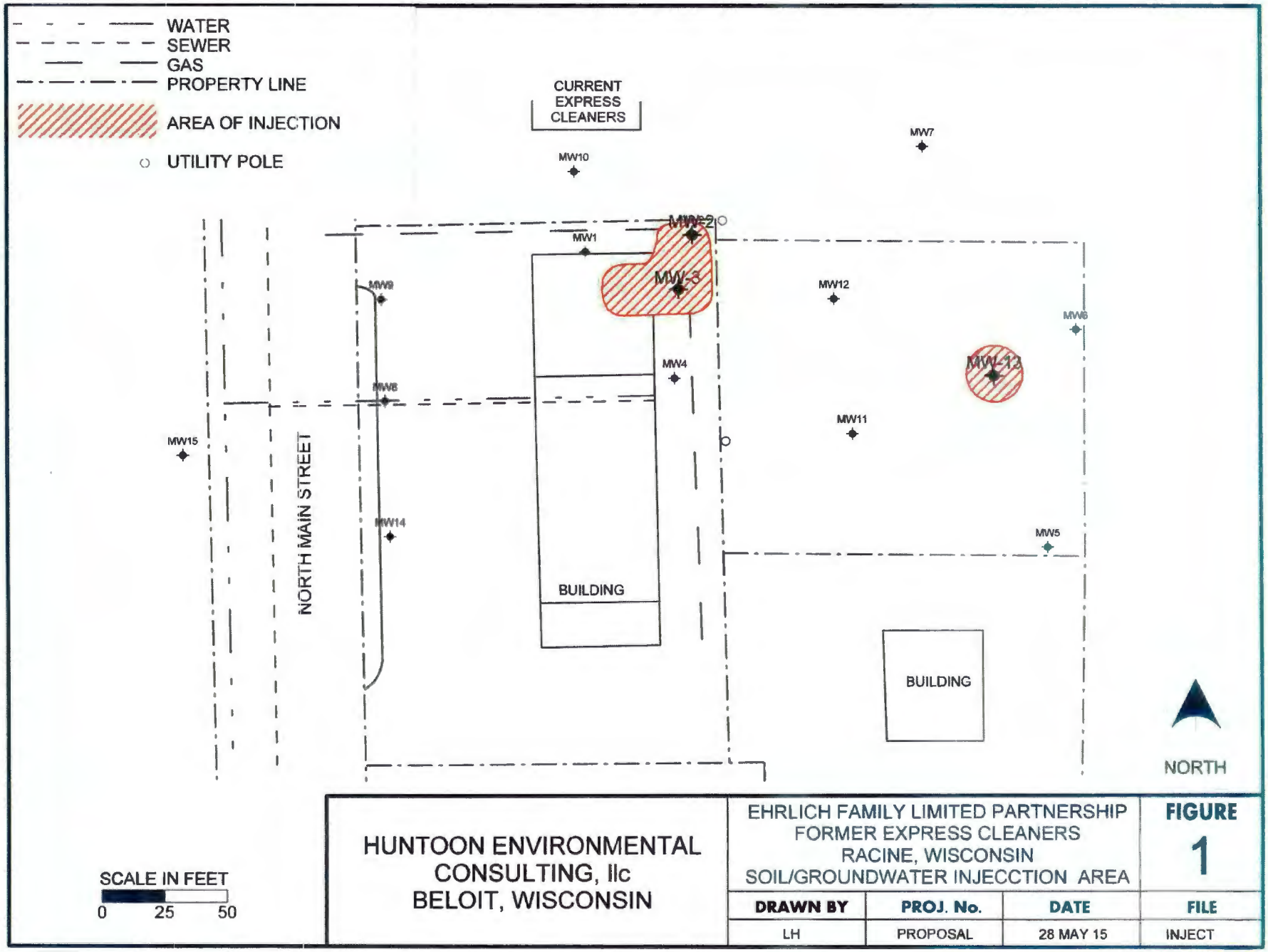
In addition, the consultant and contract services will comply with chapter NR 169 of the Wisconsin Administrative Code (WAC), as well as the chapter NR 700 WAC rule series.

Respectfully submitted,



Lori C. Huntoon, PG
Professional Geologist #13-008

5/29/15
date certified


WATER
SEWER
GAS
PROPERTY LINE
AREA OF INJECTION
UTILITY POLE
CURRENT EXPRESS CLEANERS
MW10
MW7
MW2
MW1
MW3
MW9
MW12
MW6
MW4
MW13
MW8
MW11
MW15
NORTH MAIN STREET
MW14
MW5
BUILDING
BUILDING
NORTH
SCALE IN FEET
0 25 50
HUNTOON ENVIRONMENTAL CONSULTING, llc
BELOIT, WISCONSIN
EHRLICH FAMILY LIMITED PARTNERSHIP
FORMER EXPRESS CLEANERS
RACINE, WISCONSIN
SOIL/GROUNDWATER INJECCTION AREA
FIGURE 1
DRAWN BY
PROJ. No.
DATE
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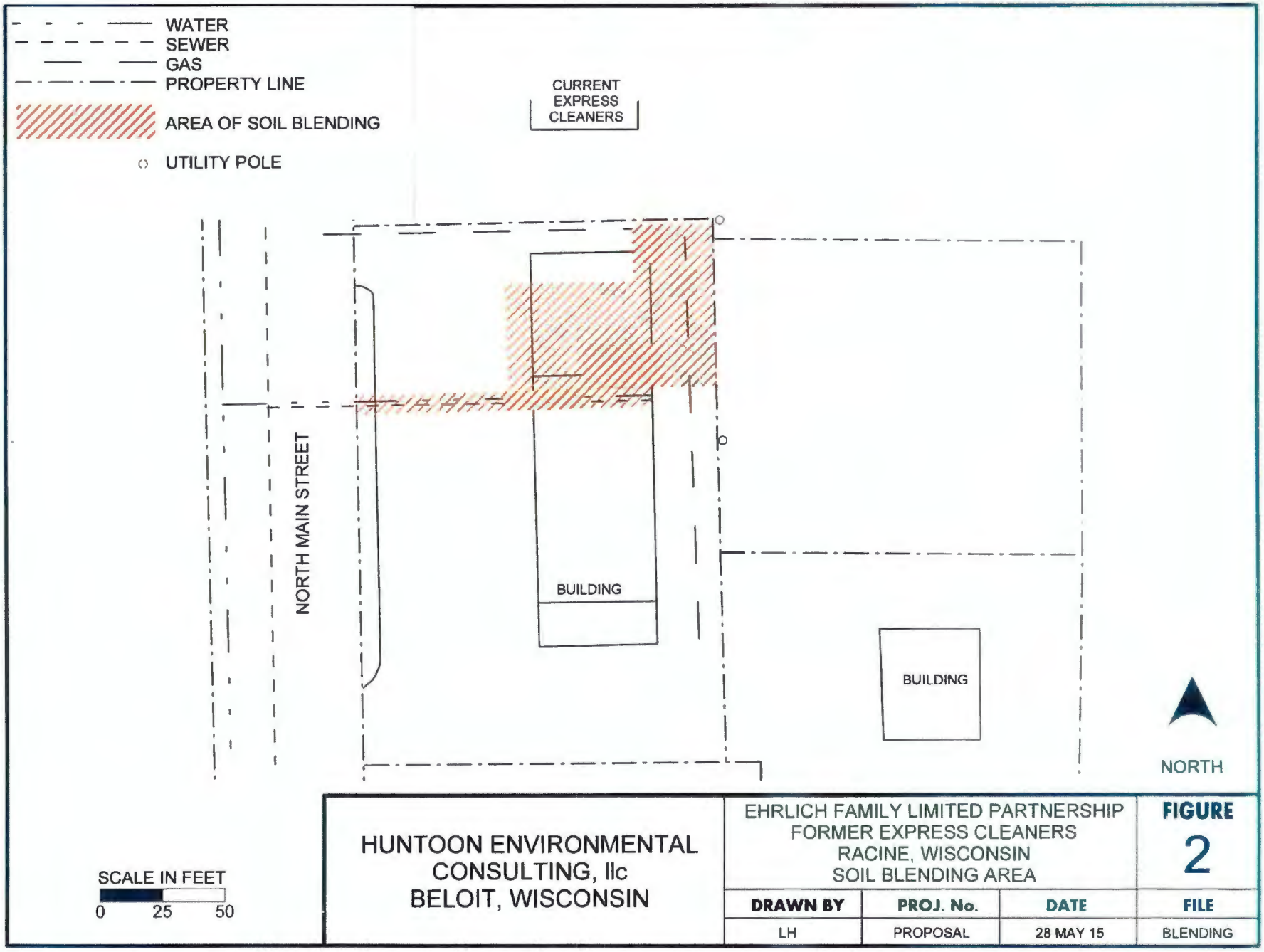
PROPOSAL
28 MAY 15
INJECT


WATER
SEWER
GAS
PROPERTY LINE
AREA OF SOIL BLENDING
UTILITY POLE
CURRENT EXPRESS CLEANERS
NORTH MAIN STREET
BUILDING
BUILDING
NORTH
SCALE IN FEET
0 25 50
HUNTOON ENVIRONMENTAL CONSULTING, llc
BELOIT, WISCONSIN
EHRLICH FAMILY LIMITED PARTNERSHIP
FORMER EXPRESS CLEANERS
RACINE, WISCONSIN
SOIL BLENDING AREA
FIGURE 2
DRAWN BY
PROJ. No.
DATE
FILE
LH
PROPOSAL
28 MAY 15
BLENDING

PF36039

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 05/29/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

John Wickhem Agency
PO Box 1500
1504 N. Randall Ave.
Janesville, WI 53547/53545

CONTACT NAME: JOHN WICKHEM
PHONE (A/C, No, Ext): 608-752-6030 FAX (A/C, No): 608-752-6992
E-MAIL ADDRESS: john.wickhem@wickheminsurance.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: ROCKHILL INSURANCE COMPANY	
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
Huntoon Environmental Consulting LLC
c/o Lori Huntoon
3909 E Cty Rd J
BELOIT WI 53511

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	☐ CLAIMS-MADE ☐ OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N						☐ WC STATU-TORY LIMITS ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ (Mandatory in NH)	N/A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	CPL & E&O $1,000,000 EA. CL. $2,000,000 AGG			POL.# ENVP013549-00	05/28/2015	05/28/2016	$2,000,000 POL. AGG	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
CONTRACTORS POLLUTION LIAB. (CPL) OCCURRENCE
PROFESSIONAL LIABILITY (E&O) Consulting (Environmental)
ROCKHILL INSURANCE COMPANY - RATED A-XII by A.M. Best

CERTIFICATE HOLDER

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
2300 N DR MARTIN LUTHER KING JR DRIVE
MILWAUKEE WI 53212

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 05/28/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

John Wickhem Agency
1504 N Randall Avenue
PO Box 1500
Janesville, WI 53547

CONTACT NAME: Wickhem, John B.
PHONE (A/C, No, Ext): 608-752-6030 FAX (A/C, No): 608-752-6992
E-MAIL ADDRESS: john.wickhem@wickheminsurance.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Secura Insurance Companies (AM Best-A Rate)	
INSURER B: Secura Insurance Companies	
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED

Huntoon Environmental Consulting, LLC
3909 E County Road J
C/o Lori Huntoon
Beloit, WI 53511

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC			3238824	05/28/2015	05/28/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ $ $ $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N N/A (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Office

CERTIFICATE HOLDER

Wisconsin Department of Natural Resources
2300 N Dr. Martin Luther King Jr. Drive
Milwaukee, WI 53212

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

B. RELEVANT COOL-OX™ PROJECT SUCCESS STORIES

DeepEarth Technologies, Inc.

Cool-Ox™

CASE HISTORY©

Work Summary (Site History) *CHS-0005 (Perchloroethylene)*

Probable off-site migration of dissolved perchloroethylene was the remedial action driver for this confidential client. Repeated releases of recycled perc over several years from a dry cleaning operation were complicated by the presence of smeared naphtha, along with oil and diesel range hydrocarbons. Action by the State required the property owner to address the problem immediately. It was concluded that chemical oxidation could provide the quickest most effective solution. Permanganate was ruled out because of the presence of hydrocarbons and Fenton peroxide was considered to reactive because much of the plume was located beneath the building. The recently developed Cool-Ox™ Technology was selected because of its effectiveness at treating mixed contaminants and its greater safety. Five weeks after completing injections of the sources, perc levels decreased to below residential levels for soil.

Project at a Glance

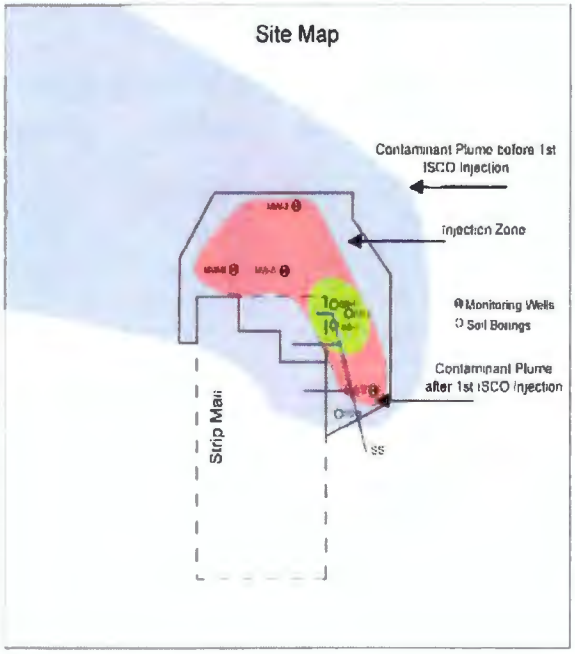
Site 0005 - Site Information

Type of site	Former Drycleaner
Contaminants	Recycled Perchloroethylene
Work Scope	Inject Oxidizer
Media Treated	Soil & Groundwater
Soil Type	Dense Clay over claystone
Groundwater Depth	14 fbgs
Remedial Objective	Locate and mitigate soil sources and reduce perc concentrations in GW

Site 0005 - Application Information

Technology Selected	Chemical Oxidation
Application Method	DPT Probe Rod
Area Treated	9,520 square feet
Vertical Interval	0 to 24 feet bgs = 24 feet
Injection Point (IP) Spacing	6 feet
Media Volume Treated	8,460 cubic yards
Number of Injection Points	265
Oxidizer Volume	29,700 gal
Oxidizer per IP	112 gal

Site Map



The green area on the site map depicts the extent of soil contaminants exceeding MCLs prior to the first Cool-Ox™ injection. During the injection work, free product was observed in several of the injection points in this area. However, post injection sampling data revealed that all soil contaminant concentrations had been reduced to levels below maximum concentrations for site closure. Groundwater (blue area prior to treatment) samples collected 18 months after the Cool-Ox™ injection, revealed that contaminant concentrations exceeding MCL closure levels had been reduced to the area depicted in red. During the injection work high concentrations of hydrocarbons (light oils) were also discovered. These were confined mainly to the green area on the Site Map.

Current Status

The Cool-Ox™ application successfully located all soil sources and reduced soil levels to less than those required by the state agency for residential standards. Groundwater is currently monitored on a quarterly basis. The site is under evaluation to ascertain future remedial needs if any.

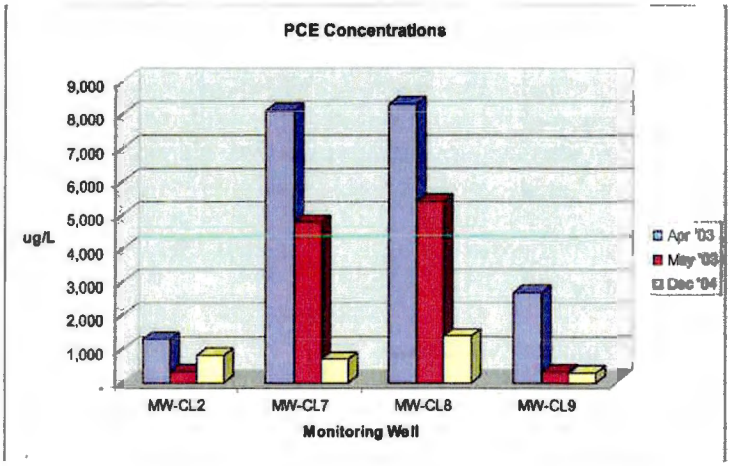
The remedial solution for this site was designed and managed by a DET Principal.

Results

Site 0005- Contaminant Data-GW (PCE)

Groundwater Samples	Pre[1] Injection Samples	30 day Post Injection Samples	18 months Post Injection Samples
MW-CL2	1,300	340	830
MW-CL7	8,100	4,800	710
MW-CL8	8,300	5,400	1,400
MW-CL9	2,700	320	300

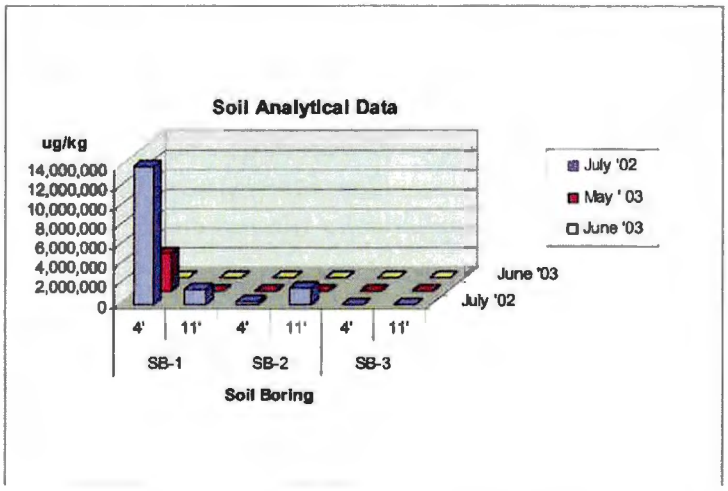
(1) All data reported in µg/L



Site 0005- Contaminant Data-Soil (PCE)

Soil Boring	Depth	07/09/02	05/28/03	06/24/03
SB-1	4'	14,000,000	3,800,000	1,700
	11"	1,500,000	2,900	320
SB-2	4'	280,000	NS	120
	11'	1,700,000	120	110
SB-3	4'	5,000	NS	59
	11'	1,100	0	12

(1) All data reported in µg/Kg



Contact: Jeff Citrone – Higgins & Associates, LLC

DeepEarth Technologies, Inc. – 12635 Kroll Drive – Alsip, IL 60803 – tech@deepearthtech.com (877) 266-5691

DeepEarth Technologies, Inc.

Cool-Ox™

CASE HISTORY©

Work Summary (Site History) ***CHS-0008 Chlorinated Compounds(TCA- DCA- DCA)***

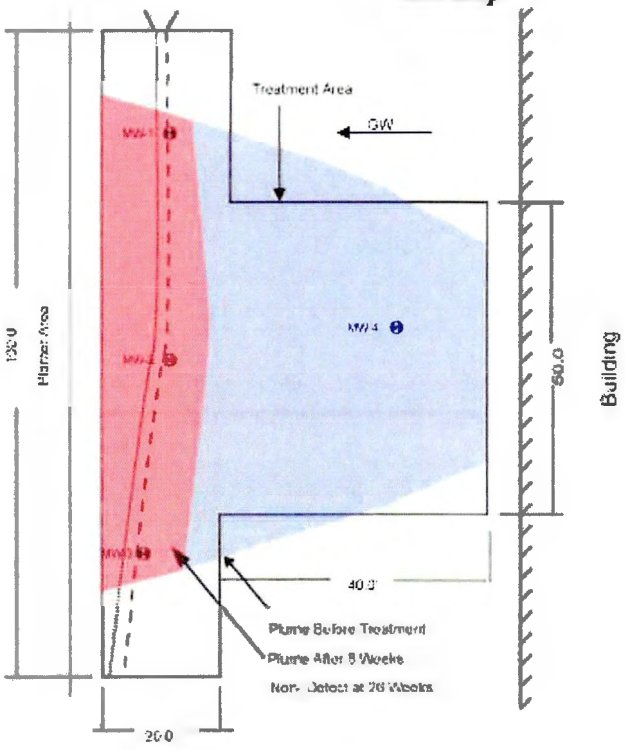
The sale of an industrial property was being held up because a groundwater plume contaminated with chlorinated VOCs required remediation. Compounding the problem was the specter that the plume was poised to migrate off-site. Because underground electrical cables were located in the plume, care had to be taken so that these utilities would be protected from physical and corrosive damage by any remedial process. Conventional technology such as SVE was ruled out because the plume was located in a wet, dense-clay strata 12 to 22 fbgs. Because of the consultants enjoyed success at treating vinyl chloride and DCE at a previous site, an in-situ chemical oxidation (ISCO) process based upon the controlled long-term in-situ generation of hydrogen peroxide was selected. The work was successful and the site was closed.

Project at a Glance

Site 0008 - Site Information

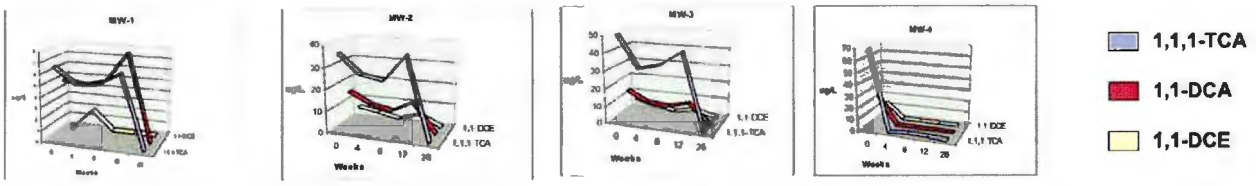
Type of site	Industrial Park
Contaminants	1,1,1-TCA, 1,1-DCA, 1,1-DCE
Work Scope	Inject chemox reagent
Media Treated	Groundwater
Soil Type	Wet Clay
Groundwater Depth	12 feet
Remedial Objective	Reduce contaminants to levels < MCLs

Site Map



Site 0008 - Application Information

Technology Selected	ISCO
Application Method	DPT Probe
Area Treated	4,000 sf
Vertical Interval	12 to 22 fbgs
Injection Point (IP) Spacing	5 feet
Media Volume Treated	1,480 cubic yards
Number of Injection Points	160
Oxidizer Volume	13,320 pounds
Oxidizer per IP	~83 pounds
Oxidizer per cubic yard	~9 pounds
Time to Complete	12 days



Current Status

Closed! A NFA letter was issued by the State of California

Results

Site 0008- Contaminant Data

Well	Week	Contaminants of Concern (µg/L)		
		1,1,1-TCA	1,1-DCA	1,1-DCE
MW-1	0	6.6	5.0	ND
	4	5.2	4.7	1.8
	8	5.3	5.2	ND
	12	6.4	7.8	ND
	26	**ND**	**ND**	**ND**
MW-2	0	36.0	16.0	5.9
	4	27.0	11.0	4.1
	8	25.0	8.9	2.1
	12	37.0	14.0	4.7
	26	**ND**	**ND**	**ND**
MW-3	0	50.0	15.0	6.1
	4	32.0	9.1	3.5
	8	35.0	8.0	1.3
	12	43.0	11.0	3.4
	26	**ND**	**ND**	**ND**
MW-4	0	68.7	24.4	13.4
	4	ND	ND	ND
	8	1.2	ND	ND
	12	0.9	ND	ND
	26	**ND**	**ND**	**ND**

Examination of the data collected approximately one month after the injection work was completed revealed that little or no change had occurred in the concentrations of the contaminants in monitoring wells MW-1, MW-2 and MW-3. However, dramatic reductions were observed in MW-4. Comparison of this data to previously treated sites impacted with the same contaminants, indicated that the expected results should have duplicated the reductions found in MW-4.

Review of Site Map shows an underground electrical utility corridor traversing the length of the injection area nearest the property line. It also reveals that monitoring wells MW-1, MW-2 and MW-3 are located in this corridor. During the injection work care was taken not to impact the underground electrical cables with the direct push equipment. Consequently, the two (2) rows of injection points on either side of the utility corridor were shifted away from the electrical lines to accommodate safety concerns. This inadvertently left the monitoring wells located in the utility corridor in an area not immediately impacted by the reagent. It was decided that because the groundwater was flowing perpendicular to the corridor, the reagent should eventually reach these monitoring wells. Data collected approximately six (6) months after the application indicated that the concentrations of contaminants in the wells had dropped below maximum contaminant levels (MCLs) for site closure.

DeepEarth Technologies, Inc.

Cool-Ox™

CASE HISTORY©

Work Summary (Site History) ***CHS-0010 Ethylene Dibromide (EDB & BTEX)***

Discovery of gasoline contaminated soil and a UST provided the criteria for acceptance for funding by the Florida Abandoned Tank Restoration Program. Initial remediation included removal of the 600 gallon UST and excavation of 45 tons of contaminated soil. Pilot testing ruled out DP extraction or SVE. Instead, the *Cool-Ox*™ Process, a Technology based upon the controlled production of hydrogen peroxide in-situ, was selected. This Technology had demonstrated its ability to eradicate mixed contaminants (hydrocarbons with halogens) and seemed ideal at this site where ethylenedibromide (EDB) was also present. Post remedial monitoring revealed 97% reduction in total BTEX with EDB reduced to non-detect.

Project at a Glance

Site 0010 - Site Information

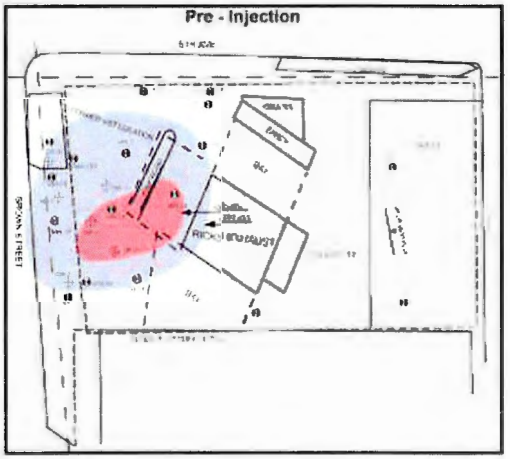
Type of site	Former Retail Gasoline Station
Location	Jackson County, Florida
Contaminants	EDB & BTEX
Work Scope	Inject *Cool-Ox*™ Reagent
Media Treated	Soil & Groundwater
Soil Type	Sandy Clay to Hard Clay, Limestone @ 40'
Groundwater Depth	11 fbgs
Remedial Objectives	1. Eliminate Soil Sources 2. Initiate GW Remediation

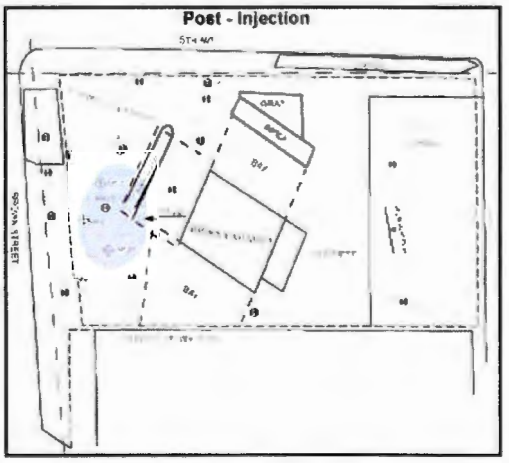
Site 0010 – Application Information

Technology Selected	*Cool-Ox*™ Process
Application Method	DPT Probe Rig
Area Treated	2,048 square Feet
Vertical Interval	10 to 40 feet bgs
Injection Point (IP) Spacing	7 feet
Media Volume Treated	2,276 cubic yards
Number of Injection Points	42
Cool-Ox™ Volume	11,400 gal
Cool-Ox™ per IP	271 gal

The blue area on the site map depicts the extent of the groundwater contaminant plume prior to the first *Cool-Ox*™ injection. Samples from replacement wells collected after the initial injection revealed that the contaminant plume had shrunk to a small area (see blue area on Post Injection Site Map).

Site Map





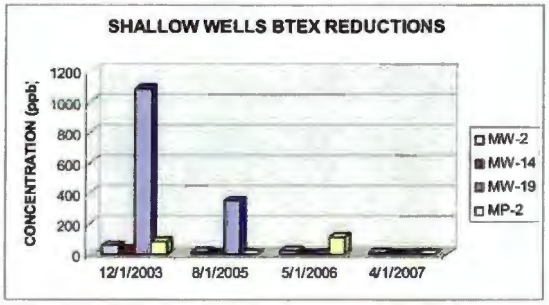
Current Status

As expected, EDB concentrations were reduced to non-detect. Because of the significant reductions in contaminant concentrations, the site was placed in Post Remedial Action Monitoring Status. Petroleum contaminant concentrations continue to decline as a function of the long-term sustained chemical oxidation and biologic mechanisms indicative of the Cool-Ox™ remedial Technology.

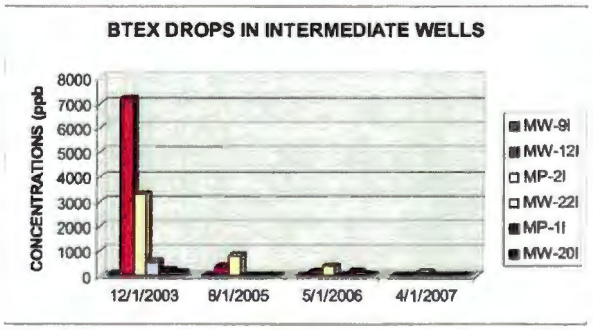
Results

Site 0010- Contaminant Data

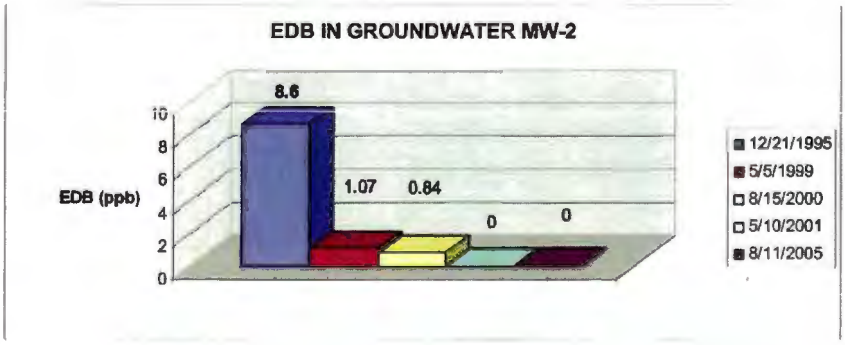
Date	MW-2	MW-14	MW-19	MP-2	AVG. Total BTEX
Dec-03	58	29	1086	84	314
Aug-05	15	5	352	4	94
May-06	25	1	<1	112	35
Apr-07	9	<1	<1	4	6.5



Date	MW-9I	MW-12I	MW-20I	MW-22I	MP-1I	MP-20I	AVG. Total BTEX
Dec-03	81	7207	140	560	220	3304	1919
Aug-05	3	383	2	2	2	813	201
May-06	10	202	15	2	192	401	137
Apr-07	0	14	0	<1	1	141	59



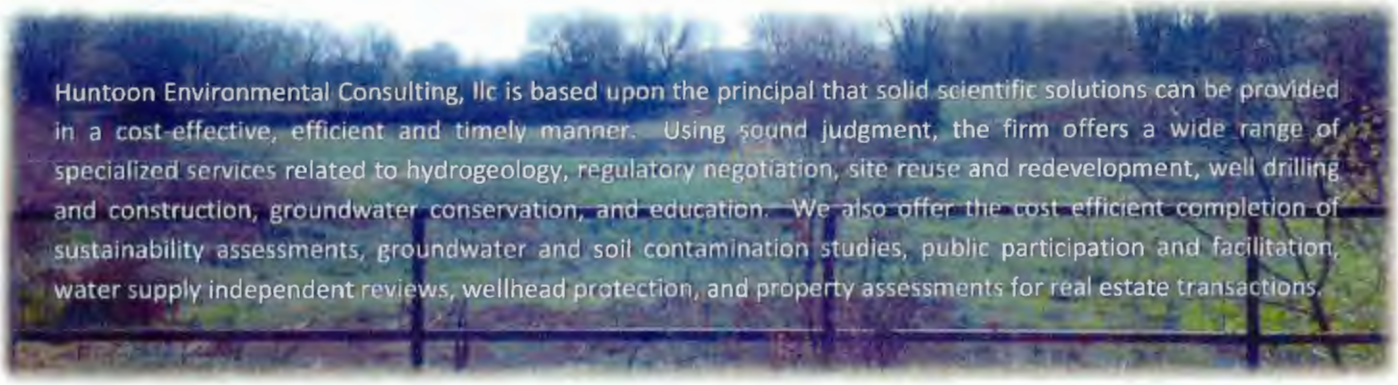
Date	12/21/95	5/5/1999	8/15/2000	5/10/2001	8/11/2005
EDB (ppb)	8.6	1.07	0.84	ND	ND



Client Contact: Alfie Nazario, P. E., AET, LLC, Pensacola, FL (850)471-2127

C. COMPANY SUMMARY: HUNTOON ENVIRONMENTAL CONSULTING, LLC

Huntoon Environmental Consulting, llc



Huntoon Environmental Consulting, llc was founded in February 2013 by Lori Huntoon, Professional Geologist (WI #13-008) to fill the need for highly technical assistance related to hydrogeologic issues within tight budgets and timeframes. An independent woman-owned consulting firm, Huntoon Environmental Consulting, llc has more flexibility and lower overhead expenses than the traditional engineering consulting firm, and has the advantage of providing the same types of services to clients within tight budgets and schedules. In addition to cost effective solutions, clients can be assured that they are always working directly with the decision maker in the firm, which allows for more direct and complete communication, resulting in efficiency and effectiveness.

Ms. Huntoon brings over twenty years of experience in environmental and sustainability consulting, regulatory oversight, education/training, and project management working for a variety of clients including municipalities, state and federal agencies, and industry. She has extensive knowledge regarding groundwater and soil contamination issues, and a broad range of experience managing large scale groundwater monitoring networks on RCRA/CERCLA/LUST/DERF projects, feasibility studies and remedial action plans. An excellent facilitator, she is available to assist with regulatory negotiations, in-house training, outreach programs, and strategic planning.

- **Oversight of Superfund Site Investigations**
- **Phase I/II Property Transaction Site Assessments**
- **Site Investigations involving a Variety of Contaminants**
- **Feasibility Studies and Alternatives Analysis**
- **Remediation of Metals-Contaminated Sites**
- **Development of Remedial Action Plans**
- **Management of Remediation Programs**

Providing strong technical knowledge, regulatory negotiation, and effective communication for all of your environmental project needs. An experienced leader within the groundwater industry.

Huntoon Environmental Consulting: a logical choice!

Huntoon Environmental Consulting, llc
P.O. Box 259927 – Madison WI 53525
608-886-7245

D. COMPANY SUMMARY: DEEPEARTH TECHNOLOGIES, INC.

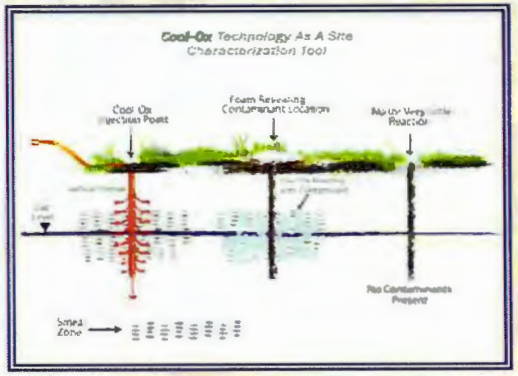
Contaminants successfully treated by

Cool-Ox™

BTEX
Coal Tars
Vinyl Chloride (DCE)
Chlorobenzenes
Polyaromatic Hydrocarbons
Creosote
Jet Fuel
Chlorinated Herbicides
Chlorinated Pesticides
Pentachlorophenol (PCP)
Chlorinated Solvents
PCBs
Dioxins
Pesticides
Home Heating Oil
Excavation Odor Control

Sites

Service Stations
Railroads
Pipelines
Agchem Formulators
Manufactured Gas Plants
Wood Treating
Military Bases
Dry Cleaners
Marine Bulk Terminals
Under Building Structures
Sediments
Mixed Plumes
Refineries
Steel Mills
Chemical Plants



Site Characterization Technique

"professional personnel teamed with cutting edge technology and superior equipment"

DeepEarth Technologies, Inc.
12635 South Kroll Dr.
Alsip, Il 60803
***Toll Free* 877-266-5691**

Chicago, IL
708-396-0100

Denver, CO
720-320-3198

Pensacola , Fl
850-206-3260

Houston, TX
281-546-3570

email us at:
tech@deepearthtech.com
www.deepearthtech.com

DeepEarth Technologies, Inc.
"the chem-ox professionals"

Cool-Ox™

"Controlled In-Situ Chemical Oxidation"

www.deepearthtech.com

Controlled In-Situ Chemical Oxidation

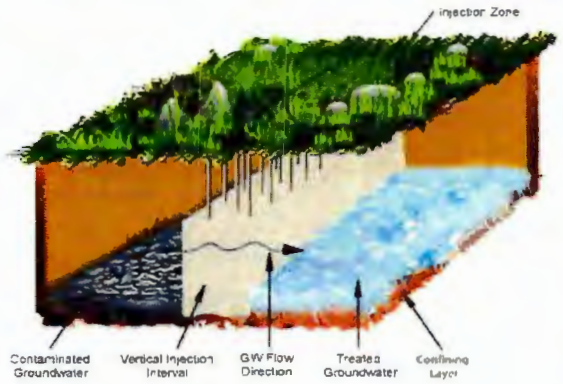
What is the Cool-Ox™ process?

Cool-Ox

Although hydrogen peroxide is widely accepted as the cleanest in-situ chemical oxidation compound, its application using the Fenton mechanism is dangerous and uncontrollable. The extremes in heat and pressure generated by the Fenton reaction can volatilize contaminants causing them to spread even further in soil and groundwater. Moreover, concentrated liquid hydrogen peroxide (>10%) has been responsible for numerous accidents.

DeepEarth Technologies, Inc., (DTI) has tamed the Fenton reaction by developing the patented *Cool-Ox™* Technology. By controlling the reaction, contaminant sources can be pin pointed quickly during the site injection work. DTI can then focus on the sources thus assuring maximum effect of the *Cool-Ox™* reagent. The photo above illustrates this forensic feature unique to *Cool-Ox™* Technology. The *Cool-Ox™* process is designed to address a broad variety of remedial challenges found at sites throughout the world.

The Cool-Ox™ Bio-Spunge™ Reactor (Groundwater Defined Flow Application)



Wherever *Cool-Ox™* Technology has been applied, rapid growth of intrinsic aerobic microbes has been observed. This unique feature provides the one-two punch of combining abiotic chemical oxidation with bio-remediation. By engineering the accumulation of the microbial cells, they will produce extra-cellular polymeric substances (ECPS) that gives the appearance of live marine sponges. This matrix allows the groundwater to flow through providing a filtration mechanism entrapping contaminants and providing a carbon source for the microbes. This is the basis of the *Cool-Ox™ Bio-Spunge™ Reactor.*

"eliminates safety hazards for workers and sites"

Cool-Ox™ was specifically designed to exploit the advantages of hydrogen peroxide while eliminating the safety hazards associated with the product. The heat and acid hazards of the Fenton reaction have been eliminated. The optimum pH for the *Cool-Ox™* reaction is 8, thereby facilitating its use in limestone strata. *Cool-Ox™* aggressively destroys a wide variety of contaminants. It is particularly well suited for treating chlorophenolic and creosote compounds where the basic pH aids in desorbing these contaminants from the soil. Eliminating acid problems, heat and the need for injection wells makes *Cool-Ox™* the safest ISCO process available. **No Heat means No Ignition Source!**

"experience, quality equipment and injection technique are keys to successful site remediation"

DTI prides itself in the quality of its equipment and personnel. For fire safety, all DTI rigs and vehicles are equipped with diesel engines and maintained continuously. All personnel hold required OSHA training certificates.

The "Deep Shot Rig" Feeding Two Probes

"Free Product Treatment"

The Cool-Ox™ Process has been successfully employed to eliminate free product at several sites both in-situ and in excavations. The photo above depicts Cool-Ox™ reagents reacting with free product at a large hydrocarbon release. An additional feature of this application is the ability of the reagent to convert aromatics to non-odorus compounds thereby, eliminating rather than masking the problem.

Lori Huntoon, PG

Principal Hydrogeologist & Owner, Huntoon Environmental Consulting, llc
P.O. Box 259927, Madison WI 53725
608-886-7245 · lorihuntoonpg@gmail.com

QUALIFICATIONS

Professional geologist, certified educator and former regulator with over 25 years of progressive leadership experience providing technical program management for water and environment.

- **Consulting experience** includes oversight of site investigations including identification of potentially responsible parties, independent technical evaluations for environmental programs, farmland assessments, Phase I and Phase II real estate property transactions; groundwater resource assessment/evaluation/ protection; development of remedial action plans, wellhead protection surveys; regulatory negotiation; wetland determinations; water supply/conservation; litigation support; oversight of administrative/field staff, and training.

- **Regulatory program management** includes Section Chief of the technical section of the Wisconsin Petroleum Cleanup Fund overseeing 25 technical staff with projects exceeding an annual budget of $94M; represented the PECFA program at public hearings throughout the state, and contributed to administrative code revisions. As a consultant, worked on the development of environmental standards for industry; participated in the initial "integrated environmental plan for the Mexican-US Border" between USEPA and (then) SEDUE in 1992.

- **Project management** experience includes oversight of subcontractors and drilling crews; completion of field and reporting activities associated with groundwater contamination investigations and remediation programs, development of well head protection programs and siting of replacement water supply wells; regulatory compliance; and establishment of consistent objectives for municipal, state/federal, legal, and and industrial clients.

- **Drilling oversight** includes management of drilling programs, supervision of an environmental drilling crew; presentation of investigative results focused on groundwater sampling at multiple intervals utilizing dual-tube drilling technology; speaker at hands-on environmental drilling technology programs; and a broad range of experience managing large-scale groundwater monitoring networks for extensive and complex site investigations.

LICENSING & CERTIFICATIONS

Licensed Professional Geologist – State of Wisconsin #13-008, since 1997
Certified Ground Water Professional – National Ground Water Association, since 1991
Certified Secondary Science Teacher – State of Wisconsin, 2008
Certified English As a Second Language Teacher – State of Wisconsin, 2008

PROFESSIONAL EXPERIENCE

Owner & Principle Hydrogeologist February 2013 to present
Huntoon Environmental Consulting, llc, Wisconsin (formerly HydroGeoLOGIC Consulting, llc)
Logical approaches to environmental and sustainability solutions for communities, non-profit groups, law firms, government agencies, other consulting firms, and businesses. Assistance with technical reviews and litigation preparation. Grant writing and oversight of grant-funded programs, technical assistance with economic development projects, program oversight, strategic planning, marketing.

Section Chief, Wisconsin Petroleum Cleanup Fund · 1997 to 2004
State of Wisconsin Department of Commerce, Madison WI
Managed the technical section of Wisconsin's Petroleum Cleanup Fund, including an experienced staff of 25 hydrogeologists and program assistants at five locations throughout the state. Conducted public hearings, facilitated meetings, coordinated interagency training, participated in preparation of interagency memorandums, assisted with administrative rule changes, represented the agency at national conferences, served as liaison in regional and national meetings with EPA, prepared annual reports for the legislature and Governor's office, chaired Administrative Code revision committee.

Hydrogeologist 1985-1997
Environmental Consulting Firms, Madison WI & Rockford IL
Project oversight, including RCRA, Phase I/II environmental site assessments for property transactions, and groundwater investigations. Managed environmental projects including Fortune 500 manufacturing firms based out of Milwaukee. Provided corporate compliance audits for facilities located nationally and along the US/Mexico border. Managed metals contaminated site investigation and remediation program in California, including an evaluation of new metals-treatment technology and facilitation of meetings involving multiple regulatory agencies. Managed office for full service engineering, geotechnical and environmental consulting firm, including monthly operations reports, timesheets, accounts payable and receivable, expense reports, hiring and discipline of staff.

Branch Manager/Operations Manager/Hydrogeologist 1985-1993
Environmental Consulting Firms, Houston TX & Milwaukee WI
Supervised staff including geologist, drilling crew, and administrative support. Conducted business development. Managed environmental projects including RCRA, leaking underground storage sites, lumber treatment facilities, and locations of illegally disposed drums. Managed field activities for the City of Wausau Superfund Site and the Sheboygan River & Harbor Superfund Site, including oversight of drilling operations on each side of the Wisconsin River and in the Sheboygan Harbor, respectively. Completed health risk assessment and groundwater investigation for neighborhood surrounding petroleum refinery in western Louisiana. Conducted business development throughout Texas, Oklahoma, and the Midwest, including assistance with the opening of offices in Michigan, Indiana and Illinois. Conducted business development, participated in corporate strategic planning and training.

EDUCATION & TRAINING

Sustainability Consulting Cohort Program, ISSP – 2013
Science and ESL Education, Edgewood College, Madison, Wisconsin – 2008
Organizational Facilitation and Negotiation, State of Wisconsin – 1997
Organizational Management and Leadership Training, State of Wisconsin – 1998 - 2000
ISO14000 Environmental Management System Training - 1996
40 Hazardous Waste Operations and Emergency Response Training – NGWA, 1985
B.S., Geology – University of Wisconsin Platteville, 1985
Advanced classes in Hydrogeology – University of Minnesota Minneapolis, 1984-1985
Mining Engineering coursework – University of Wisconsin Platteville, 1980-1982
Water Well Drilling Course, Staples Technical Institute, 1982
Baroid Mud Drilling Technology – Baroid Drilling Institute, Houston Texas, 1981

PROFESSIONAL ASSOCIATIONS

ASTM International D18-21 on Ground Water Monitoring (1987-present)
ASTM International E-50 on Environmental Site Assessments (1990-present)
Department of Interior ASTM Representative to Subcommittee on Groundwater (2010-present)
Federation of Environmental Technologists Audit Committee CoChair (1990-1994)
Ground Water Age Advisory Board (1987-1990)
International Society of Sustainability Professionals Consultant Cohort (2013)
Merlin Mentors UW-Madison (2014)
Rock Trail Coalition Board of Directors (2013-present), Newsletter Editor (2013-present)
National Ground Water Association Ground Water Scientists & Engineers Director (1990-1994)
National Ground Water Association Ground Water Management and Protection Committee (2015)
National Ground Water Research and Educational Foundation Board Member (2015)
Rock Trail Coalition Newsletter Editor (2014-2015)
Sustainable Janesville Committee Member (2014-2015)
Wisconsin Ground Water Association President (1988-90), Board member (2008-10)
Wisconsin Water Association Chair, Small Systems Committee (2012-2013)
Wisconsin Water Well Association Associate Member (1985-present)
Wisconsin Women Environmental Professionals / Madison Chapter – CoChair (2003-2004, 2011)
University of Wisconsin Women In Business Council Board Member (1998-2000)

REFERENCES

Available upon request.

Terracon

May 28, 2015

Gonzalez Saggio & Harlan LLP
111 East Wisconsin Avenue
Suite 1000
Milwaukee, Wisconsin 53202

RECEIVED
MAY 29 2015
BY:

Attn: William P. Scott, Esq.

Re: DERF Program Remedial Action Proposal
Express Cleaners
3941 North Main Street
Racine, Racine County, Wisconsin
Terracon Proposal No. P58150098

Dear Mr. Scott:

At your request, Terracon Consultants, Inc. (Terracon) has prepared this proposal to provide environmental consulting services for the above-referenced site. This proposal was prepared in general accordance with your May 5, 2015 Request for Remedial Action Bid Proposal, and includes a summary of the existing site conditions, the proposed cleanup goals for the project, a discussion of possible remedial action options, and recommends specific remedial actions. A tentative project schedule and cost estimate are also included.

This proposal is written to comply with the Wisconsin Department of Natural Resources (WDNR) requirements for maintaining eligibility for reimbursement of costs covered under the Dry Cleaner Environmental Response Fund (DERF). Terracon is experienced at providing consulting services for remediation of chlorinated solvent impacts. We are also aware of the bid contract and requirements of NR 169.13 and 169.23, Wisconsin Administrative Code (WAC). Terracon provides consulting services in compliance with the applicable requirements under NR 169 and 700 to 728. Terracon did not prepare this proposal in collusion with any other consultant. Terracon carries insurance coverage in compliance with NR 169.23(9)(b).

Terracon understands the scope of your project and the services that will be required. We have the experience and ability to analyze alternatives and design the most suitable response action, consistent with technical and economic feasibility, environmental statutes and rules, restoration timeframes, and the latest technical advances. We will provide necessary staff and facilities for the project. We will provide qualified technical reviewers and project management that will keep you advised on technical and regulatory matters and work toward planned remediation goals. Terracon's services are performed in an ethical, professional, and timely manner.

1.0 PROJECT INFORMATION

The site is located at 3941 North Main Street, Racine, Wisconsin. Based on the Request for Proposal (RFP), the site is 0.77 acres and is developed with a one-story, 6,804-square-foot strip mall located along the east side of the site. A dry cleaner formerly operated in the northernmost tenant space of the strip mall. We understand that dry cleaning operations were conducted at the site from 1971 until approximately 2006. According to the RFP, all business operations at the site have ceased.

A release of dry cleaning solvent was identified in 2006. Tetracholorethene (a.k.a. perchloroethene or PCE or perc) and associated breakdown products were detected in soil. Subsequent soil and groundwater investigation was performed in 2007 through 2011. Based on documentation provided with the RFP, it appears the last groundwater monitoring event was conducted in April 2011.

The investigation identified an area of soil and groundwater impacted by PCE and breakdown products beneath the on-site building and most of the northern third of the property. The impacted soil and groundwater also extend off-site to the east onto property owned by S.C. Johnson and Sons and to the west beneath Main Street. An estimate of the extent of the soil and groundwater impacts was depicted by others as indicated in Figures 1 and 2.

During the last phase of investigation, site-specific residual contaminant levels (SSRCL) were calculated for the site, and the soil data indicated SSRCLs for direct-contact and protection of groundwater were both exceeded. Since the last phase of investigation was completed the WDNR has established additional guidance for the calculation of soil residual contaminant levels (RCLs) for direct-contact exposure and the protection of groundwater. Terracon used the guidance document *Soil Residual Contaminant Level Determinations using the US EPA Regional Screening Level Web Calculator*, PUB-RR-890, dated June 2014 to establish RCLs for this site, and compared the available soil data to these RCLs. The approximate lateral areas of soil containing PCE at concentrations exceeding the industrial and non-industrial, direct-contact RCLs are depicted on Figure 1. The site investigation did not define the lateral extent of soil containing volatile organic compounds (VOCs) at concentrations above the soil to groundwater pathway RCLs.

Groundwater impacts exceeding NR 140, WAC, enforcement standards (ESs) are generally present beneath the area of impacted soil. The PCE plume appears to have approximately the same extent as the soil impacts. Based upon the presence of several breakdown products, it appears that conditions are favorable for limited biodegradation of the solvents. The plumes appear to be delineated horizontally and vertically. Figure 2 depicts the approximate horizontal extent of groundwater contamination in April 2011.

The investigation reports for the site indicate the water table exhibits a potential divide on-site such that groundwater on the northwest portion of the site appears to flow to the southwest while groundwater on the northeast portion of the site appears to flow to the east. The soil types are predominantly silty sand overlying silty clay. Groundwater is present as shallow as 2 feet below ground surface (bgs). Utilities corridors are expected to be located within the silty sand. A saturated soil sample collected from a depth of 6 to 8 feet bgs at a soil boring (B13) advanced near the water and sewer lateral extending west from the building to Main Street contained PCE at a concentration of 68,000 micrograms per kilogram (µg/kg), indicating that impacted groundwater may be migrating along the utility corridor. The RFP states "as part of the effort to reduce contaminant mass at the Site, the DNR supports remediating the saturated and unsaturated media in the sewer utility corridor extending from the western Site boundary to the point where the sewer utility enters the slab."

CLEANUP GOALS

The RFP states "The primary remedial goal is for DNR to award full case closure. A secondary goal is to treat or remove sufficient contaminant mass from the Site so as to substantially reduce future threats posed by vapor intrusion, ensure that the groundwater plume will not expand and ensure that any remaining contamination is naturally attenuated within a reasonable time." In accordance with the RFP, we have summarized our remediation goals for soil, groundwater, and soil vapor:

- To balance the primary and secondary goals stated in the RFP with feasibility and cost-effectiveness, Terracon proposes the non-industrial direct contact RCLs as the soil remediation goals for the site, for soil within the 0 to 4 foot interval. Remedial action options for soil were evaluated based on the likelihood these soil remediation goals could be achieved in a reasonable period of time.
- The site investigation reports indicate potable water for the site is provided from the municipal water supply system and that there is not a private potable water supply well on site or on the east adjoining property. Terracon proposes the establishment of stable or decreasing trends in groundwater VOC concentrations as the groundwater remediation goal for the site.
- With respect to soil vapor, the RFP states "the goal is to demonstrate that contaminated media remaining at the Site following remediation will not cause a vapor action level in indoor air to be attained or exceeded." The project files we were provided do not indicate whether indoor air sampling has been conducted in the strip mall or on adjacent properties. The remedial action outlined herein should reduce the potential for vapor intrusion; however, future developments should include installation of a subslab depressurization system and/or a vapor barrier to further address the potential for vapor intrusion. In accordance with the RPF, this proposal includes a contingency task to

assess vapor intrusion potential on the north adjacent property following implementation of the remedy.

2.0 REMEDIAL ACTION OPTIONS EVALUATION

To develop the approach we believe provides the best combination of technical and economic feasibility, Terracon considered multiple remedial action options, including monitored natural attenuation (MNA) and enhanced MNA. The options considered included:

- MNA with institutional controls for residual soil and groundwater impacts;
- Enhanced MNA with institutional controls for residual soil and groundwater impacts;
- Soil excavation and off-site disposal coupled with MNA; and
- Soil excavation and off-site disposal coupled with enhanced MNA.

The site investigation has generally identified up to 8 feet of unsaturated or saturated, silty sand soil in the source area. The majority of the impacted, unsaturated soil is located in areas beneath the building, currently inaccessible to excavation. In our experience, ex-situ remedial actions are consistently more effective at removing contaminant mass. Ex-situ remedial actions can be completed more quickly, allowing MNA to proceed sooner and more effectively. Having considered the above options, Terracon proposes remedial actions consisting of soil excavation and off-site disposal coupled with MNA.

We understand that demolition of all or part of the building before commencing with remediation can be considered as part of this remedial action options evaluation. Based upon the concentrations present beneath the building and difficulty associated with accessing those impacts while the building remains, Terracon requests demolition of the entire building. The RFP indicates this will be completed by others, leaving the concrete floor slab of the building and the water/sewer utility laterals. Consequently, we have not included tasks or costs for activities related to building demolition in our proposal.

Terracon estimates there is approximately 130 pounds of PCE present in the upper 4 feet of soil within the area where PCE concentrations exceed the non-industrial, direct-contact RCLs. These soils are mostly unsaturated, as the water table is reportedly located 2 to 4 feet bgs in this area. Approximately 250 pounds of PCE is present in the 4 to 8 foot soil interval in the area bounded by the estimated extent of non-industrial, direct-contact RCL exceedances. Soil in this interval is saturated and may be more difficult to excavate. This is a conservative mass estimate, as fewer soil samples were collected from the saturated soil. It is noted that the highest PCE concentrations in this interval are located in a relatively limited area in the vicinity of soil borings B9 and B11.

Excavation below the water table can be problematic. However, we feel it is important to remove as much of the PCE mass as practicable. In addition, the WDNR typically requires an engineered barrier when impacts above direct-contact RCLs are present within 4 feet of the ground surface. Therefore, we propose to excavate soil above the non-industrial, direct-contact RCLs within the upper 4 feet as depicted on Figure 1. This includes soil located along the water/sewer lateral extending from the building to Main Street and soil located on the adjacent S.C. Johnson property to the east. In addition, Terracon proposes to excavate soil from the 4 to 8 foot interval from the area of soil borings B9 and B11, if site conditions encountered during field activities indicate excavation is feasible. If necessary, Terracon will seek a contained-out determination from WDNR to allow excavated soil to be disposed at a licensed Subtitle D landfill. Soil containing PCE or TCE at concentrations above the industrial, direct-contact RCLs will need to be treated on-site to reduce concentrations to levels acceptable for Subtitle D landfill disposal. If not treated adequately to reduce concentrations below the contained-out criteria and the toxicity characteristic leaching procedure (TCLP) limits, the soil must be disposed as hazardous waste at substantially higher cost. The following is a summary of estimated excavation volumes:

- Volume to be excavated from 0 to 4 feet bgs, containing VOCs at concentrations less than the industrial, direct-contact RCLs and higher than the non-industrial, direct contact RCL: 420 cubic yards (630 tons). This area is shaded as green on Figure 1.
- Volume to be excavated from 0 to 4 feet bgs, containing VOCs at concentrations greater than the industrial, direct-contact RCLs and requiring on-site treatment: 120 cubic yards (180 tons). This area is shaded as yellow on Figure 1.
- Volume to be excavated from 4 to 8 feet bgs (if feasible), containing VOCs at concentrations greater than the industrial, direct contact RCLs and requiring on-site treatment: 65 cubic yards (95 tons). This area is roughly bounded by soil borings B9 and B11 within the shaded area on Figure 1.

We believe aggressive source removal is sufficient to allow MNA to complete the remediation over time. However, this can only be confirmed through post-remediation groundwater monitoring. The presence of biodegradation daughter products of PCE (trichloroethene (TCE), cis-1,2-dichloroethene (DCE)) indicates that reductive dechlorination is occurring. In accordance with the RFP, Terracon has included collection of eight rounds of post-remediation quarterly groundwater samples from the remaining monitoring well network to evaluate trends in groundwater quality. If, during the monitoring program, it appears that the lack of carbon in groundwater is a limiting factor in the MNA process, biodegradation can be enhanced through the injection of a variety of carbon sources into the affected groundwater. In this fashion, reductive dechlorination can be encouraged to facilitate breakdown of the PCE and TCE to DCE and vinyl chloride (VC). The DCE and VC would be expected to degrade by other means, primarily oxidative destruction at the margin of the plume. If necessary, oxidative destruction can also be enhanced. The size of the plume to be enhanced after completion of the excavation

may be substantially different than the configuration estimated in 2011, widely affecting the costs of enhanced MNA. We are not including costs for amendments to enhance MNA at this time.

Terracon does not propose to perform a pilot test for these remedial actions, as both excavation and MNA are commonly employed remedial actions. Based upon the location of the impacts and planned demolition of the building, we do not believe that additional sampling or remediation will be necessary to address potential vapor intrusion concerns. As previously noted, baseline vapor intrusion is not available for the site or for surrounding properties. The remedial action outlined herein should reduce the potential for vapor intrusion; however, future developments should include installation of a subslab depressurization system and/or a vapor barrier to further address the potential for vapor intrusion.

We have endeavored to provide sufficient detail in this proposal such that it can be considered the remedial action plan, suitable for submittal to the WDNR. The specifics of our recommended remedial actions are described in the Scope of Services section of this proposal.

3.0 SCOPE OF SERVICES

Terracon recommends the following scope of services to remediate the site and obtain closure from WDNR:

- Prepare excavation specifications, solicit bids, and prepare a health and safety plan;
- Prepare a request for a contained-out determination, if requested by the landfill;
- Collect one round of groundwater samples from the monitoring well network to establish pre-remediation groundwater conditions;
- Abandon groundwater monitoring well MW-3;
- Obtain site access to excavate impacted soil from the S.C. Johnson property in the area of soil boring BA1;
- Remove the concrete floor slab (once the building is demolished by others) and disconnect/abandon utility connections;
- Excavate approximately 540 cubic yards (yd^3), in-situ volume, of accessible soil in the source area to a depth of 4 feet bgs (green and yellow-shaded areas on Figure 1);
- Excavate (if feasible) approximately 65 cubic yards, in-situ volume, of accessible soil in the source area to a depth of 8 feet bgs (within yellow-shaded area on Figure 1);
    - The non-hazardous soils will be excavated and transported to a licensed disposal facility as a special waste. The landfill will likely be either Waste Management's - Metro landfill in Franklin, Wisconsin or Pheasant Run landfill in Bristol, Wisconsin.
    - The soils being managed as potentially hazardous waste (185 cubic yards) will be loaded into up to 15 roll-off boxes with liners and covers, and chemically

treated on-site with an amendment, water, and lime according to the following specifications:

Soil Mixing Application

10.3 lbs RegenOx Part A per ton
5.6 lbs RegenOx Part B per ton
6.5 gallons water per ton
10 bs Slaked Lime per ton

- Terracon will sample the soil from the roll-offs approximately one month after treatment and submit a composite soil sample from each roll-off for VOC laboratory analysis and toxicity characteristic leaching procedure (TCLP) laboratory analysis. If PCE concentrations are below 153 milligrams per kilogram (mg/kg), the roll-offs will be transported for disposal as a non-hazardous waste at the selected landfill. If PCE concentrations remain above 153 mg/kg after treatment, the soils will need to be treated again or disposed as hazardous waste. It has been our experience that the proposed treatment is effective at reducing concentrations. Our estimated fees do not include a second treatment, if necessary for some roll-off boxes, nor do they include costs for disposal of hazardous waste, if necessary.

- Sample the base and sidewalls of the excavation area to document the contaminant concentrations left in place, and immediately backfill the excavation (described below);
  - Confirmatory base and sidewall excavation soil samples will be collected and submitted to the laboratory for VOCs by USEPA Method 8260B. We estimate that twenty-two (22) soil samples will be submitted for analysis.
- Backfill the completed excavation;
  - Backfill will be placed and compacted in the excavation to within approximately 12 inches of the ground surface using readily available clean fill soil, similar to the existing silty sand native soil. The backfill will be placed in 8-inch lifts, or less, and mechanically compacted.
  - If necessary to achieve adequate compaction due to groundwater conditions, Terracon may excavate and backfill immediately in small areas or place breaker rock at the base of the excavation.
  - Approximately 6 inches of clean #6 crushed stone will be placed on top of the backfilled excavation on the site. For the small portion of the excavation extending onto the east adjacent S.C. Johnson property, approximately 6 inches of clean topsoil fill will be placed on top of the backfill and seeded with a suitable grass seed mix.
- Conduct eight post-excavation quarterly groundwater sampling events to document dissolved phase contaminant plume stability and groundwater contaminant concentration trends;
- Prepare a Remedial Action Documentation Report upon completion of the excavation, sampling/disposal of the soil, and first round of groundwater sampling;

- Prepare brief data transmittals following each subsequent round of groundwater sampling;
- Prepare a Case Summary and Close Out form and GIS registry information packet; and
- Abandon the groundwater monitoring wells and piezometer.

Terracon is committed to the safety of all its employees. As such, and in accordance with our *Incident and Injury Free®* safety goals, Terracon will develop a safety plan to be used by our personnel during field services. Prior to commencement of on-site activities, Terracon will hold a brief health and safety meeting to review health and safety needs for this specific project. At this time, we anticipate performing fieldwork in a USEPA Level D work uniform consisting of hard hats, safety glasses, protective gloves, and steel toed boots. It may become necessary to upgrade this level of protection, at additional cost, during sampling activities in the event that we encounter petroleum or chemical constituents in soils or groundwater that present an increased risk for personal exposure.

Terracon will arrange for demolition and landfilling of the concrete floor slab prior to excavation. Based on information provided in the RFP, it is assumed the concrete slab can be managed as nonhazardous waste. The RFP provided information from WDNR regarding characterization of the concrete as nonhazardous. If required by the landfill, we will obtain a contained out determination from the WDNR to allow excavated soil to be disposed of at a licensed Subtitle D landfill. This phase of work will include disconnection/abandonment of utilities servicing the building. After the building and concrete are removed, soil excavation can proceed. The excavation is planned to extend 4 feet bgs, with targeted excavation to a depth of up to 8 feet bgs if feasible.

Prior to excavation activities, one round of groundwater samples will be collected from the existing network of 15 groundwater monitoring wells and one piezometer and analyzed for volatile organic compounds (VOC) by USEPA Method 8260B. Following receipt of the groundwater analytical results, monitoring well MW-3 will be abandoned in accordance with NR 141, WAC. Terracon does not propose to install a replacement for monitoring well MW-3, as the remaining well network should be sufficient to monitoring the progress of natural attenuation in groundwater.

Terracon will collect sidewall samples at a depth of approximately two feet bgs. We estimate 12 sidewall samples (approximately 1 set of samples per 20 linear feet of sidewall) will be collected. Approximately 10 base samples will be collected, approximately one base sample per 400 square feet. We are not proposing to allow the excavation to remain open pending analytical results from the laboratory due to the potential for groundwater incursion.

Backfill will be placed and compacted in the excavation to within approximately 12 inches of the ground surface using readily available clean fill, similar to the existing silty sand native soil. The

backfill will be placed in 8-inch lifts, or less, and mechanically compacted. If necessary to achieve adequate compaction due to groundwater conditions, Terracon may excavate and backfill immediately in small areas or place breaker rock at the base of the excavation. Approximately 6 inches of clean #6 crushed stone will be placed on top of the backfill.

The first of the eight post-remedial groundwater sampling events will be performed within 30 days after the earthwork is completed. Terracon proposes to sample each of the 14 remaining groundwater monitoring wells and one piezometer for VOCs by USEPA Method 8260B.

Terracon will prepare a Remedial Action Documentation Report upon completion of soil disposal activities and receipt of the results from the first round of groundwater sampling.

In accordance with the RFP requirements, seven additional groundwater monitoring events are planned prior to project closure. For the purpose of this proposal, each of the 14 remaining groundwater monitoring wells and one piezometer will be sampled each quarter for VOC by USEPA Method 8260B. These groundwater monitoring events will be performed quarterly. Upon receipt of the results from the initial sampling event, we may propose reducing the number or frequency of sampling. Terracon will prepare a brief data transmittal upon completion of each groundwater sampling event. If the results are favorable, not all of the proposed monitoring events may be needed prior to requesting closure.

Terracon believes that the remedial actions described above will result in project closure with natural attenuation as a final remedy for remaining soil and groundwater impacts, provided the groundwater data supports that natural attenuation is occurring and will remediate the remaining impacts within a reasonable period of time. This route to closure may require installation of an engineered barrier (pavement) to limit infiltration and that a cap maintenance plan is prepared. However, we are not proposing to pave the excavation areas as part of the remedial actions as natural attenuation may be sufficient to offset the effects of infiltration. If stable or decreasing concentration trends in groundwater are established without the presence of pavement over the excavation areas, an engineered barrier may not be necessary.

When the data supports that the plumes are stable or decreasing and that natural attenuation can be relied upon as a final remedy, Terracon will prepare a Case Summary and Close Out form and associated GIS Registry packet for WDNR consideration.

Upon receiving conditional closure, the 14 groundwater monitoring wells and piezometer will be abandoned per NR 141, WAC. The injection piping will also be abandoned by filling the riser piping with lean cement grout.

Investigation-derived wastes (IDW), including soil cuttings and development water, will be containerized in labeled 55-gallon drums throughout the project for temporary storage on site,

and disposed of at an appropriate facility. This proposal assumes that all IDW can be managed as nonhazardous waste.

3.1 Contingency Scope of Services

In accordance with Paragraph 15 of the RFP, Terracon has included the following contingency tasks. These tasks will not be completed without prior approval of our client and WDNR:

- Install one groundwater monitoring well at the eastern margin of the plume, at a location satisfactory to WDNR; and
- Complete a contingency vapor intrusion assessment on the north adjacent property. It is assumed that this assessment will consist of the installation of up to two subslab vapor points. Vapor samples will be analyzed for PCE and related compounds by EPA Method TO-15.

3.2 Anticipated Schedule

Terracon proposes to initiate these remedial actions as soon as possible upon client and WDNR authorization. The following is a proposed schedule:

TASK	ANTICPATED SCHEDULE	ANTICIPATED COMPLETION DATE*
Submittal of this Remedial Action Proposal		June 2015
WDNR/Client Authorization	45 days from receipt	July 2015
Building Demolition (by others)		July 2015
Excavation/Backfilling		August 2015
1st Groundwater Sampling Event	30 days following backfilling	September 2015
Submittal of Remedial Action Report	30 days following receipt of analytical data from 1st groundwater sampling event	October 2015
Subsequent 7 Rounds of MNA Sampling	Quarterly/Data Transmittals submitted within 30 days following receipt of analytical data	December 2015 March 2016 June 2016 September 2016 December 2016 March 2017 June 2017
Prepare Case Closure Documents	60 days following receipt of final analytical data	September 2017
Well Abandonment	30 days following notification of conditional closure	November 2017

TASK	ANTICPATED SCHEDULE	ANTICIPATED COMPLETION DATE*
Final Closure	30 days following submittal of conditional closure documentation	December 2017

*Anticipated completion dates are contingent upon WDNR and client review time, the MNA sampling schedule, and the schedules of Terracon, laboratory, and subcontractors.

Based on the anticipated mass removal via excavation, the lower concentrations of VOCs in the monitoring wells surrounding the limits of the proposed excavation, and the decreases in groundwater VOC concentrations that were observed between 2008 and 2011, Terracon believes that a request for case closure can be submitted after the completion of the MNA monitoring program. However, pursuit of case closure may be influenced by several factors, including but not limited to, actual trends in groundwater concentrations and plume stability.

4.0 PROJECT TEAM AND QUALIFICATIONS

Mr. Timothy P. Welch, P.G., is a Registered Professional Geologist who will manage your project, and is a hydrogeologist according to NR 712, WAC. Mr. Blaine R. Schroyer, P.E. Mr. Schroyer will provide technical review and input, and serve as the NR 712, WAC, Registered Professional Engineer. Field services may be performed by other Terracon personnel, if appropriate.

As required by NR 712, these staff will meet the appropriate professional requirements necessary for each phase of the project. Project capsules and resumes describing our related experience were provided with a previously submitted proposal for this project (Terracon Proposal No. 58110351, August 19, 2011), and can be provided again upon request.

5.0 COMPENSATION

Consulting services are considered "contract services" by the DERF program. Prior to selecting a consultant, DERF requires you to review a minimum of three bids. The intent of this requirement is to allow you to compare experience, qualifications, costs, or other factors you consider important. The DERF program can reimburse for reasonable services provided by your consultant even when they were not the lowest bidder, provided the costs are reviewed and approved in advance of the work. The intent of this provision is to allow you to select the best consultant based on all factors. Please refer to the attached cost summary for the estimated costs for performing the above-described scope of services. Please understand that until we have prepared the remedial action plan and project specifications, we cannot accurately estimate subcontractor fees. We have done our best to estimate those fees, based on similar experience on other projects, but the actual fees will be determined when the contractor bids are reviewed. We believe we have estimated the number of hours and units conservatively, so

the actual costs may be less than estimated. Furthermore, some scope items may not be required (e.g. sampling rounds), which will reduce costs accordingly.

Terracon will invoice on a time and materials basis according to the rates identified in the cost summary and subcontractor bids; we will invoice for the actual number of hours and units. Laboratory and other subcontractor invoices will be sent to you for direct payment to avoid a markup assessed by Terracon. Markups are not reimbursable through DERF and our cost summary does not include our markup.

Should additional consulting services be advisable because of the conditions encountered, Terracon will invoice based on the rates listed on the attached fee schedule. Only upon your authorization and WDNR's will Terracon complete additional tasks.

Costs for consulting must be pre-approved by WDNR and our client in order to be eligible for reimbursement. Terracon understands these requirements and does not perform work without your authorization.

6.0 GENERAL COMMENTS

The analysis and opinions expressed in this proposal are based upon data obtained from the previous assessments and laboratory chemical analyses at the indicated locations or from other information discussed in this proposal. This proposal does not reflect variations in subsurface stratigraphy, hydrogeology, and contaminant distribution that may occur across the site. Actual subsurface conditions may vary and may not become evident without further assessment.

This proposal was prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted environmental engineering practices. Materials supplied by Regenesis may be influenced by several site-specific factors that affect their performance. No warranties, express or implied are intended or made. In the event any changes in the nature or location of suspected sources of contamination as outlined in this proposal are observed, the conclusions and recommendations contained in this proposal shall not be valid unless these changes are reviewed and the opinions of this proposal are modified or verified in writing by Terracon.

7.0 AUTHORIZATION TO PROCEED

We have attached an Agreement for Services that is incorporated into this proposal. This proposal is valid for 90 days from the date of this proposal. If this proposal meets with your approval, please sign the attached Agreement for Services and return it to our office via fax (414) 423-0566 or mail to our Milwaukee office.

Terracon

Terracon appreciates the opportunity to submit this proposal and we look forward to working on this project with you. If you have questions or require additional information, please do not hesitate to contact our office.

Sincerely,

Terracon

Edmund A. Buc, P.E., CHMM
Senior Project Engineer

for Blaine R. Schroyer, P.E.
Principal/Office Manager

Attachments: Cost Summary
WDNR Form 4400-214D
Figure 1 – Site Layout
Figure 2 – Groundwater Elevation Contour Map and Extent of Groundwater Contamination, April 7, 2011
Terracon Environmental Services Fee Schedule
Certificate of Insurance
Agreement for Services

EAB/BRS:eab/N:\Proposal Documents\2015\P58150098\P58150098.doc

Copy to: Nancy Ryan, Wisconsin Department of Natural Resources
File

Express Cleaners
Terracon Proposal Number P58150098
BRRTS #02-52-547631

Cost Summary

SCOPE ITEM	Description	Unit	Estimated Quantity	Terracon Labor and Expenses: Principal $ 140.00	Senior Project Manager $ 110.00	Project Manager $ 95.00	Project Professional $ 85.00	Staff Scientist $ 75.00	Drafts person $ 60.00	Clerical $ 50.00	Expenses	Subcontractors: Drilling	Primary Contractor	Direct Disposal/Landfill $19/Ton $325/drum	Roll-Off Boxes $745/box	Chemical Oxidant	Number of Analyses: VOC $ 62.00	VOCs TO-15 $ 215.00	TCLP PCE $ 90.00	Laboratory	Subcontractors Total	TOTAL
1	Landfill Profiling/Bid Specs./Bidding/HASP	Each	1	2	5	10	10		3	2										$ -		$ 2,910.00
2	Contained-Out Determination Request	Each	1		5		8			2										$ -	$ -	$ 1,330.00
3	Baseline Groundwater Sampling Event (16 wells)	Each	1		6		25	4	2	1	$ 450.00						17			$ 1,054.00	$ 1,054.00	$ 4,759.00
4	Abandon Monitoring Well MW-3/Complete Abandonment Form	Each	1		1		5			1	$ 50.00	$ 600.00								$ -	$ 600.00	$ 1,235.00
5	Access Agreement/S.C. Johnson Property	Each	1	1	9				1	1	$ -		$ -							$ -	$ -	$ 1,240.00
6	Concrete Floor Slab Removal/Disposal/Utility Abandonment	Each	1	1	8		20				$ 100.00		$ 7,000.00	$ 5,800.00						$ -	$ 12,800.00	$ 15,620.00
7	Excavation/Roll-Off Treatment/Hauling/Disposal/Soil Sampling/Backfilling	Each	1	2	10	20	80				$ 400.00		$ 43,000.00	$ 12,000.00	$ 11,175.00	$ 14,000.00	37		15	$ 3,644.00	$ 83,819.00	$ 94,299.00
8	1st GW Sampling Event-Post Excavation (15 Wells)	Each	1		6		25	4			$ 450.00						16			$ 992.00	$ 992.00	$ 4,527.00
9	RA Doc Rpt	Each	1	2	8		30	4	4	2										$ -	$ -	$ 4,350.00
10	Quarterly Sampling/Data Transmittals (7 events)	Each	7		6		25	4	2	5	$ 450.00						16			$ 992.00	$ 992.00	$ 34,279.00
11	Case Summary Close Out Form	Each	1	2	8		30		6	3										$ -	$ -	$ 4,220.00
12	Well Abandonment /Forms/Purge Water Disposal	Each	1		3			14	6	3	$ 50.00	$ 2,700.00		$ 2,600.00						$ -	$ 5,300.00	$ 7,240.00
																					TOTAL ESTIMATE	**$ 176,009.00**

Contingency Tasks

1	Monitoring Well Installation, East Plume Margin/Incremental Cost to Sample Groundwater During Monitoring Events	Each	1		3		16		1	2	$ 85.00	$ 1,900.00		$ 325.00			8			$ 496.00	$ 2,721.00	$ 4,656.00
2	Subslab Vapor Sampling and Report, North Property	Each	1	1	5		20		1	1	$ 240.00							3		$ 645.00	$ 645.00	$ 3,385.00

Site Name: *Express Cleaners*
BRRTS #: *02-52-547631*
Type of Action: *Remedial Action*

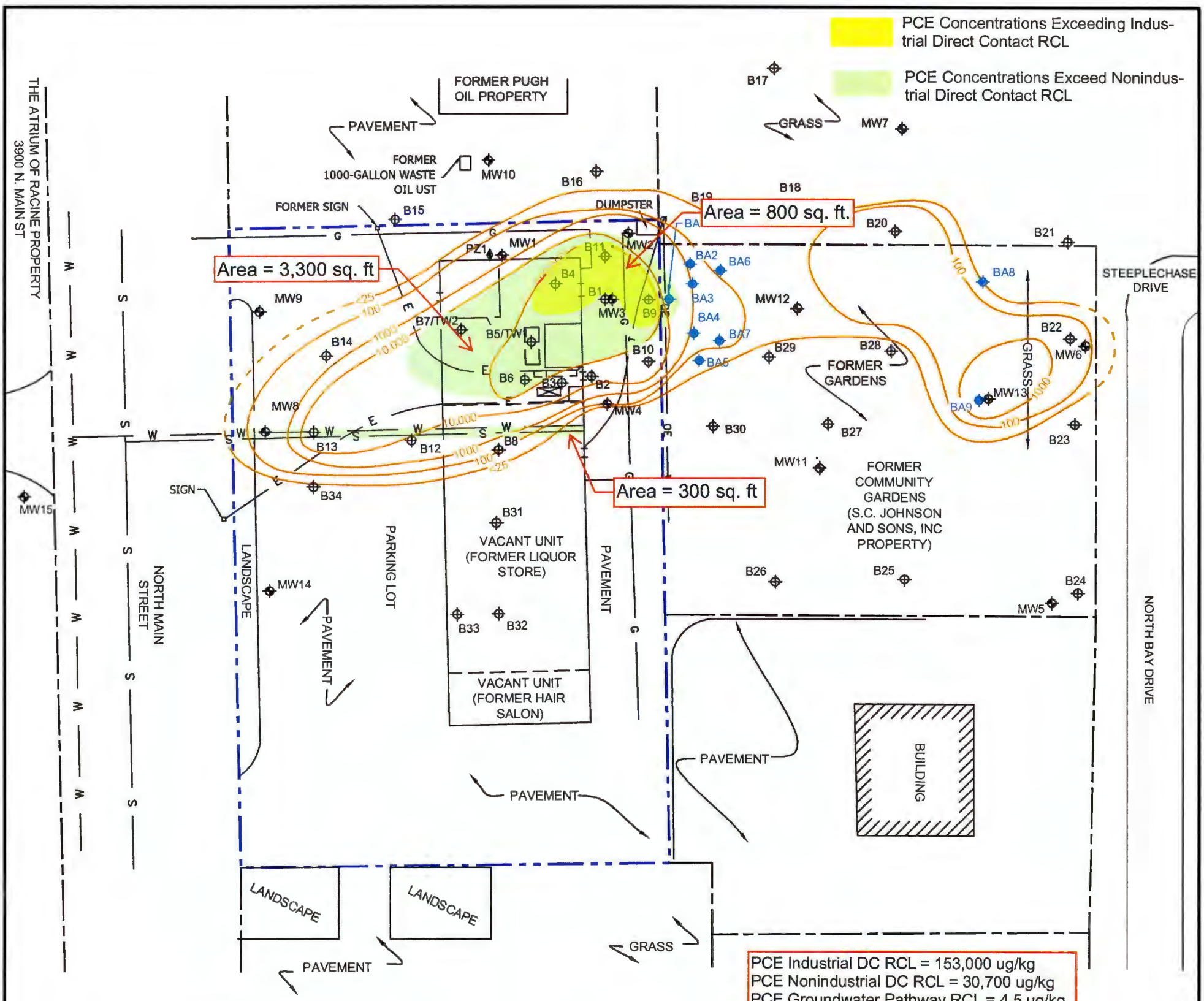
Dry Cleaner Environmental Response Program
Reimbursement Cost Detail Linking Spreadsheet Form 4400-214D (R 08/12)

TASKS	BUDGET				INVOICES						DERF COST BREAKOUT (this claim)									
Bid / Budgeted Description	Bid / Budgeted Amount	INSERT	Total Approved Budget	Previous Claims (If applicable)	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	INSERT	Total Invoiced Costs	A Soil Investigation	B Soil Remediation	C Groundwater Investigation	D Groundwater Remediation	E Air/Vapor Investigation	F Air/Vapor Remediation	G Lab & Other Analysis	H Miscellaneous Costs	Budget Remaining Use (-) to indicate cost over-run	% Task Complete, Remarks
Consultant Costs																				
Task	$ -	$ -	$ -							$ -									$ -	Task % Complete
1. Landfill Profiling/Bid Specs/Bidding/HASP	$ 2,910.00		$ 2,910.00							$ -									$ 2,910.00	
2. Contained-Out Determination Request	$ 1,330.00		$ 1,330.00							$ -									$ 1,330.00	
3. Baseline Groundwater Sampling Event (16 wells)	$ 3,705.00		$ 3,705.00							$ -									$ 3,705.00	
4. Abandon Monitoring Well MW-3/Complete Abandonment Form	$ 635.00		$ 635.00							$ -									$ 635.00	
5. Access Agreement/S.C. Johnson Property	$ 1,240.00		$ 1,240.00							$ -									$ 1,240.00	
6. Concrete Floor Slab Removal/Disposal/Utility Abandonment	$ 2,820.00		$ 2,820.00							$ -									$ 2,820.00	
7. Excavation/Roll-Off Treatment/Hauling/Disposal/Soil Sampling/Backfilling	$ 10,480.00		$ 10,480.00							$ -									$ 10,480.00	
8. 1st GW Sampling Event-Post-Excavation (15 wells)	$ 3,535.00		$ 3,535.00																	
9. RA Doc. Report	$ 4,350.00		$ 4,350.00																	
10. Quarterly Sampling/Data Transmittal (7 events)	$ 27,335.00		$ 27,335.00																	
11. Case Summary Close Out Form	$ 4,220.00		$ 4,220.00																	
12. Well Abandonment/Forms/Purge Water Disposal	$ 1,940.00		$ 1,940.00							$ -									$ 1,940.00	
			$ -							$ -									$ -	
Consultant Cost Total	*$ 64,500.00*	*$-*	$ 64,500.00	$ -						*$ -*									*$ 25,060.00*	
Sub-Contractor Costs																				
Service	$ -	$ -	$ -							$ -									$ -	
Drilling	$ 3,300.00		$ 3,300.00							$ -									$ 3,300.00	
Primary Contractor	$ 50,000.00		$ 50,000.00							$ -									$ 50,000.00	
Direct Disposal/Landfill	$ 20,400.00		$ 20,400.00							$ -									$ 20,400.00	
Roll-Off Boxes	$ 11,175.00		$ 11,175.00							$ -									$ 11,175.00	
Chemical Oxidant	$ 14,000.00		$ 14,000.00							$ -									$ 14,000.00	
Laboratory	$ 12,634.00		$ 12,634.00							$ -									$ 12,634.00	
Sub-Contractor Cost Total	*$ 111,509.00*	*$-*	*$ 111,509.00*	$ -						*$ -*									*$ 111,509.00*	
DERF ELIGIBLE SUB-TOTALS	**$ 176,009.00**	**$ -**	**$ 176,009.00**	$ -	$ -	$ -	$ -	$ -	$-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 136,569.00	

Non-DERF Eligible Expenses								
								$ -
								$ -
Non-DERF Cost Total	$ -	$ -	$ -	$ -	$ -		$ -	
INVOICE GRAND TOTAL	$ -	$ -	$ -	$ -	$ -	##	$ -	

Check Numbers

Total DERF Eligible Costs This Claim $ -



PCE Industrial DC RCL = 153,000 ug/kg
PCE Nonindustrial DC RCL = 30,700 ug/kg
PCE Groundwater Pathway RCL = 4.5 ug/kg

Saturated Soil Sample

LEGEND

- SUBJECT PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARIES
- OE — OVERHEAD ELECTRIC LINE
- G — UNDERGROUND GAS LINE
- W — WATERMAIN
- E — BURIED ELECTRIC LINE
- S — BURIED SANITARY SEWER
- T — BURIED TELEPHONE LINE
- ⌀ — UTILITY POLE
- FORMER DRY CLEANING MACHINE LOCATION
- EXISTING DRY CLEANING MACHINE
- MW1 — 2" MONITORING WELL LOCATION AND IDENTIFICATION
- B34 — BOREHOLE LOCATION AND IDENTIFICATION
- BA5 — HAND AUGER NEAR SURFACE SAMPLE LOCATION AND IDENTIFCATION
- PZ1 — PIEZOMETER LOCATION AND IDENTIFICATION
- TW2 — 1" TEMPORARY MONITORING WELL LOCATION AND IDENTIFICATION
- 100 — UNSATURATED SOIL PCE ISOCONCENTRATION LINE IN MICROGRAMS PER KILOGRAM (DASHED WHERE INFERRED)

Sample Location	Sample Depth (feet)	Soil PCE Concentration (ug/kg)
PZ1	1-3	370
MW1	3.5-5.5	430
MW2	1-3	1740
MW3	1-3	8400
MW4	1-3	<25
MW6	2-4	48
MW8	1-3	330
MW12	1-3	<18
MW14	3-5	<24
MW15	2-4	<24
B1	4	121,000
B2	2	9900
B2	12	465
B3	4	21,100
B4	2-4	270,000
B4	4-6	1,380
B4	14-16	270
B5	2-4	66,000
B5	10-12	305
B6	2-4	136,000
B6	12-14	174
B7	2-4	10,200
B7	6-8	77,000
B8	2-4	67
B9	0-2	92,000
B9	8-10	770,000
B10	2-4	14,000
B10	8-10	28
B11	2-4	63,000
B11	6-8	590,000
B12	2-4	1370
B13	2-4	112
B13	6-8	68,000
B14	2-4	131
B15	2-4	<25

Sample Location	Sample Depth (feet)	Soil PCE Concentration (ug/kg)
B15	4-6	<25
B16	2-4	<25
B17	2-4	<25
B18	2-4	<25
B19	2-4	<25
B20	2-4	104
B21	2-4	<25
B22	2-4	670
B23	2-4	<25
B24	2-4	<25
B25	2-4	<25
B26	2-4	<25
B27	2-4	<25
B28	2-4	<25
B29	2-4	<25
B30	2-4	<25
B31	2-4	<25
B32	2-4	<25
B33	2-4	<25
B34	3-5	<24
BA1	2	130
BA2	0.5	650
BA2	2	700
BA3	0.5	1200
BA3	2	1300
BA4	0.5	690
BA4	2	100
BA5	3	43
BA6	0.5	56
BA6	2	74
BA7	0.5	84
BA7	2	380
BA8	1.5	<25
BA9	0.5	33
BA9	2	1200

SCALE IN FEET
20 0 20 40

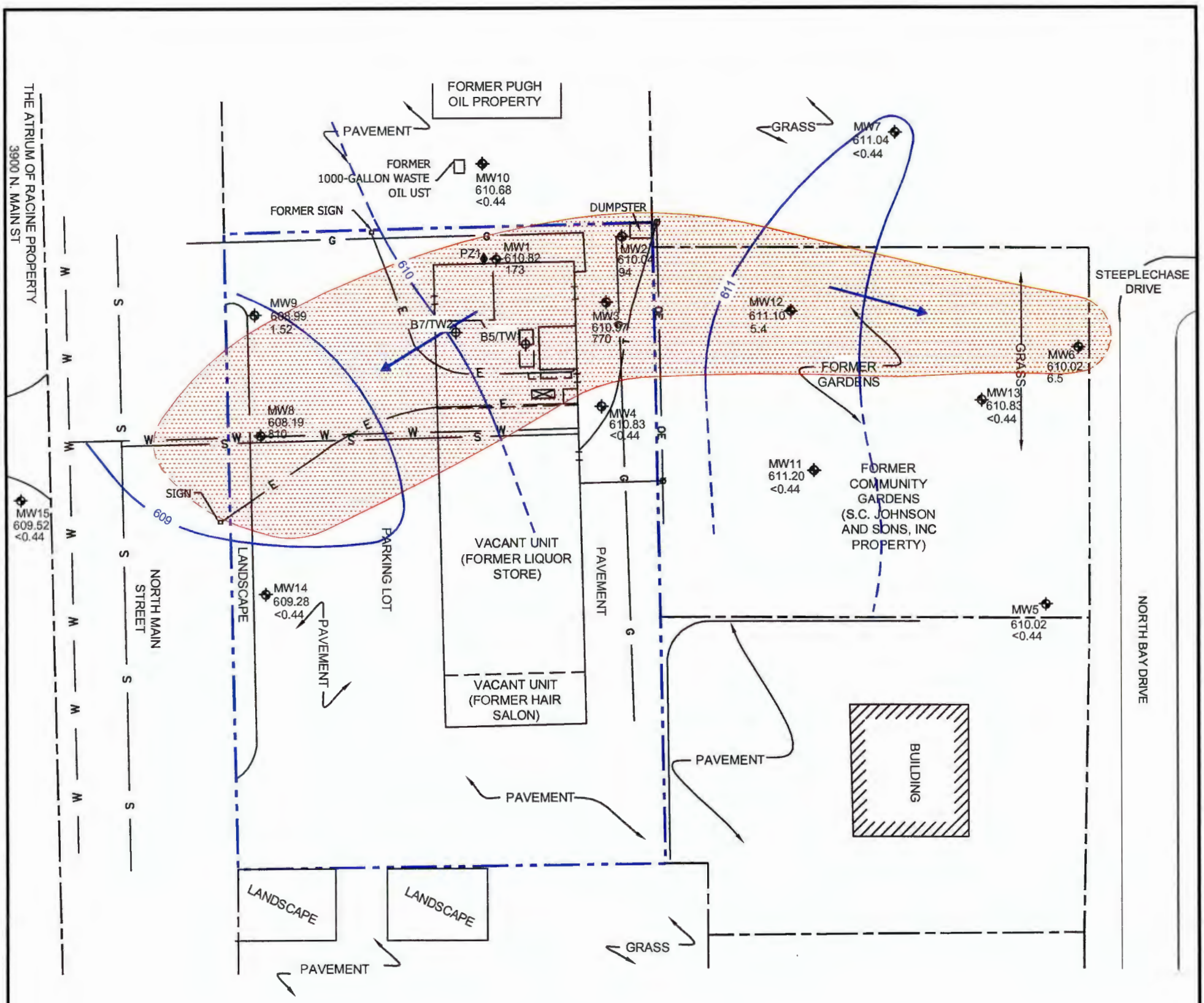
Bonestroo
12075 N CORPORATE PKWY, STE 200
MEQUON, WISCONSIN 53092
P: 262-241-4466 F: 262-241-4901

N:\3592\3592090010\Figures\003592090010_FIG 1_RACINE.dwg

SITE LAYOUT

EXPRESS CLEANERS, INCORPORATED
3941 N. MAIN STREET
RACINE, WISCONSIN

DATE:	DRAWN BY:	REVISED:	PROJECT NUMBER:	FIGURE
04/15/08	BMP	2011-04-21 AJS	003592-09001-0	1



LEGEND

- SUBJECT PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARIES
- OE — OVERHEAD ELECTRIC LINE
- X — FENCE
- G — UNDERGROUND GAS LINE
- W — WATERMAIN
- E — BURIED ELECTRIC LINE
- S — BURIED SANITARY SEWER
- T — BURIED TELEPHONE LINE
- ⌀ UTILITY POLE
- FORMER DRY CLEANING MACHINE LOCATION
- EXISTING DRY CLEANING MACHINE

- MW1 610.82 173 — 2" MONITORING WELL LOCATION AND IDENTIFICATION WITH GROUNDWATER ELEVATION AND PCE CONCENTRATIONS IN µg/L
- PZ1 — PIEZOMETER LOCATION AND IDENTIFICATION
- TW2 — 1" TEMPORARY MONITORING WELL LOCATION AND IDENTIFICATION
- GROUNDWATER FLOW DIRECTION
- 608.5 — GROUNDWATER ELEVATION CONTOUR
- ESTIMATED EXTENT OF GROUNDWATER WITH PCE CONCENTRATIONS EXCEEDING NR140 ES (DASHED WHERE INFERRED)

SCALE IN FEET
20 0 20 40

Bonestroo
12075 N CORPORATE PKWY, STE 200
MEQUON, WISCONSIN 53092
P: 262-241-4466 F: 262-241-4901

N:\3592\3592090010\Figures\003592090010_FIG1_RACINE.dwg

GROUNDWATER ELEVATION CONTOUR MAP AND EXTENT OF GROUNDWATER CONTAMINATION APRIL 7, 2011

EXPRESS CLEANERS, INCORPORATED
3941 N. MAIN STREET
RACINE, WISCONSIN

DATE:	DRAWN BY:	REVISED:	PROJECT NUMBER:	FIGURE
04/15/08	BMP	2011-04-21 AJS	003592-09001-0	2

TERRACON ENVIRONMENTAL SERVICES FEE SCHEDULE
2015

I. PERSONNEL

Note #1

A. Professional Staff

1.	Staff Professional	$75.00 hour
2.	Project Professional	85.00 hour
3.	Project Manager	95.00 hour
4.	Senior Project Manager	110.00 hour
5.	Principal	140.00 hour

B. Support Staff

1.	Clerical	$50.00 hour
2.	Draftsperson	60.00 hour

Note #1 Increase hourly rate by 1.3 for Saturday, Sunday and holiday work or off shift work when required by client or for emergency response with less than 36 hour notice.

II. EXPENSES/SUPPLIES/SUBCONTRACTED SERVICES

Note #2

1.	Transportation	0.65/mile
2.	Per Diem	72.00 day
3.	Packaging/Shipping	Cost plus 15%
4.	Subcontracted Services	Cost plus 15%
5.	Materials and Supplies	Cost plus 15%
6.	Analytical Laboratory Tests	Cost plus 15%

Note #2 Subcontract services, materials, and equipment can be paid directly by the client to avoid the mark up.

III. TERRACON EQUIPMENT SCHEDULE

1.	Bailer (Disposable)	$15.00 Each
2.	Low Flow Pump	40.00 Daily
3.	Electric Water Level Indicator	35.00 Daily
4.	Water Quality Meter	150.00 Daily
5.	In-line 0.45 Micron Water Sampling Filter	15.00 Each
6.	Photoionizer (HNU or OVM)	95.00 Daily
7.	LEL Combustible Gas Meter	30.00 Daily
8.	Air Sampling Kit	150.00 Daily
9.	Sub-slab Insert	45.00 Each
10.	Drum	50.00 Each

CERTIFICATE OF LIABILITY INSURANCE

1/1/2016

DATE (MM/DD/YYYY): 12/12/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	Lockton Companies 444 W. 47th Street, Suite 900 Kansas City MO 64112-1906 (816) 960-9000
CONTACT NAME:	
PHONE (A/C, No, Ext):	FAX (A/C, No):
E-MAIL ADDRESS:	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: AIG Specialty Insurance Company	26883
INSURER B: Travelers Property Casualty Co of America	25674
INSURER C: The Travelers Indemnity Company	25658
INSURER D: Lexington Insurance Company	19437
INSURER E:	
INSURER F:	

INSURED 1312891
TERRACON CONSULTANTS, INC.
18001 W. 106TH STREET, SUITE 300
OLATHE KS 66061

COVERAGES TERCO01 **CERTIFICATE NUMBER:** 11281774 **REVISION NUMBER:** XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR X CONTR'L LIABILITY GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT [ ] LOC OTHER	N	N	PROP3779274	1/1/2015	1/1/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 1,000,000 $ 25,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B B	AUTOMOBILE LIABILITY X ANY AUTO X ALL OWNED AUTOS [ ] SCHEDULED AUTOS X HIRED AUTOS [X] NON-OWNED AUTOS	N	N	TC2J-CAP-131J3858 TJBAP131J3895	1/1/2015 1/1/2015	1/1/2016 1/1/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ XXXXXXX $ XXXXXXX $ XXXXXXX
A A	[ ] UMBRELLA LIAB [X] OCCUR X EXCESS LIAB [ ] CLAIMS-MADE DED [ ] RETENTION $	N	N	PROU1920977 (EXCLUDES PROF. LIAB.)	1/1/2015	1/1/2016	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
C C B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [N] N/A If yes, describe under DESCRIPTION OF OPERATIONS below		N	TRKUB131J384615 (AZ,MA,WI) TC2OUB131J374215 (AOS) TC2OUB131J374215 (CA)	1/1/2015 1/1/2015 1/1/2015	1/1/2016 1/1/2016 1/1/2016	X PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
D	PROFESSIONAL LIABILITY	N	N	26030216	1/1/2015	1/1/2016	$1,000,000 EACH CLAIM & $1,000,000 ANNUAL AGGREGATE	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
FOR INFORMATIONAL PURPOSES ONLY, EXCESS LIABILITY SITS ON TOP OF GENERAL, AUTO AND EMPLOYER'S LIABILITY.

CERTIFICATE HOLDER

11281774
SPECIMEN

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Joseph M Arnello

Terracon

Reference Number: P58150098

AGREEMENT FOR SERVICES

This **AGREEMENT** is between Gonzalez Saggio Harlan ("Client") and Terracon Consultants, Inc. ("Consultant") for Services to be provided by Consultant for Client on the Former Express Cleaners project ("Project"), as described in the Project Information section of Consultant's Proposal dated 05/28/2015 ("Proposal") unless the Project is otherwise described in Exhibit A to this Agreement (which section or Exhibit is incorporated into this Agreement).

1. **Scope of Services.** The scope of Consultant's services is described in the Scope of Services section of the Proposal ("Services"), unless Services are otherwise described in Exhibit B to this Agreement (which section or exhibit is incorporated into this Agreement). Portions of the Services may be subcontracted. Consultant's Services do not include the investigation or detection of, nor do recommendations in Consultant's reports address occupant safety issues, such as vulnerability to natural disasters, terrorism, or violence. If Services include purchase of software, Client will execute a separate software license agreement. Consultant's findings, opinions, and recommendations are based solely upon data and information obtained by and furnished to Consultant at the time of the Services.
2. **Acceptance/ Termination.** Client agrees that execution of this Agreement is a material element of the consideration Consultant requires to execute the Services, and if Services are initiated by Consultant prior to execution of this Agreement as an accommodation for Client at Client's request, both parties shall consider that commencement of Services constitutes formal acceptance of all terms and conditions of this Agreement. Additional terms and conditions may be added or changed only by written amendment to this Agreement signed by both parties. In the event Client uses a purchase order or other form to administer this Agreement, the use of such form shall be for convenience purposes only and any additional or conflicting terms it contains are stricken. This Agreement shall not be assigned by either party without prior written consent of the other party. Either party may terminate this Agreement or the Services upon written notice to the other. In such case, Consultant shall be paid costs incurred and fees earned to the date of termination plus reasonable costs of closing the project.
3. **Change Orders.** Client may request changes to the scope of Services by altering or adding to the Services to be performed. If Client so requests, Consultant will return to Client a statement (or supplemental proposal) of the change setting forth an adjustment to the Services and fees for the requested changes. Following Client's review, Client shall provide written acceptance. If Client does not follow these procedures, but instead directs, authorizes, or permits Consultant to perform changed or additional work, the Services are changed accordingly and Consultant will be paid for this work according to the fees stated or its current fee schedule. If project conditions change materially from those observed at the site or described to Consultant at the time of proposal, Consultant is entitled to a change order equitably adjusting its Services and fee.
4. **Compensation and Terms of Payment.** Client shall pay compensation for the Services performed at the fees stated in the Compensation section of the Proposal unless fees are otherwise stated in Exhibit C to this Agreement (which section or Exhibit is incorporated into this Agreement). If not stated in either, fees will be according to Consultant's current fee schedule. Fee schedules are valid for the calendar year in which they are issued. Fees do not include sales tax. Client will pay applicable sales tax as required by law. Consultant may invoice Client at least monthly and payment is due upon receipt of invoice. Client shall notify Consultant in writing, at the address below, within 15 days of the date of the invoice if Client objects to any portion of the charges on the invoice, and shall promptly pay the undisputed portion. Client shall pay a finance fee of 1.5% per month, but not exceeding the maximum rate allowed by law, for all unpaid amounts 30 days or older. Client agrees to pay all collection-related costs that Consultant incurs, including attorney fees. Consultant may suspend Services for lack of timely payment. It is the responsibility of Client to determine whether federal, state, or local prevailing wage requirements apply and to notify Consultant if prevailing wages apply. If it is later determined that prevailing wages apply, and Consultant was not previously notified by Client, Client agrees to pay the prevailing wage from that point forward, as well as a retroactive payment adjustment to bring previously paid amounts in line with prevailing wages. Client also agrees to defend, indemnify, and hold harmless Consultant from any alleged violations made by any governmental agency regulating prevailing wage activity for failing to pay prevailing wages, including the payment of any fines or penalties.
5. **Third Party Reliance.** This Agreement and the Services provided are for Consultant and Client's sole benefit and exclusive use with no third party beneficiaries intended. Reliance upon the Services and any work product is limited to Client, and is not intended for third parties. For a limited time period not to exceed three months from the date of the report, Consultant will issue additional reports to others agreed upon with Client, however Client understands that such reliance will not be granted until those parties sign and return Consultant's reliance agreement and Consultant receives the agreed-upon reliance fee.
6. **LIMITATION OF LIABILITY. CLIENT AND CONSULTANT HAVE EVALUATED THE RISKS AND REWARDS ASSOCIATED WITH THIS PROJECT, INCLUDING CONSULTANT'S FEE RELATIVE TO THE RISKS ASSUMED, AND AGREE TO ALLOCATE CERTAIN OF THE ASSOCIATED RISKS. TO THE FULLEST EXTENT PERMITTED BY LAW, THE TOTAL AGGREGATE LIABILITY OF CONSULTANT (AND ITS RELATED CORPORATIONS AND EMPLOYEES) TO CLIENT AND THIRD PARTIES GRANTED RELIANCE IS LIMITED TO THE GREATER OF $50,000 OR CONSULTANT'S FEE, FOR ANY AND ALL INJURIES, DAMAGES, CLAIMS, LOSSES, OR EXPENSES (INCLUDING ATTORNEY AND EXPERT FEES) ARISING OUT OF CONSULTANT'S SERVICES OR THIS AGREEMENT. PRIOR TO ACCEPTANCE OF THIS AGREEMENT AND UPON WRITTEN REQUEST FROM CLIENT, CONSULTANT MAY NEGOTIATE A HIGHER LIMITATION FOR ADDITIONAL CONSIDERATION. THIS LIMITATION SHALL APPLY REGARDLESS OF AVAILABLE PROFESSIONAL LIABILITY INSURANCE COVERAGE, CAUSE(S) OR THE THEORY OF LIABILITY, INCLUDING NEGLIGENCE, INDEMNITY, OR OTHER RECOVERY. THIS LIMITATION SHALL NOT APPLY TO THE EXTENT THE DAMAGE IS PAID UNDER CONSULTANT'S COMMERCIAL GENERAL LIABILITY POLICY.**
7. **Indemnity/Statute of Limitations.** Consultant and Client shall indemnify and hold harmless the other and their respective employees from and against legal liability for claims, losses, damages, and expenses to the extent such claims, losses, damages, or expenses are legally determined to be caused by their negligent acts, errors, or omissions. In the event such claims, losses, damages, or expenses are legally determined to be caused by the joint or concurrent negligence of Consultant and Client, they shall be borne by each party in proportion to its own negligence under comparative fault principles. Neither party shall have a duty to defend the other party, and no duty to defend is hereby created by this indemnity provision and such duty is explicitly waived under this Agreement. Causes of action arising out of Consultant's services or this Agreement regardless of cause(s) or the theory of liability, including negligence, indemnity or other recovery shall be deemed to have accrued and the applicable statute of limitations shall commence to run not later than the date of Consultant's substantial completion of services on the project.
8. **Warranty.** Consultant will perform the Services in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. **EXCEPT FOR THE STANDARD OF CARE PREVIOUSLY STATED, CONSULTANT MAKES NO WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED, RELATING TO CONSULTANT'S SERVICES AND CONSULTANT DISCLAIMS ANY IMPLIED WARRANTIES OR WARRANTIES IMPOSED BY LAW, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**
9. **Insurance.** Consultant represents that it now carries, and will continue to carry: (i) workers' compensation insurance in accordance with the laws of the states having jurisdiction over Consultant's employees who are engaged in the Services, and employer's liability insurance ($1,000,000); (ii) commercial general liability insurance ($1,000,000 occ / $2,000,000 agg); (iii) automobile liability insurance ($1,000,000 B.I. and P.D. combined single limit); and (iv) professional liability insurance ($1,000,000 claim / agg). Certificates of insurance will be provided upon request. Client and Consultant shall waive subrogation against the other party on all general liability and property coverage.

10. **CONSEQUENTIAL DAMAGES. NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR LOSS OF PROFITS OR REVENUE; LOSS OF USE OR OPPORTUNITY; LOSS OF GOOD WILL; COST OF SUBSTITUTE FACILITIES, GOODS, OR SERVICES; COST OF CAPITAL; OR FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT, PUNITIVE, OR EXEMPLARY DAMAGES.**
11. **Dispute Resolution.** Client shall not be entitled to assert a Claim against Consultant based on any theory of professional negligence unless and until Client has obtained the written opinion from a registered, independent, and reputable engineer, architect, or geologist that Consultant has violated the standard of care applicable to Consultant's performance of the Services. Client shall provide this opinion to Consultant and the parties shall endeavor to resolve the dispute within 30 days, after which Client may pursue its remedies at law. This Agreement shall be governed by and construed according to Kansas law.
12. **Subsurface Explorations.** Subsurface conditions throughout the site may vary from those depicted on logs of discrete borings, test pits, or other exploratory services. Client understands Consultant's layout of boring and test locations is approximate and that Consultant may deviate a reasonable distance from those locations. Consultant will take reasonable precautions to reduce damage to the site when performing Services; however, Client accepts that invasive services such as drilling or sampling may damage or alter the site. Site restoration is not provided unless specifically included in the Services.
13. **Testing and Observations.** Client understands that testing and observation are discrete sampling procedures, and that such procedures indicate conditions only at the depths, locations, and times the procedures were performed. Consultant will provide test results and opinions based on tests and field observations only for the work tested. Client understands that testing and observation are not continuous or exhaustive, and are conducted to reduce - not eliminate - project risk. Client agrees to the level or amount of testing performed and the associated risk. Client is responsible (even if delegated to contractor) for requesting services, and notifying and scheduling Consultant so Consultant can perform these Services. Consultant is not responsible for damages caused by services not performed due to a failure to request or schedule Consultant's services. Consultant shall not be responsible for the quality and completeness of Client's contractor's work or their adherence to the project documents, and Consultant's performance of testing and observation services shall not relieve Client's contractor in any way from its responsibility for defects discovered in its work, or create a warranty or guarantee. Consultant will not supervise or direct the work performed by Client's contractor or its subcontractors and is not responsible for their means and methods.
14. **Sample Disposition, Affected Materials, and Indemnity.** Samples are consumed in testing or disposed of upon completion of tests (unless stated otherwise in the Services). Client shall furnish or cause to be furnished to Consultant all documents and information known or available to Client that relate to the identity, location, quantity, nature, or characteristic of any hazardous waste, toxic, radioactive, or contaminated materials ("Affected Materials") at or near the site, and shall immediately transmit new, updated, or revised information as it becomes available. Client agrees that Consultant is not responsible for the disposition of Affected Material unless specifically provided in the Services, and that Client is responsible for directing such disposition. In the event that test samples obtained during the performance of Services (i) contain substances hazardous to health, safety, or the environment, or (ii) equipment used during the Services cannot reasonably be decontaminated, Client shall sign documentation (if necessary) required to ensure the equipment and/or samples are transported and disposed of properly, and agrees to pay Consultant the fair market value of this equipment and reasonable disposal costs. In no event shall Consultant be required to sign a hazardous waste manifest or take title to any Affected Materials. Client shall have the obligation to make all spill or release notifications to appropriate governmental agencies. The Client agrees that Consultant neither created nor contributed to the creation or existence of any Affected Materials conditions at the site. Accordingly, Client waives any claim against Consultant and agrees to indemnify and save Consultant, its agents, employees, and related companies harmless from any claim, liability or defense cost, including attorney and expert fees, for injury or loss sustained by any party from such exposures allegedly arising out of Consultant's non-negligent performance of services hereunder, or for any claims against Consultant as a generator, disposer, or arranger of Affected Materials under federal, state, or local law or ordinance.
15. **Ownership of Documents.** Work product, such as reports, logs, data, notes, or calculations, prepared by Consultant shall remain Consultant's property. Proprietary concepts, systems, and ideas developed during performance of the Services shall remain the sole property of Consultant. Files shall be maintained in general accordance with Consultant's document retention policies and practices.
16. **Utilities.** Client shall provide the location and/or arrange for the marking of private utilities and subterranean structures. Consultant shall take reasonable precautions to avoid damage or injury to subterranean structures or utilities. Consultant shall not be responsible for damage to subterranean structures or utilities that are not called to Consultant's attention, are not correctly marked, including by a utility locate service, or are incorrectly shown on the plans furnished to Consultant.
17. **Site Access and Safety.** Client shall secure all necessary site related approvals, permits, licenses, and consents necessary to commence and complete the Services and will execute any necessary site access agreement. Consultant will be responsible for supervision and site safety measures for its own employees, but shall not be responsible for the supervision or health and safety precautions for any other parties, including Client, Client's contractors, subcontractors, or other parties present at the site.

Consultant:	**Terracon Consultants, Inc.**	Client:	**Gonzalez Saggio Harlan**
By:	Date: **5/28/2015**	By:	Date:
Name/Title:	**Blaine R. Schroyer, P.E. / Principal/Office Manager**	Name/Title:	**William Scott /**
Address:	**9856 S. 57th St.** **Franklin, WI 53132**	Address:	**111 East Wisconsin Avenue Suite 1000** **Milwaukee, WI 53202**
Phone:	**(414) 423-0255** Fax: **(414) 423-0566**	Phone:	**(414) 755-8144** Fax:
Email:	**brschroyer@terracon.com**	Email:	

Reference Number: P58150098

RAMBOLL ENVIRON

ENVIRONMENT
& HEALTH

Mr. William P. Scott
Gonzalez Saggio & Harlan LLP
111 East Wisconsin Avenue, Ste. 1000
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Ms. Nancy Ryan
Wisconsin Department of Natural Resources
2300 N. Martin Luther King Jr, Drive
Milwaukee, Wisconsin 23212

PROPOSAL FOR REMEDIAL ACTION SERVICES FOR THE FORMER EXPRESS CLEANERS PROPERTY LOCATED AT 3921-41 N. MAIN STREET RACINE, WISCONSIN, BRRTS# #02-52-547631
ENVIRON PROPOSAL NO. P21-15124

Dear Mr. Scott and Ms. Ryan:

In response to your Request for Proposal dated May 5, 2015, Ramboll Environ US Corporation (Ramboll Environ) appreciates the opportunity to submit this proposal to provide soil and groundwater remediation services for the former Express Cleaners Property located at 3921-41 N. Main Street in Racine, Wisconsin. As requested, the proposed scope of services includes completion of remedial actions to address soil and groundwater contamination at the site and to obtain site closure. The overall objective of this project is to implement a technically sound and cost-effective remediation approach that achieves regulatory site closure and leverages the Dry Cleaning Environmental Response Fund Program (DERP) eligibility of project costs while maintaining compliance with applicable rules, regulations and guidance.

The Ehrlich Family Limited Partnership (EFLP) has a goal of redeveloping the former dry cleaner site starting in September of 2015 into a beneficial and productive use. Ramboll Environ has spent significant time and effort reviewing existing documents to understand the site hydrogeology, quantify contaminant mass in both soil and groundwater, and calculate transport mechanisms. Based on this review, we have identified remedial goals and objectives in consideration of the anticipated site re-development schedule and the need to reduce the contaminant mass to achieve NR 726 Site Closure. We have evaluated and screened a number of remedial options based on technical and economic feasibility given the site logistics and Site contaminant characteristics. Our proposed technical approach includes an *in-situ* enhanced reductive dechlorination remedy for the source soil and groundwater impacts using soil blending as the preferred method of applying reactants to the subsurface coupled with groundwater monitored natural attenuation of the downgradient groundwater impacts to remediate greater than 90% of the contaminant mass. With an estimated 1% of the contaminant mass present in groundwater, this aggressive remedial approach meets the expected project timelines, is cost effective, and will meet regulatory closure requirements.

The attached proposal offers our scope, schedule and opinion of costs for environmental services to complete the remedial actions. Pursuant to Wisconsin Administrative Code (WAC) Chapter NR 169.23, this document also

May 29, 2015

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Ref P21-15124

RAMBOLL ENVIRON

represents a Remedial Action Options Report (RAOR)/Remedial Action Plan that is consistent with WAC NR 169 and the NR 700 series.

Our proposal identifies key project team members and includes their professional qualifications. We have also included a Statement of Qualifications (Appendix A) for Ramboll Environ that highlights additional unique capabilities that will contribute to successful project completion, provides background information concerning Ramboll Environ, and presents a summary of our relevant project experience. A copy of our insurance certificate is also included (Appendix D). The DERP certification statement is included in Section 8.0 of the proposal.

Key strengths that demonstrate the Ramboll Environ Team's ability to successfully assist you with completion of this project include the following:

- **DERF Program Experience** – Our team members have been selected due to their extensive experience in conducting environmental restoration projects under the DERF program and we are currently working on several projects within the DERF program. In addition, the project Prinicipal for this project, Ms. Jeanne Tarvin, is a member of the Governor's DERP Advisory council. Ramboll Environ is also an active member of the Wisconsin Fabricare Institute, a trade organization of independent dry cleaners.
- **Chlorinated Solvent Remediation Expertise** – Ramboll Environ has extensive experience in conducting environmental restoration projects, including the implementation of state-of-the-practice remediation technologies. Our proposed project team members have presented technical papers at international remediation conferences regarding our project case studies, which have documented successful chlorinated solvent remediation projects.
- **Local Geographic Presence** – Field staff will be utilized as appropriate from our Milwaukee office. This geographic presence will result in cost-effective execution of field work.
- **Sustainable Solutions** – To ensure minimizing unnecessary soil and habitat disturbance and destruction, the intended remediation covers a focused and limited treatment area. By following best management practices, the land will be preserved and the land disturbance minimized. In terms of the amendment to be injected, as a recycled product with minimal energy needed to produce the feed-stocks, zero valent iron (ZVI) is among the most sustainable amendments available. Moreover, based on the intended soil blending approach, the recommended enhanced reductive dechlorination remedial option will not include ongoing remedial system operations and maintenance.
- **Value-Added** – Our proposed remedial strategy focuses on in-situ enhanced reductive dechlorination soil blending with attendant groundwater remediation to remediate greater than 90% of the contaminant mass thereby meeting the project goals of reduction of contaminant mass and concentration. We have utilized this approach on other projects with great success in Wisconsin. This technical approach allows site development objectives as well as remedial objectives to be met in a timely and sustainable manner.

Thank you for the opportunity to assist you with this project. We look forward to discussing this proposal and answering any questions you may have. In the meantime, if you have any immediate questions, please do not hesitate to contact us.

Yours sincerely

Jeanne Tarvin, PG, CPG
Principal

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Prepared for

Mr. William P. Scott
Gonzales Saggio & Harlan LLP
111 East Wisconsin Avenue, Suite 1000
Milwaukee, WI 53202

Date

May 29, 2015

Proposal No.

P21-15124

FORMER EXPRESS CLEANERS SITE
RACINE, WISCONSIN
BRRTS #02-52-547631
FID #252010000

PROPOSAL FOR REMEDIAL ACTION SERVICES

RAMBOLL ENVIRON

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EXECUTIVE SUMMARY

In response to the Request for Proposal (RFP) dated May 5, 2015, Ramboll Environ US Corporation (Ramboll Environ) appreciates the opportunity to submit this proposal to provide environmental remediation consulting services for the Former Express Cleaners Property located at 3921-41 N. Main Street in Racine, Wisconsin (the "Site"). As requested, the proposed scope of services includes presentation of a remedial strategy to address soil, groundwater, and soil vapor contamination at the Site and adjacent property. The objective of the project is to implement a technically sound and cost-effective approach that leverages the Dry Cleaner Environmental Repair Fund Program (DERP) eligibility of project costs while maintaining compliance with applicable rules, regulations and guidance.

As required by DERP, this proposal includes a Remedial Action Options Report (RAOR)/Remedial Action Plan (RAP) as part of this proposal consistent with Wisconsin Administrative Code (WAC) Chapters NR 169 and NR 700. The RAOR identifies a number of potentially applicable remedial action technologies including the following:

- no action;
- institutional controls;
- monitored natural attenuation (MNA);
- excavation and landfill disposal;
- soil vapor extraction;
- air sparging;
- groundwater extraction and treatment;
- *in-situ* electro-thermal remediation;
- *in-situ* chemical oxidation; and
- *in-situ* enhanced reductive dechlorination.

These technologies were screened based on technical and economic feasibility. Considering the technical and economic feasibility criteria evaluated herein, it is critical to optimize the application of valuable financial resources in order to maximize the reduction in risk to public health, safety and welfare as well as the environment over time. Complete soil and groundwater remediation to meet all WAC NR 140 and NR 700 soil and groundwater clean-up standards is not practical based on the concentrations detected across the Site. As such, Ramboll Environ evaluated the spatial distribution of chlorinated volatile organic compound (CVOC) concentrations in soil and groundwater to identify a target treatment volume that, upon remediation, would represent such an optimization of financial resources while maximizing reduction in risk. Based on the results of this evaluation, the target treatment volume covers an area of approximately 5,700 square feet, and extends down to an approximate depth of 9 feet below ground surface (bgs). Based on these dimensions, the target treatment volume totals approximately 1,900 cubic yards (approximately 2,850 tons). To reduce the potential for off-site migration of impacted groundwater, the recommended target treatment volume includes the east-west trending utility corridor located between the site building and the western property boundary.

Key considerations in identifying and evaluating remedial options were the following pertinent site characteristics obtained from the Site Investigation.

- The site owner desires that the Site be available for re-development by September 30, 2015. The redevelopment could include construction of a new site building within the area of impact. Therefore, remedial methods that include significant short term mass removal are preferred, to reduce the vapor intrusion potential for any new site building.
- Deeper subsurface soils (generally below 6 to 8 feet) are generally clayey in nature with relatively low hydraulic conductivity when compared with coarse-grained surficial soils. The depth to the water table is approximately 3 feet bgs.
- The most heavily impacted soil and groundwater is present within the northern third of the property, and extends from the ground surface to approximate depths of 9 feet bgs. Although the presence of dense non-aqueous phase liquid (DNAPL) has not been observed, historical groundwater data suggest that concentrations of tetrachloroethene (PCE) are sufficiently high that DNAPL could be present as DNAPL droplets or ganglia within the porous media near former temporary wells TW-1 and TW-2.
- Soil affected with PCE from former dry cleaner operations is subject to Universal Treatment Standards, under 40 CFR §268.49. Soils with PCE concentrations that exceed 60 milligrams per kilogram (mg/kg) will require treatment prior to disposal at a RCRA Subtitle C facility at a cost of $700 per ton. In addition, soil with PCE concentrations that exceed approximately 1,000 mg/kg would be required to be treated through incineration with transportation and disposal costs that exceed approximately $1,200 per ton. Based on the foregoing, Ramboll Environ concludes that the soil excavation and off-site disposal alternative would be cost-prohibitive and impracticable.
- Removal of all contamination in soil and groundwater to below generic soil cleanup standards and groundwater standards, respectively, is not practicable given the magnitude and extent of impacted soil and groundwater. Therefore, a performance based standard for soil and groundwater that focuses on contaminant mass removal is recommended.
- The proposed remedy needs to be consistent with the intended site demolition and redevelopment schedule.

Based on review of the key site characteristics and applicable remedial action options, Ramboll Environ recommends implementation of *in-situ* enhanced reductive dechlorination through on-site soil blending of zero valent iron (ZVI) and carbon amendment at the subject property. This remedial approach eliminates potential future liability associated with disposal of hazardous waste soil in a landfill or other off-site location. After contaminant mass removal, Ramboll Environ recommends groundwater monitoring of residual CVOCs to demonstrate continued natural attenuation. The detected presence of PCE degradation products trichloroethene (TCE), cis-1,2-dichlorethene (cDCE) and vinyl chloride (VC) in groundwater samples obtained from the Site indicate that reductive dechlorination is already occurring, and can be stimulated. The recommended remedial action based on reductive dechlorination technologies is therefore consistent with native groundwater conditions at the Site.

This remedial strategy was selected based on the following technical factors:

- Only 1% of the total contaminated mass is estimated to be in the groundwater. By using enhanced reductive dechlorination, blending of the soil mass (both saturated and unsaturated) in the source area as proposed herein, over 90% of the total contaminant mass will be treated. This amount of mass reduction coupled with stable or decreasing CVOC groundwater concentration will meet the goals and objectives for site closure.
- The existing groundwater environment is already demonstrated to be favorable for generation of PCE degradation products, based on the groundwater data collected to date.

Addition of ZVI and carbon amendment will enhance the existing environment, rather than attempting to modify it.

- The estimated cost for remediation of the target treatment volume using *in-situ* chemical reduction (i.e., ZVI) is substantially less than that associated with other technically feasible options.
- The duration of chemical oxidation of the CVOCs of interest would range between several days and several weeks; in contrast, the application of *in-situ* enhanced reductive dechlorination could provide a hydrogen source to support and maintain reductive dechlorination over a several-year timeframe.

A 2-year natural attenuation groundwater monitoring program will be necessary following implementation of *in-situ* enhanced reductive dechlorination to demonstrate continuing natural attenuation of groundwater following treatment of the target area. After CVOC concentrations in groundwater are demonstrated to decline or remain stable, a request for case closure will be submitted to the Wisconsin Department of Natural Resources (WDNR) in accordance with WAC NR 726. Our proposed RAP includes costs through closure including post-treatment monitoring, closure package preparation, Geographic Information System (GIS) registries, and well abandonment following WDNR approval of the closure.

1. INTRODUCTION

Ramboll Environ appreciates the opportunity to submit this RAOR/RAP and estimated costs for the Former Express Cleaners Property located at 3921-41 N. Main Street in Racine, Wisconsin (Figure 1). This proposal offers a strategy and approach for implementing soil and groundwater remedial actions; groundwater monitoring is also recommended to be conducted to evaluate the progress of groundwater remediation. We have summarized key project team member's experience, including their relevant experience with remediation of sites with CVOC impacted soil and groundwater. We have also included a Statement of Qualifications that highlights additional unique capabilities that will allow us to successfully execute this project. Key strengths that demonstrate the Ramboll Environ team's ability to successfully complete this project include the following.

Experienced Project Team: The project team will be led by Jeanne Tarvin, PG, CPG, and Scott Tarmann, PE, and managed by Stanley Popelar, PG, with Mark Mejac, PG, serving as a technical expert and hydrogeologist. Our team has demonstrated site investigation, remediation and monitoring experience with numerous projects involving chlorinated solvents, in particular dry cleaning solvents. Ms. Tarvin, Mr. Tarmann, and Mr. Mejac also have substantial experience with DERP, and are currently working with the WDNR on five other DERP remediation projects in southern Wisconsin. Ms. Tarvin is also a member of the DERF Advisory Committee.

Qualified Subcontractors: Ramboll Environ has selected experienced subcontractors to implement the recommended remedial actions. Our proposed remedial subcontractors, Redox Tech, LLC and North Shore Environmental Construction, have extensive chlorinated solvent remediation experience in Wisconsin. Ramboll Environ has successfully completed similar projects using Redox Tech and North Shore Environmental Construction under our direct supervision.

Focused Remedial Approach: Ramboll Environ has evaluated data available from past site investigations and reviewed investigative studies in the surrounding area to better understand regional hydrogeologic conditions and site characteristics. The information we gathered and reviewed, as well as our past experience with respect to similar projects, has allowed us to develop a recommended scope of work to complete the remedial action of soil and groundwater to achieve timely site closure in an efficient and cost-effective manner.

Local Presence: Proximity to the site is an important component of cost control. Field work will be completed by staff from our Milwaukee area office, which is located in close proximity to the site. As demonstrated in this proposal, Ramboll Environ and our subcontractors are familiar with local conditions and regulatory environment.

Sustainable Solutions: Our proposed strategy remediates the soil and groundwater in place, thereby reducing truck traffic and limiting the transfer of waste to off-site disposal areas.

2. RAMBOLL ENVIRON QUALIFICATIONS

2.1 About Ramboll Environ

A premier global consultancy, Ramboll Environ is trusted by clients to manage their most challenging environmental, health and social issues. We have earned a reputation for technical and scientific excellence, innovation and client service. Our independent science-first approach ensures that our strategic advice is objective and defensible. We apply integrated multidisciplinary services and tailor each solution to our client's specific needs and challenges.

At the end of 2014, ENVIRON International Corporation joined forces with Ramboll, Northern Europe's leading engineering, design and management consultancy, to create a global practice called Ramboll Environ. Together we provide an even higher level of service to our clients and address some of the most important issues facing our global community, including the environmental and health implications of urbanization, climate change and resource scarcity.

Ramboll Environ's network of experts includes more than 12,000 employees across 300 offices in 26 countries around the world. Clients will continue to benefit from our unique ability to bring clarity to issues at the intersection of science, business and policy.

Our vibrant and collaborative work environment will continue to attract—and retain—many of the world's top consultants. This expanded worldwide network of professionals will provide clients strategic and technical support.

2.2 Environmental Service Offerings

Ramboll Environ has completed extensive site investigation and remediation projects (i.e., feasibility studies, pilot tests, and design) for a variety of sites with media (e.g., soil, groundwater, sediments, surface water, etc.) contaminated with a wide variety of constituents (e.g., CVOCs, perchlorate, PCBs, inorganics, etc.).

Ramboll Environ has no preference for a specific technology but utilizes our vast technical experience to identify and evaluate a full spectrum of remedial technologies depending on site conditions and contaminants of concern. We have experience in physical, biological, chemical and thermal techniques for both soil and groundwater. Solidification and stabilization are also common remediation technologies to impart chemical or physical stability. Traditional source control technologies include soil excavation or dredging. Technologies identified and screened based on technical feasibility and cost generally include surfactant enhanced aquifer remediation, pump and treat of groundwater, ISCO, soil vapor extraction, electrical resistance or 6-phase heating, reactive barriers, soil mixing, bioremediation using whey, molasses or other proprietary products, and natural attenuation of groundwater.

Ramboll Environ's approach to evaluating sites and to selecting remediation alternatives often differs from the approach of many traditional engineering consultants in that our work is founded on and guided by a strong scientific basis in health and environmental science. Our preeminent skills and experience in chemical exposure and risk assessment, along with a complementary capability in fate and transport analysis and engineering, enable us to address the complex remediation issues effectively.

Ramboll Environ's relevant experience includes several current sites in DERP. Project profiles of some of the more recent and notable sites are included in Appendix A. This relevant experience has enabled us to develop a streamlined-phased remediation approach by identifying and evaluating known source areas, while understanding overall groundwater quality and its effect on receptors.

2.3 Project Team

Ramboll Environ has assembled a project team to lead the Site to regulatory case closure. The following is a brief description of each project team member:

- Ms. Jeanne Tarvin, PG, CPG, will serve as the Project Principal for the project. Ms. Tarvin has over 30 years of experience in managing environmental investigation and remediation projects. As a Principal, she is responsible for various hydrogeologic studies, environmental assessments, landfill studies, feasibility studies, remedial designs and remedial actions. Ms.

Tarvin is a Gubernatorial Appointment to the Technical Advisory Committee for the Dry Cleaners Environmental Reimbursement Fund.

- Mr. Scott Tarmann, PE, will serve as Project Director and Engineer. Mr. Tarmann has over 24 years of experience with environmental and civil design projects, with particular emphasis on the application of remedial investigation, feasibility studies, remedial system performance evaluation, groundwater modeling, and remedial action design. His work has included technical design of *in-situ* and *ex-situ* remediation technologies to address organic and inorganic contaminants in soil and groundwater. His main focus has been primarily with technological applications involving enhanced *in-situ* bioremediation, *in-situ* solidification/ stabilization, soil vapor extraction, vapor intrusion mitigation, *in-situ* thermal remediation processes, *in-situ* chemical oxidation, hydraulic containment/control technologies, and permeable reactive barriers. His work has also included developing technical strategies for remediation, providing technical support for regulatory negotiations, conducting sophisticated remediation system performance evaluations and feasibility studies, and preparing technical design plans and specifications documents in support of construction bidding and implementation. Mr. Tarmann is a registered professional engineer in the State of Wisconsin.
- Mr. Stanley Popelar, PG, will serve as the Project Manager. Mr. Popelar has over 30 years of consulting experience in the fields of environmental consulting, geology, hydrogeology, hazardous waste management and applied science, with particular emphasis on site investigation, risk-based corrective action and management of remediation projects. The sites investigated involve numerous industries including dry cleaning, the steel industry, chemical manufacturing and recycling, retail petroleum, machine tool manufacturing, construction equipment maintenance facilities, coal storage and transfer yards, railroad warehouse and bulk oil facilities, property development, military installations and landfills.
- Mr. Mark Mejac, PG, CGWP, will serve as a technical resource for the site remediation activities. Mr. Mejac has over 31 years of environmental consulting experience. He has extensive experience in a variety of hydrogeologic investigations, environmental risk assessments, and remedial alternatives evaluations. He specializes in the evaluation and implementation of innovative and cost effective remedial alternatives at contaminated groundwater and soil sites. Mr. Mejac routinely applies his expertise in groundwater flow and contaminant transport modeling, and migration analysis of DNAPLs contaminants in porous and fractured media.

Professional resumes for key personnel dedicated to the success of this project are provided in Appendix B. These staff members will be available to complete all tasks associated with this project on a prompt and timely basis.

In addition to the Ramboll Environ team, the subcontractors we propose to use for the selected remedial option is Redox Tech, LLC (Redox Tech), North Shore Environmental Construction, Inc. (North Shore) and the analytical laboratory PACE Analytical Services, Inc. (PACE). Redox Tech is a specialty environmental remediation company that provides expert, turn-key *in-situ* soil and groundwater remediation services. The company was founded in 1995 by Dr. John Haselow. Redox Tech can design an *in-situ* remedial approach from bench- to pilot- to full-scale implementation. Redox Tech has experience with chemical oxidation (Fenton's chemistry, permanganate, persulfate and ozone), bioremediation (biosparging, cometabolic, anaerobic bioremediation (ABC+®) and bioaugmentation), reductive chlorination (ZVI) and metals treatment via Eh-pH manipulation.

Redox Tech has worked for numerous Fortune 500 companies through contracts with large consulting firms. In addition, Redox Tech has $5 million of general liability, workmen's compensation

and auto insurance coverage. Redox Tech has $2 million in pollution and professional liability coverage.

Redox Tech currently employs more than 30 individuals ranging from PhD engineers to field level technicians. This diversity allows both design and implementation of our remediation strategies. In addition, Redox Tech owns and operates a wide range of environmental equipment, such that no other subcontractors are typically required to implement the remedial design.

Equipment owned and operated by Redox Tech includes Geoprobe® direct push drilling equipment, injection trailers for a variety of chemicals and fluids, hydraulic fracturing capabilities, blowers for sparging, steamers for thermal enhancement, and *in-situ* soil blending.

North Shore, a Milwaukee area environmental management company, provides emergency hazardous material response, site remediation, AST/UST removal, and other industrial services. North Shore will provide concrete slab removal and disposal services, soil management, and backfilling/earthwork services.

PACE is one of the largest analytical laboratories in the United States. PACE provides the scientific expertise and instrumentation to support variant analytical testing requirements--regardless of scope or complexity. Throughout their 34-year history, clients have benefited from their commitment to data quality, timely sample turnaround times and excellent service. PACE offers comprehensive testing services for consulting, engineering, energy/utility companies, industry, municipalities and government agencies--as well as for the pharmaceutical and medical device industries. Their full service environmental testing laboratories offer inorganic, organic and radiochemistry capabilities--specializing in the analysis of trace level contaminants in air, water, wastewater, soil, biota and waste. PACE is a Wisconsin certified laboratory.

3. SITE BACKGROUND INFORMATION

This Site Background Information section was summarized from the May 5, 2015, Request for Remedial Action Bid Proposal for Former Express Cleaners Site, and from the reports listed below in Section 3.2. Parties currently involved with this project include the following:

Responsible Party/Site Owner:	Ehrlich Family Limited Partnership c/o James Small P.O. Box 081007 Racine, Wisconsin 53408-1007
Owner's Representative:	Mr. William P. Scott Gonzalez Saggio & Harlan LLP 111 East Wisconsin Avenue, Suite 1000 Milwaukee, Wisconsin 53202
Regulatory Agency/Project Manager:	Ms. Nancy Ryan Wisconsin Department of Natural Resources 2300 North Dr. Martin Luther King, Jr. Drive Milwaukee, Wisconsin 53212-3128

3.1 Site Setting

The Site is located at 3921-41 N. Main Street in the northeast 1/4 of the northeast 1/4 of Section 33, Township 4 North, Range 23 East, City of Racine, Racine County, Wisconsin (Figure 1). The

geographic position of the Site in WTM 91 (x, y) coordinates obtained from the WDNR Remediation and Redevelopment (RR) interactive Site Map (http://dnrmaps.wi.gov) is 701507, 257580.

The Site consists of a one-story, 6,804 square foot strip mall (without a basement) on a 0.77-acre lot located at 3921-3941 North Main Street and the adjacent 0.45-acre lot located at 3936 North Bay Drive, Racine, Wisconsin 53402-3611 (Figure 2). The northern unit of the strip mall (3941 N. Main Street) was formerly the location of a dry cleaning operation from 1971 until approximately 2006. The Site has been contaminated by dry cleaning solvents; concentrations of PCE, TCE, cis-1,2 DCE and vinyl chloride in groundwater have all historically exceeded the enforcement standards. Impacted soils are present in some locations beneath the paved surfaces and building slab, and extend beneath the water table to a depth of up to approximately 11 feet. Impacted soils within 4 feet of the ground surface exceed the direct contact industrial RCLs for some contaminants. PCE and/or TCE have been detected in soil vapor beneath the foundation of the strip mall building. An off-site monitoring well west of Main Street tested on April 7, 2011, did not contain dry-cleaning related contaminants above laboratory analytical detection limits.

The ground surface slopes radially from the site building. Surface-water runoff on the Site flows to the east on the eastern half of the Site and to the west on the western half. The Site and vicinity commercial properties are served by the Racine municipal water supply that obtains potable water from Lake Michigan. The nearest surface water body is Lake Michigan, which is located approximately 0.4 mile to the east of the Site.

The Site and adjacent area to the east (3936 North Bay Drive) have been the subject of several subsurface investigations since 2006. The WDNR has assigned BRRTS #02-52-547631 to the case file. Based on the RFP, Ramboll Environ understands that the Site will be redeveloped upon completion of active remedial site work including the construction of a new site building.

3.2 Previous Subsurface Investigations

Several investigation reports have been submitted to the WDNR by previous consultants that contain additional background information regarding this Site. The following key documents were utilized to evaluate site conditions and the investigative history for the subject property:

1. Site Investigation Dry Cleaner Solvent Release, Express Cleaners, Inc., 3941 N. Main Street, Racine, Wisconsin, BRRTS #02-52-547631, prepared by Northern Environmental Technologies, Incorporated, May 14, 2008.
2. Additional Information, Express Cleaners, 3941 N. Main Street, Racine, Wisconsin, BRRTS #02-52-547631, prepared by Northern Environmental Technologies, Incorporated, January 14, 2009.
3. Additional Investigation Activities, Express Cleaners, 3941 N. Main Street, Racine, Wisconsin, BRRTS #02-52-547631, prepared by Bonestroo/Northern Environmental, June 9, 2009.
4. Additional Investigation Activities, Express Cleaners, 3941 N. Main Street, Racine, Wisconsin, BRRTS #02-52-547631, prepared by Bonestroo, May 2, 2011.
5. STS, January 14, 2000, Results of the Environmental Assessment at 1214-1222 West Wells Street, Milwaukee, Wisconsin.

Based on this information, from April 2006 through April 2011, a total of 43 Geoprobe® borings were sampled on the Site and at adjacent properties (B1 through B34 and BA1 through BA9), two of which were converted to temporary groundwater monitoring wells (B5/TW1 and B7/TW2). Fifteen monitoring wells (MW1 through MW15) and one piezometer (PZ1) were also installed; with *in-situ* hydraulic conductivity testing conducted at monitoring well MW3 and piezometer PZ1. Additionally,

three sub-slab vapor probes were installed and sampled (VP4 through VP6). The most recent groundwater sampling was conducted during April 2011.

3.3 Geologic and Hydrogeologic Setting

Up to 4 feet of gravelly sand to sand fill underlie the site building and other portions of the Site. Native sediments consisting of silty sand underlie the fill or are present at the surface in areas where no fill is present, and extend to depths of approximately 6 to 8 feet bgs. The silty sand is underlain by silty clay that extends to the maximum depth investigated of approximately 16 feet bgs. The silty clay was identified by the previous consultants as part of the Oak Creek Formation. Reportedly Silurian-age dolomite bedrock is present in the vicinity of the Site at depths ranging from 50 to 150 feet bgs (Trotta and Cotter, 1973).

Slug testing of site wells indicates the silty sand has a hydraulic conductivity measured at 2.1×10^{-4} centimeters per sec (cm/sec). The water table is reported to be present at approximately 2.75 to 4.75 feet bgs with a shallow groundwater divide present beneath the existing building in which groundwater flows to the east at locations east of the building and to the west/southwest west of the building.

3.4 CVOC Mass Estimates

Based on the available site information, Ramboll Environ estimated the CVOC contaminant mass present in site soil and groundwater in the areas shown on Figure 2 that included analytical data for 1,2-cis-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), tetrachloroethene (PCE), and trichloroethene (TCE)[1]. As part of this evaluation the area of impacted soil and groundwater was divided into the 12 areas shown on Figure 2 in which average soil and groundwater concentrations and vertical layer thickness were assigned. Vertical layers[2] evaluated included:

1. Soil (vadose) – ranging 2.75 to 4.25 feet thick[3] in the areas evaluated;
2. Soil (coarse, saturated) – ranging 4.5 to 5 feet thick at the source area (Source Areas 1 and 2);
3. Soil (clay, saturated) – 1.5 feet thick at the source area (Area 1);
4. Groundwater (coarse saturated) – ranging 1 to 4.5 feet thick in the areas evaluated; and
5. Groundwater (clay saturated) – ranging 0 to 9 feet thick in the areas evaluated.

The contaminant mass estimate indicates that approximately 287 pounds of CVOC is present in the areas evaluated, and the primary CVOC site contaminant in soil and groundwater is PCE (97.3% of total CVOC mass present), with smaller amounts of breakdown products (TCE, cis-1,2-DCE, and trans-1,2-DCE). A summary tabulation of the results of this evaluation is presented on Table 1. As discussed below, this evaluation indicates that 99.0% of the CVOC is present in soil; with 1.0% present in groundwater.

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[1] Based on the data available, vinyl chloride was only historically detected in groundwater one time at one location (MW3) and was not observed to be present in follow-up groundwater sampling events. Therefore, vinyl chloride was not included in this evaluation.

[2] Note that Ramboll Environ has interpreted the data to indicate that CVOCs are adhered to soil in the upper saturated zone in source Area 1 and 2, and as such may be a continuing source of CVOCs to groundwater. This interpretation differs somewhat from the assumption presented in the RFP that assumes all soil analytical data from soil samples collected below the water table are representative of groundwater impacts.

[3] Average thickness values used for each area evaluated.

3.4.1 Soil

The largest amount of CVOCs present in site soil are within Areas 1 and 2 (Source Areas 1 and 2; 2,179 ft^2), containing approximately 94.7% of the total CVOC contaminant mass present at the Site (approximately 0 to 8 feet bgs). Approximately one-half (50.6%) of the total mass is contained in the vadose zone (0 to 3 feet bgs), with another 37.5% estimated to be present in coarse-grained saturated soil (3 to 8 feet bgs) in Areas 1 and 2, and the remaining 6.6 % present in the upper portion of the saturated clay (8 to 9.5 feet bgs) in Area 1.

The CVOC impacts at Area 5 are apparently due to a separate surface release at that location, and that CVOCs have migrated downgradient from Source Areas 1 and 2 through the subsurface utility corridor in Area 4. Even though elevated maximum CVOC concentrations were detected in these areas, the calculated contaminant mass in vadose soil is low, only 0.4% of the total mass present at the Site.

The remainder of the CVOC mass present in vadose zone soil at the Site is distributed at lower concentrations throughout the remainder of the Site (9,029 ft^2) and accounts for approximately 3.8% of the total CVOC mass present.

Toxicity characteristic leaching procedure (TCLP) soil testing results are not available for site soil. The concentration of PCE in vadose soil in Source Areas 1 and 2 (maximum detected concentration of 270 mg/kg at 2 to 4 feet at boring B4) suggests that the soils, if excavated, would likely be above both the 35 mg/kg contained-out concentration and above the 0.7 mg/L TCLP limit for PCE, and would need to be treated/disposed as a RCRA characteristically hazardous waste.

3.4.2 Groundwater Quality

Only 1.0% of the total contaminant mass is estimated to be present in site groundwater (Table 1). The highest CVOC concentrations in groundwater have been identified at monitoring well MW-3 and temporary wells TW-1 and TW-2 (Source Areas 1 and 2) beneath the northern portion of the former dry cleaning building where PCE was historically released to the subsurface. Detected concentrations of PCE in groundwater at Source Areas 1 and 2 have ranged from 770 to 6,000 µg/L.

Based on the concentrations of PCE, TCE, and cis-1,2-DCE detected in the groundwater, impacted groundwater with CVOC concentrations greater than ES values extends east from the source area near wells MW3, TW1, and TW2 (and just north of the source area at PZ1, MW1, and MW2) to monitoring well MW6 located at the eastern boundary of the 3936 North Bay Drive property, and to the west/southwest to Well MW8 on the western site boundary. Historically, CVOCs have not been detected in groundwater, or were detected at low concentrations below the ES, at monitoring wells located north of the plume (MW-7 MW-9, MW-10), south of the plume (MW4, MW5, MW11, and MW13), and west/southwest of the plume (MW14 and MW15).

3.5 Potential Receptors

3.5.1 Soil

Previous subsurface investigations have indicated the presence of CVOCs in soil at the Site. Potential scenarios by which CVOCs may come in contact with receptors include direct dermal contact during drilling, soil excavation, or soil injection activities. Such activities at the Site will be monitored to reduce potential risk due to inhalation of vapors or particulate matter and dermal protection will be utilized as necessary to protect field personnel from direct contact.

3.5.2 Groundwater

Potential ingestion of CVOC-impacted groundwater could hypothetically occur if affected groundwater were to migrate off-site to a private or municipal well used for potable water supply. However, no such groundwater receptors are currently present within the site vicinity, as it is served by the

Milwaukee municipal water supply that obtains potable water from Lake Michigan. As such, the groundwater exposure pathway is not complete.

3.5.3 Surface Water

Local surface waters consist of Lake Michigan, which is located 0.4 mile to the east of the Site. As such, the surface water pathway is not complete on site.

3.5.4 Utility Corridors

Potential concerns for sites with chlorinated-solvent contamination include migration of contaminants along utility corridors. The depth to the water table at the Site ranges between approximately 2.75 to 4.25 feet bgs. Based on their invert elevations relative to the water table, the sanitary sewer and water service utility corridor to the former strip mall may receive impacted groundwater from the Site (see Figure 2).

3.5.5 Vapor Intrusion

Potential concerns for sites with CVOC contamination include vapor migration into buildings. WDNR vapor intrusion guidance for CVOCs indicates that the vapor intrusion pathway should be investigated if any of the following conditions are met:

- the building of interest is located over a CVOC source;
- the building is located within 100 feet of a CVOC source;
- the building overlies a groundwater plume that exceeds WAC NR 140 Enforcement Standard (ES) concentrations;
- groundwater with CVOC concentrations that exceed WAC NR 140 Preventive Action Limit (PAL) values is entering the building or is in contact with the building foundation or sump; and
- vapors have the potential to enter preferential pathways that connect to the building.

Based on these criteria, the occupied building located on the former Pugh Oil property approximately 40 feet directly north of the Site is close enough to the soil and groundwater CVOC plume to warrant investigation of the vapor intrusion pathway. No information was available concerning the building on the former Pugh Oil property north of the Site, so it is not known if it has a basement or sump that could contact groundwater. In any event, the vapor intrusion pathway at this building will be evaluated as part of the remedial action activities proposed for the Site. Additionally, as part of the scope of work discussed herein, Ramboll Environ has provided the scope and estimated cost to conduct a soil vapor assessment at the building located on the former Pugh Oil property.

3.6 Summary of Design Considerations

Based on the above site conditions and pathways of concern, a summary of site conditions relative to remedial evaluation and selection is as follows:

- The Site is located in a populated urban area, with high visibility. A remediation strategy should be selected that minimizes short-term exposure and impacts to receptors during construction and long-term exposure based on the final remedy.
- The site owner desires that the Site be available for re-development by September 30, 2015. Ramboll Environ assumes the redevelopment will include construction of a new site building and other site improvements. Therefore, remedial methods that can accomplish significant soil and groundwater mass removal in the short term are preferred.

- The most heavily impacted soil and groundwater is present within the northern third of the property, and extends from the ground surface to approximate depths of 9 feet bgs.
- Although the presence of DNAPL has not been observed in groundwater samples obtained from the Site, historical data suggests that concentrations of PCE are sufficiently high that DNAPL could be present as DNAPL droplets or ganglia within the porous media near former temporary wells TW-1 and TW-2.
- Removal of all contamination in soil and groundwater to below generic soil and groundwater cleanup standards is not practicable given the magnitude and extent of impacted soil and groundwater at the Site. Therefore, utilization of WAC NR 720 performance standards for soil and groundwater that rely on contaminant mass removal and groundwater CVOC plume stability as the primary remediation objective is proposed.
- Removal of the majority of the residual soil and groundwater CVOC mass in the former source area is essential to reduce the probability for indoor air vapor action level exceedances to occur within any new site building.
- While the mass of soil and groundwater impacts that extend onto the adjacent properties to the north and east of the former Express Cleaners site are relatively small compared to the mass on the former Express Cleaners property, the likelihood for these off-site impacts to cause an indoor air vapor action level exceedance within a building on the former Express Cleaners property may be relatively low. However, any new building that may be constructed at the Site should incorporate a vapor migration barrier.
- After contaminant mass removal, groundwater remediation via natural attenuation will be essential. Enhancing degradation via reductive dechlorination technologies consistent with the existing natural processes at the Site will likely be more successful for long-term groundwater natural attenuation.
- Ramboll Environ does not recommend active soil and groundwater remediation within the eastern portion of the site near monitoring wells MW-6 and MW-13. Groundwater samples collected to date from monitoring well MW-13 have not contained detectable concentrations of VOCs, and only one groundwater sample obtained from MW-6 revealed a slight exceedance (6.5 ug/L) of the WAC NR 140 ES for PCE (5 ug/L). Monitoring well MW-6 will, however, be included as part of the recommended quarterly groundwater monitoring program for evaluation of MNA.

4. REMEDIAL GOALS AND OBJECTIVES

This section presents the proposed remedial action goals and objectives for the impacted soil and groundwater at the Site. The overall goal of the remedial action is to remediate soil impacts that threaten human health and the environment, reduce source soil concentrations and mass to minimize leaching of VOCs through the vadose zone to groundwater, and decrease the persistent groundwater contaminant concentrations at the source and down gradient of the source area consistent with WAC NR 700. This goal can be realized by effectively remediating source soil and groundwater concentrations on site to levels that will ultimately result in stable and/or receding groundwater contaminant concentrations down gradient of the source area as well as reducing the potential for vapor intrusion or need to implement vapor mitigation actions in nearby buildings. The remedial actions proposed for achieving this goal will also result in increased value to, and redevelopment potential of the Site. The following sections discuss the rationale and selected method for establishment of the soil clean-up goals for soil and the remedial objective for achieving a no-further action for residual groundwater impacts at the Site.

The case closure goal for the Site is to obtain a "no further action" status under WAC NR 726 following successful implementation of soil and groundwater remedial actions. The closure pathway is anticipated to rely upon WDNR's GIS registry for recording closed sites that have contamination exceeding residual contaminant levels (RCLs) in soil and ES in groundwater. For the Site, the closure pathway for obtaining a no further action status for soil is via the use of a soil performance standard as a component of active remediation while the closure pathway for obtaining a no further action status for groundwater is via a MNA remedy subsequent to active remediation.

4.1 Proposed Remedial Action Goals for Soil

As the generic WDNR soil to groundwater pathway RCLs for the chemicals of interest (PCE [4.5 ug/kg], TCE [3.6 ug/kg], cis-DCE [41.2 ug/kg], and VC [0.1 ug/kg]) using a dilution-attenuation factor of 2 are more stringent than the corresponding non-industrial direct contact RCLs (PCE [30,700 ug/kg], TCE [1,260 ug/kg], cis-DCE [156,000 ug/kg], and VC [67 ug/kg]), remediation of the site soil to meet groundwater pathway RCLs would require over a 99.99% reduction in the maximum soil concentration and a 99.97% reduction in contaminant mass to achieve the soil to groundwater RCL goals. Contaminant concentration and mass reduction of this magnitude is beyond the capabilities of ordinary soil remedial methods and technologies, and therefore, may not be technically or economically feasible. Furthermore, the soil clean-up concentrations for PCE, TCE, and VC at this level are well below the method detection limits that analytical laboratories can achieve using the most current SW846 methods. As such, a performance-based remedial action goal for the protection of groundwater is recommended instead of the WDNR groundwater pathway RCLs and for the following additional reasons:

- Remediation of the soil source area to the groundwater protection RCLs would likely create an area of clean subsurface soil that may become re-contaminated by potential off-site shallow groundwater impacts in the area;
- Rebound to higher concentration levels following remediation activities could exceed the soil to groundwater RCL concentrations for PCE, TCE, and VC. From this perspective, any added benefit to achieving a soil mass removal to meet the low level soil to groundwater RCL concentrations may prove to be ineffective in the long term; and
- Remediation of soil to these concentrations would be cost prohibitive.

As such, a performance based soil remedial action goal for the protection of groundwater is proposed for the Site. As described in the previous paragraphs, WAC NR 720 stipulates that site specific soil clean-up standards protective of public health, safety, and welfare and the environment are generally established to restore the environment to the lowest concentration practicable for specified soil contaminants. However, in the event that it is not practicable to achieve the established and/or most stringent soil RCL, a soil performance standard may instead be implemented. For the Express Cleaners Site, soil performance standards are applicable to address both the direct contact and groundwater pathways and must be implemented and maintained to ensure that contamination no longer poses a threat to human health or the environment.

Ramboll Environ proposes to establish a clean-up goal for impacted soil based on the direct contact exposure pathway. The default non-industrial direct contact RCL's for PCE, TCE, cis-DCE, and VC will be used as the soil clean-up goals for the Site and are summarized below:

- PCE – 30,700 ug/kg
- TCE – 1,260 ug/kg
- cis 1,2-DCE – 156,000 ug/kg
- VC – 67 ug/kg

In addition to achieving the direct contact RCLs, the remedial objective includes removal of sufficient CVOC mass to allow for stable and/or receding groundwater concentrations. To achieve this objective, we believe that this residual PCE concentration may result in non-stable groundwater conditions. Therefore, our recommended approach is to address the PCE concentration in soil to at least an order of magnitude less than the non-industrial direct contact RCL. Based on our experience on other similar sites in Wisconsin and because the sorbed phase CVOC mass represents an estimated 99% of the total CVOC mass at the Site, we propose an internal goal of 1,500 ug/kg for PCE.

These proposed remedial action goals will allow the impacted soil boundaries to be defined and to establish a performance level in which various remedial alternatives can be reasonably compared and evaluated. As direct contact with soil is a potential exposure pathway at the Site, two potential receptors of the residually impacted soil have been identified: 1) current and future on-site workers; and 2) future construction workers. The current and future on-site worker is assumed to not be exposed to soil deeper than 4 feet bgs. However, a future construction worker may be exposed to the chemical of interest (COI) in surface and subsurface soils (0 to 9 feet bgs) via incidental ingestion, dermal contact, and inhalation of volatiles and dust. Therefore, the default non-industrial direct contact RCLs are considered applicable for the subsurface soil throughout the 0 to 9 foot depth to address the construction worker receptor scenario.

The proposed soil remedial action goals for the Site will be performance based to ensure that any residual soil contamination remaining at the Site does not further degrade groundwater quality. The performance based soil remedial action goals will be evaluated by monitoring groundwater conditions to document a stable and/or receding contaminant plume.

Remediation of the site soil to the above RCLs will result in a greater than 93% reduction in the maximum documented soil concentration and a greater than 95% overall contaminant mass reduction in source soil. Remediation of soil to these soil performance standards also requires a demonstration that natural degradation processes are functioning to remediate any residual contaminants to levels that are protective of groundwater and which will result in stable and/or decreasing groundwater contaminant concentrations. This remedial strategy achieves the goal of the soil clean-up standard (reducing the threat to the environment) by containing and remediating environmental contaminants. Provided that the conditions required by the performance standard are maintained, no further action regarding the contaminated soil would be required once the soil performance standard has been successfully documented.

4.2 Proposed Remedial Action Goals for Groundwater

The closure pathway objective for groundwater at the Site is to obtain a "no further action" status under WAC NR 726 following successful documentation that remedial actions conducted at the source results in reduced mass loading of contaminants to groundwater so that the residual groundwater contaminant plume is stabilized and/or has receding COI concentrations. To document attainment of this goal, a groundwater monitoring program will be implemented to evaluate plume conditions and document that no adverse impact on human health, safety or welfare, and to the environment exists or develops in the future. This closure pathway for the residual groundwater impacts is anticipated to incorporate a closure approach that relies upon the WDNR's GIS registry for recording closed sites that have residual contamination that exceeds the ES in groundwater.

The following sections provide an evaluation of remedial options for soil and groundwater followed by a recommended remedial action scope of work.

5. EVALUATION OF REMEDIAL ACTION OPTIONS

This section identifies several feasible remedial action options that have the greatest potential to achieve the goals and objectives for remediating the impacted soil, groundwater and vapor at the Site. The identified remedial action options are evaluated based on the requirements specified in WAC NR 722, which are summarized in the following sections. Alternatives that were determined to not be technically or economically feasible were not retained for further evaluation.

5.1 Technical Feasibility

The technical feasibility of appropriate remedial action options are evaluated using the following criteria:

1. Long-term Effectiveness: The long-term effectiveness of appropriate remedial action options, taking into account the following factors:
   - the degree to which the toxicity, mobility and volume of the contamination is expected to be reduced; and
   - the degree to which a remedial action option, if implemented, will protect public health, safety and welfare and the environment over time.
2. Short-term Effectiveness: The short-term effectiveness of appropriate remedial action options, taking into account any adverse impacts on public health, safety and welfare and the environment that may be posed during the construction and implementation period until case closure under WAC NR 726.
3. Implementability: The implementability of appropriate remedial action options, taking into account the technical and administrative feasibility of construction and implementation of the remedial action options. Disruption of the existing business and potential impacts to neighboring properties were also considered when evaluating the implementability of each alternative.
4. Restoration Timeframe: The expected timeframe needed to achieve the necessary restoration.

5.2 Economic Feasibility

The economic feasibility of each appropriate remedial action option was evaluated using the following criteria: capital costs, annual operation and maintenance costs, total present worth of the costs, costs associated with potential future liability, and disruption to businesses on or adjacent to the Site. The economic feasibility of a remedial action option is determined by comparing the costs to what is expected to be technically achieved by that option, taking into account long-term effectiveness, short-term effectiveness, implementability, and the time until restoration is achieved for each option.

5.3 Identified Remedial Action Options

The response actions identified for preliminary screening for the subject property include an appropriate range of potential remedial action options. The no action alternative is included as a general response action against which other actions can be evaluated.

Based on review of laboratory results of previously-collected soil and groundwater samples, the recommended soil and groundwater treatment area includes the location approximately bounded by monitoring wells MW-1, MW-2, MW-4 and MW-8, as shown on Figure 3. This recommended soil and groundwater treatment area covers approximately 5,700 square feet. The vertical extent of the impacted soil and groundwater extends to approximately 9 feet bgs. Based on these dimensions, the

target treatment volume includes approximately 1,900 cubic yards, which is equivalent to approximately 2,850 tons. To reduce the potential for off-site migration of impacted groundwater, the recommended target treatment volume includes the east-west trending utility corridor located between the site building and the western property boundary.

Based on the remedial objectives for soil and groundwater identified in Section 4.1 and 4.2, and the available groundwater quality data, Ramboll Environ does not recommend active soil and groundwater remediation within the eastern portion of the site near monitoring wells MW-6 and MW-13. Groundwater samples collected to date from monitoring well MW-13 have not contained detectable concentrations of VOCs, and only one groundwater sample obtained from MW-6 revealed a slight exceedance (6.5 ug/L) of the WAC NR 140 ES for PCE (5 ug/L). Monitoring well MW-6 will, however, be included as part of the recommended quarterly groundwater monitoring program for evaluation of MNA.

Approximately one-half of the estimated CVOC mass is present in the vadose zone, and one-half is present in the saturated zone at the Site. As such, CVOC mass above the water table can act as a long-term source of groundwater impact, such that the intended site remediation will include reducing contaminant mass flux to the water table from the vadose zone.

Remedial action options considered for the impacted soil and groundwater at the subject property are as follows:

- no action;
- institutional/engineering controls;
- monitored natural attenuation;
- excavation and landfill disposal;
- soil vapor extraction;
- air sparging;
- groundwater extraction and treatment;
- *in-situ* electro-thermal remediation;
- *in-situ* chemical oxidation; and
- *in-situ* enhanced reductive dechlorination.

5.3.1 No Action

The No Action response involves no treatment of contaminated soil, groundwater and vapor at the subject property. This response typically serves as a baseline against which the other remedial options and technologies can be compared. The No Action response may be used as the sole remedial action only in the event the prevailing site conditions lead to the determination that the Site poses no significant risk to human health or the environment. In that event, implementation of other types of action becomes unnecessary.

In terms of technical feasibility, the No Action alternative would eventually reduce the magnitude of the existing risk by natural attenuation processes. Because No Action is proposed under this alternative, the implementability is very high. From an administrative feasibility point of view, this alternative would likely not be accepted by the WDNR as the remedy for the Site because short-term remedial objectives would not be met.

This alternative was considered the lowest in terms of present worth cost and disruption to the subject property. It has no associated capital costs or operation and maintenance costs. As indicated above, this alternative would likely not be accepted by the WDNR and is not retained for further evaluation.

5.3.2 Institutional Controls

In Wisconsin, the GIS Registry of Closed Remediation Sites provides a means of public notice regarding properties with residual contamination. Sites closed with residual soil contamination exceeding WAC NR 720 RCL values for soil and/or WAC NR 140 ES values for groundwater are required to be listed in the GIS Registry. Sites closed with deed restrictions prior to June 2006 are also included in the GIS Registry. As of June 2006, the GIS Registry also became the database for listing sites closed with land use controls, which replaced deed restrictions.

If a land use control is required for a particular site, a maintenance plan may also be required. Maintenance plans may include requirements for cover inspections, fencing inspections, and/or routine groundwater monitoring. General information provided in the GIS Registry related to soil and/or impacts includes the site analytical data, site maps, as well as any special precautions that may be required for future potential redevelopment of a site.

With regard to technical feasibility, no additional treatment technology would be included with this option; therefore, this alternative can only offer gradual reduction in the toxicity, mobility or volume of the contaminants. As with the No Action alternative, this option would likely not be accepted by the WDNR as the sole remedy for the Site as short-term remedial objectives would not be met. This alternative is therefore not retained for further evaluation as a sole remedy; it is, however, retained for further evaluation in conjunction with closure activities using active remediation.

5.3.3 Monitored Natural Attenuation

Natural attenuation processes can account for improvements in groundwater quality. This process is therefore considered a passive remedial alternative. Natural attenuation in the subsurface occurs due to a combination of processes including the following: biodegradation, adsorption, dilution, and dispersion. Depending on the initial concentrations and properties of the chemicals in the groundwater, and physical or biological processes controlling attenuation, the contaminant plume may eventually decrease or narrow over time, as the edges of the plume will degrade to insignificant concentrations. Intrinsic bioremediation is the use of a scientific approach to demonstrate the occurrence of microbial degradation of contaminants by monitoring the geochemical and biological properties of the groundwater, including pH, temperature, conductivity, oxidation/reduction potential, electron acceptors (e.g., dissolved oxygen, nitrate, nitrite, sulfate, etc.), carbonate, bicarbonate, carbon dioxide, methane, alkalinity, cations, TDS, chloride, sulfide, etc.

Biodegradation of PCE has been well documented under reducing conditions, and the biochemical pathway and microorganisms responsible identified. In addition to these general considerations, cDCE and other daughter products of TCE and PCE are commonly detected in groundwater at the Site. The presence of daughter products such as cDCE is generally understood to result from the biodegradation of TCE, consistent with the well-known biodegradation pathway:

PCE→TCE→cDCE/tDCE→vinyl chloride→ethene

Therefore, the detected presence of cDCE and other daughter compounds at the Site is consistent with biodegradation of TCE and PCE.

MNA has limited effectiveness for contaminant plumes that have migrated to receptors or are present in an area where future groundwater use is likely. The ideal goal of MNA is to demonstrate that

active remediation is unnecessary because groundwater plumes will not reach potential receptors or other points of compliance before being remediated by organisms that occur naturally in groundwater.

Groundwater monitoring is used as a tool to provide information regarding changes in subsurface conditions over time. This action is a component of remedial action options for groundwater. In the case of MNA, time-series data are collected from monitoring wells to evaluate plume stability and determine if natural attenuation is occurring. If MNA is selected as the preferred remedy at a site, time-series monitoring is used to confirm the effectiveness of natural processes in the degradation of contaminants. The WDNR endorses use of the Mann-Whitney U Test, which is equivalent to the Wilcoxon Rank Sum Test, for evaluating natural attenuation processes. Per current WDNR guidance, the Mann-Whitney U Test is conducted by assembling well data for the most recent eight consecutive quarterly or semi-annual sampling events for each contaminant that has exceeded the WAC NR 140 ES at one or more monitoring wells.

No active groundwater treatment process is proposed under this alternative; instead it would rely on the effectiveness of natural processes to reduce the toxicity, mobility and volume of the contaminants after vadose zone soil remediation. Because no major remedial action is proposed as part of this alternative, it would have minimal impact to the community, and on-site workers. No short-term environmental impacts are therefore expected from this alternative. Remedial objectives may be met by implementing this alternative; however, the time to achieve the remedial objectives would be longer than most of the other alternatives considered and would not occur within a reasonable timeframe.

From an administrative feasibility point of view, this option will require a demonstration of effectiveness (*i.e.,* stable or declining concentration trends) before the administrative agency can accept this alternative as the final remedy for the Site. Soluble hydrocarbon plumes containing CVOCs are amenable to natural attenuation processes. However, the presence of CVOCs as DNAPL has been detected in site groundwater. As such, it is not currently possible to estimate a timeframe for completion of MNA and attainment of regulatory case closure in the absence of active groundwater remediation. Moreover, as indicated in WAC NR 722.07, for CVOCs "that do not readily degrade in soil and groundwater, an active remedial action that will reduce the contaminant mass and concentration will typically be necessary." Based on the foregoing, the MNA alternative alone is not retained for further evaluation, except in conjunction with active remediation.

5.3.4 Excavation and Landfill Disposal

Soil excavation and off-site treatment/disposal is a commonly-used approach to achieve remedial objectives for sites with contaminated soils within a short time-frame. Under this option, impacted soils would be excavated and transported off-site for appropriate landfill disposal.

In terms of the identified remedial alternatives to address the CVOC-impacted soil, soil disposal costs associated with the excavation and off-site landfill disposal alternative would be high, as a substantial portion of the impacted soils would likely represent RCRA characteristic hazardous waste based on detected PCE concentrations. Soil that contains greater than 60 mg/kg PCE represents a characteristic RCRA hazardous waste that exceeds land disposal restriction threshold concentrations as provided in 40 CFR 268.40, such that a substantial portion of the excavated soil might require chemical oxidation pre-treatment or incineration with a transportation and disposal cost alone of approximately $700 per ton. Moreover, the depth to the water table is approximately 3 feet bgs, such that substantial additional costs would likely be incurred for infiltrated groundwater disposal and possible excavation shoring during the course of excavation activities. Based on the target treatment identified in Section 5.3 (1,900 cubic yards or 2,850 tons), the cost to implement the soil

excavation and off-site treatment/disposal alternative is estimated to total approximately $2,900,000. Based on this evaluation of economic feasibility, the soil excavation and off-site treatment/disposal alternative is not retained for further evaluation.

5.3.5 Soil Vapor Extraction

Soil vapor extraction (SVE), also known as "soil venting" or "vacuum extraction," is an *in-situ* remedial technology that reduces concentrations of VOCs adsorbed to soils in the unsaturated (vadose) zone. In this technology, a vacuum is applied through extraction wells near the source of contamination in the soil. Volatile constituents of the contaminant mass enter the vapor phase and the vapors are drawn toward the extraction wells. Extracted vapor is then treated as necessary (commonly with carbon adsorption) before being released to the atmosphere. SVE may be enhanced by the addition of air inlet wells (sometimes pressurized) within the vacuum radius of influence (ROI), pulsing the air flow in the soil, or switching flow by reversing inlet and extraction wells.

SVE is most effective in removing VOCs at sites with homogeneous, relatively coarse grained soils where the water table is sufficiently deep such that upwelling of groundwater into SVE wells does not occur. SVE typically has limited effectiveness in low permeability and/or wet silts and clays. Based on the shallow depth to the water table at the Site (approximately 3 feet), the SVE remedial alternative is not retained for further evaluation based on technical implementability.

5.3.6 Air Sparging

Air sparging is an *in-situ* remedial technology that reduces concentrations of VOCs in petroleum products that are adsorbed to coarse-grained soils and dissolved in groundwater. This technology, which is also known as "*in-situ* air stripping" and "*in-situ* volatilization," involves the injection of contaminant-free air into the subsurface saturated zone, enabling a phase transfer of hydrocarbons from a dissolved state to a vapor phase. The air is then vented through the unsaturated zone. Air sparging is often used together with SVE, but it can also be used with other remedial technologies. When air sparging is combined with SVE, the SVE system creates a negative pressure in the unsaturated zone through a series of extraction wells to control the vapor plume migration.

When used appropriately, air sparging has been found to be effective in reducing concentrations of VOCs found in petroleum products. However, air sparging is generally more applicable to the lighter gasoline constituents (*i.e.*, benzene, ethylbenzene, toluene, and xylene [BTEX]), because they readily transfer from the dissolved to the gaseous phase. Oxygen added to contaminated groundwater as part of air sparging can also enhance biodegradation of BTEX and other VOCs that are amenable to aerobic bioremediation. PCE is not amenable to aerobic bioremediation. Air sparging processes can also mobilize DNAPLs. Based on comparison of detected PCE concentrations in groundwater with the aqueous solubility of PCE, PCE as DNAPL may be present in the subsurface at the Site. As such, the air sparging remedial alternative is not retained for further evaluation based on technical implementability.

5.3.7 Groundwater Extraction

This alternative consists of groundwater collection coupled with vadose zone source remediation as the selected remedial action option to treat affected groundwater at the subject property. Collection of groundwater is conducted as part of pump-and-treat systems. Groundwater is extracted from the subsurface for the purpose of aboveground treatment prior to re-injection, reuse, or discharge. Collection techniques include use of vertical or horizontal extraction wells or interceptor trenches.

It is widely established that contaminated aquifers typically cannot be restored through simple groundwater extraction and treatment (Keely, 1990; Travis and Doty, 1990; and McKay and Cherry, 1989). As such, groundwater extraction is often used as a hydraulic containment technology, as

opposed to an aquifer restoration technology. The limitations associated with pump-and-treat methodology include the following:

- Organic contaminants generally have low solubility in groundwater. Therefore, only a small fraction of the total contaminant mass is accessible to the pump-and-treat process.
- Contaminants sorb onto sediments, further restricting their removal by the pump-and-treat process.
- Many pumping systems create stagnation zones or lead to contamination of previously uncontaminated areas.

The limitations associated with pump-and-treat methodology listed above are exacerbated by the possible presence of DNAPL at the Site, which would result in extended remedial timeframes. Based on the foregoing, the groundwater collection alternative is not retained for further evaluation associated with the Site.

5.3.8 *In-Situ* Electro-Thermal Remediation

Using an *in-situ* electrical resistance thermal remediation technology, the impacted soil and groundwater in the target area is heated by resistance from an electric current applied between subsurface electrodes. The heating creates an *in-situ* source of steam to strip VOCs from the soil and groundwater as the dissolved constituents partition to the vapor phase. Udell (1996) determined that steam stripping was the mechanism by which subsurface heating removed a wide range of hydrocarbons from pore spaces, including high boiling point compounds. Specific processes include evaporation into the subsurface air stream, and steam distillation (as the treatment zone is heated, each milliliter of soil moisture produces over a liter of steam). Organic vapors tend to partition into the produced steam, and are swept along with the steam toward extraction wells.

The continuous heating also lowers the viscosity of water, and causes pressure-driven micro-fracturing in low permeability soils to increase the effective permeability of the soil; these two processes increase the mobility of the identified CVOCs. The increased contaminant mobility allows for the removal of the CVOCs using soil vapor extraction to a degree that would not be possible in the current condition of the soil. Under some *in-situ* electrical resistance thermal remediation approaches, tap water is injected into the electrodes and drawn to soil vapor extraction wells during the operation, to sustain the presence of beneficial steam.

ERH is an aggressive and relatively costly remediation technology that is best suited for treatment of low permeability sites, as opposed to the moderately-high permeability media associated with the impacted silty sand soil at the Site. Moreover, based on the high infrastructure costs alone associated with this technology (often in excess of $1,000,000), this remedial action option is not retained for further evaluation for the Site.

5.3.9 *In-Situ* Chemical Oxidation

Remediation of soil and groundwater impacted with contaminants of interest using *in-situ* chemical oxidation (ISCO) involves injecting or mixing oxidants and potentially co-amendments directly into the impacted media. With chemical oxidation, the substrate loses electrons and is oxidized, while the oxidant gains electrons and is reduced:

$$Cl2C{=}CHCl + H_2O + 3O_3 \rightarrow 2CO_2 + 3Cl^- + 3H^+ + 3O_2$$

Oxidation of Substrate: $Cl2C{=}CHCl + 4H_2O \rightarrow 2CO_2 + 3Cl^- + 9H^+ + 6e^-$

Reduction of oxidant: $O_3 + 2H^+ + 2e^- \rightarrow O_2 + H_2O$

The oxidant chemicals react with the contaminants, producing innocuous substances such as carbon dioxide, water, and, in the case of chlorinated compounds, inorganic chloride. Chlorinated solvents (ethene and ethanes) are amenable to treatment by ISCO.

Four commonly-used oxidants for soil and groundwater remediation are permanganate, persulfate, peroxide, and ozone. Permanganate oxidants are typically selected for their longer persistence in the subsurface to address relatively low permeability soils, fractures, and sometimes to achieve longer transport periods.

For treatment of contaminated soil and groundwater, oxidants in concentrated solution or solid form can be delivered using hydraulic injection, *in-situ* soil blending, or hydraulic fracturing techniques. The chemical oxidant can be injected as a liquid or slurry into the capillary fringe and water bearing zone.

The two most critical success factors in all ISCO projects are the effective distribution of the reagents in the treatment zone and the reactivity of a particular oxidant with the contamination present. Failure to account for subsurface heterogeneities or preferential flow paths can cause an uneven distribution of the oxidant, resulting in pockets of untreated contaminants. The applied reagents also consume natural organic matter in the soil, some of which has sorbed contamination. As the natural organic matter is consumed, the sorbed contamination will be released. Therefore, when applying liquid oxidants in the both the saturated and vadose zone, there is a potential to release contamination to the groundwater. This phenomenon is highly dependent on the transport properties of the soil. The more permeable the soil, the greater chance for release to groundwater because the oxidant has less time for reacting with the contaminants. Desorption of contamination can be considered a benefit for remediation purposes because reactions typically occur in the aqueous phase and more contamination is available for reaction. The remedial design must account for both the sorbed and dissolved-phase contamination for effective site cleanup. An important advantage of ISCO is its relatively high rate of reaction. However, because of the reactivity of the oxidants, there is potential to cause a significant change in both the concentration and distribution of contamination, potentially resulting in large changes in a site's established equilibrium of contaminants between the vapor, liquid, and sorbed phases.

The overall effectiveness of ISCO is primarily dependent on contact with the contaminants. Factors that affect the efficiency, implementability, and costs include injection spacing, hydraulic conductivity, and the ability to inject by direct-push rather than by conventional well drilling techniques. Advantages of using ISCO include *in-situ* treatment (i.e., no treatment equipment to operate and maintain), relatively fast treatment, and potential enhancements to the post-oxidation aerobic microbial environment. Some disadvantages of ISCO are that the natural oxidant demand may be high in some areas and multiple applications may be required. Proper design of a field-scale implementation of ISCO involves evaluation of contaminant concentrations as well as quantitative estimates of other oxidant sinks. In addition to the target contaminants, other possible oxidant sinks include reduced minerals and naturally occurring organic matter. Not all naturally occurring organic matter will be amenable to oxidation, and the level of oxidation of naturally occurring organic matter depends upon the oxidant selected. If all of the oxidant sinks are not properly taken into account, the amount of oxidant that needs to be applied will be underestimated, and it is likely that the ISCO effort will fail.

DNAPL pools, in themselves, cannot be oxidized by chemical oxidants. Chemical oxidation (as well as biodegradation) must occur in the aqueous phase with the process working solely on the "halo" of dissolved constituents surrounding the immiscible-phase contaminants.

Experimental data have shown that if the oxidant can contact the dissolved VOC in the aqueous phase, the VOC will be rapidly destroyed. Similar experiments have shown that small DNAPL droplets in the aqueous phase can also be effectively remediated as the soluble phase is oxidized, driving the equilibrium conditions to solubilize more of the VOC from the DNAPL droplet which is subsequently quickly oxidized (Fam and Kidd, 2005).

Other experimental data indicate that generation of manganese dioxide and carbon dioxide (reaction by-products) presents plugging issues for ISCO application in DNAPL source areas, which can limit treatment efficiencies in terms of total mass destroyed. Localized plugging over time may be sufficient to prevent the efficient delivery of oxidant to the source areas that the oxidant was intended to treat. This entombment of contaminants is due to the generation of manganese dioxide encrustation at the location of reaction. Because source areas contain the most contaminant, these plugging by-products tend to be co-located at the VOC source areas. In such instances, the resultant oxidant flow regime will no longer contact the most contaminated areas and may lead to flow regimes following paths of least resistance.

As indicated above, oxidants can be delivered using hydraulic injection or *in-situ* soil blending. Injection of oxidants in liquid form through vertical hydraulic probes into shallow heterogeneous vadose zone soils can readily result in preferential transport of oxidant through relatively high permeability zones and short-circuiting of injected oxidant to the ground surface. Both of these outcomes would result in poor oxidant delivery and ineffective soil remediation. Oxidants are often delivered into contaminated soil using *in-situ* soil blending, which serves to increase contact between the oxidant and impacted soil. This approach is most applicable to shallow contamination within the vadose zone (ITRC, 2005).

Hydraulic injection approaches are not effective in delivering oxidant to locations just below ground surface as indicated above. Based on the high detected CVOC concentrations in surficial soil samples previously obtained at the Site, and the high costs associated with soil disposal as discussed in Section 5.3.4, ISCO application using *in-situ* soil blending is retained for further evaluation.

Potassium permanganate would represent an appropriate oxidant for the Site based on its demonstrated effectiveness in treating soil and groundwater impacted with CVOCs. Based on the possible presence of DNAPL at the Site, the total average soil oxidant demand is assumed to range on the order of 10 grams of oxidant per kilogram of soil (g/kg). The actual soil oxidant demand to be applied at the Site would be based on the results of permanganate natural oxidant demand (PNOD) testing.

To achieve a 10 g/kg loading rate, the target treatment zone would need to be dosed with approximately 55,000 pounds of oxidant. Using this quantity of oxidant, costs associated with implementation of the ISCO alternative using *in-situ* soil blending are estimated to total approximately $495,000.

5.3.10 *In-Situ* Enhanced Reductive Dechlorination

A variety of *in-situ* reductive chemical and biological reactions can be induced in a contaminated aquifer to remove CVOCs through enhanced solubilization and desorption. Chemical reduction by amendments such as zero valent iron (ZVI) have the advantage of being able to treat high concentrations of CVOCs while producing limited amounts of intermediates, such as VC. Biological reduction by amendments such as emulsified vegetable oil (EVO) or lactates have the advantage of being able to treat low concentrations of CVOCs. The state of the soil and groundwater remediation practice is evolving, in recognition that combining chemical and biological reduction can function synergistically by creating a reducing environment that thermodynamically promotes biological

reductive dechlorination. This combined approach is intended to promote rapid abiotic degradation within the zone of influence, and to also enhance long-term biological dechlorination. Summaries of *in-situ* chemical and biological reduction processes are provided below.

In-Situ Chemical Reduction

In-situ chemical reduction (ISCR) is essentially a mirrored technology of ISCO. Both processes involve the transfer of electrons. With chemical reduction, electrons are transferred from the reductant to the substrate. The substrate gains electrons and is reduced, while the reductant loses electrons and is oxidized (Brown, 2008):

$Cl_2C{=}CHCl + Fe^0 \rightarrow HC{\equiv}CCl + 2Cl^- + Fe^{+2}$

Reduction of Substrate: $Cl_2C{=}CHCl + 2e^- \rightarrow HC{\equiv}CCl + 2Cl^-$

Oxidation of reductant: $Fe0 \rightarrow Fe^{+2} + 2e^-$

How susceptible a chlorinated solvent is to oxidation or reduction is determined by its chemical structure. In general, solvents with carbon atoms that are electron rich are more susceptible to oxidation; carbon atoms that are electron deficient are more susceptible to reduction. The more chlorines added to a solvent molecule the more oxidized it is and the more resistant it is to further oxidation but the more susceptible to reduction.

ZVI has been employed successfully in low pH environments as a stand-alone remedy to support abiotic VOC degradation. Chemical reduction of the VOCs can occur on the ZVI particle surface, and hydrogen produced during iron corrosion can serve as an electron donor for biological dechlorination. In addition, hydroxyl ions produced from corrosion of ZVI increase pH within the treatment area to levels favorable for dechlorination. This abiotic process is suited to aquifers that have relatively high accumulation of daughter products. β-*elimination* mechanisms promoted by ZVI would typically not accumulate daughter products, as the degradation pathways bypass the production of cDCE and VC.

In-Situ Biological Reduction

CVOCs can be degraded by anaerobic microbes known as reductive dechlorinators to non-toxic daughter products. Such biodegradation requires reducing conditions to stimulate anaerobic bacteria to dechlorinate the CVOC. The approach is designed to provide a carbon or electron donor source to create reducing conditions necessary to enhance anaerobic biodegradation. Examples of effective electron donors that degrade the chlorinated VOCs when delivered to the subsurface include molasses/water mixture, whey, high fructose corn syrup, or sodium lactate. Such anaerobic bioremediation processes have been successful and well documented at a wide variety of sites, and guidance documents are available that describe the process in detail (AFCEE, 2004).

The anaerobic microbes use CVOCs during dehalorespiration via reductive dechlorination. There are a variety of bacteria that dehalorespire only on PCE or TCE, producing toxic cDCE in the process. In contrast, the dechlorinating microorganisms *Dehalococcoides* (*Dhc*) are the only known microorganisms capable of further dechlorination to non-toxic ethene. Although *Dhc* microorganisms are widely distributed in the environment, research indicates that they are not ubiquitous. If *Dhc* is absent from a site, incomplete dechlorination and accumulation of cDCE is anticipated to occur, or extended acclimation periods will be required to allow low concentrations or poorly distributed *Dhc* populations to achieve functional cell densities. If the results of groundwater monitoring during the course of anaerobic bioremediation indicate insufficient *Dhc* bacterial populations, then the biostimulation is often combined with bioaugmentation using commercially-available microbes.

Under this remedial approach, the microbes sequentially dechlorinate the CVOCs and gain energy in each step, while utilizing the substrate as a carbon source and the CVOC as an electron acceptor. The adapted microbes respire using the CVOCs in place of other electron acceptors such as oxygen. The areas in which substrate is delivered become anaerobic due to the uptake of available electron acceptors to support respiration of the microbes, which provides the environment required for the bioremediation process to take place. This process has been shown to be more effective and less costly than other treatment processes, such as physical removal.

In order to effectively anaerobically bioremediate a particular area, it is critical to:

- Select the optimal chemical additives.
- Properly distribute the chemical and biological additives to stimulate the dechlorination process within the contaminated area.
- Bioaugment (if necessary) the site with dechlorinating microbes.
- Maintain the enhanced subsurface conditions for sufficient time to fully dechlorinate the dissolved and adsorbed CVOCs.

Combined *In-Situ* Chemical and Biological Reduction

Biologically mediated ZVI technology has focused on systems that combine abiotic and biotic reduction. For example, NASA developed emulsified zero valent iron (EZVI) to address DNAPL TCE found at the Cape Canaveral Launch Complex 34, Florida facility (Reinhart et al., 2003). The emulsion of oil, surfactants, water, and either microscale (1 to 10 microns) or nanoscale (<1.0 micron) ZVI is injected into the subsurface in the vicinity of the DNAPL. The DNAPL constituents partition into the oil phase and react with the ZVI, yielding less chlorinated VOCs and the innocuous end-products acetylene, ethene and ethane. The oil coating is designed to protect the ZVI from oxidation, which extends the timeframe that the ZVI remains active. The oil and surfactants are fermented to hydrogen, and the corrosion of the iron with the water also leads to hydrogen formation that can then support biological reductive dechlorination of CVOCs. Several reports have demonstrated the effectiveness of EZVI to destroy DNAPL (Lee, M.D., 2008).

Commercially-available products other than EZVI that cost-effectively combine slow-release carbon amendment with ZVI would be applicable to the Site. Such products would represent appropriate reductants based on their demonstrated effectiveness in treating soil and groundwater impacted with high concentrations of CVOCs.

As with ISCO as discussed in Section 5.3.9, reductants can be delivered using hydraulic injection or *in-situ* soil blending. Hydraulic injection approaches are not effective in delivering reagent to locations just below ground surface as indicated above. Based on the high detected CVOC concentrations in surficial soil samples previously obtained at the Site, and the high costs associated with soil disposal as discussed in Section 5.3.4, application of enhanced reductive dechlorination using *in-situ* soil blending is retained for further evaluation.

The application of approximately 38,000 pounds of ZVI and carbon amendment would be recommended to treat the target CVOC-impacted soil and groundwater. The ZVI content would be equivalent to approximately 0.5% of the weight of the target treatment volume. Using this quantity of reductant, costs associated with implementation of the enhanced reductive dechlorination alternative using *in-situ* soil blending are estimated to total approximately $358,300.

6. SELECTED REMEDIAL ACTION OPTIONS/RAP

Based on the identification and evaluation of the remedial options presented above, Ramboll Environ recommends implementation of the following remedial action options for the Site.

- Enhanced reductive dechlorination of unsaturated and saturated soil using a combined *in-situ* chemical and biological reduction approach (ZVI and carbon amendment or similar reductant such as ABC+) that is applied with *in-situ* soil blending methods;
- Monitored natural attenuation of near-source and down-gradient groundwater impacts; and,
- Institutional controls (WDNR GIS registry) for residual soil and groundwater impacts that remain in excess of WAC NR 720 non-industrial soil remediation goals and WAC NR 140 ES, respectively.

Treatment of CVOCs by ZVI has been proven and widely-accepted as an effective in situ remediation technology. ZVI destroys CVOCs in groundwater, including PCE and daughter products detected in soil and groundwater at the Site. The degradation process is an abiotic reductive dehalogenation process occurring on the surface of the granular iron, with the iron acting as an electron source. Because the site is already anaerobically degrading the PCE, this remedial process will enhance the natural degradation process.

A natural attenuation groundwater monitoring program will be instituted following implementation of chemical reduction using a soil blending technology. A request for case closure will be submitted to the WDNR in accordance with WAC NR 726 after demonstrating CVOC concentrations are stable or declining after the source soil remediation activities have been completed. Eight rounds of groundwater monitoring are proposed as required by WDNR guidance to demonstrate natural attenuation has sufficiently reduced or stabilized the groundwater concentrations after source treatment.

As residual soil and/or groundwater concentrations are likely to remain above WAC NR 720 non-industrial soil remediation goals and WAC NR 140 ESs, respectively, institutional controls will be employed to satisfy the requirement of conditional closure as a part of the active remedy. The intuitional control will consist of listing the former Express Cleaners property, possibly the former Pugh Oil property to the north, and the adjacent property to the east on the WDNR GIS Registry.

Based on the expected contaminant mass reduction and the attendant reduction in soil and groundwater concentration from the aggressive proposed remedy, it is Ramboll Environ's opinion that the potential for on-and off-site vapor intrusion risk will be greatly reduced. Therefore, our proposal does not include extensive vapor intrusion monitoring; however, we have included a contingent scope and cost to perform a vapor intrusion assessment of the former Pugh Oil property. It is recommended that any new building that may be constructed at the Site should incorporate a vapor migration barrier.

The following sections provide a proposed RAP to complete the remedial actions described herein, as summarized below:

1. Preparation of remedial action work plan documents and permit requests.
2. Removal of existing strip mall building (by others).
3. Pre-remedial groundwater sampling.
4. Remove and dispose of concrete foundation slab and utility removal.

5. Implementation of *in situ* enhanced reductive dechlorination.
6. Installation of additional and replacement monitoring wells.
7. Post-remediation soil confirmation sampling.
8. Preparation of remedial action completion report.
9. Conduct vapor intrusion assessment at former Pugh Oil building.
10. Completion of groundwater monitoring and reporting.

6.1 Preparation of Remedial Action Work Plan and Permit Requests

6.1.1 Design Report and Design Plans/Specifications

Pursuant to WAC NR 724.09 and 724.11, a Design Report and Design Plans/Specifications will be submitted to the WDNR that will include the following information:

- a complete and detailed description of the remedial action being designed; criteria, concepts, assumptions and calculations used in preparing the design, including adequate justification for their use; and test results used to develop the design;
- a description of the public health and environmental laws and standards applicable to the contamination and the remedial action being implemented, including the physical location where the environmental standards will be complied with;
- a preliminary discussion of the types, frequency and schedule for monitoring of the remedial action; and
- a proposed schedule for implementation of the remedial action, which identifies timing for initiation and completion of the tasks.

The proposed dates for completion of the remedial action and major milestones will be specified in the Design Report. The schedule will include deadlines for all reports, plans and submittals required by the WDNR, and a discussion of any other relevant technical factors. The Design Plans/ Specifications will include detailed drawings of the proposed design, including general process flow information, and sampling locations; visual aids, including maps, plan sheets, drawings, and cross-sections as appropriate for the remedial technology.

Pursuant to WAC NR 724.17, a long-term groundwater monitoring plan will also be incorporated into the Design Report that will include the following information: the parameters to be monitored; the sampling and analytical methods to be used, consistent with the sampling and analysis requirements in WAC NR 716.13; the interval at which monitoring is to be performed; and the public health and environmental laws, including standards, to be complied with.

6.1.2 Underground Injection Control (UIC) Permit

As required by the WDNR guidance document entitled "Underground Injection Control Approval Request, Technical Assistance for Submittals," two permits will be required as part of the recommended remedial actions: 1) an Underground Injection Permit, and 2) a General Permit for Groundwater Remediation Projects. These permits need to be approved by the WDNR prior to remedial action implementation. Ramboll Environ will prepare these permit requests as part of our proposed scope of services.

6.1.3 Removal of Existing Building and Utility Disconnection

The Former Express Cleaners Site contains a one-story, 6,804 square foot strip mall (without a basement) that is situated on a 0.77-acre lot. The immediate area surrounding the strip mall consists of paved parking lots and access drives. The foundation for the one-story building contains

a 6-inch concrete slab-on-grade and existing subsurface utilities that service the strip mall (water, sanitary sewer, natural gas and electric) currently remain in-place.

In order to implement the selected remedial option, it is recommended that the existing strip mall building be removed/demolished prior to conducting the proposed soil remediation activities. Removal of the building will assure that sufficient room to maneuver the *in-situ* blending equipment is provided and that space is available for equipment and material storage adjacent to the remediation area. In addition, the subgrade utilities servicing the site building should be disconnected from their main service lines at the property boundary. It is assumed that removal of the existing building and disconnection of the electric, natural gas, water, and sanitary sewer at the property boundary will be performed by the site owner (EFLP). Removal of the abandoned utilities, building slab, and asphalt parking area within the proposed area of remediation will be completed with the implementation of the selected remedy.

6.2 Pre-Remedial Groundwater Sampling

The initial groundwater monitoring task to be completed is baseline groundwater monitoring, prior to completion of the Remedial Action Work Plan. It is critical to conduct a baseline groundwater monitoring event since the wells have not been sampled since 2011. As part of this task, all 14 monitoring wells will be sampled for VOCs (Method 8260). In addition, field instruments will be used to measure geochemical parameters, including pH, dissolved oxygen, and oxidation-reduction potential. In accordance with the WDNR April 2003 guidance document "Understanding Chlorinated Hydrocarbon Behavior in Groundwater" (WDNR Publication RR-669), monitoring wells MW-3 and MW-8 (near the treatment area) also will be sampled for the following natural attenuation parameters: ethene/ethane/methane (Method 8015), dissolved iron (Method 8146), total organic carbon (Method 5310), nitrate+nitrite (Method 353.2), and sulfate (Method 300). One quality assurance/quality control (QA/QC) duplicate groundwater sample and one QA/QC laboratory trip blank sample will be submitted for laboratory analysis of VOCs as part of the baseline groundwater monitoring event.

6.3 Implementation of In-Situ Enhanced Reductive Dechlorination

Chapter NR 169.23(6)(d) requires that this proposal includes "a description and cost estimate for the implementation, analysis and interpretation of a pilot test for all active remediation systems, unless the consultant can justify to the department's satisfaction that a pilot test is not necessary." It is Ramboll Environ's opinion that a pilot test is not necessary, based on the following factors:

1. The contaminants of concern, PCE and its degradation products, are relatively common and well understood in terms of documented reductive dechlorination as an effective soil and groundwater remedial technology. Ramboll Environ has directed the successful remediation of a similar CVOC site in Wisconsin using the reductive amendments that are proposed herein.
2. *In-situ* soil blending facilitates effective contact between amendment and contaminant, and allows for greater amendment dosing than hydraulic injection delivery approaches. Therefore, completion of a costly and time-consuming pilot test would not represent efficient use of limited DERF funds.

Based on the foregoing, Ramboll Environ does not include a pilot test as part of the proposed remedial actions for the Site.

Ramboll Environ will develop a Health and Safety Plan for personnel conducting field activities on site. This Plan is a separate document and will be available for WDNR review upon request. Project field personnel will be familiar with the Plan prior to commencement of fieldwork. Subcontractors will

be provided with a copy of the project Health and Safety Plan and Ramboll Environ will conduct a briefing on-site prior to commencement of field work. Subcontractors, however, will be responsible for developing their own Site Safety Plans regarding their activities. Prior to soil blending activities, Ramboll Environ will contact Digger's Hotline for the location of public utilities within the VOC-impacted area and will also review maps and other available information regarding the locations of private utilities. Ramboll Environ will request notification of the type and location of all private utilities on the property.

In-situ soil blending involves using an *in-situ* blender to effectively distribute chemical amendments throughout the soil medium to treat contaminants of concern. The chemical amendments can range from oxidants, reductants, biostimulants, or soil stabilizers. The *in-situ* blender is mounted on a large excavator with a modified diesel engine and hydraulic power system. Utilizing hydraulic pressures of 5,000 pounds per square inch (psi), a 28-inch diameter mixing drum with specially designed "teeth" is rotated at speeds up to 100 rounds per minute (rpm) with a torque of 20,300 pounds per foot.

Because many chemical remediation alternatives require direct contact with the target contaminants, the effectiveness of the remediation strategy is often limited by the ability to distribute the chemical amendments throughout the soil medium. Application of an *in-situ* blender is among the most effective and efficient methods to achieve mixing at shallow depths (less than 20 feet).

The *in-situ* blending process will be performed systematically by subdividing the treatment area into smaller cells. The cell dimensions typically do not exceed 20 feet by 20 feet, depending on location, chemical loading rates, etc. A detailed implementation plan would be developed prior to mobilization to properly coordinate the mixing process.

The application of approximately 38,000 pounds of ZVI and carbon amendment is recommended to treat the target CVOC-impacted soil and groundwater. The ZVI content will be equivalent to approximately 0.5% of the weight of the target treatment volume. The blending and addition of amendments and water will increase the volume of soils. Generally, we anticipate that the degree of soil swell that will result from the soil blending technology will not exceed approximately 2 feet within the treatment area. After soil blending has been completed, any mounded or excess soil will be segregated into roll off boxes, or appropriately managed within the treatment area on-site pending laboratory analysis of the soil for TCLP-VOCs for Subtitle D landfill acceptance. We have accounted for additional soil management/removal and disposal in our proposal to allow for the swell and to restore the ground surface to match the existing grade using No. 6 crushed stone aggregate. We estimate that the *in-situ* soil blending activities can be completed within a 2-week timeframe.

6.4 Soil Remediation Verification Sampling

Verification of soil remediation will be conducted through confirmation soil sampling and analysis. To evaluate post-remediation soil conditions, eight hydraulic probes will be installed after completion of the *in-situ* enhanced reductive dechlorination remedial action. The hydraulic probes will be installed to depths of 9 feet bgs.

Two soil samples will be collected from each of the probes, one between 0 to 4 feet bgs and one between 4 and 9 feet bgs, for a total of 16 post-remediation soil samples to be submitted for laboratory analysis of VOCs using USEPA Method 8260. Following soil sample collection, each sample container will be labeled with the sample location identification, date of sample collection and intended analysis. The sample containers will then be packed in an iced, insulated container. A chain-of-custody form will be filled out upon completion and will accompany the container of soil

samples to the laboratory. The samples will be transported from the Site to the laboratory via same-day or overnight courier.

Based on toxicity, concentration, and frequency of detection, the identified chemicals of interest in soil at the site are PCE, TCE, cDCE, and VC. Laboratory results of soil samples collected prior to commencement of *in-situ* chemical reduction that revealed detectable concentrations of these CVOCs will be compared to the results of soil samples collected after completion of *in-situ* chemical reduction. Based on the anticipated several order-of-magnitude variations in VOC concentrations in the soil samples, geometric mean values may be used to quantify average residual soil contamination concentrations to evaluate the amount of contaminant mass reduced by the remedial action.

6.5 Installation of Additional Monitoring Wells

After completion of the soil blending activities, the installation of two monitoring wells will be conducted. One well will be generally located at the eastern margin of the groundwater plume affecting the North Bay Drive portion of the Site at a location satisfactory to WDNR (MW-16). Another well will be located in the general location of MW-3 in the blending area and will serve as a replacement well (MW-3R). These wells will be installed using hollow stem auger drilling methods. The wells will be developed in accordance with WAC NR 141 requirements.

6.6 Vapor Assessment at Former Pugh Oil Building

A vapor assessment of the former Pugh Oil building located adjacent to the northern property boundary of the Main Street portion of the Site will be conducted. The vapor assessment will consist of installing two soil vapor pins in the building floor followed by the collection of two sub-slab soil vapor samples. The soil vapor samples will be collected using 6-liter Summa canisters that will be submitted for laboratory analysis using EPA Method TO-15.

6.7 Preparation of Remedial Action Completion Report

Pursuant to WAC NR 724.15, a Remedial Action Completion Report will be prepared after completion of the remedial actions, which will include the following information: a summary of the remedial action and documentation that the design was carried out in accordance with the specifications; an explanation of any minor changes to the technical approach and the rationale for those changes; the results from the soil remediation verification sampling; and a description of the public health and environmental laws applicable to the contamination and the remedial action selected.

6.8 Implementation of Groundwater Monitoring Program

After completion of *in-situ* soil blending, eight quarterly groundwater monitoring events will be conducted. As part of this task, eight existing monitoring wells (MW-1, MW-2, MW-3, MW-6, MW-8, MW-9, MW-12, and MW-15) will be sampled for VOCs (Method 8260). In addition, two new existing monitoring wells (MW-3R and MW-16) will also be sampled. Monitoring wells MW-4, MW-5, MW-10, MW-11, MW-13, and MW-14 have historically not revealed notable VOC concentrations, and based on the assumption (for cost estimating purposes) those six monitoring wells will not be included as part of the subsequent quarterly monitoring program. However, all 16 wells will be sampled as part of the eighth (and assumed final) quarterly groundwater monitoring event prior to preparation of a Case Closure Request.

For the quarterly groundwater monitoring, the selected monitoring wells will be sampled for VOCs (Method 8260). In addition, field instruments will be used to measure geochemical parameters, including pH, dissolved oxygen and oxidation-reduction potential. In addition, monitoring wells MW-3 and MW-8 (near the treatment area) also will be sampled at least once for the following natural attenuation parameters: ethene/ethane/methane (Method 8015), dissolved iron (Method

8146), total organic carbon (Method 5310), nitrate+nitrite (Method 353.2), and sulfate (Method 300). One QA/QC duplicate groundwater sample and one QA/QC laboratory trip blank sample will be submitted for laboratory analysis of VOCs as part of each groundwater monitoring event.

Groundwater monitoring will continue until it is demonstrated that concentrations of the CVOCs of interest are stable or decreasing to the extent that a conditional regulatory case closure under WAC NR 726 is secured. The WDNR endorses use of the Mann-Whitney U Test for evaluating natural attenuation processes. Per current WDNR guidance, the Mann-Whitney U Test or other similar approved trend analysis methods will be conducted by assembling well data for the eight quarterly sampling events for each contaminant that has exceeded the WAC NR 140 ES at one or more monitoring wells.

Following MNA termination and case closure, the site monitoring wells will be abandoned in accordance with WAC NR 141. For cost estimating purposes, Ramboll Environ assumes that nine (one baseline and eight quarterly) groundwater monitoring events will be conducted. Additional rounds of groundwater monitoring may be necessary to demonstrate the presence of enhanced natural attenuation processes to achieve site closure.

6.9 Case Closure Report

After completion of the soil and groundwater remedial activities and groundwater monitoring results document that the groundwater plume remains stable and/or is receding, a site closure package will be prepared and submitted for WDNR approval in accordance with WAC NR 726. Institutional controls will be implemented, as necessary, as part of case closure. Institution controls will consist of recording the Site and any adjacent properties affected by the residual CVOC impacts to be recorded on the WDNR GIS database for closed remediation sites.

The groundwater monitoring data will be continuously evaluated to determine when the plume has become stable. If constituent concentrations remain stable or decrease after eight quarters of monitoring, a request for closure will be submitted in accordance with WAC NR 726. The necessity for these institutional controls will be based on the effectiveness of the recommended remediation measures. The closure package will include the applicable GIS Registry information required for a conditional site closure, as appropriate. After final closure is granted by the WDNR, the groundwater monitoring wells will be abandoned.

7. COST ESTIMATE

A summary of the project costs are provided on WDNR Form 4400-212 and 4400-214d and are contained in Appendix C. In addition, itemized costs for each of the work elements as outlined in the Request for Remedial Action Bid proposal is included in Appendix C.

Additional proposal-specific conditions and assumptions used for developing our cost estimate are summarized below:

1. Pilot testing is not recommended as part of the remedial action activities.
2. The volume of soil to be treated is approximately 1,900 cubic yards.
3. The maximum depth of treatment will not exceed 9 feet bgs.
4. Meetings with the WDNR outside the context of interaction in the field as part of scheduled activities are not included in the attached project budget. Any such meetings would be invoiced on a time-and-expense basis in accordance with our Fee Schedule.

5. Subcontractor markups are not reimbursable under DERP. As such, Ramboll Environ assumes that the Client will contract directly with the major remedial subcontractors (Redox Tech and North Shore Environmental Construction) to avoid the subcontractor markup (as assumed in the estimated costs provided in Appendix C). Alternatively, the project-specific subcontractor markup rate is 8 percent.
6. Post blending soil stabilization of the treated soils is not included in the cost estimate. Alternatives for providing soil stabilization can be further evaluated based on specific site redevelopment plans.
7. Groundwater monitoring results will be submitted to the WDNR on a quarterly basis, and groundwater monitoring reports will be submitted to the WDNR on a semi-annual basis.
8. A nearby municipal water source will be available for use during the remedial activities.
9. WDNR review and GIS Registry fees have not been included.

Ramboll Environ has selected the recommended remedial alternative based on literature review, communications with specialized remediation contractors, successful application of the recommended remedial technology at other similar sites, and professional experience, in conformance with the care and skill ordinarily exercised by reputable members of the professional engineering community practicing under similar conditions at the same time in the same or similar locality. No other warranty of any kind, expressed or implied, is provided herein.

8. SCHEDULE

A schedule that includes the major remedial activities, milestones, and phases for the project is presented in Appendix D.

9. INSURANCE

Ramboll Environ has provided a certificate of insurance in Appendix E that demonstrates that Ramboll Environ meets the errors and omissions of $1,000,000/claim and a minimum of $1,000,000/year aggregate. The policy is an occurrence-based policy. Although our maximum deductible is greater than $25,000 per claim, we hereby declare that Ramboll Environ meets the proof of financial responsibility for the amount of deductible under WAC NR 169.23 (9)(b)2. Because we are a privately held corporation, we will provide the required proof upon selection.

10. TERMS AND CONDITIONS

10.1 General

We propose to provide the services outlined in this proposal on a time-and-expense basis in accordance with the DERP Interim and Remedial Action Bid Proposals Summary provided in Appendix C, and our Fee Schedule also provided in Appendix C. Ramboll Environ's Conditions of Service and Certificate of Insurance (Appendix E) are also expressly incorporated into, and are an integral part of our contract for professional services. Invoice amounts will be based on actual units utilized at the rates shown on the Fee Schedule. Estimated costs associated with the proposed remedial action services are provided in Appendix C.

10.2 Certifications

Consultant and contract services will be generally completed in accordance with §292.65, Wis. Stat., and WAC NR 169, NR 140, and NR 700 series. Ramboll Environ will obtain and evaluate bids for commodity services, including excavation and analytical testing services. In addition, Ramboll Environ will coordinate and supervise drilling, laboratory and such other subcontractors as required for completion of investigation activities. Ramboll Environ will make available to the WDNR upon request, for inspection and copying, the consultant's documents and records related to the contract services.

In accordance with WAC NR 169.21, Ramboll Environ will do the following:

1. Be fully informed about the project's scope and required services, and have the experience and ability to analyze alternatives and design the most suitable response action consistent with technical and economic feasibility, environmental statutes and rules, restoration timeframes, and the latest technical advances.
2. Provide necessary staff and facilities for all phases of planning, investigation, design, construction, and operation.
3. Retain and confer with specialists on unusual matters; provide qualified technical reviewers, who will keep the owner advised on technical and regulatory matters and work toward planned remediation goals.
4. Perform all services in an ethical, professional and timely manner.

In addition, Ramboll Environ certifies the following:

1. Consultant and contract services comply with applicable requirements under Chapters NR 169 and NR 700 series.
2. Ramboll Environ will make available to the department for inspection and copying all documents and records related to the contract services.
3. Ramboll Environ did not prepare this bid in collusion with any other consultant submitting a bid on the Site.

11. LIMITATIONS

This remediation protocol has been prepared exclusively for use by Owner and may not be relied upon by any other person or entity without Ramboll Environ's permission. The conclusions presented in this report represent Ramboll Environ's professional judgment based on the information available to us during the course of this assignment and on conditions that existed at the time of the assessment. Ramboll Environ made reasonable efforts to verify the information provided to us. Nonetheless, this proposal is accurate and complete only to the extent that information provided to Ramboll Environ was itself accurate and complete.

12. REFERENCES

Air Force Center for Environmental Excellence (AFCEE), 2004. "Principles and Practices of Enhanced Anaerobic Bioremediation of Chlorinated Solvents." Environmental Security Technology Certification Program, Arlington, Virginia.

Brown, Richard A., 2008. "Developments in In Situ Chemical Reduction (ISCR) Technology," Proceedings of the Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds. Battelle ISBN 1-57477-163-9.

Fam, S. and D. Kidd, 2005. "Chemical Oxidation or Enhanced Anaerobic Dechlorination – A Science-Based Decision," Battelle Press.

ITRC (Interstate Technology & Regulatory Council), 2005. Technical and Regulatory Guidance for In Situ Chemical Oxidation of Contaminated Soil and Groundwater, 2nd ed. ISCO-2. Washington, D.C.: Interstate Technology & Regulatory Council, In Situ Chemical Oxidation Team. Available on the Internet at http://www.itrcweb.org.

Keely, J.F., October 1990. "Performance Evaluation of Pump-and-Treat Remediations," EPA/540/4-89/005.

Mackay, D.M. and Cherry, J.A., 1989. "Groundwater Contamination: Pump-and-Treat Remediation," Environmental Science & Technology, Vol. 23, No. 6, pp. 630.

Lee, M.D., 2008. "Treatability Studies Using EZVI and Bioaugmentation for Dissolved Phase and DNAPL Chlorinated Solvents," Proceedings of the Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds. Battelle ISBN 1-57477-163-9.

Reinhart, D.R., C. Clausen, C.L. Geiger, J. Quinn, and K. Brooks, 2003. U.S. Patent 6,664,298 B1. Zero-Valent Metal Emulsion for Reductive Dehalogenation of DNAPLs.

Travis, C.C. and Doty, C.B., 1990. "Can Contaminated Aquifers at Superfund Sites be Remediated?" Environmental Science & Technology, Vol. 24, No. 10, pp. 1465.

Trotta, L.C. and R.D. Cotter, 1973. "Depth to Bedrock in Wisconsin. "Madison, WI: Geological and Natural History, University of Wisconsin. 1 map (1:1,000,000)."

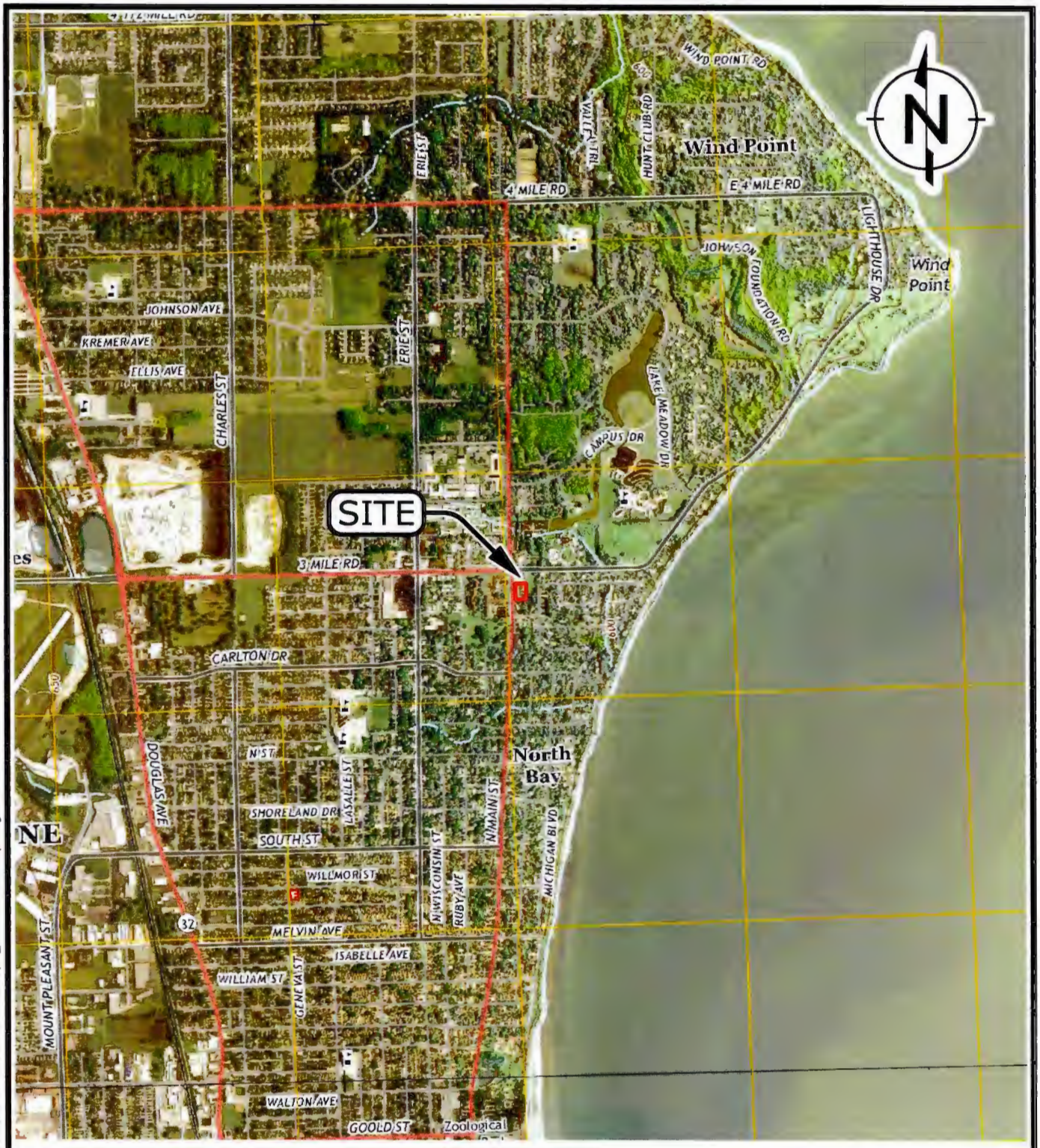
Udell, K.S., 1996. Heat and mass transfer in clean-up of underground toxic wastes. In Annual Reviews of Heat Transfer, vol. 7, ed. C.-L. Tien. 333–405. New York/Wallingford, UK: Begell House, Inc.

TABLES

Table 1. CVOC Mass Summary
Express Cleaners, Racine, Wisconsin

Zone	Area Designations	Area (sq ft)	Vertical Zone	cis 1,2 DCE (lbs)	trans 1,2 DCE (lbs)	PCE (lbs)	TCE (lbs)	Subtotal (lbs)	Percent of Total CVOC
Primary Source	1, 2	2,179	Soil - Vadose Zone	2.735	0.745	139.789	2.012	145.28	50.6%
			Soil (Coarse, Saturated)	0.174	0.003	107.035	0.496	107.71	37.5%
			Soil (Clay, Saturated)	0.001	0.001	18.783	0.082	18.87	6.6%
			Groundwater (Coarse saturated)	0.118	0.004	0.151	0.016	0.29	0.1%
			Groundwater (Clay saturated)	0.240	0.008	0.307	0.033	0.59	0.2%
Downgradient of Source	4, 5	4,801	Soil - Vadose Zone	0.027	0.027	1.089	0.027	1.17	0.4%
			Groundwater (Coarse saturated)	0.024	0.006	0.185	0.003	0.22	0.1%
			Groundwater (Clay saturated)	0.041	0.008	0.332	0.005	0.39	0.1%
Plume Adjacent to Source	3	802	Soil - Vadose Zone	0.033	0.004	3.140	0.027	3.20	1.1%
			Groundwater (Coarse saturated)	0.084	0.002	0.398	0.011	0.49	0.2%
			Groundwater (Clay saturated)	0.135	0.003	0.637	0.017	0.79	0.3%
Migrated Plume	6, 7, 8, 9, 10, 11, 12	8,227	Soil - Vadose Zone	0.159	0.158	7.327	0.172	7.82	2.7%
			Groundwater (Coarse saturated)	0.013	0.001	0.023	0.002	0.04	0.01%
			Groundwater (Clay saturated)	0.014	0.000	0.027	0.002	0.04	0.02%
Proposed Treatment Area	Portions of 1, 2, 3, 4, 6, 7, 8, 9	5,708	Soil - Vadose Zone	2.870	0.847	138.333	2.085	144.13	50.2%
			Soil (Coarse, Saturated)	0.174	0.003	100.719	0.467	101.36	35.3%
			Soil (Clay, Saturated)	0.001	0.001	17.672	0.077	17.75	6.2%
			Groundwater (Coarse saturated)	0.202	0.010	0.782	0.032	1.03	0.4%
			Groundwater (Clay saturated)	0.371	0.018	1.340	0.057	1.79	0.6%
Total Site	All Areas	16,009	Soil - Vadose Zone	2.955	0.933	151.345	2.237	157.47	54.9%
			Soil (Coarse, Saturated)	0.174	0.003	107.035	0.496	107.71	37.5%
			Soil (Clay, Saturated)	0.001	0.001	18.783	0.082	18.87	6.6%
			Groundwater (Coarse saturated)	0.239	0.012	0.757	0.032	1.04	0.4%
			Groundwater (Clay saturated)	0.429	0.019	1.303	0.057	1.81	0.6%
			Summary Total	**3.80**	**0.97**	**279.22**	**2.90**	**286.9**	

FIGURES



Source: USGS 7.5 minute series (topographic)
Quadrangle: Racine North, Wisconsin (2013), Racine South, Wisconsin (2013).

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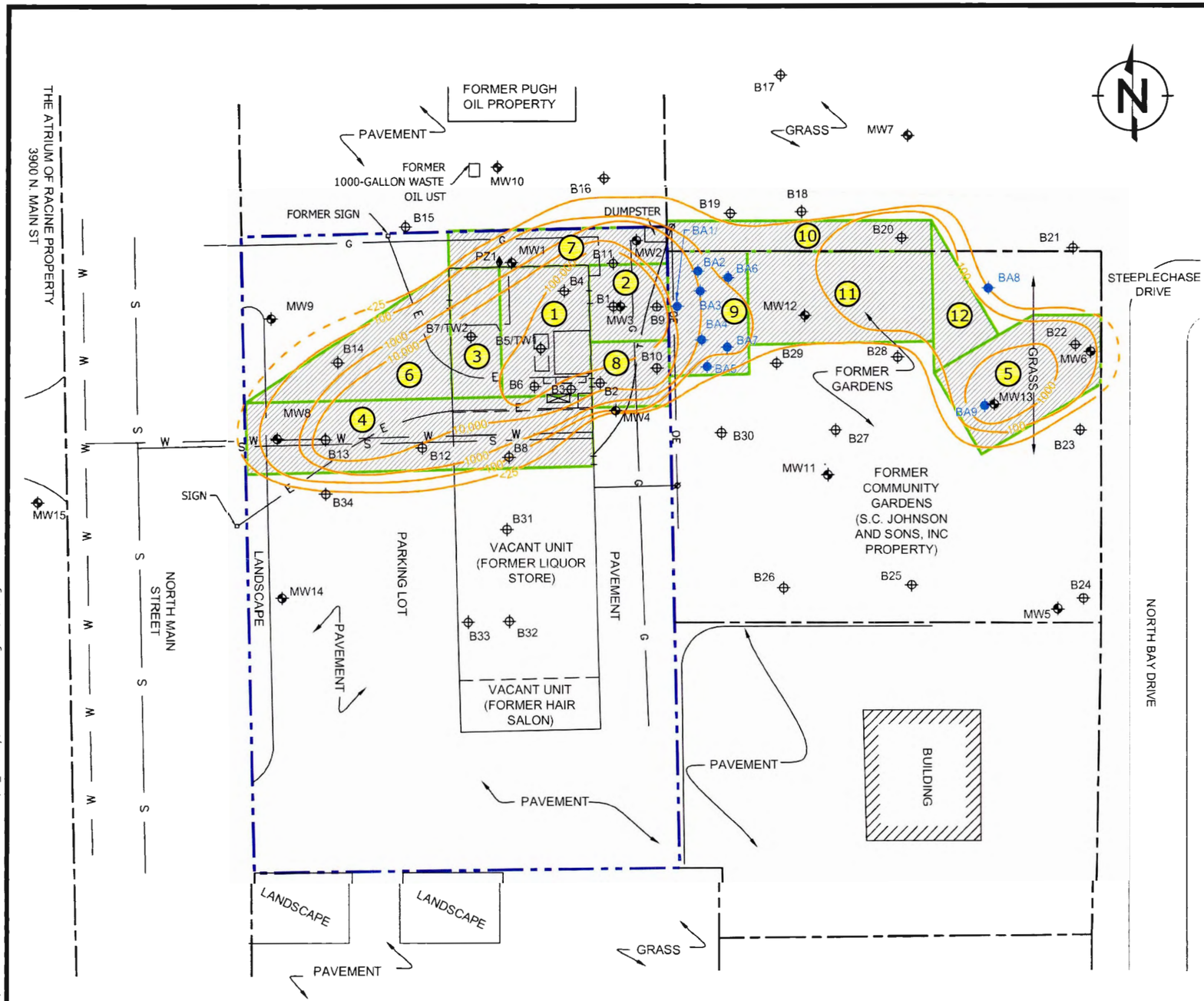
RAMBOLL ENVIRON

DRAFTED BY: CKL | DATE: 5/21/15

SITE LOCATION MAP

EXPRESS CLEANERS, INC.
3941 NORTH MAIN STREET
RACINE, WISCONSIN

FIGURE
1



LEGEND

- SUBJECT PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARIES
- OE — OVERHEAD ELECTRIC LINE
- G — UNDERGROUND GAS LINE
- W — WATERMAIN
- E — BURIED ELECTRIC LINE
- S — BURIED SANITARY SEWER
- T — BURIED TELEPHONE LINE
- UTILITY POLE
- FORMER DRY CLEANING MACHINE LOCATION
- EXISTING DRY CLEANING MACHINE
- MW1 — 2" MONITORING WELL LOCATION AND IDENTIFICATION
- B34 — BOREHOLE LOCATION AND IDENTIFICATION
- BA5 — HAND AUGER NEAR SURFACE SAMPLE LOCATION AND IDENTIFCATION
- PZ1 — PIEZOMETER LOCATION AND IDENTIFICATION
- TW2 — 1" TEMPORARY MONITORING WELL LOCATION AND IDENTIFICATION
- 100 — UNSATURATED SOIL PCE ISOCONCENTRATION LINE IN MICROGRAMS PER KILOGRAM (DASHED WHERE INFERRED)
- (#) — AREA DESIGNATIONS

SOURCE: BASE FIGURE FROM REPORT BY BONESTROO, "ADDITIONAL INVESTIGATION ACTIVITIES, EXPRESS CLEANERS", MAY 22,2011

RAMBOLL ENVIRON

DRAFTED BY: CKL | DATE: 5/21/15

SITE LAYOUT WITH AREA DESIGNATIONS

EXPRESS CLEANERS, INC.
3941 NORTH MAIN STREET
RACINE, WISCONSIN

FIGURE
2

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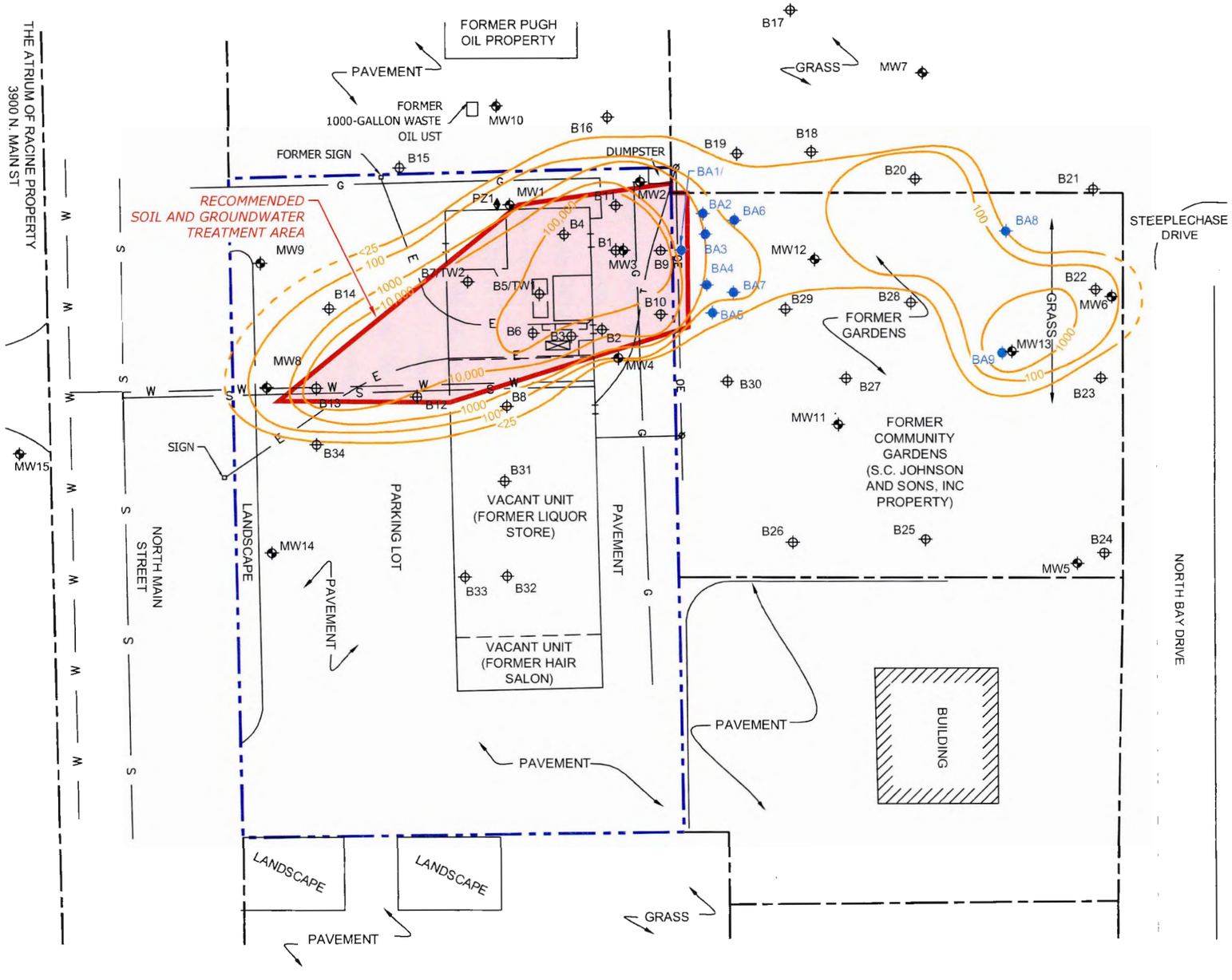

LEGEND

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- 100 — UNSATURATED SOIL PCE ISOCONCENTRATION LINE IN MICROGRAMS PER KILOGRAM (DASHED WHERE INFERRED)

0 40
SCALE IN FEET

SOURCE: BASE FIGURE FROM REPORT BY BONESTROO, "ADDITIONAL INVESTIGATION ACTIVITIES, EXPRESS CLEANERS", MAY 22,2011

RAMBOLL ENVIRON

DRAFTED BY: CKL/APR | DATE: 5/28/15

RECOMMENDED SOIL AND GROUNDWATER TREATMENT AREA

EXPRESS CLEANERS, INC.
3941 NORTH MAIN STREET
RACINE, WISCONSIN

FIGURE
3

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APPENDIX A

Project Profiles

RAMBOLL ENVIRON

RAMBOLL ENVIRON PROJECT SUMMARY

- **Project Name:** McHenry, Illinois Facility
- **Project Charge Code:** 21-29660A
- **Project Location:** McHenry, Illinois
- **Date Completed:** On-Going
- **Client Name:** Confidential
- **Principal-in-Charge/Project Manager:** Jeanne Tarvin/Mark Mejac
- **Practice Area:** Site Solutions
- **Industry:** Manufacturing

Description:

Previous subsurface investigations of a manufacturing site in northeastern Illinois revealed the presence of groundwater impacted with trichloroethene (TCE). The TCE-impacted groundwater covered an approximate 3-acre area and extended to depths of approximately 35 feet below ground surface within a fine to medium sand aquifer media. Based on technical feasibility, cost, and implementability criteria, groundwater remediation using enhanced anaerobic dechlorination (EAD) technology was recommended in 2008 in order to address the TCE-impacted groundwater.

Use of molasses solution as an inexpensive electron donor was recommended for the subject site. Based on the scale of the impacted area (approximately 3 acres), the electron donor was injected using groundwater re-circulation as opposed to batch injection. This approach uses increased hydraulic gradients imposed by injection and extraction wells to expedite electron donor distribution within the impacted aquifer.

The EAD system design consists of a network of ten vertical injection wells and four groundwater extraction wells. Groundwater is recovered at the four extraction wells, amended with substrate, and injected into the injection wells. An existing horizontal sparge well was also used for supplemental addition of substrate-amended groundwater. The EAD system commenced operations in December 2010, and ongoing quarterly groundwater monitoring has continued since that time.

Injection of molasses-based electron donor resulted in biofouling of the injection well screens within 6 months of EAD system start-up. The wells were subsequently rehabilitated, which involved the injection of chlorine dioxide solution through the injection wells. Well biofouling was further reduced by changing the electron donor to ethyl lactate solution and implementing a more intermittent (pulsed) electron donor injection cycle. Based on evaluation of chlorinated ethene molar concentrations and molar fractions associated with the most heavily impacted monitoring well, which had previously contained 9,500 micrograms per liter of TCE, injection and re-circulation of electron donor alone (without bioaugmentation with microbial culture) has led to complete dechlorination of TCE and its intermediate degradation products to only ethene within 22 months. The results of future groundwater monitoring will be used to evaluate the need for additional EAD system operations or to determine if the site is eligible for regulatory case closure.

RAMBOLL ENVIRON

RAMBOLL ENVIRON PROJECT SUMMARY

- **Project Name:** Reedsburg, Wisconsin Facility
- **Project Charge Code:** 21-28166A
- **Project Location:** Reedsburg, Wisconsin
- **Date Completed:** On-Going
- **Client Name:** Confidential
- **Principal-in-Charge/Project Manager:** Jeanne Tarvin/Mark Mejac
- **Practice Area:** Site Solutions
- **Industry:** Dry Cleaning

Description:

Previous subsurface investigations at a dry cleaner site in western Wisconsin revealed the presence of groundwater impacted with tetrachloroethene (PCE). The PCE-impacted groundwater covered an approximate 1-acre area and extended to depths of approximately 30 feet below ground surface within a poorly-buffered bedrock aquifer media. Based on technical feasibility, cost, and implementability criteria, groundwater remediation using enhanced anaerobic dechlorination (EAD) technology was recommended in 2009 in order to address the PCE-impacted groundwater.

Chlorinated volatile organic compounds (CVOCs) can be degraded to non-toxic daughter products by certain anaerobic microbes, which require reducing and moderate pH conditions to dechlorinate the CVOCs. An electron donor source is used in this approach to create reducing conditions. Use of dairy whey as an inexpensive electron donor was recommended for the subject site. Whey is a water soluble byproduct of the food industry and contains lactose and several mineral nutrients.

Applications of whey through injection wells occurred in December 2009, July 2010, November 2010, and June 2011. Injection of sufficient whey to maintain anaerobic conditions supportive of EAD adversely impacted aquifer pH. The reduced aquifer pH suppressed development of *Dehalococcoides* population such that accumulation of cis-1,2-dichloroethene occurred. To address this challenge, several pH buffers were added with the whey and bioaugmentation with microbial culture was conducted in November 2010. EAD within a poorly-buffered bedrock aquifer media is inherently challenging. However, within a 2-1/2 year timeframe after the initial whey electron donor injection event, the areal extent of PCE-impacted groundwater has substantially receded and maximum PCE concentrations have decreased by 2-1/2 orders-of-magnitude at the site. The results of future groundwater monitoring will be used to evaluate whether additional remedial action may be necessary, or if the site may be eligible for regulatory case closure.

RAMBOLL ENVIRON PROJECT SUMMARY

- **Project Name:** Sao Paulo, Brazil Facility
- **Project Charge Code:** BR-1101101
- **Project Location:** Sao Paulo, Brazil
- **Date Completed:** On-Going
- **Client Name:** Confidential
- **Principal-in-Charge/Project Manager:** Jeanne Tarvin/Mark Mejac
- **Practice Area:** Site Solutions
- **Industry:** Manufacturing

Description:

Production of heat exchangers and radiators at an industrial facility near Sao Paulo, Brazil, commenced during 1996. A subsurface investigation of this industrial facility conducted in 2007 revealed two separate areas of groundwater impacted with chlorinated volatile organic compounds (CVOCs), which cover an approximate 12-acre area and extend to depths of approximately 60 feet below ground surface. ENVIRON[1] was retained in October 2011 to complete an evaluation of remedial alternatives to address the CVOC-impacted groundwater. Based on technical feasibility, cost, and implementability criteria, ENVIRON recommended active groundwater remediation using enhanced anaerobic dechlorination (EAD) technology. The proposed strategy consists of a two-phased approach. Implementation of Phase 1 expeditiously restricts migration of impacted groundwater onto hydraulically downgradient properties. Phase 2 is designed to meet the groundwater remedial objectives modeled in a 2011 Human Health Risk Assessment report.

The operation of an EAD system works to create biologically active mixing zones for distributing amendments and enhancing the degradation of the CVOCs. This distribution of amendments can be accomplished by recovering groundwater with extraction wells, amending the groundwater with dilute solutions of a degradable food source such as molasses, ethanol and/or sodium lactate, buffers and nutrients, as necessary, and subsequently recharging the amended groundwater to the subsurface through recirculation wells. The areas in which this substrate is delivered become anaerobic due to the uptake of available electron acceptors to support respiration of the microbes, which provides the environment required for the EAD process to take place. This process has been shown to be more effective than other treatment processes including physical and chemical removal, and can be completed within a relatively short (several year) timeframe, depending on aquifer characteristics and groundwater flow rates. Application of EAD is a particularly attractive alternative in the vicinity of Sao Paulo because the average groundwater temperature is greater than 70°F, which is approximately 20 degrees higher than groundwater temperatures in North America and Europe. The higher temperature may provide desired reaction rates up to twice as high as those commonly observed in more temperate climates. Additional benefits of EAD over other remedial technologies include: no air emissions, no need for the treatment or discharge of extracted groundwater, no waste by-products, and no use of toxic chemical reagents. ENVIRON is currently preparing engineering plans and specifications for the Phase 2 EAD system, Phase 1 of which became operational in late 2012.

[1] Effective May 1, 2015, the legal name of ENVIRON International Corporation became Ramboll Environ US Corporation.

APPENDIX B

Key Staff Resumes

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

JEANNE M. TARVIN

Principal

Jeanne Tarvin is a certified professional geologist with more than 30 years of consulting experience. Her project experience includes directing and managing transaction due diligence work, hydrogeologic studies, remedial investigations, landfill studies, feasibility studies, remedial designs and remedial actions under CERCLA, RCRA, TSCA and state-led programs. Responsible for technical quality, project execution, strategic direction and resource management. Her practice focuses on remediation and redevelopment of environmentally impaired properties, solid and hazardous waste management, environmental, health and safety due diligence for mergers and acquisitions, and contaminated sediment issues. Jeanne is currently a Gubernatorial Appointee to the Technical Advisory Committee for the Wisconsin Drycleaners Environmental Reimbursement Fund (DERF).

EDUCATION

BS, Engineering Geophysics
Michigan Technological University

Post-Graduate Studies, Hydrogeology
University of Wisconsin-Milwaukee

COURSES/CERTIFICATIONS

Certified Professional Geologist
Certified Hydrogeologist - Wisconsin
Professional Geologist - Wisconsin
OSHA 40-hour Hazardous Waste Operations and Emergency Response Standard - HAZWOPER
FRA Railroad Workplace Safety

PROJECTS

- Served as Project Principal on RI/FS and remediation for four Manufactured Gas Plant Sites in Wisconsin. Former member of MGP Advisory Committee for major utility in Midwest.
- Presented technical data/interpretation at public meetings on behalf of responsible parties.
- Performed as Project Manager for a Superfund NPL site in Central Wisconsin. Negotiated a Record of Decision Amendment to delete an Alternative Water Supply as part of

CONTACT INFORMATION

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jtarvin@environcorp.com
+1 (262) 901-0085

Ramboll Environ
175 North Corporate Drive
Suite 160
Brookfield, WI 53045
United States of America

the final remedy. This Amendment saved the client millions of dollars over projected remedial action costs.

- Managed compliance audits and environmental permitting at several industrial sites and power plants.
- Served as Project Principal for development of a Remedial Action Work Plan for dredging at the Great Lakes Naval Station in Illinois. Negotiated dredging strategy with USEPA Region 5 and IEPA.
- Functioned as Project Manager for a RFI at an industrial facility in Little Rock, Arkansas. Negotiated a scope of work with the ADEQ and USEPA Region 6. The work is being completed under the USEPA Region 6 Corrective Action Strategy (CAS) Pilot Program.
- Performed as Project Principal on a RCRA Part B Permit Modification for a hazardous waste kiln in Missouri. Project included USEPA Region 3 negotiations, design plans and specifications and preparation of the permit modification.
- Managed and performed numerous environmental site assessments for property transfer including preparation of work plans for soil and groundwater sampling, soil gas surveying, interpretation of chemical analysis, development of remedial action plans and final report preparation.
- Served as Project Principal on Remedial Action Dredging Project for the Fox River Operable Unit One cleanup in Little Lake Butte Des Morts for a pulp and paper client. Responsible for developing remedial action work plans and overseeing remedial action as oversight engineer.
- Functioned as Project Principal on a RCRA 3013 Order for investigation at a steel manufacturing facility in Indiana. Responsible for negotiations with USEPA Region 5 and IDEM for development of a scope of work for investigation. Performed further investigation in an attempt to avoid a Corrective Action on the majority of the site. Corrective Action is proposed on the former Coke Plant location within the site.
- Served as Project Environmental Principal for confidential railroad derailment site in Illinois. Provided operation and maintenance services and developed a closure strategy on a groundwater pump and treatment system/bentonite containment wall installed in response to a release of 30,000 gallons of tetrachloroethene. In addition, performed a hydrogeologic evaluation and risk assessment of the remedial system performance to develop a closure strategy for the site.
- Investigated and closed industrial and commercial sites with chlorinated VOC impacts using natural attenuation and risk based evaluation. Successfully closed site using natural attenuation that were slated for active remediation by the WDNR.
- Performed geophysical surveys including seismic refraction, thermography, electromagnetics, electrical resistivity, downhole bore logging and subsurface interface radar for contamination assessments; development of groundwater monitoring plans, hydrogeologic analysis and engineering design of drilling activities for major exploration programs.
- Prepared siting studies, feasibility studies, hydrogeologic studies and facility designs for industrial and municipal landfills, including permitting.
- Functioned as Project Manager for preparation and negotiation of a RCRA Facility Investigation Work Plan at a solvent recovery facility in Wisconsin which contains nine SWMUs.
- Functioned as Project Manager for a pre-design study, remedial design and remedial action for two multi-million dollar Superfund NPL projects in Central Wisconsin. Directly responsible for USEPA Region 5 and WDNR negotiations, project scheduling and budgeting, development of project work plans, technical direction of NCP level field and laboratory testing program, regulatory liaison and preparation and review of technical work plans and reports.
- Performed as Project Principal on M&A projects involving portfolios of sites ranging from two sites to upwards of 100 sites. Responsible for directing project teams on quick turn projects and providing technical review. Developed and implemented probabilistic cost modeling on numerous sites for estimating environmental liabilities for clients and their environmental counsel. Strategies used for reducing liability risks have included Voluntary Party Liability Exemption tools in Minnesota, Wisconsin, New Jersey, Illinois and Michigan.

- Provided expert and fact witness testimony on contested cases involving hydrogeologic characterization, sediment costs and landfill design and operation.
- Served as Lead Auditor for a comprehensive environmental compliance audit for a large manufacturing facility. The audit addressed handling and storage of hazardous materials, storage and disposal of hazardous and special waste, spill response and spill containment, storm water regulations, wastewater permits and air emissions. The final report included an air emissions inventory and recommendations for a spill response plan, as well as improvements in hazardous waste stream management.
- Functioned as Project Manager on a Superfund site in Wisconsin. Negotiated a Record of Decision Amendment to remove the requirement for an active groundwater pump and treat system. Performed a corrective action on a failed landfill cover in 2009. The original design by another consultant was flawed. The new innovative cover was the largest application of a geoweb cover system in the Midwest.
- Performed as Project Manager for a RCRA Part B closure of four cupola sludge lagoons at an iron works foundry. Duties included a RFI and preparation and implementation of the closure plan. As part of the closure plan, a confirmation of removal of hazardous soils was performed and a groundwater monitoring system was installed.
- Responsible for negotiating Administrative Orders on Consent and Consent Decrees with state and federal regulatory agencies on Superfund, RCRA and state-led remediation projects.

OTHER ACTIVITIES

- Recipient of Supply Chain Award of Excellence for 1996 and 1997 from Wisconsin Electric
- Gubernatorial Appointment to the Technical Advisory Committee for the Drycleaners Environmental Reimbursement Fund (DERF) - current
- BT1 Client Service A-team's roster in 1996 for delivering truly superior client services
- Cost Effectiveness of the Horizontal Biosparge Well Application for Aerobic Co-Metabolic Groundwater Remediation, NGWA Remediation Conference
- Application of Horizontal Biosparge Wells for Aerobic Co-metabolic Groundwater Remediation, Eighth International In-Situ and On-Site Bioremediation Symposium
- Avoiding RCRA and CERCLA Liabilities, Client Training Seminar
- Waste Management, Risks and Liabilities, Client Training Seminar
- Brownfields From a Technical Standpoint, Brownfields Development in Wisconsin Seminar
- Mergers and Acquisitions: Audits and Due Diligence Strategies, STS Client Seminar
- Drycleaner Cleanup Rules Legislative Update, Wisconsin Fabricare Institute
- Spill Response Awareness Training, Client Training Seminar
- Remediation: A Case Study, Client Training Seminar
- Strategic Regulatory Negotiations, Client Seminar
- Comparison of Sludge Lagoon Covers, TAPPI Conference Proceedings

MEMBERSHIPS

American Institute of Professional Geologists (AIPG)
Federation of Environmental Technologists (FET)
National Water Well Association
Women Environmental Professionals

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

SCOTT W. TARMANN

Senior Manager

Scott Tarmann has over 24 years of experience with environmental and civil design projects, with particular emphasis on the application of remedial investigation, feasibility studies, remedial system performance evaluation, groundwater modeling, and remedial action design under Superfund, Resource Conservation and Recovery Act (RCRA) and state cleanup programs. His work has included technical design of *in situ* and *ex situ* remediation technologies to address organic and inorganic contaminants in soil and groundwater. His main focus has been primarily with technological applications involving enhanced *in situ* bioremediation, *in situ* solidification/ stabilization, soil vapor extraction, vapor intrusion mitigation, *in situ* thermal remediation processes, *in situ* chemical oxidation, hydraulic containment/control technologies, and permeable reactive barriers. His work has also included developing technical strategies for remediation, providing technical support for regulatory negotiations, conducting sophisticated remediation system performance evaluations and feasibility studies, and preparing technical design plans and specifications documents in support of construction bidding and implementation.

CONTACT INFORMATION

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United States of America

EDUCATION

BS, Civil and Environmental Engineering
University of Wisconsin - Madison

CERTIFICATIONS

Registered Professional Engineer: Wisconsin, Michigan, Indiana, Illinois, Minnesota, and Ohio

RELEVANT PROJECT EXPERIENCE

- Senior Project Manager responsible for investigating releases of chlorinated and petroleum volatile organic compounds to soil and groundwater at a former paint manufacturing facility in Milwaukee, WI. Performed extensive soil and groundwater sampling to characterize the sources of chemicals and describe risk-based impacts to groundwater. Utilized EPA's contained-in rule to manage contaminated soil as non-hazardous to implement a cost-effective remediation. Project objectives were also to determine the financial risks associated with the use of various short and long-term remedial approaches and to provide potential purchasers guidance on selecting the best alternative that met their goals and objectives for property redevelopment. Implemented

successful and cost-effective corrective action approaches to address impacted soils and groundwater to facilitate the transfer of the property and return it back into productive use. Responsibilities also included negotiating clean-up levels with WDNR during the development of remedial alternatives, identifying source remediation options that would lead to cost-effective risk reduction measures, coordinated site remediation activities with adjacent landowners and local government agencies, prepared detailed design plans and technical specifications, and prepared subcontractor bid documents, which included, site clearing/ demolition, applying storm water best management practices to conform with state requirements, removal/ excavation of source area soil, backfilling operations, utility relocation, shoring system installation, soil treatment and disposal, site capping, and site restoration activities.

- Remediation design engineer and project manager for an *in situ* chemical oxidation soil treatment remedy utilizing an innovative application methodology (rotating dual axis blending) to remediate 14,000 yd3 of trichloroethylene (TCE) impacted soil at a former electrical components manufacturing facility in southeast Wisconsin. Responsibilities included:
  - Developing attainable soil clean-up goals and objectives.
  - Evaluating chemical oxidation bench scale and pilot test results for chemical reagent selection and designing application dose rates.
  - Preparing remedial action plans, technical design plans and specifications.
- Remediation design engineer for the construction, operation, and monitoring of a thermal remediation system (electrical resistance heating [ERH]) to reduce source concentrations of CVOC in soil and groundwater at a former electronics manufacturing facility in central Indiana. Responsibilities included:
  - Conducted cost evaluations for various treatment configuration scenarios.
  - Assisted ERH subcontractor with the system construction and operation.
  - Designed vapor recovery systems for contaminant recovery and vapor intrusion mitigation.
  - Assisted with construction permitting and developed system monitoring plans for performance verification.
- Lead engineer for designing a soil vapor extraction (SVE) system to remediate CVOC impacted soil and to address soil vapor beneath a large manufacturing facility to reduce the risk of CVOC vapor intrusion. Technical responsibilities for the project included designing and coordinating SVE pilot studies, performing subsurface air-flow modeling to determine air-flow velocity and radius of influence for the design basis; air permitting and treatment system design; and, assessment of SVE system performance.
- Remedial design engineer responsible for the design and implementation of an enhanced bioremediation system involving reductive dechlorination of CVOC's in groundwater at a former electronics manufacturing facility. Responsibilities including designing an injection system to deliver substrate to a stratified groundwater aquifer to stimulate natural microorganisms to enhance the biodegradation of CVOC's. Assisted in the design of the bioremediation process evaluation to determine the optimal substrate for bioremediation and the required volumes needed to achieve remedial clean-up goals and objectives.
- Principal remedial design engineer responsible for the design and construction of a groundwater and DNAPL recovery system to remediate CVOC's in unconsolidated sediments and fractured bedrock at a former paper manufacturing facility in Neenah, WI. Responsibilities also included assisting in the design and implementation of source soil removal actions to remediate source area impacts to soil. Removal action design required evaluation of several shoring and soil stabilization techniques to protect building foundations and maintain structural integrity of the facility.
- Lead engineer responsible for designing a sub-slab vapor intrusion mitigation system to reduce indoor air CVOC concentrations and worker exposure at a former electronics manufacturing facility in Indiana. Challenges associated with the project included designing the vapor extraction and

piping distribution system within an extensive facility with numerous utilities and foundation obstacles and installing the system with minimal disruption to the existing tenant work spaces.

- Lead engineer in charge of designing, planning and implementing vapor intrusion mitigation systems to address petroleum hydrocarbon vapors from entering indoor air in approximately 100 homes downgradient of a petroleum refinery in southwest Illinois. Responsibilities included:
  - Preparing interim measure work plans, effectiveness monitoring plans, and directing vapor intrusion abatement measures for a large residential neighborhood affected by the release.
  - Interfacing with private homeowners, the potentially responsible party (PRP) Group, and the USEPA to present various alternatives for vapor intrusion mitigation.
  - Designing non-intrusive and aesthetic sub-slab depressurization systems to effectively reduce human health impacts.
  - Developing operation, maintenance and monitoring plans to document effectiveness.

PUBLICATIONS & PRESENTATIONS

Tarmann, Scott W. 2012. In Situ Chemical Oxidation Using Rotating Dual Axis Blending Technology. Proceeding of Fourth International Symposium and Exhibition on the Redevelopment of Manufactured Gas Plant Sites, Chicago, Illinois.

Hellerich, L., Tarmann, S.W., Curran, R., and Stevens, G. Mitigation Techniques for Existing Structures. Massachusetts LSPA – Vapor Intrusion Course. January 2009.

Tarmann, S.W., Gregg, W.M., and Lingle, J.W., 2004. Cost Allocation at a Former MGP and LUST Site, Neenah, WI. Proceeding of Gas Technology Institute Conference, Phoenix, Arizona.

Adams, T.V., Tarmann, S.W., and Sopcich, D.J., 2004. PRB Installation for TCE Remediation in a Bedrock Aquifer. Proceeding of Battelle Memorial Institute's 4th International Conference on Remediation of Chlorinated & Recalcitrant Compounds, Monterey, California.

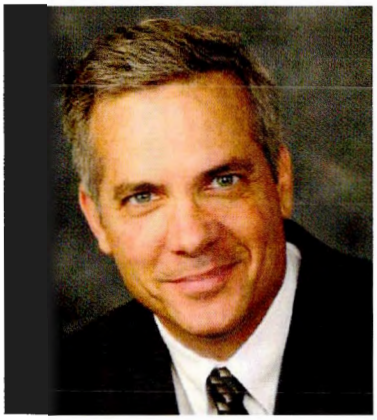
RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

STANLEY J. POPELAR

Senior Manager

Stanley Popelar has more than 30 years of experience in environmental consulting, geology, hydrogeology, hazardous waste management and applied science, with particular emphasis in site investigation, risk-based corrective action and remediation projects. He has extensive experience with clients in the Midwest and California performing environmental assessment and/or remediation of CERCLA, RCRA, LUST and voluntary brownfield sites, providing successful solutions for their environmental contaminant problems and regulatory compliance. He has provided litigation support and acted as an expert witness on matters related to environmental sampling and data analysis. The sites investigated and/or remediated involve numerous industries, including dry cleaning, steel and chemical manufacturing and recycling, retail petroleum, machine tool manufacturing, construction equipment maintenance facilities, coal storage and transfer yards, railroad warehouse and bulk oil facilities, property development, military installations and landfills. Stan has also conducted geological and hydrogeological evaluations of proposed low-level radioactive disposal facilities, bedrock tunnel routes beneath Lake Michigan, offshore marine platform sites, and existing and proposed aggregate and silica quarries.



CONTACT INFORMATION

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United States of America

EDUCATION

MS, Geology
California State University

BS, Geology
California State University

COURSES/CERTIFICATIONS

Professional Geologist – Illinois and California
OSHA and USEPA 40-hour Health and Safety Training Course
OSHA and USEPA 8-hour Health and Safety Refresher Course, Annual
OSHA 8-hour Health and Safety Supervisor Training
American Red Cross-Certified CPR/First Aid Training
Project Manager Training, Smith Culp Consulting
Hydrogeology Short Course, Harding Lawson Associates
Organic Chemistry of Hazardous Materials and Their By-Products, University of California, Irvine
Biotransformation of Chlorinated Solvents, University of California, Irvine
Introduction to Groundwater Geochemistry, Association of Groundwater Scientists

Principles of Hazardous Materials Management, University of California, Irvine
Instrumental Analysis of Hazardous Materials, University of California, Irvine
Hazardous Materials, Wastes and Dangerous Goods Shipping Paper Preparation, Government Service Institute

PROJECTS

Litigation Support

- Provided litigation support and expert testimony in the field of environmental sampling and remediation. Specific expertise includes evaluation of environmental sampling plans and data analysis.

Voluntary Cleanup

- Performed environmental site assessment, risk assessment, and an evaluation of areas of potential concerns and developed a risk-based closure strategy for a 45-acre former manufacturing site. The site had a 100-year history of heavy manufacturing, chlorinated volatile organic chemical and petroleum solvent use, and was located along a lakefront that the local city government had targeted for redevelopment. The client decided to decommission site facilities, deal with any environmental concerns and sell the property. As a result of these activities the city acquired portions of the site under eminent domain, for construction of roads and bike paths. The challenge was to evaluate appropriate cleanup criteria for the proposed land uses, and to develop cost effective remedial solutions that would protect the health and safety of potential future users of the site. Project required dealing with eminent domain concerns, evaluation of changing regulatory criteria and requirements, coordinating activities with the client's site decommissioning contractors, and responding under short time frames to evaluate discovered site conditions. Prepared a site remedial action plan that presented a risk-based evaluation of soil and groundwater impacts to prevent unnecessary remediation at the site.
- Served as project manager and technical lead for a project that involved an active manufacturing facility that historically utilized an on-site water supply well until the county sampled the well and determined that the water contained chlorinated volatile organic compounds. The Michigan Department of Environmental Quality (MDEQ) requested that the facility owner conduct a remedial investigation to evaluate the nature and extent of impact in accordance with the Michigan Environmental Response Act. Site investigations were conducted in several phases to define impacts to soil and groundwater, aquifer pump tests were conducted to define aquifer characteristics, and risk assessment was conducted to evaluate potential health and safety concerns. A feasibility study was prepared, and an off-site investigation was conducted to evaluate potential off-site impacts.
- Served as the project manager and environmental consultant for Liquidating Trustee responsible for assessing and addressing environmental response actions at 56 former railroad-related properties. Duties have included coordination of a due diligence and remediation program of Trust owned properties located in Minnesota, Wisconsin, Iowa, Indiana and Missouri under the oversight of the USEPA. Related follow-up work included the closure of two Iowa sites through the Iowa Department of Natural Resources, ten Minnesota sites through the Minnesota Pollution Control Agency Petroleum Remediation Program, and the Minnesota Department of Agriculture for agricultural chemical releases, and four Wisconsin sites through the Wisconsin Department of Natural Resources. Additional duties included monitoring USEPA actions at a Trust related southeast Minneapolis national priorities list (NPL) site.
- Served as project and technical manager for the redevelopment of a 66-acre, former steel mill brownfield site, allowing the property to be put back into productive use as a heavy equipment maintenance and storage facility for a large construction company. The site is located in an area of heavy industrial use, is surrounded on two sides by a river, and has about five acres of natural wetland along another site boundary. Received no further remediation (NFR) status for the site using a combination of hot-spot soil remediation (6,800 tons of impacted soil), partial wetland replacement, the use of a site-wide engineered barrier and risked-based closure.
- Worked with a Chicago-area developer to remediate six acres of industrial property to allow redevelopment and residential use through the Illinois Site Remediation Program (SRP). The

property was formerly used for the production of electrical relays and circuit boards, and was located in the middle of a residential neighborhood. The facility was idle and had become an eyesore and a source of anxiety for the local residents. Cleanup of the site by the previous owner had been begun, but was halted due to local resident concerns. Initial work involved the detailed review of pre-existing environmental data and reports, and the evaluation of the feasibility and cost of remedial alternatives to clean the site. Additional follow-up work included an asbestos survey, soil sampling to verify site conditions, and a Phase I environmental assessment of an adjoining parcel. Pilot testing of an in situ remedial oxidation method was also conducted. Upon completion of this work, assisted in addressing community concerns by presenting planned remediation work to focused neighborhood committees and to the general public at community meetings, and then began remediation under the Illinois SRP. Soil excavation and off-site disposal was the selected remedial alternative, and involved the use of structural shoring to excavate to depths of 28 feet, and coordination with a gas company and other property owners to prevent damage to a natural gas substation and other nearby structures. A clean soil engineered barrier was utilized in one area to prevent costly excavation and replacement of a storm sewer. Approximately 7,100 cubic yards of hazardous and non-hazardous soil were excavated and transported off-site for disposal during two phases of remediation work; site completion reports were prepared, and two NFR letters were issued by the Illinois Environmental Protection Agency (IEPA). The site was featured as a "success story" by the IEPA in their 2002 SRP Annual Report (www.epa.state.il.us/land/site-remediation/annual-reports/index.html).

- Served as project and technical manager for work related to a self-implemented polychlorinated biphenyl (PCB) cleanup of an out-of-service above ground storage tank (AST) and the related concrete secondary containment structure. Prepared a remediation work plan for submittal and approval of USEPA Region 5. Supervised the confined-entry cleanup contractor and performed post-remediation sampling of both porous and non-porous surfaces located in a low occupancy area. Documented remediation work and post-remediation sampling in a written report.
- Participated in the redevelopment of a brownfield located in Sterling, Illinois, formerly an electric arc furnace steel mill (mini-mill). Conducted bedrock groundwater investigations that successfully led to less restrictive remediation objectives. Investigation efforts were coordinated with local government officials allowing access to brownfield grant monies made available by the city of Sterling. At the 2004 Brownfield Association Conference, the Deputy Director of the Illinois SRP considered the steel company to be one of the four top brownfield redevelopment success stories in Illinois.
- Participated in a voluntary cleanup project of an auto part manufacturer. The industrial facility had a light nonaqueous phase liquid (LNAPL), which existed beneath the building slab that contained PCBs. The project included the design, construction and operations and maintenance of a product recovery system. The PCB-containing oil that was collected was held in a containment area and was shipped off-site for incineration. Over 6,000 gallons of LNAPL was removed from the site over a five-year period.
- Performed site assessment and evaluated the extent of impact related to former site operations at an Illinois site. Conducted site remediation that consisted on excavating approximately 200 yards of metal and cyanide impacted soil from beneath a building; restored site facilities.
- Conducted site assessments at seven locations at a California military base. Field duties included supervision of a five member field crew in a high security area, geologic logging of 80 soil borings and installation and sampling of three groundwater monitoring wells. Compiled and evaluated data, prepared reports and conducted a follow-up investigation at one locality.
- Conducted preliminary site assessment prior to new construction at a California military base. Field activities included directing use of a backhoe to collect shallow soil samples from glacial till deposits. Coordinated a three-member field crew with base personnel to conduct investigation.

Resource Conservation and Recovery Act

- Served as project and technical manager for environmental work at a California RCRA site. Work included soil and groundwater site investigation, and developing and implementing a monitoring program to evaluate the migration of chlorinated volatile organic compounds through groundwater. Designed soil gas monitoring network, and performed and evaluated a soil vapor extraction (SVE) pilot test.

- Served as project and technical manager for work related to a RCRA feasibility investigation (RFI) at a 23-acre sulfuric acid recycling facility in Hammond, Indiana. The purpose of the RFI was to evaluate the nature and extent of on-site releases of hazardous waste or hazardous waste constituents and to gather all necessary data to support a corrective measures study. The RFI was organized and implemented using four related documents, including a RFI work plan, a community relations plan, a quality assurance project plan, and a site safety and health plan. Field work associated with the RFI involved the installation of three piezometers, seven groundwater monitoring wells, and drilling and sampling 70 soil borings. By negotiating with the Indiana Department of Environmental Management (IDEM) to install groundwater wells along the site perimeter, avoided having to install wells at each solid waste management unit (SMWU) and areas of concern (AOC), resulting in substantial savings to the client. The collected data was used to develop a remedial strategy and utilize Indiana Risk Integrated System of Closure (RISC) to develop site-specific cleanup objectives for soil that resulted in no further action at 11 SWMUs and AOCs, and eliminated further investigation at seven other SWMUs and AOCs.
- Served as project and technical manager for characterization and remediation of chromium-impacted soil and groundwater at an Illinois RCRA site. Evaluated site geology and hydrogeology, conducted aquifer tests and analysis, designed and installed a groundwater extraction and containment system. Conducted a risk-based analysis to achieve closure of site soil issues. Established a groundwater management zone for the site with the IEPA; negotiated elimination of select compounds present at background concentrations from inclusion into the Groundwater Management Zone. Oversaw operation of groundwater extraction system, remediated groundwater to below clean up objects and moved site into post-remediation monitoring prior to site closure.

Leaking Underground Storage Tank

- Supervised installation of 40 steam injection and 40 dual phase extraction wells for the remediation of soil impacted by 140,000 gallons of diesel fuel. Work included continuously coring numerous borings to a depth of 60 feet to verify site stratigraphy and preparing isopach maps of the lower confining bed. Installed well cluster network to monitor shallow and deep aquifers. Installed temperature probes to monitor migration of steam front during remediation. Abandoned numerous site wells using mud rotary drilling techniques. Performed monthly groundwater monitoring and periodic sampling at 30 site wells.
- Conducted the removal of a 10,000-gallon fuel oil underground storage tank (UST) and remediation and closure of the resulting LUST incidents. Received an NFR letter from the IEPA approximately two months after tank removal.
- Served as project manager and technical lead of a project that involved the removal of five USTs and closure of the resulting two LUST incidents. The USTs were discovered during remediation of impacted soil related to a historical release incident at the site. Work included oversight of the removal of the USTs and the over-excavation and disposal of petroleum impacted soil. Required reports, including 20-day, 45-day/corrective action completion reports were prepared in accordance with Illinois LUST regulations. Met clients demanding site re-development construction deadlines and received as NFR letter from the IEPA to close the incidents.
- Managed project to conduct site classification for two LUST incidents at a municipal service center in Illinois. Provided technical support for field personnel, evaluated collected data, prepared site classification completion Reports and received two NFR letters to close the LUST incidents.
- Served as the project and technical manager for the remediation and closure of two LUST incidents with the receipt of an NFR from the IEPA. The USTs were discovered during demolition of a former school, demolished to make way for the construction of a new residential subdivision. Remediation work was conducted that involved oversight of the removal of the USTs and the over-excavation and disposal of petroleum impacted soil. Required reports, including 20-day, 45-day/corrective action completion reports were prepared in accordance with Illinois LUST regulations. Although the majority of the former school property had been purchased by the developer, during remediation work, it was discovered that the USTs were located on portion of the property that would become a future road, and would remain in the possession of the city. Therefore, the project also involved dealing with city representatives to obtain an NFR for the two LUST incidents.

- Served as project and technical manager for the remediation and closure of two LUST incidents related to three USTs that were discovered during demolition of several structures, demolished to make way for the construction of a new high-density residential housing. Remediation work was conducted that involved oversight of the removal of the USTs and the over-excavation and disposal of petroleum impacted soil. . Required reports, including 20-day, 45-day and free product removal reports were prepared and submitted to the IEPA LUST Division. Transferred the LUST incidents to the SRP by submitting an election to proceed under the SRP and a remedial action completion report to the IEPA SRP Group, so that closure of the LUST incidents could become part of a draft NFR letter that had already been issued for the site. A revised draft NFR letter has been issued by the IEPA, and the final NFR will be issued upon the construction an engineered barrier (concrete floor slab) at several locations on the site.
- Served as a project manager for work related to a Voluntary Remediation Program (VRP)/LUST site with a subsurface dielectric oil release from underground piping associated with an AST farm. Initial work involved evaluation of tank removal sampling data, and performance of site investigations to fully delineate that extent of impacted soil and groundwater in the vicinity of the former UST and in the vicinity of the underground piping release. Entered site into Indiana VRP. Prepared assessment reports and a remediation work plan to recover free product dielectric oil from the subsurface.
- Evaluated effectiveness of dual vapor extraction/groundwater extraction remediation system. Provided technical review of corrective action completion report; received NFR closure of LUST incident. Provided assistance with LUST reimbursement paperwork.
- Served as a project manager for environmental work at an Illinois photo-processing facility. Negotiated cleanup objectives and removed a waste photo processing chemical UST under the Illinois Pre-Notice program. Obtained clean closure letter ("4Y letter") from IEPA.
- Served as project manager and technical lead for environmental work at a Chicago-area adhesive manufacturing site. Negotiated site-specific soil and groundwater cleanup objectives for waste and raw material UST farm. Obtained no further action letter and closure of the LUST incident from the IEPA.
- Served as project manager and technical lead for environmental work at a California retail petroleum site. Conducted aquifer evaluation, and preliminary design of an SVE and groundwater pump-and-treat systems to remediate aromatic hydrocarbons in soil and groundwater resulting from a LUST incident.
- Served as project manager for a process tank removal project in California. Arranged for the removal of below-ground process tank, coordinated work with subcontractors, assisted in permitting, conducted soil sampling and arranged for hydrocarbon fingerprint analysis to identify hydrocarbons in soil.
- Served as the project manager and technical lead for environmental work at a California retail petroleum site. Conducted soil and groundwater assessment work; supervised natural gamma, neutron and induction logging at eight site wells; used collected data to assess the extent of free phase and dissolved phased contaminant plumes; assessed the presence of unconfined and semi-confined groundwater; and evaluated geologic constraints on the migration of contaminants in the subsurface.
- Served as project manager for a California UST removal project. Coordinated efforts with subcontractors, obtained permits, assigned field personnel to conduct South Coast Air Quality Management District monitoring and soil sampling, arranged soil disposal and prepared report documenting activities.
- Served as the project manager for a remedial investigation and vapor extraction pilot test in California. Prepared remedial action plan and a feasibility study. Managed interim remedial action and site monitoring. Supervised preparation of bid documents for construction of a vapor extraction system.

Geologic/Hydrogeologic/Geotechnical Evaluation

- Served as technical and field manager for a geological/hydrogeological/geotechnical evaluation of a two-mile-long bedrock tunnel route to be located approximately 150 feet below Lake Michigan. Project involved 24-hour-day field operations on a "jack-up" barge for a three- to four-week period.

Investigation work involved the logging of lake bed sediments and bedrock core down to depths of approximately 150 feet, and the collection and packaging of bedrock and sediment samples for laboratory geotechnical testing. Performed constant head injection packer testing at 20-foot intervals within the bedrock portions of the core holes. The core holes underwent downhole geophysical logging, and a marine seismic survey and bottom profiling were also conducted. Interpreted packer test data and assembled the collected data into an investigation report.

- Performed geologic/hydrogeologic evaluation of a proposed underground aggregate mine. Work involved researching publicly-available geological information, conducting on-site mapping of bedrock joint sets, reviewing available packer test data and preparing a report of findings. Presented information concerning site geology and hydrogeology at a meeting with representatives from a near-by electrical generating plant, and at a public meeting held to approve re-zoning of the site for use as an underground mine. The new zoning status was granted, thereby clearing the way for use of the site as an underground mine.
- Conducted mapping of chemical quality indicators for a proposed expansion of an existing Portland cement quarry. Utilized client-supplied chemical analysis and boring logs to contour C3S quality indicators, target limestone thickness, and overburden thickness in an area proposed for quarry expansion. Evaluated contoured data and made recommendations for additional data collection to help select areas for future mining.
- Conducted a hydrogeologic assessment to evaluate potential groundwater drawdown around a proposed open-pit silica sand quarry. The evaluation included the review of available local and regional stratigraphic, structural geologic and hydrogeologic information. Utilized available data to estimate future groundwater flow into the quarry and potential drawdown of the local groundwater table. Presented information at public meetings to address concerns about the potential for future mining activities to affect groundwater quality, and the potential for mine dewatering to drawdown groundwater levels in nearby water supply wells.
- Performed groundwater level drawdown evaluation for a proposed open-pit, aggregate quarry. Proposed site was located in the vicinity of the client's existing open-pit quarry, so water level drawdown data around the existing quarry was collected and used to evaluate potential drawdown around the proposed location.
- Performed hydrogeologic evaluation for a proposed open-pit, aggregate quarry. Evaluation work included the installation of a bedrock well and performing chemical sampling and hydraulic aquifer testing of the well. Collected data was used to evaluate potential future drawdown and to estimate the potential for offsite groundwater impacts to migrate on site during mining operations. Attended public meetings to present the results of the study.
- Served as project manager and technical lead for a hydrogeologic evaluation of groundwater flow conditions at an Illinois aggregate quarry. The evaluation included the review of available local and regional stratigraphic, structural geologic and hydrogeologic information. Additionally, surface geophysical data, collected by another consultant, was reviewed and utilized along with the information described above to identify structural or stratigraphic discontinuities, and to determine optimal drilling locations for the evaluation of groundwater flow. For the purpose of characterizing groundwater movement and production from bedrock, 2,300 feet of drilling was conducted and 11 bedrock groundwater monitoring wells were installed to depths ranging from to 87 to 300 feet below the base of the quarry floor. The bedrock wells were develop and monitored for water elevation. Groundwater contour maps were prepared and this data was evaluated. Planning and permitting work was conducted to install wells and evaluate glacial overburden geology, hydrogeology, and slope stability and bearing capacity of the soils.
- Served as field activities manager of a multi-million dollar geologic and hydrogeologic assessment to support the licensing effort for a proposed low-level radioactive waste disposal site. Developed and implemented technical procedures to conduct drilling, coring to a depth of 700 feet, and high technology geologic and hydrogeolgic logging work. Field logging and evaluation techniques included borehole geophysics, hydrophysical logging, vertical seismic profiling, packer tests and geochemical sampling. Conducted hydrogeologic analysis of site's fracture flow environment.

- Prepared geologic and hydrogeologic portions of an environmental impact report for a marine oil terminal. Researched historical seismic activity, geologic and hydrogeologic setting, and groundwater quality and improvement plans.
- Participated in geological/marine investigation for siting of an offshore oil platform. Prepared structural cross sections, bathymetry, isopach and geologic hazard maps using high resolution seismic data; X-rayed and described shallow marine cores.
- Participated in the geotechnical investigation of the quantity and geotechnical properties of potential fill material located in select borrow sites at a military base. Performed aerial photography interpretation and mapping, geotechnical data evaluation and report preparation.

Health and Safety/Environmental Compliance Audit

- Associated with acquisition of real property, along with merger and acquisitions. Sites investigated include chemical and manufacturing plants, commercial properties, military bases, landfills, retail petroleum, petroleum storage and refining facilities, steel plants, aggregate quarries, silica quarries and marine harbor facilities.
- Conducted due diligence compliance audits of numerous manufacturing facilities. Audits included reviewing site manufacturing processes and evaluation of all facility air permits, wastewater and surface water discharge permits, handling of all hazardous and nonhazardous waste streams, and compliance with worker right-to-know, community right-to-know and other agency reporting requirements.
- Performed audit of clean construction debris acceptance program. Reviewed procedures and program documentation, provided a compliance evaluation and recommendations to assist the client with maintaining conformity with state law and the written program procedures.
- Performed annual environmental and health and safety audits of facility. Participated in pilot waste minimization projects. Developed and implemented SARA Title III worker right-to-know and community right-to-know reporting programs. Responsible for air pollutant emissions and wastewater discharge permitting, hazardous waste management, environmental compliance, and the facility's health and safety program. Supervised removal of the facility's USTs.
- Conducted training of consultants and contractors. Discussed appropriate health and safety procedures to be used during environmental site assessments.

PUBLICATIONS & PRESENTATIONS

Popelar, S. J. and F.W. Boelter, 2012. Redeveloping Abandoned Industrial Property Resolving a Stalemate with Local Government and a Neighboring Community. AIChE Conference, Indianapolis, Indiana.

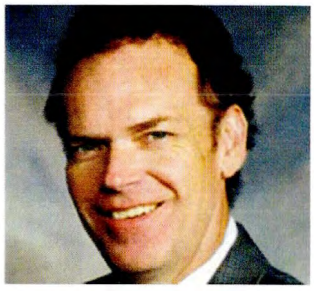
Yaldezian, J.G., Popelar, S.J., and Fritsche, A.E., 1983. Movement of the Nacimiento fault in northern Santa Barbara County, in Andersen, D.W., and Rymer, M.J., eds., Tectonics and sedimentation along faults of the San Andreas Systems: Society of Economic Paleontologists and Mineralogists, Pacific Section, pp.11-15.

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

MARK M. MEJAC

Senior Manager



Mark Mejac has over 30 years of environmental consulting experience, which includes subsurface investigation, evaluation and implementation of innovative and cost-effective soil and groundwater remediation technologies, groundwater flow and contaminant transport modeling, and technical support for regulatory negotiations under CERCLA, RCRA and state led programs. His particular area of experience includes in-situ bioremediation, in-situ chemical reduction, and in-situ thermal remediation of groundwater impacted with chlorinated volatile organic compounds. He is a registered professional geologist in Wisconsin and Illinois.

EDUCATION

BS, Geological Sciences
University of Wisconsin-Milwaukee

MS, Geology
Northern Illinois University

COURSES/CERTIFICATIONS

Professional Geologist: Wisconsin, Illinois
NR 712 Wisconsin Certified Hydrogeologist
HAZWOPER 40-Hour and 8-Hour Supervisor Safety Training
Federal Railroad Association (FRA) Railroad Workplace Safety

PROJECTS

- Directed the remedial alternative selection and completed the conceptual design of an electron donor injection and groundwater recirculation system for remediation of a large-scale tetrachloroethene-impacted industrial facility located in Sao Paulo, Brazil. This cost-effective strategy includes a phased remedial approach using enhanced anaerobic dechlorination (EAD) technology that features groundwater recirculation to enhance electron donor distribution within the aquifer.
- Directed the technology selection and implementation of an enhanced reductive dechlorination system using groundwater recirculation, and prepared a Tier 2 remedial objective risk assessment for a northern Illinois industrial site affected with chlorinated volatile organic compounds (VOCs).
- Directed the technology selection and implementation of emulsified vegetable oil and/or whey electron donor injection and bioaugmentation technology at four chlorinated VOC impacted dry cleaner sites in Wisconsin.

CONTACT INFORMATION

Mark M. Mejac, PG

mmejac@environcorp.com
+1 (262) 901-0127

Ramboll Environ
175 North Corporate Drive
Suite 160
Brookfield, WI 53045
United States of America

- Directed the technology selection and implementation of an electro-thermal remediation system at a chlorinated VOC impacted industrial site in southeastern Wisconsin, which resulted in timely regulatory case closure.
- Directed the technology selection and implementation of a co-metabolic aerobic horizontal biosparge well groundwater remediation system at a southeastern Wisconsin industrial facility impacted with chlorinated VOCs. Received American Council of Engineering Companies (ACEC) 2006 Engineering Excellence State Finalist Award.
- Directed the technology selection and implementation of in-situ chemical reduction at an eastern Wisconsin industrial facility impacted with chlorinated VOCs.
- Managed a RCRA 3013 Order for investigations at a steel manufacturing facility in Indiana.
- Managed a site investigation and water supply alternatives evaluation for a former landfill in central Wisconsin that was previously a proposed National Priorities List (NPL) site.
- Managed a Superfund remedial investigation and risk assessment of a paper sludge lagoon facility located in northern Wisconsin.
- Managed a remedial investigation of a US Department of Energy facility in northern Illinois affected with radionucleides, VOCs and metals.
- Managed a feasibility study of remedial alternatives for a spent sulfite liquor contaminated paper mill site in northern Wisconsin.
- Managed the implementation of a Superfund remedial design Investigation of a trichloroethene-contaminated aquifer in central Nebraska, which involved analysis of a large-scale aquifer pumping test, followed by groundwater capture zone analysis to design a high-capacity groundwater extraction well field.
- Managed a soil and groundwater investigation of an industrial site in central Illinois affected with CVOCs as dense non-aqueous phase liquids, as well as metals and cyanide.
- Directed the technology selection and implementation of aerobic bioremediation of a petroleum hydrocarbon impacted agricultural property in southeastern Wisconsin, which resulted in rapid regulatory case closure.
- Directed the technology selection and implementation of aerobic bioremediation of a manufacturing facility located in northeastern Illinois, which was impacted by aromatic VOCs, resulting in regulatory case closure.
- Managed a site assessment and remedial action plan of a northeastern Illinois industrial facility affected with VOCs, which involved presentation of investigation results to the city's mayor and local organizations.
- Assisted in preparation of a RCRA Part B Permit Modification for a hazardous waste kiln in Missouri.
- Provided expert and fact witness testimony involving evaluations of source contributions and contaminant travel times.
- Provided environmental consulting services as part of a two-month professional exchange program in Arnhem, The Netherlands.

PUBLICATIONS & PRESENTATIONS

"A Geochemical Study of Surface Water-Groundwater Interaction in Lake Ellyn, Glen Ellyn, Illinois," unpublished Master's thesis, Northern Illinois University, 1984.

"Application of Analytical Contaminant Transport Modeling to Evaluate Public Health Risks," McGill University, Montreal, Canada, Guest Lecturer, February 1989.

"Application of Horizontal Biosparge Wells for Aerobic Co-Metabolic Groundwater Remediation," Proceedings of the Eighth International In-Situ and On-Site Bioremediation Symposium, June 2005, Baltimore, Maryland, Battelle Press, Columbus, Ohio.

"Cost Effectiveness of Horizontal Biosparge Well Application for Aerobic Co-metabolic Groundwater Remediation," Proceedings of the National Groundwater Association (NGWA) Conference on Remediation: Site Closure and the Total Cost of Cleanup, November 2005, Houston, Texas, NGWA Press, Westerville, Ohio.

"Horizontal Biosparge Wells: A Cost Effective and Rapid Groundwater Remediation Technology," Federation of Environmental Technologists (FET) Annual Conference and Exhibition, March 2006, Milwaukee, Wisconsin.

"Cost Effectiveness of Horizontal Biosparge Well Application for Aerobic Co-metabolic Groundwater Remediation," Railroad Environmental Conference, October 2006, Urbana, Illinois.

"In-Situ Electro-Thermal Remediation of Chlorinated VOCs: Full-Scale Evaluation," Proceedings of the Battelle Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2008, Monterey, California, Battelle Press, Columbus, Ohio.

"Enhanced Anaerobic Dechlorination Case Studies: Challenges and Solutions," Proceedings of the Battelle Second International Symposium on Bioremediation and Sustainable Environmental Technologies, June 2013, Jacksonville, Florida, Battelle Press, Columbus, Ohio.

"Challenges Associated with Large-Scale Enhanced Anaerobic Dechlorination Near Sao Paulo, Brazil," Battelle Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2014, Monterey, California.

HONORS AND AWARDS

ASFE "Fundamentals of Professional Practice," magna cum laude, 2008

APPENDIX C

Summary of Project Costs

Site Name: *Former Express Cleaners*
BRRTS #: *02-52-547631*
Type of Action: *Remediation*

Dry Cleaner Environmental Response Program
Reimbursement Cost Detail Linking Spreadsheet Form 4400-214D (R 08/12)

TASKS	BUDGET				INVOICES						DERF COST BREAKOUT (this claim)									
Bid / Budgeted Description	Bid / Budgeted Amount	INSERT	Total Approved Budget	Previous Claims (If applicable)	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	*Provider Name, Invoice #, Billing Date*	INSERT	Total Invoiced Costs	A Soil Investigation	B Soil Remediation	C Groundwater Investigation	D Groundwater Remediation	E Air/Vapor Investigation	F Air/Vapor Remediation	G Lab & Other Analysis	H Miscellaneous Costs	Budget Remaining Use (-) to indicate cost over-run	% Task Complete, Remarks
Consultant Costs																				
Task	$ -	$ -	Express							$ -									#VALUE!	Task % Complete
Project Management and Setup, Contracts, HASP Preparation	$ 7,000.00		$ 7,000.00							$ -									$ 7,000.00	
Pre-Remediation Groundwater Sampling & Abandonment MW3	$ 8,200.00		$ 8,200.00							$ -									$ 8,200.00	
Remedial Action Plan	$ 13,300.00		$ 13,300.00							$ -									$ 13,300.00	
Building Slab Removal	$ 4,500.00		$ 4,500.00							$ -									$ 4,500.00	
In-Situ Enhanced Reductive Dechlorination	$ 25,200.00		$ 25,200.00							$ -									$ 25,200.00	
Post-Remediation Confirmation Sampling	$ 2,200.00		$ 2,200.00							$ -									$ 2,200.00	
Well Replacement (MW3)	$ 1,700.00		$ 1,700.00							$ -									$ 1,700.00	
Well Installation (Optional - 1 Well)	$ 500.00		$ 500.00							$ -									$ 500.00	
Remedial Action Completion Report	$ 10,300.00		$ 10,300.00							$ -									$ 10,300.00	
MNA Groundwater Sampling & Reporting (8 qtrs)	$ 47,300.00		$ -							$ -									$ -	
Sub-Slab VI Sampling	$ 3,200.00		$ 3,200.00							$ -									$ 3,200.00	
Case Closure Reporting/GIS Registry	$ 9,800.00		$ 9,800.00							$ -									$ 9,800.00	
Final Well Abandonment	$ 4,100.00		$ 4,100.00							$ -									$ 4,100.00	
Consultant Cost Total	*$ 137,300.00*	*$ -*	$ 90,000.00	$ -						$ -									*#VALUE!*	
Sub-Contractor Costs																				
Service	$ -	$ -	$ -							$ -									$ -	
Pre-Remediation Groundwater Sampling & Abandonment MW3	$ 200.00		$ 200.00							$ -									$ 200.00	
Remedial Action Plan	$ 5,700.00																			
Building Slab Removal	$ 100.00																			
In-Situ Enhanced Reductive Dechlorination	$ 16,300.00																			
Post-Remediation Confirmation Sampling	$ 152,200.00																			
Well Replacement (MW3)	$ 4,800.00																			
Well Installation (Optional - 1 Well)	$ 5,000.00																			
Remedial Action Completion Report	$ 800.00																			
MNA Groundwater Sampling & Reporting (8 qtrs)	$ 100.00		$ 100.00							$ -									$ 100.00	
Sub-Slab VI Sampling	$ 29,200.00		$ 29,200.00							$ -									$ 29,200.00	
Case Closure Reporting/GIS Registry	$ 2,500.00		$ 2,500.00							$ -									$ 2,500.00	
Final Well Abandonment	$ 100.00		$ 100.00							$ -									$ 100.00	
	$ 4,000.00		$ 4,000.00							$ -									$ 4,000.00	
Sub-Contractor Cost Total	*$ 221,000.00*	*$ -*	*$ 36,100.00*	$ -						$ -									*$ 36,100.00*	
DERF ELIGIBLE SUB-TOTALS	$ 358,300.00	$ -	$ 126,100.00	$ -	$ -	$ -	$ -	$ -	$-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	#VALUE!	

Non-DERF Eligible Expenses	[redacted]								
									$ -
									$ -
Non-DERF Cost Total		$ -	$ -	$ -	$ -	$ -	$ -		$ -
INVOICE GRAND TOTAL		$ -	$ -	$ -	$ -	$ -	$ -	##	$ -
Check Numbers	[redacted]								

Total DERF Eligible Costs This Claim $ -

State of Wisconsin
Department of Natural Resources
Box 7921, Madison, WI 53707-7921

Dry Cleaner Environmental Response Program
Interim and Remedial Action Bid Proposals Summary

Form 4400-212 (R 4/04)

Notice: This form is authorized under s. 292.65, Wis. Stats., and ch. NR 169, Wis. Adm. Code. The following information about the selection of consultants for interim actions, site investigations, and remedial action activities is required under ch. NR 169, Wis. Adm. Code. There are no penalties for failing to complete this form, but persons who do not complete and submit this form will not be eligible for reimbursement under this program. Personal information is not intended to be used for any other purpose other than that for which it is originally being collected. Information will be made available to requesters under Wisconsin's Open Records laws (s. 19.32-19.39, Wis. Stats.) and requirements.

Instructions: Complete this form and attach a copy of the accepted signed bid. See reverse side for detailed instructions. ***Copy this form as necessary.***

Applicant Information

Applicant Name	Business Name
James Small	Erlich Family Limited Partnership
Dry Cleaning Facility Name	**Location**
Former Express Cleaners	3921-41 Street, Racine, Wisconsin

Consultant Information

Consultant Name	Bid Proposal Amount	Consultant Selected (select one)
Ramboll Environ US Corporation	$358,300	☐
		☐
		☐
		☐
		☐

If this summary is being provided as part of a reimbursement application, did your actual costs exceed the proposal costs by more than $3,000 or 5% of the original estimate (whichever is larger).

☐ Yes ☐ No

If yes, send a copy of the accepted amendment, signed by the DNR project manager.

Certification

I certify that the information co

Applicant Signature	Date Signed

ntained above is true and correct to the best of my knowledge.

Department Use Only		
Project Manager Signature	Date	Telephone Number

Consultant Selection	Reason For Rejection/Notes
☐ Accepted ☐ Rejected	

Instructions

You are required to submit this form with a copy of the signed accepted bid. The accepted bid must be signed by both the applicant and the Project Manager.

You are required to provide the bid proposals summary information on this form for interim and remedial actions.

a. Fill in applicant name, applicant business name, dry cleaning facility name and location.

b. Submit this form with the Dry Cleaner Environmental Response Program Application, Form 4400-211 to your DNR region Remediation and Redevelopment project manager.

c. **Attach a copy of the accepted proposal for services,** including copies of any records of contract negotiations. Remember to code the detailed costs on the accepted bid proposal to the program's standard cost categories. Also submit a copy of all signed amendments.

See the application instructions for information on coding bid proposals for reimbursement..

Definition of Form Sections

Applicant Information: Enter your name and check the appropriate box indicating why you are submitting this form.

Applicant Additional Information: If you are submitting this form to obtain DNR approval to select a consultant other than the lowest bidder, enter your mailing address and telephone number. Enter your fax number and e-mail address if you have them.

Consultant Information: Check the appropriate box to indicate the type of response action services you solicited bid proposals for. For each consultant that you received a bid proposal from (the program requires a minimum of three), list their name, the total amount of their bid proposal, and then in the "Consultant Selected" column check one box to indicate the consultant that you selected or would like to select. If you are submitting this form with a reimbursement application, check the box to indicate whether your actual costs exceeded the original proposal costs by more than $3,000. **Certification:** Sign and date the application, certifying that the information you are submitting is true and correct.

FOR ADDITIONAL INFORMATION: see ch. NR 169.23, Wis. Adm. Code, Consulting and Contract Services, and publications RR #631, The Dry Cleaner Environmental Response Program and RR #635, Hiring a Consultant - What You Should Know. Contact your DNR regional Remediation and Redevelopment project manager, if you have any questions.

Table C-1. Remediation Cost Estimate Summary
Express Cleaners, Racine Wisconsin

Task No.	Task Description	Ramboll Environ Labor (nearest $100)	Expenses and Subcontractors (nearest $100)	Subtotal (nearest $100)
1	Project Management and Setup, Contracts, HASP Preparation	$7,000	$200	$7,200
2	Pre-Remediation Groundwater Sampling & Abandonment MW3	$8,200	$5,700	$13,900
3	Remedial Action Plan	$13,300	$100	$13,400
4	Building Slab Removal	$4,500	$16,300	$20,800
5	In-Situ Enhanced Reductive Dechlorination	$25,200	$152,200	$177,400
6	Post-Remediation Confirmation Sampling	$2,200	$4,800	$7,000
7	Well Replacement (MW3)	$1,700	$5,000	$6,700
8	Well Installation (Optional - 1 Well)	$500	$800	$1,300
9	Remedial Action Completion Report	$10,300	$100	$10,400
10	MNA Groundwater Sampling & Reporting (8 qtrs)	$47,300	$29,200	$76,500
11	Sub-Slab VI Sampling	$3,200	$2,500	$5,700
12	Case Closure Reporting/GIS Registry	$9,800	$100	$9,900
13	Final Well Abandonment	$4,100	$4,000	$8,100
	Total Estimate	**$137,300**	**$221,000**	**$358,300**

COST SUMMARY FOR:	*Project Management & HASP Express Cleaners - Task 1*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$6,989
Expenses includes 10%	$216
Contingency 0%	$0
Total	$7,205

COST SUMMARY	
Task 1	$3,942
Task 2	$1,269
Task 3	$1,247
Task 4	$747
Task 5	$0
Task 6	$0
Totals	$7,205

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Project management	*HOURS*	4	6	8					4		22
		DOLLARS	$882	$1,188	$1,404	$0	$0	$0	$0	$252	$3,726	
2	Contracts	*HOURS*	2		4					2		8
		DOLLARS	$441	$0	$702	$0	$0	$0	$0	$126	$1,269	
3	HASP	*HOURS*			1		8			1		10
		DOLLARS	$0	$0	$176	$0	$1,008	$0	$0	$63	$1,247	
4	Scheduling	*HOURS*		2	2							4
		DOLLARS	$0	$396	$351	$0	$0	$0	$0	$0	$747	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**6**	**8**	**15**	**0**	**8**	**0**	**0**	**7**		**44**
TOTAL DOLLARS BY CATEGORY			**$1,323**	**$1,584**	**$2,633**	**$0**	**$1,008**	**$0**	**$0**	**$441**	**$6,989**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Miscellaneous	1.08	$200									
		$216	$0	$0	$0	$0	$0	$0	$0	$0	**$216**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
MARKED-UP TASK TOTALS		**$216**	**$0**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$216**

COST SUMMARY FOR:	*Pre-Remediation Well Sampling & Abandonment* *Express Cleaners - Task 2*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$8,154
Expenses, includes 10%	$5,740
Contingency 0%	$0
Total	$13,894

COST SUMMARY	
Task 1	$11,939
Task 2	$1,956
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$13,894

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	gw sampling (15 wells)	*HOURS*		1	3		50					54
	Low flow	*DOLLARS*	$0	$198	$527	$0	$6,300	$0	$0	$0	$7,025	
2	Abandon MW3	*HOURS*	0	1	1		5			2		9
		DOLLARS	$0	$198	$176	$0	$630	$0	$0	$126	$1,130	
3	No report, data put into RAP	*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**0**	**2**	**4**	**0**	**55**	**0**	**0**	**2**		**63**
TOTAL DOLLARS BY CATEGORY			**$0**	**$396**	**$702**	**$0**	**$6,930**	**$0**	**$0**	**$126**	**$8,154**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Air Transportation											
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Rental Car	1.08	$500	$125								
		$540	$135	$0	$0	$0	$0	$0	$0	$0	**$675**
Car Mileage	0.565										
(Enter number of miles)		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Lodging and/or per diem	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Utility Clearance and Surveyor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Drilling Subcontractor	1.08		$640								
		$0	$691	$0	$0	$0	$0	$0	$0	$0	**$691**
Analytical Laboratory Subcontractor	1.08	$2,550									
15 wells, 1 dup, 1 TB		$2,754	$0	$0	$0	$0	$0	$0	$0	$0	**$2,754**
Misc Supplies		$50									
ice, DI water, etc		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Field Equipment and/or miscellaneous	1.08	$1,500									
Low flow sampling equip.		$1,620	$0	$0	$0	$0	$0	$0	$0	$0	**$1,620**
MARKED-UP TASK TOTALS		**$4,914**	**$826**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$5,740**

[redacted] [redacted] [redacted]

COST SUMMARY FOR:	*RAP* *Express Cleaners - Task 3*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY		
Labor		$13,271
Expenses, includes 10%		$54
Contingency	0%	$0
Total		$13,325

COST SUMMARY	
Task 1	$7,083
Task 2	$3,429
Task 3	$2,813
Task 4	$0
Task 5	$0
Task 6	$0
	$13,325

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	RAP Preparation/permitting	*HOURS*		6	10		24		8	8		56
		DOLLARS	$0	$1,188	$1,755	$0	$3,024	$0	$612	$504	$7,083	
2	RAP QC Review	*HOURS*	2	8	8							18
		DOLLARS	$441	$1,584	$1,404	$0	$0	$0	$0	$0	$3,429	
3	Revisions to RAP and Submittal	*HOURS*	1	2	4		8		4	2		21
		DOLLARS	$221	$396	$702	$0	$1,008	$0	$306	$126	$2,759	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**3**	**16**	**22**	**0**	**32**	**0**	**12**	**10**		**95**
TOTAL DOLLARS BY CATEGORY			**$662**	**$3,168**	**$3,861**	**$0**	**$4,032**	**$0**	**$918**	**$630**	**$13,271**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Fedex	1.08			$50							
		$0	$0	$54	$0	$0	$0	$0	$0	$0	**$54**
		$0	$0	$0	$0	. $0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
MARKED-UP TASK TOTALS		**$0**	**$0**	**$54**	**$0**	**$0**	**$0**	$0	$0	$0	**$54**

COST SUMMARY FOR:	*Concrete Slab Removal* *Express Cleaners - Task 4*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/27/2015

COST SUMMARY	
Labor	$4,505
Expenses, includes 10%	$16,348
Contingency 0%	$0
Total	$20,853

COST SUMMARY	
Task 1	$20,853
Task 2	$0
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$20,853

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Scheduling and Oversight Task 1	*HOURS*	1	2	6			30				39
		DOLLARS	$221	$396	$1,053	$0	$0	$2,835	$0	$0	$4,505	
		HOURS										0
		DOLLARS										
		HOURS										0
		DOLLARS										
		HOURS										0
		DOLLARS										
		HOURS										0
		DOLLARS										
		HOURS										0
		DOLLARS										
TOTAL HOURS BY CATEGORY			**1**	**2**	**6**	**0**	**0**	**30**	**0**	**0**		**39**
TOTAL DOLLARS BY CATEGORY			**$221**	**$396**	**$1,053**	**$0**	**$0**	**$2,835**	**$0**	**$0**	**$4,505**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Air Transportation	1.08										
		$0			$0	$0	$0	$0	$0	$0	**$0**
Rental Car	1.08	375									
		$405			$0	$0	$0	$0	$0	$0	**$405**
Car Mileage (Enter number of miles)	0.565										
		$0			$0	$0	$0	$0	$0	$0	**$0**
Utility Clearance and Surveyor	1.08	1,100									
		$1,188			$0	$0	$0	$0	$0	$0	**$1,188**
North Shore Task 1 Remove Slab (6,804 sq ft)	1.00	$13,755									
		$13,755			$0	$0	$0	$0	$0	$0	**$13,755**
Abandoned Utility Removal	1.00	$1,000									
		$1,000			$0	$0	$0	$0	$0	$0	**$1,000**
	1.08										
		$0			$0	$0	$0	$0	$0	$0	**$0**
	1.08	$0			$0						
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
MARKED-UP TASK TOTALS		**$16,348**	**$0**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$16,348**

COST SUMMARY FOR:	*In-Situ Reductive Dechlorination* *Express Cleaners - Task 5*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$25,218
Expenses, includes 10%	$152,191
Contingency 0%	$0
Total	$177,409

COST SUMMARY	
Task 1	$177,409
Task 2	$0
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$177,409

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Field Implementation of ZVI Soil Blending	HOURS	16	24	24		80	20		12		176
		DOLLARS	$3,528	$4,752	$4,212	$0	$10,080	$1,890	$0	$756	$25,218	
2		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
3		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		HOURS										0
		DOLLARS	$0	$0	$0	0	$0	$0	$0	$0	$0	
6		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**16**	**24**	**24**	**0**	**80**	**20**	**0**	**12**		**176**
TOTAL DOLLARS BY CATEGORY			**$3,528**	**$4,752**	**$4,212**	**$0**	**$10,080**	**$1,890**	**$0**	**$756**	**$25,218**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Excess Soil Disposal	1.00	$31,667									
		$31,667	$0	$0	$0	$0	$0	$0	$0	$0	**$31,667**
Soil Blending Contractor	1.00	112,871									
		$112,871	$0	$0	$0	$0	$0	$0	$0	$0	**$112,871**
Geoprobe Contractor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Laboratory	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
0.5 ft of #6 crushed stone aggregate	1.00	4,222									
		$4,222	$0	$0	$0	$0	$0	$0	$0	$0	**$4,222**
Field Equipment/vehicle	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Potable Water	1.08	$770									
		$831	$0	$0	$0	$0	$0	$0	$0	$0	**$831**
Vapor Control and Security Fencing	1.00	$2,600									
		$2,600	$0	$0	$0	$0	$0	$0	$0	$0	**$2,600**
MARKED-UP TASK TOTALS		**$152,191**	**$0**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$152,191**

COST SUMMARY FOR:	*Post Remediation Confirmation Sampling* *Express Cleaners - Task 6*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$2,201
Expenses, includes 10%	$4,772
Contingency 0%	$0
Total	$6,973

COST SUMMARY	
Task 1	$6,973
Task 2	$0
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$6,973

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Post-remediation Conf Soil Sampling	HOURS		1	1		14			1		17
		DOLLARS	$0	$198	$176	$0	$1,764	$0	$0	$63	$2,201	
2		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
3		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		HOURS										0
		DOLLARS	$0	$0	$0	0	$0	$0	$0	$0	$0	
6		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			0	1	1	0	14	0	0	1		17
TOTAL DOLLARS BY CATEGORY			$0	$198	$176	$0	$1,764	$0	$0	$63	$2,201	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
	1.00	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Utility Clearance Contractor	1.00	1,100 $1,100	$0	$0	$0	$0	$0	$0	$0	$0	$1,100
Geoprobe Contractor	1.08	2,000 $2,160	$0	$0	$0	$0	$0	$0	$0	$0	$2,160
Laboratory	1.08	1,000 $1,080	$0	$0	$0	$0	$0	$0	$0	$0	$1,080
	1.00	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Field Equipment/vehicle	1.08	$400 $432	$0	$0	$0	$0	$0	$0	$0	$0	$432
	1.08	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	1.00	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
MARKED-UP TASK TOTALS		$4,772	$0	$0	$0	$0	$0	$0	$0	$0	$4,772

COST SUMMARY FOR:	*Well Replacement (mw3)* *Express Cleaners*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$1,697
Expenses, includes 10%	$4,965
Contingency 0%	$0
Total	$6,662

COST SUMMARY	
Task 1	$1,697
Task 2	$4,965
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$6,662

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Well installation - replacement	*HOURS*		1	2		8		1	1		13
		DOLLARS	$0	$198	$351	$0	$1,008	$0	$77	$63	$1,697	
2	No Report - Included in Constr. Comp. Rpt	*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
3		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**0**	**1**	**2**	**0**	**8**	**0**	**1**	**1**		**13**
TOTAL DOLLARS BY CATEGORY			**$0**	**$198**	**$351**	**$0**	**$1,008**	**$0**	**$77**	**$63**	**$1,697**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Air Transportation	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Rental Car	1.08		150								
		$0	$186	$0	$0	$0	$0	$0	$0	$0	**$186**
Car Mileage (Enter number of miles)	0.565										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Lodging and/or per diem	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Utility Clearance and surveyor	1.08		2,600								
		$0	$2,808	$0	$0	$0	$0	$0	$0	$0	**$2,808**
Drilling Subcontractor	1.08		$1,700								
		$0	$1,836	$0	$0	$0	$0	$0	$0	$0	**$1,836**
Analytical Laboratory Subcontractor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Field Equipment and Miscellaneous Supplies	1.08		$125								
		$0	$135	$0	$0	$0	$0	$0	$0	$0	**$135**
MARKED-UP TASK TOTALS		**$0**	**$4,965**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$4,965**

COST SUMMARY FOR:	*Well Installation (Optional)* *Express Cleaners - Task 8*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$504
Expenses, includes 10%	$756
Contingency 0%	$0
Total	$1,260

COST SUMMARY	
Task 1	$504
Task 2	$756
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$1,260

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Well installation (1 new, cost assumes will be installed at same time as the replacmt' well)	HOURS					4					4
		DOLLARS	$0	$0	$0	$0	$504	$0	$0	$0	$504	
2	No Report - Included in Constr. Comp. Rpt	HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
3		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		HOURS										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**		**4**
TOTAL DOLLARS BY CATEGORY			**$0**	**$0**	**$0**	**$0**	**$504**	**$0**	**$0**	**$0**	**$504**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Air Transportation	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Rental Car	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Car Mileage (Enter number of miles)	0.565										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Lodging and/or per diem	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Utility Clearance and surveyor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Drilling Subcontractor	1.08		$700								
		$0	$756	$0	$0	$0	$0	$0	$0	$0	**$756**
Analytical Laboratory Subcontractor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Field Equipment and Miscellaneous Supplies	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
MARKED-UP TASK TOTALS		**$0**	**$756**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$756**

COST SUMMARY FOR:	*Remedial Action Completion Report* *Express Cleaners - Task 9*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY		
Labor		$10,269
Expenses, includes 10%		$54
Contingency	0%	$0
Total		$10,323

COST SUMMARY	
Task 1	$5,958
Task 2	$1,233
Task 3	$3,132
Task 4	$0
Task 5	$0
Task 6	$0
	$10,323

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Report Preparation	*HOURS*		4	8		24		8	2		46
		DOLLARS	$0	$792	$1,404	$0	$3,024	$0	$612	$126	$5,958	
2	Report QC Review	*HOURS*	2	4								6
		DOLLARS	$441	$792	$0	$0	$0	$0	$0	$0	$1,233	
3	Revisions to Report and Submittal	*HOURS*	2	2	6		6		4	2		22
		DOLLARS	$441	$396	$1,053	$0	$756	$0	$306	$126	$3,078	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**4**	**10**	**14**	**0**	**30**	**0**	**12**	**4**		**74**
TOTAL DOLLARS BY CATEGORY			**$882**	**$1,980**	**$2,457**	**$0**	**$3,780**	**$0**	**$918**	**$252**	**$10,269**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Fed-Ex	1.08			$50							
		$0	$0	$54	$0	$0	$0	$0	$0	$0	**$54**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
MARKED-UP TASK TOTALS		**$0**	**$0**	**$54**	**$0**	**$0**	**$0**	$0	$0	$0	**$54**

COST SUMMARY FOR:	*MNA GW sampling (Per Event)* *Express Cleaners - Task 10*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$5,909
Expenses, includes 10%	$3,645
Contingency 0%	$0
Total	$9,554

COST SUMMARY	
Task 1	$7,020
Task 2	$2,534
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$9,554

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Quarterly Sampling (Per Event)	*HOURS*			2		24					26
	8 wells, 1 Dup, 1 TB	*DOLLARS*	$0	$0	$351	$0	$3,024	$0	$0	$0	$3,375	
2	Semi annual Report (per event)	*HOURS*	1	1	4		8		2	4		20
		DOLLARS	$221	$198	$702	$0	$1,008	$0	$153	$252	$2,534	
3		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**1**	**1**	**6**	**0**	**32**	**0**	**2**	**4**		**46**
TOTAL DOLLARS BY CATEGORY			**$221**	**$198**	**$1,053**	**$0**	**$4,032**	**$0**	**$153**	**$252**	**$5,909**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Air Transportation	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Rental Car	1.08	$375									
		$405	$0	$0	$0	$0	$0	$0	$0	$0	**$405**
Car Mileage	0.565										
(Enter number of miles)		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Lodging and/or per diem	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Utility Clearance and surveyor	1.08		0	0							
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Drilling Subcontractor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Analytical Laboratory Subcontractor	1.08	$1,500									
		$1,620	$0	$0	$0	$0	$0	$0	$0	$0	**$1,620**
Field Equipment and Miscellaneous Supplies	1.08	$1,500									
		$1,620	$0	$0	$0	$0	$0	$0	$0	$0	**$1,620**
MARKED-UP TASK TOTALS		**$3,645**	**$0**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$3,645**

COST SUMMARY FOR:	*Subslab VI sampling, 2 subslab locations* *Express Cleaners - Task 11*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$3,231
Expenses, includes 10%	$2,473
Contingency 0%	$0
Total	$5,704

COST SUMMARY	
Task 1	$4,327
Task 2	$1,377
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$5,704

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	VI Sampling	*HOURS*		2			12					14
		DOLLARS	$0	$396	$0	$0	$1,512	$0	$0	$0	$1,908	
2	VI report -will be included in one of the Qtr. GW MNA rpts., Addl time needed shown	*HOURS*			2		6		2	1		11
		DOLLARS	$0	$0	$351	$0	$756	$0	$153	$63	$1,323	
3		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**0**	**2**	**2**	**0**	**18**	**0**	**2**	**1**		**25**
TOTAL DOLLARS BY CATEGORY			**$0**	**$396**	**$351**	**$0**	**$2,268**	**$0**	**$153**	**$63**	**$3,231**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Fedex	1.08		50								
		$0	$54	$0	$0	$0	$0	$0	$0	$0	**$54**
Rental Car	1.08	150									
		$162	$0	$0	$0	$0	$0	$0	$0	$0	**$162**
Car Mileage (Enter number of miles)	0.565										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Lodging and per diem	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Utility Clearance	1.08	1,100									
		$1,188	$0	$0	$0	$0	$0	$0	$0	$0	**$1,188**
Drilling Subcontractor	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Analytical Laboratory Subcontractor	1.08	$440									
		$475	$0	$0	$0	$0	$0	$0	$0	$0	**$475**
Field Equipment and Miscellaneous Supplies	1.08	$550									
		$594	$0	$0	$0	$0	$0	$0	$0	$0	**$594**
MARKED-UP TASK TOTALS		**$2,419**	**$54**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$2,473**

[redacted] [redacted] [redacted]

COST SUMMARY FOR:	*Case closure report and GIS submittal* *Express Cleaners - Task 12*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$9,846
Expenses, includes 10%	$108
Contingency 0%	$0
Total	$9,954

COST SUMMARY	
Task 1	$4,491
Task 2	$1,233
Task 3	$1,881
Task 4	$2,349
Task 5	$0
Task 6	$0
	$9,954

TASK NO.	TASK DESCRIPTION	STAFF: / RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Closure Report Preparation	*HOURS*		4	8		16		2	2		32
		DOLLARS	$0	$792	$1,404	$0	$2,016	$0	$153	$126	$4,491	
2	Closure Report QC Review	*HOURS*	2	4								6
		DOLLARS	$441	$792	$0	$0	$0	$0	$0	$0	$1,233	
3	Revisions to Closure Report and Submittal	*HOURS*	1	1	4		4		1	2		13
		DOLLARS	$221	$198	$702	$0	$504	$0	$77	$126	$1,827	
4	GIS Registry	*HOURS*	2	2	6				2	4		16
		DOLLARS	$441	$396	$1,053	$0	$0	$0	$153	$252	$2,295	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**5**	**11**	**18**	**0**	**20**	**0**	**5**	**8**		**67**
TOTAL DOLLARS BY CATEGORY			**$1,103**	**$2,178**	**$3,159**	**$0**	**$2,520**	**$0**	**$383**	**$504**	**$9,846**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY		COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
iscellaneou	FedEx	1.08			$50	$50						
			$0	$0	$54	$54	$0	$0	$0	$0	$0	**$108**
		1.08										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		0.565										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		1.08										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		1.08										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		1.08										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		1.08										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
		1.08										
			$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
MARKED-UP TASK TOTALS			**$0**	**$0**	**$54**	**$54**	**$0**	**$0**	$0	$0	$0	**$108**

COST SUMMARY FOR:	*Post remediation well abandonment* *Express Cleaners - Task 13*
PROJECT NUMBER:	P21-15124
PREPARED BY:	cb/sp
DATE:	5/26/2015

COST SUMMARY	
Labor	$4,073
Expenses, includes 10%	$4,037
Contingency 0%	$0
Total	$8,109

COST SUMMARY	
Task 1	$8,109
Task 2	$0
Task 3	$0
Task 4	$0
Task 5	$0
Task 6	$0
	$8,109

TASK NO.	TASK DESCRIPTION	STAFF: RATE:	Principal $221	Manager 10 $198	Manager 9 $176	Manager 8 $158	Sr. Assoc 6 $126	Assoc 4 $95	Drafting $77	Support $63	DOLLARS	HOURS
1	Well Abandonment			2	4		22		1	2		31
	16 wells	*DOLLARS*	$0	$396	$702	$0	$2,772	$0	$77	$126	$4,073	
2												0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
3		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
4		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
5		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
6		*HOURS*										0
		DOLLARS	$0	$0	$0	$0	$0	$0	$0	$0	$0	
TOTAL HOURS BY CATEGORY			**0**	**2**	**4**	**0**	**22**	**0**	**1**	**2**		**31**
TOTAL DOLLARS BY CATEGORY			**$0**	**$396**	**$702**	**$0**	**$2,772**	**$0**	**$77**	**$126**	**$4,073**	

Non North Shore/Redox Expense Mark-up	1.08
Subcontractor Mark-up	1.08

EXPENSE CATEGORY	COST FACTOR	PROJECT TASK NO. 1	2	3	4	5	6	7	8	9	DOLLARS
Air Transportation	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Rental Car	1.08	250									
		$311	$0			$0	$0	$0	$0	$0	**$311**
Car Mileage (Enter number of miles)	0.565										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Lodging and per diem	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Analytical Laboratory	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Driller	1.08	$3,400									
		$3,672	$0	$0	$0	$0	$0	$0	$0	$0	**$3,672**
Field equipment	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Permit Fees	1.08										
		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**
Miscellaneous Supplies	1.08	$50									
		$54	$0	$0	$0	$0	$0	$0	$0	$0	**$54**
MARKED-UP TASK TOTALS		**$4,037**	**$0**	**$0**	**$0**	**$0**	**$0**	$0	$0	$0	**$4,037**

RAMBOLL ENVIRON

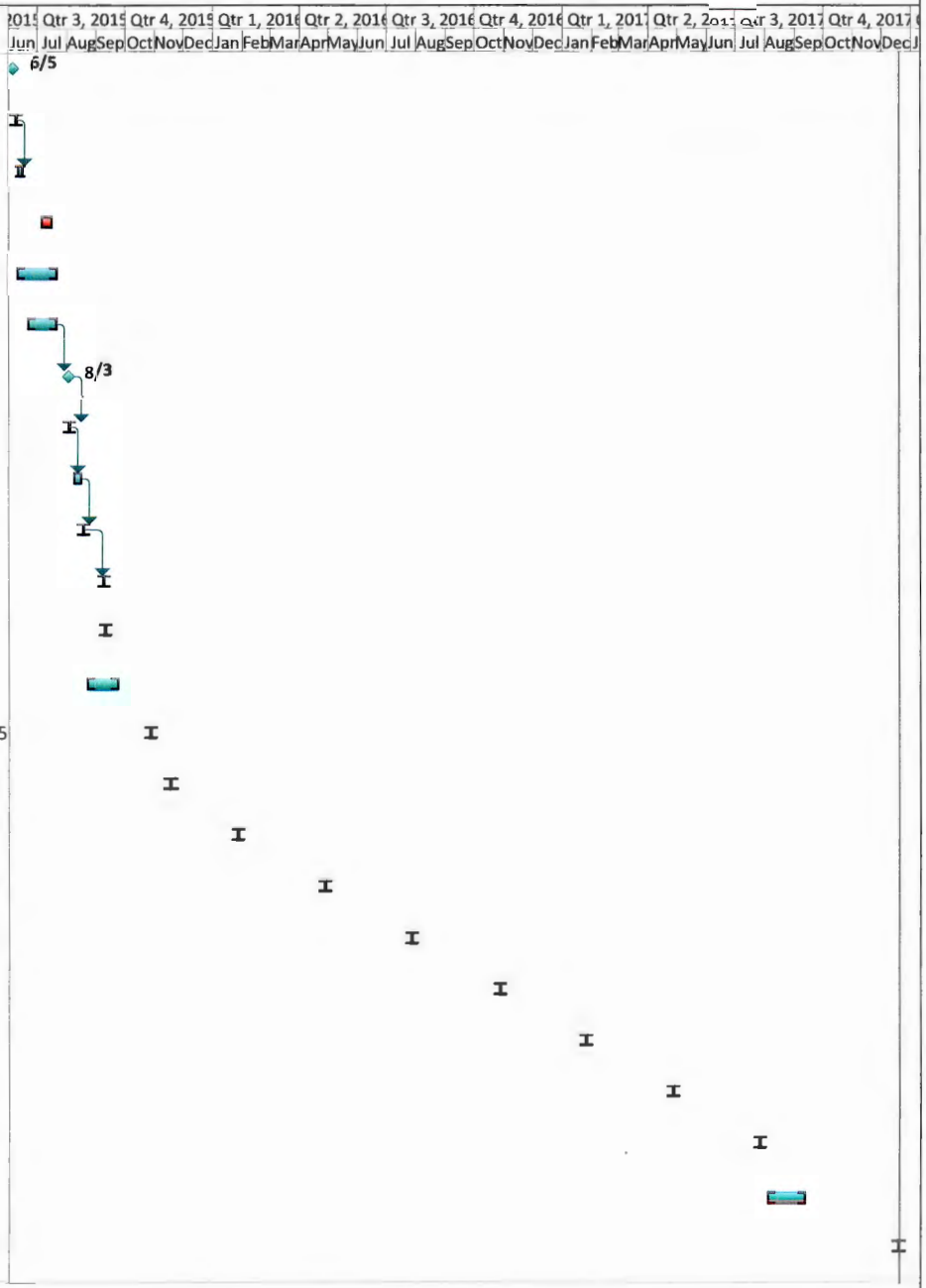
Ramboll Environ 2015 Rate Schedule US$	
Principal	221
Principal Consultant	221
Manager 10	198
Manager 9	176
Manager 8	158
Sr. Assoc. 7	144
Sr. Assoc. 6B	135
Assoc. 6	126
Assoc. 5	113
Assoc. 4	95
Assoc. 3	81
Drafting	77
Support	63

APPENDIX D

Project Schedule

Estimated Site Remediation Schedule
Former Express Cleaners Site

ID	Task Name	Duration	Start	Finish
1	Estimated Award of Contract	1 day	Fri 6/5/15	Fri 6/5/15
2	Contract Execution and project Set-up	3 days	Mon 6/8/15	Wed 6/10/15
3	Pre-Remedial Groundwater Sampling	4 days	Thu 6/11/15	Tue 6/16/15
4	Removal of Existing Building Structure (By Others)	10 days	Mon 7/6/15	Fri 7/17/15
5	Prepare NR 724 Remedial Action Work Plans	30 days	Thu 6/11/15	Wed 7/22/15
6	Permitting	23 days	Mon 6/22/15	Wed 7/22/15
7	Mobilization	1 day	Mon 8/3/15	Mon 8/3/15
8	Remove and Dispose of Concrete Slab and Utility Removal	3 days	Tue 8/4/15	Thu 8/6/15
9	In Situ Soil Blending	7 days	Mon 8/10/15	Tue 8/18/15
10	Site Restoration and Demobilization	3 days	Wed 8/19/15	Fri 8/21/15
11	Install Additional/Replacement Monitoring Wells	3 days	Wed 9/9/15	Fri 9/11/15
12	Post Remediation Soil Confirmation Sampling	3 days	Wed 9/9/15	Fri 9/11/15
13	Prepare NR 724 Soil Remedial Action Completion Report	25 days	Mon 8/24/15	Fri 9/25/15
14	1st Post Remediation Quarterly Groundwater Monitoring Round	3 days	Mon 10/26/15	Wed 10/28/15
15	Vapor Assessment at Former Pugh Oil Building	1 day	Tue 11/17/15	Tue 11/17/15
16	2nd Post Remediation Quarterly Groundwater Monitoring Round	3 days	Tue 1/26/16	Thu 1/28/16
17	3rd Post Remediation Quarterly Groundwater Monitoring Round	3 days	Tue 4/26/16	Thu 4/28/16
18	4th Post Remediation Quarterly Groundwater Monitoring Round	3 days	Tue 7/26/16	Thu 7/28/16
19	5th Post Remediation Quarterly Groundwater Monitoring Round	3 days	Wed 10/26/16	Fri 10/28/16
20	6th Post Remediation Quarterly Groundwater Monitoring Round	3 days	Tue 1/24/17	Thu 1/26/17
21	7th Post Remediation Quarterly Groundwater Monitoring Round	3 days	Tue 4/25/17	Thu 4/27/17
22	8th Post Remediation Quarterly Groundwater Monitoring Round	3 days	Tue 7/25/17	Thu 7/27/17
23	Prepare and Submit NR 726 Closure/GIS Documents	30 days	Mon 8/7/17	Fri 9/15/17
24	Well Abandonment	2 days	Mon 12/18/17	Tue 12/19/17



APPENDIX E

Certificate of Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY) 05/27/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

Holder Identifier :

PRODUCER	CONTACT NAME:	
Aon Risk Insurance Services West, Inc. San Francisco CA Office 199 Fremont Street Suite 1500 San Francisco CA 94105 USA	PHONE (A/C. No. Ext): (949) 608-6300	FAX (A/C. No.): (949) 608-6451
	E-MAIL ADDRESS:	

INSURED	INSURER(S) AFFORDING COVERAGE		NAIC #
Ramboll Environ, Inc. Ramboll Environ US Corporation 4350 N. Fairfax Drive, Suite 300 Arlington, VA 22203 USA	INSURER A:	Commerce & Industry Ins Co	19410
	INSURER B:	AIG Specialty Insurance Company	26883
	INSURER C:	Zurich American Ins Co	16535
	INSURER D:	American Guarantee & Liability Ins Co	26247
	INSURER E:		
	INSURER F:		

COVERAGES **CERTIFICATE NUMBER:** 570057803986 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY			GL7673948	06/30/2014	06/30/2015	EACH OCCURRENCE	$1,000,000
	CLAIMS-MADE [X] OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$1,000,000
							MED EXP (Any one person)	$5,000
							PERSONAL & ADV INJURY	$1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$2,000,000
	POLICY [X] PRO-JECT [X] LOC						PRODUCTS - COMP/OP AGG	$2,000,000
	OTHER:							
D	AUTOMOBILE LIABILITY			BAP 5882722-01	12/31/2014	12/31/2015	COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	
	DED RETENTION							
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N			WC588272101	12/31/2014	12/31/2015	X PER STATUTE OTH-ER	
	ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? N (Mandatory in NH)	N/A					E.L. EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE-EA EMPLOYEE	$1,000,000
							E.L. DISEASE-POLICY LIMIT	$1,000,000
B	Contractor Poll			COPS24205049 Pollution & Professional	06/30/2014	06/30/2015	Occ/ Agg	$2,000,000

Certificate No : 570057803986

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Re: Evidence of Insurance
General Liability Excludes Claims Arising out of the Performance of Professional Services.

CERTIFICATE HOLDER

Ramboll Environ, Inc.
Ramboll Environ US Corporation
4350 N. Fairfax Drive, Suite 300
Arlington VA 22203 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Insurance Services West, Inc.