

September 14, 2018



Mr. Chris Dockry
c/o Mr. Don Gallo
Axley Brynelson LLP
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RE: Remedial Action Proposal-Revised September 2018
Smoke-Out Cleaners
1631 Brookfield Avenue, Unit D-4
Howard, Wisconsin ("Property")
BRRTS #02-05-552214
Terracon Proposal No. P58187103R

Dear Mr. Gallo:

Terracon Consultants, Inc. (Terracon) appreciates the opportunity to prepare this proposal to provide environmental consulting services for the above-referenced site (Property), as requested in the May 14, 2018, Axley Brynelson LLP (Axley) *Request for Remedial Proposal*. This proposal was revised as requested by the Wisconsin Department of Natural Resources (WDNR) in a August 29, 2018 electronic mail. This proposal includes a brief summary of the existing site conditions (Project Information), a recommended remedial action scope of services, associated costs, and project schedule necessary to achieve case closure in accordance with NR 726, Wisconsin Administrative Code (WAC).

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 provides consulting services in compliance with the applicable requirements under NR 700, and is experienced at providing consulting services for the investigation and remediation of chlorinated volatile organic compounds (CVOC) -impacted soil and groundwater. We are also aware of the bid contract requirements of NR 169.13 and 169.23, WAC. Terracon provides consulting services in compliance with the applicable requirements under NR 169 and 700 to 728. Terracon will make available all of the project-related documents and records related to the contract services to the department for inspection and copying. Our proposal was prepared independently of the other consultants that submitted bids for the subject site. Terracon carries insurance coverage in compliance with NR 169.23(9)(b).



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Geotechnical



Environmental



Construction Materials



Facilities

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Terracon reviewed available environmental information of the property from the WDNRs on-line BRRTS web site, and 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. If necessary, Terracon will retain and confer with specialists on unusual matters. 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 Smoke-Out Cleaners Ltd (Smoke-Out) site is located at 1631 Brookfield Avenue, Unit D-4, Howard, Wisconsin. The site lies within a commercial business park, which is in an area of mixed industrial, commercial, and residential use. Beginning in 2005, Smoke-Out operated from a leased space within the western multi-tenant building on the property. The building is slab-on-grade construction with single story offices along the eastern part of the building, and with two-story work space in the western part of the building. A dry-cleaning machine (DCM) is located in the south-central part of the work area. Black Diamond Builders occupies the lease space adjacent north of Smoke-Out, and Badger Scale adjoins Smoke-Out to the south. Asphalt-paved parking areas exist to the east and west of the building.

A Preliminary Site Assessment (PEA) was completed at the site by Giles Engineering Associates (Giles) in August 2008. The PEA included two interior soil borings (HP-1 and HP-2) near the DCM and one exterior hand boring (GP-1) near the rear (west) service door. The PEA identified CVOCs in both soil and groundwater. As a result, a Notification of Release was submitted to the WDNR on August 21, 2008. The WDNR issued a Responsible Party (RP) letter on August 29, 2008, that named Mark Woppert of Smoke-Out as the RP and required a site investigation be performed to determine the magnitude and extent of contamination.

Giles performed the subsequent site investigation during multiple phases from 2008 through 2017. Giles advanced a total of 12 additional direct-push soil borings from July 2011 through March 2017, to investigate the nature and extent of soil and groundwater contamination. Nine shallow, small-diameter prepacked observation wells (MW-1 through MW-9) and one piezometer (PZ-1) were installed. Four observation wells (MW-1 through MW-4) were installed in the building's interior. A total of eight sub-slab vapor sampling points (VP-1 through VP-8) were installed during the course of the site investigation, including five within the Smoke-Out space, and three in the south adjacent Badger Scale space. Soil, sub-slab vapor, and groundwater samples were collected and analyzed for volatile organic compounds (VOC). Giles also collected groundwater samples from the four potable wells that serve the occupied buildings in the business park. The site investigation results indicated that soil and groundwater had been impacted above

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applicable standards by CVOCs, and that indoor air may be impacted based on sub-slab vapor results that exceeded small commercial vapor risk screening levels (VRSLs). The site investigation indicated that shallow soils were primarily fine to medium-grained sand with varying amounts of silty to depths of approximately 10-12 feet below grade. The sand is underlain by clay, silt, and silty clay to the terminus of the deepest boring at approximately 30 feet below grade. The site investigation results were documented in Giles' *Site Investigation Report* dated August 31, 2017.

Specifically, the soil to groundwater pathway residual contaminant level for soil was exceeded for one or more CVOCs including cis-1,2-dichloroethene (cis-DCE), methylene chloride, tetrachloroethene (aka perchloroethylene, perc, or PCE), and trichloroethene (TCE) at interior borings HP-1, HP-2, MW-2, MW-3, and MW-4, and exterior boring GP-1. The highest concentration detected in soil was 2,500 micrograms per kilogram ($\mu\text{g}/\text{kg}$) at 2 to 3 feet below grade at interior soil boring MW-3, located near the DCM.

Groundwater at the site is shallow, typically ranging from approximately 2.5 to 4.5 feet below grade, but seasonally may be as shallow as 1.5 feet below grade in some parts of the site. Shallow groundwater flow is generally to the east.

During the most recent groundwater sampling event conducted in March 2017, the CVOCs cis-DCE, PCE, TCE, and vinyl chloride were detected at concentrations above their respective WAC, Chapter NR 140 Enforcement Standard (ES) at one or more interior observation wells, including MW-1, MW-3, and MW-4.

The sub-slab vapor sampling results indicated that PCE and/or TCE were detected at concentrations above their respective small commercial VRSLs at sub-slab vapor monitoring points VP-1, VP-4, VP-5, and VP-8 located within the Smoke-Out space, and at VP-2 and VP-7 located within the south adjoining Badger Scale space.

Based on review of the initial Site Investigation Report, the WDNR requested an additional round of sub-slab vapor sampling in conjunction with indoor ambient air sampling. The field work was performed on October 25, 2017. Two 8-hour indoor ambient air samples were collected. One was from the office area of Smoke-Out (IA-1) and the other from the office area of Badger Scale to the south. The results were documented in Giles' *Site Investigation Report Addendum*, dated December 6, 2017.

The results indicated that PCE concentrations in indoor ambient air sample IA-1 was above the WDNR small commercial vapor action limit (VAL). The sub-slab vapor sampling results confirmed that PCE and/or TCE concentrations remained above their respective small commercial VRSL at sub-slab vapor monitoring points VP-1, VP-4, VP-5, and VP-8 located within the Smoke-Out space, and at VP-2 and VP-7 located within the south adjoining Badger Scale space.

2.0 REMEDIAL ACTION OPTIONS EVALUATION

Potential remedial options were evaluated relative to Chapter NR 722 WAC, criteria to address the areas of impacted soil and groundwater identified during the site investigation. Remedial action options were also evaluated to address areas where sub-slab VRSLs were exceeded within the Smoke-Out Cleaners and adjacent Badger Scale lease spaces. In summary, areas where impacted soil, groundwater, and potentially indoor air at the site warrant a remedial response include the following:

- n An area of mixed chlorinated ethene (predominantly PCE) and ethane contaminants in shallow soil is present (centered on the DCM) at concentrations above soil to groundwater pathway residual contaminant levels (RCLs). The area lies beneath the building under most of the southern half of the Smoke-Out Cleaners space and the northern part of the Badger Scale space, and extends west slightly beyond the building footprint encompassing direct-push boring GP-1, hand probe borings HP-1 and HP-2, and observation wells MW-1 through MW-4. The highest PCE concentration was detected at 2 to 3 feet below floor grade at observation well MW-3 near the DCM.
- n The groundwater contaminant plume with CVOCs present above their respective ES lies entirely under the building centered on the DCM and encompassing observation wells MW-1, MW-3, and MW-4. The area extends southward beneath the adjacent Badger Scale space. At each observation well within the dissolved-phase CVOC contaminant plume, one or more CVOCs including PCE, TCE, cis-DCE, and vinyl chloride were present at concentrations above their respective ES in the most recent groundwater sampling event conducted in March 2017.
- n Vapor concentrations in a large area beneath the Smoke-out Cleaners space and extending south to beneath the Badger Scale space exceed the small commercial sub-slab VRSLs. The area encompasses sub-slab vapor monitoring points VP-1, VP-2, VP-4, VP-5, VP-7, and VP-8 where PCE and/or TCE vapors were detected above their respective small commercial sub-slab VRSL. During the most recent air sampling event conducted in October 2017, the highest PCE vapor concentration detected was 564,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). PCE was also present at concentrations above its VAL in Indoor air sample IA-1, collected inside the Smoke-Out office area in October 2017.

Due to the relatively high concentrations of PCE in shallow, sandy, source area soil beneath the building, shallow groundwater, and high PCE vapor concentrations that exceed small commercial sub-slab VRSLs in a relatively large area, monitored natural attenuation (MNA) alone is not a sufficient remedy for this site. Other options or combinations of options for remedial action are also limited.

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Another potential option with limited application at this site is removal of contaminated soil via excavation and treatment/disposal. The amount of soil accessible to excavation would be severely limited though because backhoe size (and therefore reach) would be limited by what could be brought into the building through the loading dock overhead door and by maneuverability inside the building. Because of the very shallow groundwater and sandy soils, the amount of contaminated soil that could be safely excavated, would be limited by the reach of the small backhoe and by necessary sidewall sloping due to the proximity of bearing walls and support columns to the contaminated areas. As such, the majority of the contaminant mass would remain inaccessible in saturated soil. There is not a viable area on the property for ex-situ onsite treatment of the soil and, therefore, excavated soil would have to be hauled to a landfill for disposal. However, hauling the contaminated soil to a landfill for disposal is not the best green/sustainable option. Overall this option is feasible albeit quite limited, but because it cannot remove much of the contaminant mass the relatively high cost for small gain makes it less desirable and economically unviable considering the potential long time-frame to closure.

In-situ treatment options via injection of amendments are technically feasible, but may become economically infeasible if required over large areas. In-situ options such as enhanced biodegradation or oxidation may become more economically viable when applied only to smaller, limited source areas. Further these types of treatments are more green/sustainable than excavation, hauling, and disposal at a landfill or excavation and ex-situ treatment.

For this site, Terracon has identified a relatively small source area that could be targeted for in-situ treatment. In-situ measurements and contaminant distribution in these areas suggest that geochemical conditions are largely reducing (e.g. generally low DO and ORP, reductive dechlorination products present). As such, in-situ treatment with oxidizers such as permanganate, persulfate, or hydrogen peroxide would be difficult because a large mass of oxidizer would need to be used to overcome the reducing conditions before the contaminants could be oxidized. In many cases multiple injections of oxidizers are necessary resulting in high costs. Further, an oxidant would have to be carefully selected and monitored after injection because of the plume location under the building and potential production of heat during the oxidizing process. In general, treatment with oxidizers can rapidly reduce very high contaminant concentrations (thousands of parts per million) by 90 percent (%) at locations where the initial conditions are not reducing, but typically cannot reduce the remaining 10%. Because of the reducing conditions at this site, which would likely require multiple injections and increased monitoring required to safely inject oxidizers inside a building, in-situ treatment via oxidation is not an economically viable option.

Because general reducing conditions already exist and reductive dechlorination has or is occurring to some extent at the site, conditions are already chemically favorable for enhanced biodegradation. As such, Terracon also evaluated enhanced reductive dechlorination (ERD) in combination with in-situ chemical reductions (ISCR). Specifically, Terracon evaluated ERD via

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injection of a carbon-hydrogen source, 3-D Micro Emulsion® (3DMe®), a Regenesis product. The ERD injection amendment would also include Bio-Dechlor INOCULUM® Plus (BDI Plus®). The 3DMe® is an engineered electron donor material that is delivered in-situ. BDI Plus® is an enriched natural microbial consortium containing species of Dehalococcoides sp (DHC) that should be applied in conjunction with the 3DMe®. The combination of 3DMe® and BDI Plus® has been shown to be effective at degrading CVOC contaminants. The degradation would be further enhanced by simultaneous injection of the ISCR agent Micro Zero Valent Iron (MicroZVI™). MicroZVI™ helps provide reducing conditions to enhance the ERD, which requires strong reducing conditions to be most effective. In some cases such as at Smoke-Out, which has sandy soils and shallow groundwater, general reducing conditions are present, but may not be as strongly reducing as are generally present in clay soils. ERD and ISCR via injection of 3DMe®, BDI Plus®, and MicroZVI™ is capable of reducing contaminants to no detect. Initial results may be evident in only 1 to 6 months whereby concentrations of the parent compound (PCE) are decreased as they are transformed into initial daughter products TCE and cis-DCE. Concentrations of daughter products first increase before being degraded further into eventual end products methane, ethane, and ethene. Increasing concentrations of ethene and ethane may be evidenced in only a few months to a year or more after injection. Overall injection and treatment via ERD is slower than for oxidation, but is less expensive and is capable of full degradation of the contaminants. As such, injection of 3DMe®, BDI Plus®, and MicroZVI™ for treatment of the soil and groundwater contamination source area via ERD and ISCR is both technically feasible and economically viable, and is, therefore, the option recommended by Terracon to fulfill the initial remedial objective of reducing contaminant mass within the identified CVOC source area. Following mass reduction within the source area via ERD, MNA may then be an appropriate alternative to further reduce groundwater contaminant mass.

Options to address sub-slab vapors are limited by the very shallow groundwater to low-vacuum systems. As such, a soil vacuum extraction system would not be feasible. Therefore, the most feasible and economic method to (temporarily) address the sub-slab VRSL exceedances, potential contribution to negative indoor air quality, and to control potential generation of methane during the in-situ degradation process, Terracon recommends installing a sub-slab depressurization system (SSDS). Assuming there or no subsurface barriers that would impede air flow, Terracon anticipates installing a two-suction point SSDS with one suction point in or near the office area in the east part of Smoke-Out Cleaners and the other on the south wall near the DCM. This should allow control of sub-slab vapors not only within the Smoke-Out Cleaners space, but also in the adjacent Badger Scale lease space to the south. Terracon anticipates that the SSDS would operate for approximately 2 years until the in-situ ERD/ISCR injection has sufficiently degraded contaminants in the source area such that contaminant vapors in the subsurface are reduced to levels below the small commercial sub-slab VRSLs.

3.0 SCOPE OF SERVICES

In an August 29, 2018, email, the WDNR project manager, Tauren Beggs, requested that several additional site investigation tasks be completed prior to implementation of remedial actions. As such, Terracon proposes the following scope of services to complete the additional investigation requested by the WDNR, prepare a detailed Remedial Action Plan (RAP), implement the RAP, and position the site for regulatory case closure. A description of the major tasks is presented below.

3.1 Additional Site Investigation

3.1.1 Pre-Investigation Tasks

Following approval and authorization to proceed from the WDNR and client, Terracon will begin the following preparatory tasks:

- n Prepare a site-specific Health and Safety Plan (HASP) to be followed during all field activities. The health and safety plan will be prepared in general accordance with 29 CFR 1910.120.
- n Terracon will obtain written access permission from the property owner and adjacent occupant Badger Scale prior to work being performed at the site.
- n Because the WDNR requested additional investigation and because groundwater has not been sampled at the site in more than 9 months, Terracon will prepare and submit a Work Plan for Additional Site Investigation and Baseline Groundwater Sampling for WDNR approval to obtain current data to serve as the basis for the development of the detailed RAP and injection design, and to serve as a baseline to compare post-injection results.

3.1.2 Soil Borings and Monitoring Well Construction

Following WDNR approval of the work plan, Terracon will proceed with the additional site investigation activities as described in the work plan. In general, as requested by the WDNR, the additional investigation will include advancing two soil borings and constructing two monitoring wells to help define the extent of contaminated soil and groundwater. The proposed soil boring and monitoring well locations are approximately shown on the attached Exhibit 2.

The soil borings will include an interior soil boring to the north of observation well MW-2 and an exterior soil boring to the northeast of MW-2. One unsaturated soil sample will be collected from each boring and submitted to a Wisconsin-certified laboratory for analysis of VOCs by EPA Method 8260B.

The requested additional monitoring wells include an observation well to the northeast of observation well MW-2, and a piezometer nested with either the new observation well or existing observation well MW-7. The monitoring wells will be constructed in conformance with Chapter NR 141, WAC. Following construction, the monitoring wells will be developed in accordance with NR 141, WAC, and will be surveyed relative to a local benchmark to the nearest 0.01 foot. The two new monitoring wells will be sampled as part of the baseline groundwater sampling event.

3.1.3 Baseline Groundwater Sampling

- n Terracon will conduct the baseline groundwater sampling event to confirm shallow groundwater flow direction and verify groundwater quality. Terracon will measure static groundwater levels prior to purging, and collect groundwater samples from each of the 12 proposed and existing groundwater monitoring wells in the monitoring well network, which includes 10 water table observation wells and 2 piezometers. Samples will be collected via low-flow methods to the extent possible considering the existing small-diameter groundwater monitoring wells. The groundwater samples will be submitted for analysis of VOCs by USEPA Method 8260B. Two duplicate samples will also be analyzed for VOCs. Samples from observation wells MW-1, MW-2, MW-3, MW-4, and MW-7 will also be analyzed for methane/ethane/ethene (MEE), total organic carbon (TOC), and dissolved iron.
- n During the mobilization for the baseline groundwater sampling, Terracon will also inspect the building and assess the overall condition of the building and sub-slab for the design of the SSDS system, including cracks, sumps, and drains, as well as access for interior injection borings.
- n The soil analytical results from the requested soil borings and the baseline groundwater analytical results will be submitted to the WDNR project manager via email and discussed prior to developing the remedial action plan. If the results indicate unanticipated conditions, additional site investigation activities may be requested or required prior to developing the remedial action plan.

3.2 Remedial Action Options and Remedial Action Plan Preparation

The results of the additional site investigation and baseline groundwater sampling, in conjunction with previous investigation results, will be used to develop and evaluate remedial action options (RAO) in conformance with WAC Chapter NR 722. The selected alternative will be presented in the RAOR/RAP, which will also serve as the remedial action design report. As previously mentioned, injection of a carbon/hydrogen donor for EDR in conjunction with zero valent iron for ISCR has been identified as a technically feasible option to address impacted soil and groundwater in the source area. Following receipt of the baseline groundwater sampling results and further development of the injection design criteria, Terracon will contact injection contractors to obtain cost estimates for the final injection design. Because the target injection area is quite

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small, Terracon does not recommend conducting an initial pilot test, but rather recommends proceeding with full implementation of the remedy as a cost-effective measure.

For preliminary design and costing purposes, Terracon provided Regenesis groundwater quality, CVOC contaminant extent, and other data so that they could prepare a conceptual injection design and associated cost estimate. Regenesis recommended injecting the Regenesis products 3DMe[®], BDI Plus[®], and MicroZVI[™] into 10 injection points in the CVOC contaminant source area. The targeted injection area is shown on the attached Exhibit 2. 3DMe[®] is an engineered electron donor material that is delivered in-situ. BDI Plus[®] is an enriched natural microbial consortium containing species of *Dehalococcoides* sp (DHC) that should be applied in conjunction with the 3DMe[®]. The ability of 3DMe[®] to create a neutral pH environment makes it ideal for use with BDI Plus[®], which is a pH-sensitive bioaugmentation culture.

The application of 3DMe[®], which provides an electron donor source, along with the application of BDI Plus[®], which introduces a supply of microbes capable of complete reductive dechlorination, and MicroZVI[™], is intended to create a favorable strongly reducing environment for anaerobic biodegradation of CVOCs. According to Regenesis, “the molecular structure of the main 3DMe[®] component allows it to distribute in the subsurface via micellar movement.” Regenesis asserts that this feature will allow for the migration of 3DMe[®] beyond the initial injection points and, as a result, remediation will occur over a larger area following the initial injection. Ideally, this remediation measure will result in complete reductive dechlorination.

Terracon has had great success at several chlorinated solvent sites in northeastern Wisconsin, including Green Bay, Ashwaubenon, and Appleton, using the combination of 3DMe[®] and BDI Plus[®]. We have used MicroZVI[™] in conjunction with 3DMe[®] and BDI Plus[®] at one other sand site in southern Wisconsin where 3DMe[®] and BDI Plus[®] alone were not initially able to completely degrade the CVOCs.

Based on existing information only, injection would be from approximately 2 feet to 8 feet below the floor grade at each of the proposed 10 injection points within the source area. We will work with you to determine economic feasibility of the proposed alternative or possible staged implementation that may be economically feasible.

3.3 Remedial Action Plan Implementation

After the WDNR approval of the RAOR and RAP, Terracon will implement the RAP, which for the purposes of this proposal will be for installation of a SSDS, and soil and groundwater treatment injection as detailed in the following sections. The process of implementation will remain the same regardless of the scale of the injection.

3.3.1 Permits

Prior to injection, a Wisconsin Pollution Discharge Elimination System (WPDES) Permit will be required. In addition, a WAC, Chapter NR 140 exemption to inject materials for which a groundwater quality standard has not been established and a determination by WDNR that WAC, Chapter NR 812.05 (Injection Prohibition) does not apply, will be required. Terracon will prepare the WPDES application and the information necessary for WDNR to issue the NR 140 exemption and determination that NR 812.05 does not apply. The application (and costs included within this proposal) will include a proposed vapor and groundwater monitoring program in conformance with WPDES permits issued for other Terracon injection projects in Wisconsin; however, WDNR may identify additional monitoring requirements specific to this site. If that is the case, the scope of work and costs may need to be modified.

3.3.2 Sub-Slab Depressurization System Installation

Terracon contacted a local radon abatement contractor to obtain preliminary SSDS design and associated cost information. The preliminary design SSDS includes two suction drop points consisting of a 4-inch diameter polyvinyl chloride (PVC) pipe for control over the area of concern. One suction drop point will be placed in or near the office area on the east side of Smoke-Out Cleaners and one will be placed near the south wall by the DCM, which assuming no subsurface obstructions should be able to control sub-slab vapors in the adjacent Badger Scale space. Cracks and penetrations in the floor slab in the area should be sealed. A blower will be placed inline of the exhaust stack. Because of the distance to an exterior wall, the exhaust stack will likely go vertically through the roof. A u-tube manometer or similar direct-read vacuum measuring device will be placed on each suction point riser. A sample port will also be placed on the riser pipe to allow air screening for VOCs with a photoionization detector (PID) and measurement of lower explosive limit (LEL) or methane. A system of small-diameter holes spaced throughout the area of concern will also be drilled through the concrete to be used as both vacuum monitoring points to verify the area of vacuum influence and points from which to measure the LEL to evaluate methane conditions. The vacuum monitoring points will be capped when not in use for measuring vacuum or the LEL. If necessary, an additional drop-point(s) could be installed based on vacuum monitoring results.

3.3.3 Injection Field Activities

Terracon will engage Regenesys Remediation Services (RRS, a division of Regenesys) or other remediation contractor as the injection contractor along with a direct-push driller to perform the fieldwork. A source of water to supply approximately 1,200 gallons of water during the injection activities will be necessary. The injection product will be delivered to the site in drums prior to commencement of the injection.

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Prior to injection Terracon will complete pre-injection monitoring as required by the WPDES permit and exemptions. The groundwater monitoring performed as described in Section 3.1.2 above, will serve as the pre-injection baseline groundwater monitoring round for comparison with post-injection results. The WPDES permit may also require pre-injection baseline vapor monitoring (% LEL and VOCs via PID) at observation wells within and/or near the injection area, and at other nearby floor slab penetrations. In addition, baseline water levels and groundwater parameters such as pH, dissolved oxygen (DO), oxidation-reduction potential, temperature, and specific conductance will be measured at the primary monitoring point and two subsidiary monitoring points in each injection area prior to commencement of the injection activities.

The injection will be performed by RSS using an injection trailer equipped with pumps, a mixing tank, delivery manifold, injection heads with flow and pressure gauges, safety bypass valve, and a first aid station. Due to the small treatment area, up to three injection locations can be completed simultaneously. A direct-push boring subcontractor will advance injection rods to approximately 8 feet below floor grade at the initial injection point and will leave them in the ground and then move to the second and third injection locations where the rods will also be left in the ground. Two to three injection points will be connected by a header to allow injection at multiple points at a time. The rods will be raised as needed at each injection point until the injection is complete throughout the target interval at each injection point.

During the injection, Terracon will continuously or periodically monitor the water level and DO, ORP, pH, temperature, and specific conductance in observation wells MW-1, MW-3, and MW-4 using a water quality meter. Parameters may also be periodically monitored at additional nearby monitoring points. Changes in these parameters compared to pre-injection readings and water level measurements in these monitoring points will be used as initial evidence of potential successful injection in the targeted areas. Terracon will also periodically perform vapor monitoring during the injection process

Continued performance groundwater monitoring will be required to document the effectiveness of the injection to reduce groundwater contaminant concentrations as outlined in Section 3.5. In accordance with WDNR requirements, a minimum of 8 quarterly groundwater monitoring rounds will be performed following the injection. The first post-injection quarterly groundwater sampling event will be performed approximately 1 month after the injection (or as specified in the WPDES permit) with subsequent events approximately every 90 days thereafter.

3.4 Post-Injection Monitoring

3.4.1 Groundwater and Vacuum Monitoring

Terracon will petition the WDNR to perform 1 year of post-injection quarterly groundwater monitoring prior to closure. However, recently the WDNR has been requiring a minimum of 2

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years of quarterly monitoring prior to closure. As such, for the purposes of this proposal, Terracon has included the scope and costs for eight post-injection quarterly groundwater monitoring events with the first event performed approximately 1 month after injection or as otherwise specified in the WPDES permit. Subsequent groundwater monitoring events will be performed at approximate 90-day intervals thereafter. The fourth and eighth events will be annual groundwater monitoring events (see below). Static groundwater levels will be measured at each of the monitoring wells in the monitoring well network, prior to purging. Samples will be collected by low-flow purge and sample techniques as much as possible in consideration of the existing small-diameter monitoring wells. Post-injection groundwater sampling rounds one through three and five through seven will include sampling observation wells MW-1, MW-3, and MW-4 for VOCs and a suite of natural attenuation geochemical parameters including TOC, MEE, and dissolved iron.

Concurrent with the groundwater monitoring events, Terracon will also perform at least three vacuum monitoring events that will include measuring the vacuum using a magnehelic gauge at the 10 vacuum monitoring points and at observation wells MW-1, MW-3, and MW-4 to verify the SSDS area of influence.

3.4.2 Annual Groundwater Monitoring

Post-injection groundwater sampling events four and eight will be annual sampling rounds and will include measuring static groundwater levels and collecting samples from the entire monitoring well network including existing observation wells MW-1 through MW-9 and piezometer PZ-1, the proposed new observation well (MW-10) and piezometer (PZ-2), and potable well PW-4 for analysis of VOCs. Monitoring wells MW-1, MW-2, MW-3, MW-4, and MW-7 will also be sampled for the suite of natural attenuation geochemical parameters (TOC, MEE, and dissolved iron).

3.4.3 Vapor Monitoring

In conjunction with the proposed December 2020 groundwater monitoring event (post-injection event #7), Terracon proposes to perform vapor monitoring to evaluate sub-slab CVOC vapor concentrations after source area CVOC mass reduction through the injection treatment of groundwater and soil, and to evaluate the continuing necessity of the SSDS. After the system is shut down and allowed to equilibrate for at least 30 days, Terracon will collect 30-minute grab samples from existing sub-slab vapor monitoring points VP-4, VP-5, VP-7, and VP-8. Leak testing will be performed at the sub-slab sampling points. Samples will be collected into calibrated 6-Liter Summa Canisters and submitted to a Wisconsin-certified lab for analysis of CVOCs by EPA Method TO-15 (short list-PCE and associated CVOCs, only).

If the results indicate continued VRSL exceedances, the system will be restarted. If there are no VRSL exceedances, the system will remain off and one to two additional sub-slab vapor sampling events will be performed including at least one event during the non-heating season to evaluate

conditions and verify if the system can remain off permanently. Each of these verification vapor sampling events will be conducted as described above for the initial vapor monitoring event.

3.5 Purge Water Disposal

Contaminated purge water generated during the groundwater sampling events will be placed in labeled, 55-gallon drums for temporary storage onsite. Drums will periodically be removed from the site and properly disposed. Terracon assumes that three drums of purge water will be generated during the activities described in this proposal. It has not been determined whether the drums will require disposal as hazardous materials.

3.6 Reporting

3.6.1 Supplemental NR 716 Site Investigation and Remedial Action Documentation Report

Following completion of the injection and initial post-injection groundwater monitoring event, a Supplemental NR 716 Site Investigation and Remedial Action Documentation Report (SI-RADR) will be prepared that will include the following items:

- n Documentation of the additional site investigation activities;
- n Soil boring logs;
- n Updated soil results table;
- n Estimated extent of soil contamination map;
- n Monitoring well construction and development forms;
- n Photographs of the site investigation activities;
- n Documentation of SSDS installation activities;
- n Vacuum monitoring results;
- n Photographs of the SSDS installation activities;
- n Documentation of injection field activities;
- n WPDES monitoring results;
- n Baseline groundwater monitoring results;
- n Groundwater contour map;
- n Groundwater contaminant distribution map;
- n Initial post-injection groundwater monitoring results;
- n Updated groundwater elevation and results tables;
- n Laboratory reports;
- n Site plan showing pertinent site features and final injection point locations;
- n Injection contractor report; and

Remedial Action Proposal

Smoke Out Cleaners ■ Howard, Wisconsin

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Photographs of the injection activities. The SI-RADR will be provided to you as a draft for review. The final SI-RAR will be submitted to WDNR to document the additional site investigation and remediation activities.

3.6.2 Groundwater Monitoring and Remediation Report

Assuming the WDNR requires eight quarterly groundwater sampling events, A *Groundwater Monitoring and Remediation Report* (GWMR) will be prepared following the last (eighth) post-injection quarterly groundwater sampling event or after an earlier monitoring event if conditions suggest closure is possible. The GWMR will document the monitoring and remediation results, and make recommendations for continued monitoring, modified monitoring, or site closure, as appropriate. Terracon will submit electronic copies (only) of updated summary tables to WDNR following receipt of results from post-injection quarterly monitoring events 2 through 7.

The GWMR will include a groundwater contour map for the two annual groundwater monitoring rounds, trend graphs for selected monitoring points, a groundwater elevation table, a groundwater results table, laboratory analytic test reports, and field sampling sheets.

The report will be provided to you as a draft for review. The final report will be submitted to the WDNR to document the groundwater and remediation results.

3.6.3 Semi-Annual Electronic Reporting

The WDNR requires semi-annual electronic reporting for open cases including this site. Reporting is required in July for the period of January 1 through June 30, and in January for the period of July 1 through December 31. Terracon estimates that six reporting events will be required for the scope of work described in this proposal.

3.7 Regulatory Closure

Terracon anticipates that the site may be ready for closure within 1-2 years following the groundwater amendment injection. Once the WDNR indicates the site is ready for closure, Terracon will prepare a Request for Closure/Continuing Obligations packet that will include Form 4400-202 and supporting documentation, offsite owner notification letters, and maintenance plan, as appropriate. Terracon anticipates that closure will require GIS registry of residual soil and groundwater contamination.

Once the WDNR reviews the closure request and concurs that the site can be closed, the monitoring wells, SSDS, vacuum monitoring points, and sub-slab vapor monitoring points will be abandoned and documentation submitted to the WDNR.

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4.0 ANTICIPATED SCHEDULE

Terracon proposes to initiate these remedial actions as soon as possible upon client and WDNR authorization. Specifically, the proposed schedule is as follows:

TASK	ANTICIPATED SCHEDULE	ANTICIPATED COMPLETION DATE*
Client Authorization/WDNR Approval		September 2018
Access Permission; Preparation and Submittal of the Additional Site Investigation and Baseline Groundwater Monitoring Work Plan	14 days following client authorization to proceed	October 2018
WDNR Approval of Work Plan/Authorization to Proceed	30 days after receipt	November 2018
Soil Borings and Monitoring Well Construction	21 days following authorization to proceed	November 2018
Baseline Groundwater Monitoring	Immediately following monitoring well development	November 2018
Preparation of the Remedial Action Options Report (RAOR)/Remedial Action Plan (RAP)	30 days after receipt of groundwater results	December 2018
WDNR Approval of RAOR/RAP	30 days after receipt	January 2019
WPDES Permit Application	14 days after WDNR RAP approval	January 2019
SSDS Installation	30 days after WDNR RAP approval	February 2019
WPDES Permit Issued by WDNR	30 days after receipt	February 2019
Injection Activities	30 days after WPDES Permit issued	March 2019
Initial Post-Injection Groundwater and Vacuum Monitoring Event	30-45 days after injection	April 2019
Preparation of the Remedial Action Documentation Report	45 days after receipt of results from the initial post-injection groundwater monitoring event	June 2019
Quarterly Post-Injection and Annual Groundwater Monitoring Events (7) and Initial Vapor Monitoring Event	Every 90 days	September 2019 December 2019 March 2020 (Annual) June 2020 September 2020 December 2020 (Vapor) March 2021 (Annual)
Verification Vapor Monitoring	After heating season	May 2021
Continued on next page		

Remedial Action Proposal

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TASK	ANTICIPATED SCHEDULE	ANTICIPATED COMPLETION DATE*
Groundwater Monitoring and Remediation Report	45 days after receipt of results from the verification vapor monitoring event	July 2021
Preparation of Closure Request		September 2021
WDNR Closure Review	60 days after receipt	November 2021
Well Abandonment	30 days after closure	December 2021
Semi-Annual Electronic Reporting	Twice per year through closure	January 2019 July 2019 January 2020 July 2020 January 2021 July 2021

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

5.0 PROJECT TEAM AND QUALIFICATIONS

Mr. Scott A. Hodgson, P.G., a registered Professional Geologist and hydrogeologist according to NR 712, WAC, will manage your project. Mr. Blaine R. Schroyer, P.E. will provide technical review and input, and serve as the NR 712, WAC, registered Professional Engineer. Mr. David Wolfgram, P.E. is a registered Professional Engineer, and will function as the Remediation Specialist. Field services will be performed by other Terracon personnel.

As required by NR 712, these staff will meet the appropriate professional requirements necessary for each phase of the project. Resumes are attached. We have also attached selected project capsules and other information demonstrating our qualifications.

6.0 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 **Detailed Cost Summary-Remedial Action** for the estimated costs for performing the above-described scope of services. We believe we have estimated the number of hours and units conservatively, so the actual costs may be less than estimated.

Remedial Action Proposal

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The costs for performing activities are summarized as follows:

Total Estimated Project Cost	\$120,906.00
Estimated Ineligible WDNR Fees	\$1,700.00
Estimated Total DERF Eligible Expenses	\$119,206.00

Costs for DERF reimbursement claim preparation are not shown on the Detailed Cost Breakdown. Terracon anticipates that a claim would be prepared immediately following the remedial action fieldwork and then annually thereafter for a total of approximately three claims during the remaining course of the project through closure.

The estimated eligible DERF costs, as summarized on the attached Linking Spreadsheet (LSS) is \$119,206, which includes approximately \$69,346 in consulting costs (labor and expenses) and \$49,860 in subcontractor costs.

Terracon will invoice on a time and materials basis according to the rates identified in the cost summary and attached fee schedule; 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 to be eligible for reimbursement. Terracon understands these requirements and does not perform work without your authorization.

7.0 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. 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

Remedial Action Proposal

Smoke Out Cleaners ■ Howard, Wisconsin

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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.

8.0 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 via email to Scott.Hodgson@terracon.com or mail to our Milwaukee office.

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,

The Terracon logo, featuring a large "T" followed by the word "erracon" in a smaller, bold, sans-serif font.

Scott A. Hodgson, P.G.
Senior Project Manager

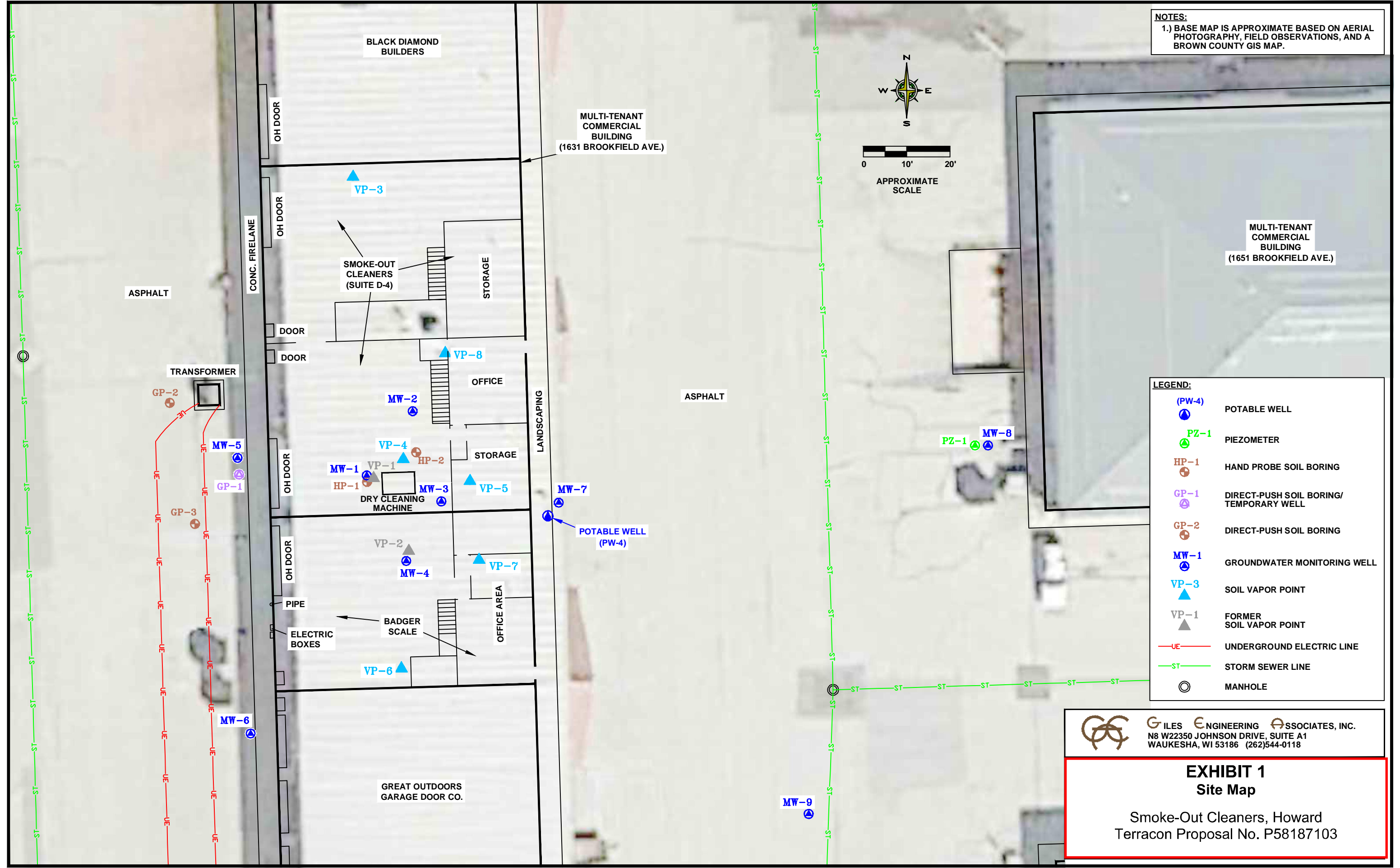
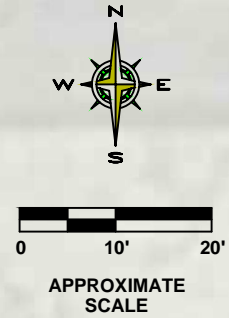
Timothy P. Welch, P.G.
Manager, Environmental Services

Attachments – Exhibit 1: Site Map
Exhibit 2: Proposed Injection Treatment Area
Cost Summary
Linking Spreadsheet
Fee Schedule
SOQ/Project Capsules
Resumes
Certificate of Insurance
Agreement for Services

SAH/TPW:sah\milwaukee1\Data\Proposal Documents\2018\P58187103\Sept 2018 Revision\P58187103.Smoke Out Cleaners
Proposal.revSept2018.docx

Copy to: Mr. Tauren Beggs-WDNR
File

NOTES:
 1.) BASE MAP IS APPROXIMATE BASED ON AERIAL PHOTOGRAPHY, FIELD OBSERVATIONS, AND A BROWN COUNTY GIS MAP.



LEGEND:

	(PW-4) POTABLE WELL
	PZ-1 PIEZOMETER
	HP-1 HAND PROBE SOIL BORING
	GP-1 DIRECT-PUSH SOIL BORING/ TEMPORARY WELL
	GP-2 DIRECT-PUSH SOIL BORING
	MW-1 GROUNDWATER MONITORING WELL
	VP-3 SOIL VAPOR POINT
	VP-1 FORMER SOIL VAPOR POINT
	UNDERGROUND ELECTRIC LINE
	STORM SEWER LINE
	MANHOLE


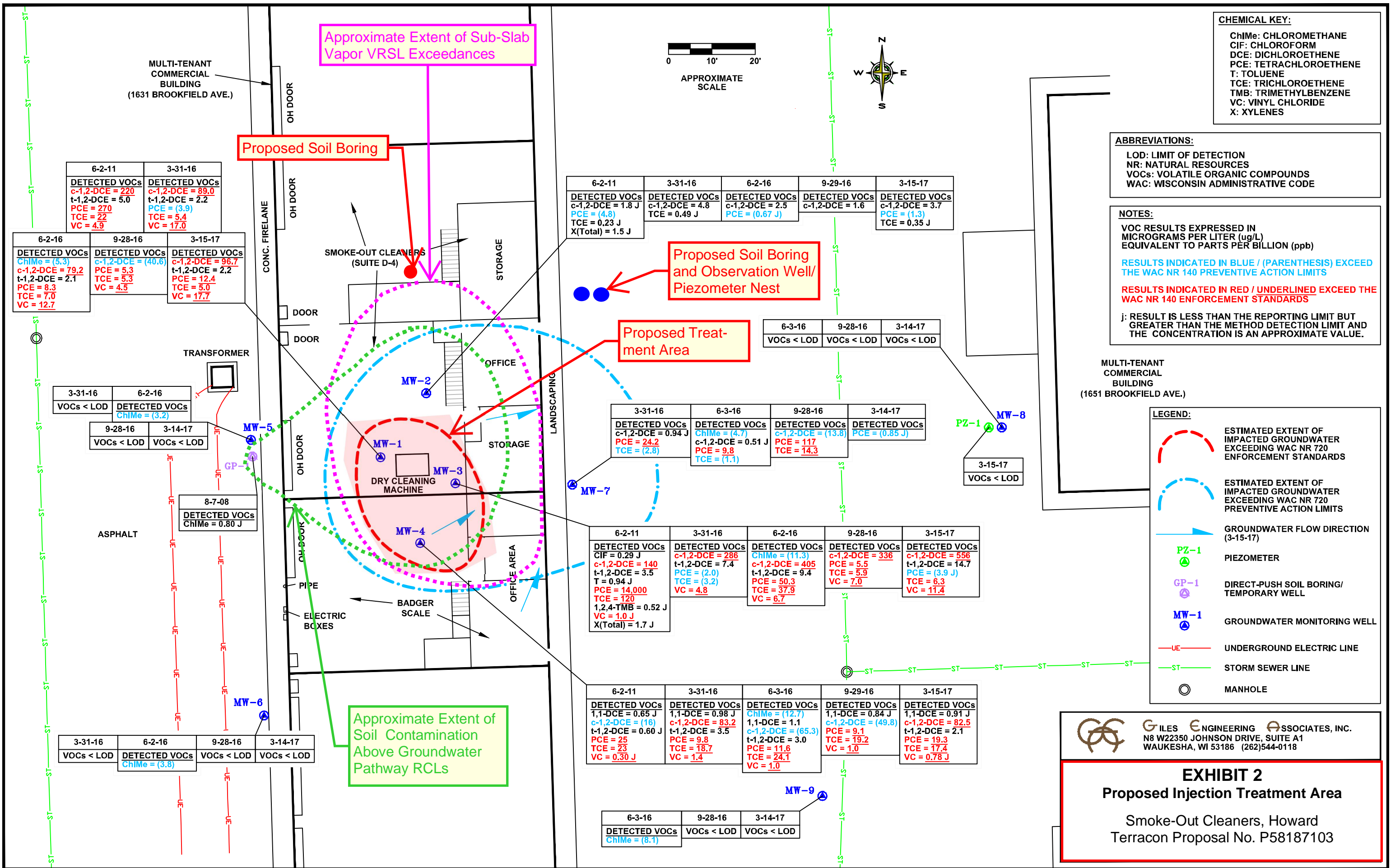
 GILES ENGINEERING ASSOCIATES, INC.
 N8 W22350 JOHNSON DRIVE, SUITE A1
 WAUKESHA, WI 53186 (262)544-0118

EXHIBIT 1
Site Map

Smoke-Out Cleaners, Howard
 Terracon Proposal No. P58187103



CHEMICAL KEY:

- ChMe: CHLOROMETHANE
- CIF: CHLOROFORM
- DCE: DICHLOROETHENE
- PCE: TETRACHLOROETHENE
- T: TOLUENE
- TCE: TRICHLOROETHENE
- TMB: TRIMETHYLBENZENE
- VC: VINYL CHLORIDE
- X: XYLENES

ABBREVIATIONS:

- LOD: LIMIT OF DETECTION
- NR: NATURAL RESOURCES
- VOCs: VOLATILE ORGANIC COMPOUNDS
- WAC: WISCONSIN ADMINISTRATIVE CODE

NOTES:

VOC RESULTS EXPRESSED IN MICROGRAMS PER LITER (ug/L) EQUIVALENT TO PARTS PER BILLION (ppb)

RESULTS INDICATED IN BLUE / (PARENTHESIS) EXCEED THE WAC NR 140 PREVENTIVE ACTION LIMITS

RESULTS INDICATED IN RED / UNDERLINED EXCEED THE WAC NR 140 ENFORCEMENT STANDARDS

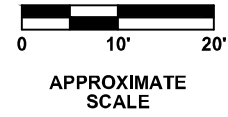
j: RESULT IS LESS THAN THE REPORTING LIMIT BUT GREATER THAN THE METHOD DETECTION LIMIT AND THE CONCENTRATION IS AN APPROXIMATE VALUE.

LEGEND:

- ESTIMATED EXTENT OF IMPACTED GROUNDWATER EXCEEDING WAC NR 720 ENFORCEMENT STANDARDS
- ESTIMATED EXTENT OF IMPACTED GROUNDWATER EXCEEDING WAC NR 720 PREVENTIVE ACTION LIMITS
- GROUNDWATER FLOW DIRECTION (3-15-17)
- PIEZOMETER
- DIRECT-PUSH SOIL BORING/ TEMPORARY WELL
- GROUNDWATER MONITORING WELL
- UNDERGROUND ELECTRIC LINE
- STORM SEWER LINE
- MANHOLE

GILES ENGINEERING ASSOCIATES, INC.
 N8 W22350 JOHNSON DRIVE, SUITE A1
 WAUKESHA, WI 53186 (262)544-0118

EXHIBIT 2
Proposed Injection Treatment Area
 Smoke-Out Cleaners, Howard
 Terracon Proposal No. P58187103



Approximate Extent of Sub-Slab Vapor VRSL Exceedances

Proposed Soil Boring

Proposed Soil Boring and Observation Well/ Piezometer Nest

Proposed Treatment Area

Approximate Extent of Soil Contamination Above Groundwater Pathway RCLs

6-2-11	3-31-16
DETECTED VOCs c-1,2-DCE = 220 t-1,2-DCE = 5.0 PCE = 270 TCE = 22 VC = 4.9	DETECTED VOCs c-1,2-DCE = 89.0 t-1,2-DCE = 2.2 PCE = (3.9) TCE = 5.4 VC = 17.0

6-2-11	3-31-16	6-2-16	9-29-16	3-15-17
DETECTED VOCs c-1,2-DCE = 1.8 J PCE = (4.8) TCE = 0.23 J X(Total) = 1.5 J	DETECTED VOCs c-1,2-DCE = 4.8 TCE = 0.49 J	DETECTED VOCs c-1,2-DCE = 2.5 PCE = (0.67 J)	DETECTED VOCs c-1,2-DCE = 1.6	DETECTED VOCs c-1,2-DCE = 3.7 PCE = (1.3) TCE = 0.35 J

6-3-16	9-28-16	3-14-17
VOCs < LOD	VOCs < LOD	VOCs < LOD

3-31-16	6-3-16	9-28-16	3-14-17
DETECTED VOCs c-1,2-DCE = 0.94 J PCE = 24.2 TCE = (2.8)	DETECTED VOCs ChMe = (4.7) c-1,2-DCE = 0.51 J PCE = 9.8 TCE = (1.1)	DETECTED VOCs c-1,2-DCE = (13.8) PCE = 117 TCE = 14.3	DETECTED VOCs PCE = (0.85 J)

3-31-16	6-2-16
VOCs < LOD	DETECTED VOCs ChMe = (3.2)
9-28-16	3-14-17
VOCs < LOD	VOCs < LOD

6-2-11	3-31-16	6-2-16	9-28-16	3-15-17
DETECTED VOCs CIF = 0.29 J c-1,2-DCE = 140 t-1,2-DCE = 3.5 T = 0.94 J PCE = 14,000 TCE = 120 1,2,4-TMB = 0.52 J VC = 1.0 J X(Total) = 1.7 J	DETECTED VOCs c-1,2-DCE = 286 t-1,2-DCE = 7.4 PCE = (2.0) TCE = (3.2) VC = 4.8	DETECTED VOCs ChMe = (11.3) c-1,2-DCE = 405 t-1,2-DCE = 9.4 PCE = 50.3 TCE = 37.9 VC = 6.7	DETECTED VOCs c-1,2-DCE = 336 PCE = 5.5 TCE = 5.9 VC = 7.0	DETECTED VOCs c-1,2-DCE = 556 t-1,2-DCE = 14.7 PCE = (3.9 J) TCE = 6.3 VC = 11.4

3-31-16	6-2-16	9-28-16	3-14-17
VOCs < LOD	DETECTED VOCs ChMe = (3.8)	VOCs < LOD	VOCs < LOD

6-2-11	3-31-16	6-3-16	9-29-16	3-15-17
DETECTED VOCs 1,1-DCE = 0.65 J c-1,2-DCE = (16) t-1,2-DCE = 0.60 J PCE = 25 TCE = 23 VC = 0.30 J	DETECTED VOCs 1,1-DCE = 0.98 J c-1,2-DCE = 83.2 t-1,2-DCE = 3.5 PCE = 9.8 TCE = 18.7 VC = 1.4	DETECTED VOCs 1,1-DCE = 1.1 c-1,2-DCE = (65.3) t-1,2-DCE = 3.0 PCE = 11.6 TCE = 24.1 VC = 1.0	DETECTED VOCs 1,1-DCE = 0.84 J c-1,2-DCE = (49.8) PCE = 9.1 TCE = 19.2 VC = 1.0	DETECTED VOCs 1,1-DCE = 0.91 J c-1,2-DCE = 82.5 t-1,2-DCE = 2.1 PCE = 19.3 TCE = 17.4 VC = 0.78 J

6-3-16	9-28-16	3-14-17
DETECTED VOCs ChMe = (8.1)	VOCs < LOD	VOCs < LOD

Site Name: Smoke-Out Cleaners

BRRTS #: 02-05-552214

Type of Action: Remedial Action

Dry Cleaner Environmental Response Program

TASKS	BUDGET			Previous Claims (If applicable)	INVOICES			Total Invoiced Costs	Budget Remaining Use (-) to indicate cost over-run	% Task Complete, Remarks
	Bid / Budgeted Description	Remedial Action	INSERT		Total Approved Budget	Provider Name, Invoice #, Billing Date	Provider Name, Invoice #, Billing Date			
Consultant Costs										
HASP, Access, Work Plan, Soil Borings and Monitoring Well Construction; Baseline GW Monitoring; and Preparation of Remedial Action Plan	\$ 13,000.00	\$ -	\$ 13,000.00					\$ -	\$ 13,000.00	Task % Complete
Permit Applications	\$ 1,435.00		\$ 1,435.00					\$ -	\$ 1,435.00	
SSDS Installation, Injection Coordination and Fieldwork	\$ 5,649.00		\$ 5,649.00					\$ -	\$ 5,649.00	
Groundwater Sampling-Post-Injection Quarterly Sampling Rounds (6) and Annual Sampling Rounds (2); SSDS Vacuum Monitoring; and Vapor Monitoring	\$ 17,505.00		\$ 17,505.00					\$ -	\$ 17,505.00	
Purge Water Disposal	\$ 673.00		\$ 673.00					\$ -	\$ 673.00	
Project Management, Data Tabulation and Analysis	\$ 12,645.00		\$ 12,645.00					\$ -	\$ 12,645.00	
Reporting--RADR, GWMR, and Semi-annual Electronic Reporting	\$ 10,836.00		\$ 10,836.00					\$ -	\$ 10,836.00	
Closure Request Preparation and SSDS/Well/Sub-slab Vapor Point Abandonment	\$ 7,603.00		\$ 7,603.00					\$ -	\$ 7,603.00	
			\$ -					\$ -	\$ -	
			\$ -					\$ -	\$ -	
			\$ -					\$ -	\$ -	
<i>Consultant Cost Total</i>	\$ 69,346.00	\$ -	\$ 69,346.00	\$ -				\$ -	\$ 69,346.00	
Sub-Contractor Costs										
SSDS Contractor	\$ 3,000.00	\$ -	\$ 3,000.00					\$ -	\$ 3,000.00	
Injection Contractor	\$ 24,500.00		\$ 24,500.00					\$ -	\$ 24,500.00	
Driller/Well Abandonment Contractor	\$ 9,900.00		\$ 9,900.00					\$ -	\$ 9,900.00	
Purge Water Disposal	\$ 900.00		\$ 900.00					\$ -	\$ 900.00	
Laboratory	\$ 11,560.00		\$ 11,560.00					\$ -	\$ 11,560.00	
			\$ -					\$ -	\$ -	
			\$ -					\$ -	\$ -	
<i>Sub-Contractor Cost Total</i>	\$ 49,860.00	\$ -	\$ 49,860.00	\$ -				\$ -	\$ 49,860.00	
DERF ELIGIBLE SUB-TOTALS	\$ 119,206.00	\$ -	\$ 119,206.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 119,206.00	
Non-DERF Eligible Expenses										
Claim Preparation								\$ -		
Closure Fees (\$1,700)								\$ -		
<i>Non-DERF Cost Total</i>				\$ -	\$ -	\$ -		\$ -		
INVOICE GRAND TOTAL				\$ -	\$ -	\$ -	##	\$ -		

Check Numbers

2018 Terracon Fee Schedule Smoke Out Cleaners

DESCRIPTION	TERRACON FEES
I. PERSONNEL	
A. <u>Professional Staff</u>	
1 Staff Professional	\$65.00 hour
2 Staff Professional I	\$75.00 hour
3 Staff Professional II	\$80.00 hour
4 Staff Professional III	\$88.00 hour
5 Project Professional	\$95.00 hour
6 Project Professional I	\$105.00 hour
7 Project Professional II	\$120.00 hour
8 Project Professional III	\$130.00 hour
9 Project Professional IV	\$145.00 hour
10 Principal/Senior Professional	\$167.50 hour
11 Senior Principal	\$185.00 hour
B. <u>Support Staff</u>	
1 Clerical	\$55.00 hour
2 Draftsman	\$65.00 hour

Note: Deposition or court testimony at a minimum of 1.75 times regular rate - minimum of \$175.00 hour

II. EXPENSES/SUPPLIES / EQUIPMENT / SUBCONTRACTED SERVICES*	
1 Transportation (Mileage) (not DERF Eligible)	\$0.65 mile
2 Per Diem (not DERF Eligible)	\$150.00 Day
3 Bailer (disposable)	\$25.00 Each
4 Drum	\$60.00 Each
5 Water Quality Meter (includes rental and shipping)	\$150.00 Day
6 Peristaltic Pump	\$40.00 Day
7 Electronic Water Level Indicator	\$27.00 Day
8 Photoionization Detector (PID)	\$95.00 Day
9 Multigas Meter (includes rental and shipping)	\$65.00 Day
10 Sub-Slab Vapor Point	\$45.00 Each
11 Air Sampling Kit	\$150.00 Day
12 Magnehelic Gauge	\$30.00 Day
13 Other Equipment Rental	@ Cost
14 Other Materials and Supplies	@ Cost

* - Terracon will send subcontractor invoices to client for direct payment whenever possible.

ROYAL CLEANERS – Allouez, Wisconsin



Terracon was retained to provide remediation services at this dry cleaning site impacted from historical dry cleaning operations with tetrachloroethene (aka perchloroethylene or PCE) and its degradation products. Terracon developed an initial Remedial Action Plan (RAP) that included excavation of accessible impacted soil, installation of an infiltration gallery in the excavation bottom prior to backfilling, gravity infiltration of a carbon/hydrogen donor amendment for enhanced anaerobic dechlorination treatment of groundwater, and post-injection groundwater monitoring. The RAP was approved by WDNR in July 2009 and implemented in August 2009 (see photo, upper left) with excavation and disposal of approximately 949 tons of impacted soil and gravity infiltration/injection of the amendment in November 2009. Post-injection groundwater monitoring indicated decreasing chlorinated volatile organic compound (CVOC) concentrations in downgradient monitoring well MW-1, but CVOC concentrations, primarily PCE and trichloroethene (TCE), continued to increase in monitoring well MW-2. As a result Terracon proposed to directly inject a carbon/hydrogen donor amendment and an inoculum containing CVOC-degrading bacteria in an area around monitoring well MW-2. Following WDNR approval of the injection program and after obtaining the necessary permits, the injection was performed in November 2012 (see photo at left).



As a result Terracon proposed to directly inject a carbon/hydrogen donor amendment and an inoculum containing CVOC-degrading bacteria in an area around monitoring well MW-2. Following WDNR approval of the injection program and after obtaining the necessary permits, the injection was performed in November 2012 (see photo at left).

The results of six post-injection groundwater monitoring events indicated that PCE was reduced from 2,000 micrograms per liter ($\mu\text{g/L}$) in MW-2 prior to injection to 7.3 $\mu\text{g/L}$ in January 2015. As anticipated, PCE degradation products initially increased with degradation of PCE, and then decreased dramatically by January 2015. The remedial actions successfully addressed the impacted soil and groundwater such that closure would be possible. As part of the closure process, an on- and offsite vapor intrusion assessment was performed, which included installing and sampling three sub-slab vapor monitoring points in the basement of the Royal Cleaners building and one in the basement of the adjacent office building. The results indicated potential vapor intrusion issues in the Royal Cleaners building. Consequently a sub-slab depressurization system (SSDS) was installed in the basement of the building to mitigate the vapors. The SSDS consists of two suction drop points, each with a separate fan, installed through the floor slab. Vacuum monitoring indicates that the SSDS has influence over the area of concern. Following successful remediation of impacted soil and groundwater and mitigation of vapor intrusion issues, a request for regulatory closure of the site is being prepared which will include Geographic Information System (GIS) registry of residual soil and groundwater contamination. Closure is anticipated in fall 2016.

CLIENT NAME

Bay Towel, Inc.

CONTRACT VALUE

\$130,000

COMPLETION DATE

2009 through present

RELEVANT FEATURES

- Ü Remediation of Chlorinated Solvents in Soil, Groundwater, and Air
- Ü Excavation of Impacted Soil
- Ü Passive In-situ Treatment of Groundwater Via Infiltration
- Ü Secondary In-Situ Treatment of Groundwater Via Direct-Injection in a Targeted Area
- Ü On and Offsite Vapor Intrusion Assessment
- Ü Installation of a Sub-Slab Depressurization System for Mitigation of Vapors

CONFIDENTIAL SITE – Ashwaubenon, Wisconsin



Terracon was retained to initiate site investigation activities after a limited site investigation performed by others documented chlorinated volatile organic compounds (CVOCs) in groundwater within a former auto service center of a big box retail facility. The Wisconsin Administrative Code

(WAC), Chapter NR 716 site investigation included advancing direct-push soil borings, collecting soil samples, and converting three of the soil borings into temporary groundwater monitoring wells to collect groundwater samples. Based on the results an area of groundwater contaminated with CVOCs was identified near a former hydraulic lift. A NR 141, WAC-compliant monitoring well (MW-1) was subsequently constructed to confirm the temporary well results. Groundwater monitoring confirmed that vinyl chloride was present above its NR 140 Enforcement Standard at MW-1. Because the property owner, who was different than the building owner, wanted an unrestricted closure, remediation activities were undertaken to reduce the vinyl chloride concentration at MW-1 to below its ES.

To initially address the groundwater plume, the Wisconsin Department of Natural Resources (WDNR) approved a high vacuum extraction program from monitoring well MW-1 using a vacuum truck. Three vacuum extraction events were performed over the course of a year, but CVOc concentrations were not reduced to the extent that unrestricted closure would be possible. As a result, Terracon proposed to inject a carbon/hydrogen donor amendment and inoculum containing CVOc-degrading bacteria in an area around monitoring well MW-1 for enhanced anaerobic dechlorination to treat the groundwater, which was subsequently approved by the WDNR. After obtaining a Wisconsin Pollution Discharge Elimination System (WPDES) permit and an NR 812 exemption to allow injection, the injection program was performed in May 2013 in conformance with the WPDES permit. Nine quarterly post-injection performance groundwater monitoring events indicated that within a month after the injection, vinyl chloride concentrations spiked as anticipated, and then consistently decreased to no-detect during the last three events. The injection successfully reduced the groundwater plume to allow unrestricted site closure, which was granted by WDNR on June 21, 2016.

CLIENT NAME

Confidential

CONTRACT VALUE

\$90,000

COMPLETION DATE

June 2016

RELEVANT FEATURES

- Ü Site Investigation and Remediation of Chlorinated Solvent Plume in Groundwater
- Ü High Vacuum Extraction
- Ü WPDES Permit and Injection Exemption
- Ü In-situ Treatment of Groundwater Via Direct-Injection of Carbon/Hydrogen Donor Amendment
- Ü Site Closure

AHLMAN STEELYARD – Appleton, Wisconsin



Terracon was retained to initiate site investigation activities as a result of observed staining and odors associated with drums of spent chlorinated solvents on the Ahlman Steelyard property. Onsite soil and groundwater investigation identified four source area soil hotspots requiring excavation, including

soil with concentrations of tetrachloroethene (PCE) above hazardous criteria, if removed. Offsite soil, groundwater, and vapor intrusion investigation identified an area of PCE-impacted soil on the adjacent property to the west that required excavation including additional soil above hazardous criteria. In 2008, Terracon implemented a WDNR-approved Remedial Action Plan (RAP) for excavation of the four onsite soil hotspots with ex-situ chemical oxidation (onsite) of hazardous soil. The RAP included the following elements—segregation of hazardous soil onto constructed pads rimmed with berms and covered with plastic; pre-treatment of soil with slaked lime ($\text{Ca}[\text{OH}]_2$) to disaggregate the clay soil; treatment of 208 tons of hazardous soils with a chemical oxidant (see photo above); post-treatment verification sampling; disposal of the treated soil at a Subtitle D landfill; the excavation and landfill disposal of 1,586 tons of non-hazardous chlorinated volatile organic compound (CVOC) impacted soil; application of an amendment for enhanced anaerobic dechlorination treatment of groundwater (see photo at left) prior to backfilling and compaction of the excavation; and the implementation of a quarterly groundwater monitoring plan to document contaminant attenuation.

Subsequent groundwater monitoring through August 2012 indicated a 80% reduction in total VOC and 88% reduction in PCE in the most highly contaminated monitoring well. In 2012, the approved RAP for the offsite excavation included similar elements but also included approval of an NR 670.079 Hazardous Waste Remediation Variance (HWRV), the first granted in Wisconsin. The HWRV allows onsite treatment of hazardous waste (via specific approved methods) for a period of up to five years without obtaining a hazardous waste treatment license. The HWRV required treatment of hazardous soils within roll-off boxes. A total of approximately 51 tons of hazardous soil was treated in the rolloff boxes and disposed at a Subtitle D landfill. Approximately 923 tons of nonhazardous CVOC-impacted soil was excavated and disposed during the 2012 remedial activities. Future work will include investigation of the utility corridor in the adjacent street as a potential preferential contaminant migration pathway. An innovative investigation technique will be employed whereby suction lysimeters will be placed through the wall or base of storm sewer manholes into the adjacent backfill to collect groundwater samples directly from the backfill. Site closure is anticipated within two years.

CLIENT NAME

R. Sabee Company LLC

CONTRACT VALUE

\$350,000

COMPLETION DATE

2004 through present

RELEVANT FEATURES

- ✓ Site investigation of large chlorinated solvent plume in soil and groundwater
- ✓ Vapor Intrusion Assessment
- ✓ Hazardous Waste Excavation and Innovative Onsite (Ex-situ) Treatment
- ✓ In-situ treatment of groundwater
- ✓ First NR 670.079 Hazardous Waste Remediation Variance granted in Wisconsin
- ✓ Less than \$90 per ton for onsite treatment of hazardous soil/disposal compared to \$400-800 per ton for offsite treatment/disposal, a savings of up to \$640,000

CLARE CENTRAL – Milwaukee, Wisconsin



Terracon performed a Limited Site Investigation (LSI) at the Clare Central apartment complex property to evaluate recognized environmental conditions (RECs) identified in a Phase I ESA performed by others in 2006. An automatic control manufacturing facility, a wire and iron works factory, and an automotive service facility were historically located on the subject property. The site is developed on an irregularly-shaped parcel, which contains a paved parking lot, and two multi-story 8-unit apartment buildings (slab on grade) located in a residential area in the City of Milwaukee. Chlorinated volatile organic compounds (CVOCs) were identified in soil and groundwater beneath the site during the direct-push LSI, which included the installation of temporary groundwater monitoring wells to evaluate the extent and magnitude of impacts, prior to the implementation of a Wisconsin Administrative Code (WAC), NR 716 compliant site investigation. The site investigation included obtaining access permits from the City of Milwaukee, installation of WAC, NR 141 compliant groundwater monitoring wells, and a vapor intrusion (VI) assessment of each apartment complex. The site investigation results indicated that the primary contaminant of concern is trichloroethylene (TCE). Approximately 3,200 tons of CVOC affected soils are present at concentrations above (potentially) hazardous waste levels in soil adjacent to the complexes. TCE was also detected in groundwater at concentrations above its WAC, NR 140 Enforcement Standard.

The VI assessment consisted of the installation of sub-slab vapor monitoring points and collection of ambient air samples in each complex over a 24-hour period. TCE and other CVOCs were reported at concentrations above vapor action levels; therefore, an interim remedial action consisting of the installation of sub-slab depressurization systems was implemented for the health and safety of the building residents. Terracon developed and presented several remedial action options to the WDNR. Based on the projected expenses associated with remediation, Terracon prepared an application for a \$300,000 WDNR Ready for Reuse Hazardous Substance Loan and Grant. The Redevelopment Authority of the City of Milwaukee (RACM) owns a portion of the alley adjacent to the apartment complexes, and worked with the WDNR to obtain additional grant funds to assist in site investigation completion for the non-profit business.

CLIENT NAME

Telos, Inc.

CONTRACT VALUE

\$80,000

COMPLETION DATE

Ongoing

RELEVANT FEATURES

- ✓ Phase II Environmental Site Assessment
- ✓ NR 716 site investigation
- ✓ Off-site access agreements
- ✓ Vapor Intrusion Assessment
- ✓ Interim Action Vapor Mitigation
- ✓ Remedial Action Option Analysis
- ✓ VPLE Site Investigation

Excavation/Treatment and Disposal

Excavation is often a component of active remedial actions resulting from a need to get the site remediated quickly or because soil needs to be removed to allow redevelopment of a site. Ex-situ soil treatment followed by replacement of the treated soil is sometimes an attractive option. Examples of ex-situ treatment include: thermal desorption, biopiling, vapor extraction, solidification, soil washing, soil augmentation, and microencapsulation. However, if soil cannot be treated on-site and replaced, offsite treatment or disposal may be necessary. Terracon has direct experience in Wisconsin with characterizing, profiling, and disposing of contaminated media. We have evaluated contaminated media to determine if it met the criteria of a listed or characteristically-hazardous waste. Terracon works with our clients to select reputable, financially-accountable treatment and disposal providers to limit our client's potential for future liability for their waste.

Active In-situ Soil and Groundwater Remediation Systems

Our staff of registered environmental professionals can design active soil and groundwater remediation systems including: air stripping, carbon adsorption, biological treatment, chemical fixing, dual-phase recovery, ion exchange, phytoremediation, and soil venting. Terracon has obtained permits for air discharges, storm water discharges, sanitary system discharges, landspreading, and subsurface injections (pending) of treated groundwater.

Project capsules, representative of Terracon's Phase III Remediation experience follow.

ALTERRA-BAYVIEW COFFEE ROASTERS & BAKERY – Milwaukee, Wisconsin



Terracon reviewed Phase I and Phase II ESA reports prepared by others to evaluate remedial action options relative to petroleum-affected soil, and chlorinated volatile organic compound (CVOC) affected soil and groundwater at the former Maritime Savings property. Development plans for the property included demolition of the buildings to accommodate the new structure. Prior to demolition, Terracon

assisted the client in obtaining a Wisconsin Department of Natural Resources (WDNR) Ready for Reuse Hazardous Substance Grant for remediation, and performed a geotechnical exploration. Subsequent to demolition, Terracon implemented a WDNR-approved Remedial Action Plan (RAP), which included the following components: direct-push soil borings drilled in a grid array to delineate the extent of CVOC-impacted soil that required handling as hazardous waste; excavation and on-site pre-treatment of 150 tons of hazardous soils with a chemical oxidant in roll-off boxes so they could be transported to a Subtitle D landfill for disposal; the excavation and landfill disposal of 2,000 tons of non-hazardous CVOC affected soil; the installation of an underground infiltration gallery for groundwater amendment distribution concurrent with backfilling and compaction of the excavation; off-site vapor intrusion assessment of several residences, and the implementation of a quarterly groundwater sampling and analyses plan to document contaminant attenuation. During footing

excavation for the new structure, several unknown petroleum USTs were encountered, and Dakota Intertek (also on our team for this project) was retained to remove the USTs. Based upon two quarters of groundwater attenuation monitoring performed subsequent to excavation, the CVOC dissolved phase groundwater contaminant plume is substantially reduced, with concentrations of tetrachloroethylene in the former source zone reduced by 80%. The case file related to the petroleum release was closed by the DSPS and it is anticipated that the Wisconsin Environmental Repair Program (ERP) case file related to the CVOC release will be closed utilizing the institutional and engineering controls of the Geographic Information System (GIS) registry and Cap Maintenance Plan, respectively.

CLIENT NAME

Lap Dog, LLC

CONTRACT VALUE

\$250,000

COMPLETION DATE

2010-2013

RELEVANT FEATURES

- ✓ Innovative Remedial Action Option Evaluation
- ✓ Remedial Action Plan Implementation
- ✓ Geotechnical exploration
- ✓ Ready for Reuse grant-writing assistance
- ✓ Construction Materials Consultation and Testing
- ✓ Vapor Intrusion Assessment
- ✓ UST excavation and disposal

Scott A. Hodgson, P.G.

SENIOR PROJECT MANAGER

PROFESSIONAL EXPERIENCE

Mr. Hodgson is a senior project manager in Terracon's Franklin, Wisconsin office, with more than 24 years of experience in geologic interpretation, hydrogeology, and environmental cleanups. Mr. Hodgson is well versed in Wisconsin regulatory requirements and is well-known within the Wisconsin Department of Natural Resources (WDNR). He presented a case study for innovative cleanup to the WDNR Bureau of Remediation & Redevelopment annual statewide training meeting on November 7, 2012.

Mr. Hodgson's experience includes project scope development, cost estimating, supervision and training of personnel, technical data analysis, technical report preparation and review, and client management.

Mr. Hodgson has performed EPA Brownfields assessments, numerous Phase II limited site investigation as well as full-scale site investigations within complex geologic regimes; performed vapor intrusion assessment and mitigation, performed groundwater pump & treat, soil vapor extraction, and air sparge pilot tests; designed groundwater and soil remediation systems including plan and specifications preparation; performed system construction oversight and QA/QC; and operated, monitored, and evaluated remediation system operation. His experiences have included investigation and remediation of sites contaminated with agricultural chemicals, metals, petroleum hydrocarbons, chlorinated solvents, and semi-volatile organic compounds, including hazardous waste remediation.

PROJECT EXPERIENCE

AGRICULTURAL

Agricultural Facility – Fond du Lac County, Wisconsin

Project manager for site investigation of fertilizer/pesticide contamination as well as buried drums of a banned herbicide. Investigation techniques included geophysics to define target areas followed by carefully excavating test pits utilizing a mini-back hoe and hand digging. Subsequent remediation included removal and disposal of liquids, contaminated drum remnants and debris, and impacted soil as separate hazardous waste streams. Additional non-hazardous impacted soil was excavated following the hazardous waste removal during several remedial action events. Groundwater investigation is ongoing.

Professional Services Completed: 2005-present

Terracon Fee: \$400,000

FEDERAL/BROWNFIELDS REDEVELOPMENT

Ripon Brownfields – Ripon, Wisconsin

Project manager for community-wide assessments of brownfield properties including developing a brownfields property inventory, providing community outreach, and preparing a Multi-site Quality Assurance Project Plan for the purpose of performing Phase I and II Environmental Site Assessments (ESA) at numerous brownfield sites throughout Ripon to spur redevelopment. A total of nine Phase I and four Phase II ESA's were performed.

Professional Services Completed: 2011

Terracon Fee: \$200,000

EDUCATION

Master of Science, Geology, New Mexico State University, 1991

Bachelor of Science, Geology and Geography, University of Wisconsin-Platteville, 1986

REGISTRATIONS

Professional Geolpist: Wisconsin, No. PG-1229

CERTIFICATIONS

40-Hour HAZWOPER

WORK HISTORY

Terracon Consultants, Inc., Senior Project Manager, 2011-Present;
Project Geologist, 2007-2011

Miller Engineers & Scientists, Project Engineer/Scientist, 2005-2007; Staff Engineer/Scientist, 1995-2005; Junior Engineer/Scientist, 1992-1995

PRESENTATIONS/PUBLISHED

ARTICLES

See Endnote¹

¹ * Work performed prior to joining Terracon.

SCOTT A. HODGSON, P.G. (continued)

STATE GOVERNMENT-ENVIRONMENTAL

N.W. Mauthe Superfund Site – Appleton, Wisconsin

Project manager for this continuing Wisconsin Department of Natural Resources state-lead site for operation and maintenance of a remediation system. Activities include operation, maintenance, and monitoring of existing groundwater remediation systems for hexavalent chromium and volatile organic compounds, and groundwater monitoring. Work included evaluation of the systems and improvements to increase efficiency, improve safety, and reduce costs. Additional work has included chromium and hexavalent chromium soil sampling in residential areas to further define the distribution of remaining hexavalent chromium contamination

Professional Services Completed: 2011-present

Terracon Fee: \$180,000

Former Quicfrez Complex – Fond du Lac, Wisconsin*

Lead investigator and project manager for characterization and remediation of 4.5 acre high priority old industrial site with metals, semi-volatile, and chlorinated solvent contamination. Site investigation included sediment and surface water sampling, soil borings, and construction of multiple 3-well monitoring well nests. High concentrations of chlorinated solvent contamination were documented in soil and groundwater to depths of 45 feet adjacent to, and under a river. Innovative in-situ remediation of the chlorinated solvent contamination involved the second large-scale application of the Lasagna™ electro-osmosis/treatment wall technology in the US. Implementation of the technology required design and construction of a bulkhead into the river to allow treatment of contaminated soil beneath the river. Work included system construction oversight of the \$1.2 million dollar system, including construction observation, preparation and administration of contract documents, process contractor payment requests, conduct construction meetings, and review contractor submittals. Work also included development of specialized techniques to sample soil and groundwater at temperatures of 180°F, and specialized system and remediation monitoring plans to ensure public safety (such as stray voltage monitoring), protect nearby utilities, protect the river environment, and collect data to assess the remediation.

Professional Services Completed: 2007

Project Cost: >\$1,500,000

Ripon Wells 6 & 9 – Ripon, Wisconsin*

Project manager and lead author for a city-wide Phase I and limited Phase II Environmental Assessment performed for the Wisconsin Department of Natural Resources to identify potential source(s) for trichloroethene contamination in City of Ripon Municipal Wells No. 6 and No. 9. The Phase I ESA identified a number of potential sources that were previously unknown. Phase II activities involved identifying and sampling existing monitoring wells, private potable wells, and surface water localities throughout the city.

Professional Services Completed: 2006

Project Cost: \$200,000

Lakewood Pelky DX – Lakewood, Wisconsin*

Project manager and lead investigator for a diving trichloroethene plume in a complex geologic setting for the Wisconsin Department of Natural Resources. The plume was identified at depths greater than 150 feet, covered an area of over ½ square mile, and contaminated more than seven private wells. The investigation successfully identified the hydrogeologic characteristics responsible for plume migration and identified several additional contaminated or at-risk private potable wells.

Professional Services Completed: 2005

Project Cost: \$185,000

UTILITIES

Electric Company – Appleton, Wisconsin*

Project manager for Quality Assurance testing for in-situ stabilization at a former manufactured gas plant site. Responsible for overseeing sample collection and preparation, coordination and communication with the consultant and contractor, and timely reporting of the results.

Professional Services Completed: 2005

Project Cost: \$50,000

SCOTT A. HODGSON, P.G. (continued)

INDUSTRIAL

Ahlman Steelyard – Appleton, Wisconsin

Coordinated and managed multiple investigation phases to determine the extent of soil and groundwater contamination impacted by industrial solvents on and off site. Investigation also included vapor intrusion assessment of adjacent structures. Investigation of underground utility lines in the adjacent street as potential contaminant migration pathways utilized lysimeters installed through the sidewalls of sewer manholes. Initial remediation included onsite hotspot source removal and injection of a carbon/hydrogen source to treat groundwater. Additional hotspot required preparation of an NR 670.079 Remediation Variance to allow treatment of hazardous soil in roll-off boxes via chemical oxidation onsite. WDNR approved the Variance, which was the first in Wisconsin to receive such approval. Additional remediation measures included targeted injection for shallow and deep groundwater remediation.

Professional Services Completed: 2004-present

Terracon Fee: \$730,000

Weathershield Facility – Ladysmith, Wisconsin

Project manager for site investigation (SI) to determine the magnitude and extent of pentachlorophenol (PCP) associated with a dip tank for wood treatment and associated volatile organic compounds (VOCs) in soil and groundwater at their northern Wisconsin facility where they manufactured windows and doors. The SI included performing interior and exterior soil borings and constructing groundwater monitoring wells, but was complicated by commingling with an area-wide “phantom” tetrachloroethene (PCE) plume investigated by the Wisconsin Department of Natural Resources (WDNR) in conjunction with the US Environmental Protection Agency.

Professional Services Completed: 2011

Terracon Fee: \$25,000

COMMERCIAL

Multiple Dry Cleaner Investigations and Remediations – Various, Wisconsin

Coordinated and managed investigation and remediation of numerous drycleaner sites throughout northeast Wisconsin. Work included investigation of soil and groundwater using a variety of techniques. Vapor intrusion assessment was performed, which included construction and sampling of permanent shallow soil-gas monitoring points and sub-slab monitoring points, indoor air sampling, and outdoor ambient air sampling. Remediation included installation and operation of vapor mitigation systems, contaminated soil excavation, in-situ treatment of groundwater by injection of a carbon/hydrogen source, and monitored natural attenuation.

Professional Services Completed: 2007-present

Terracon Fee: \$500,000 (aggregate)

¹Hodgson, Scott A., . “*Innovative Remediation (Chemical Oxidation and Enhanced Anaerobic Dechlorination) Case Study—Ahlman Steelyard, Appleton, Wisconsin*” (Presentation), presented at the Wisconsin Department of Natural Resources Bureau of Remediation and Redevelopment Statewide Training Conference, Waupaca, Wisconsin, November 7, 2012.

Hodgson, S.A., *Structural Geology and Laramide Tectonics of the Little Hatchet Mountains, Southwestern New Mexico* (New Mexico Geological Society Guidebook, 51st Field Conference, Southwest Passage—A Trip through the Phanerozoic, 2000), pp. 109-116.

Blaine R. Schroyer, P.E.

PRINCIPAL/OFFICE MANAGER

PROFESSIONAL EXPERIENCE

Blaine is responsible for all aspects of operations in the Milwaukee, Wisconsin office. This includes technical oversight, client management, business development, quality review, and mentoring staff. In addition, Blaine manages national accounts involving work performed by other offices nationwide.

Blaine's career started over 25 years ago, specializing in investigation and remediation of agricultural pesticides and fertilizers. Since then, Blaine has assisted clients with a wide range of environmental needs. He has managed projects involving environmental compliance, due diligence, spill response, air quality, solid waste, and regulatory-driven site investigation and remediation of soil, groundwater, and soil vapor. In addition to understanding pesticides and fertilizers, Blaine has experience with asbestos, lead-based paint, mold, PCBs, solvents, petroleum products, and metals. Over the years, Blaine has managed projects involving dozens of staff working together on projects in multiple states. However, Blaine's expertise is most prevalent in Wisconsin where he has spent the majority of his career.

PROJECT EXPERIENCE

BANKING/DUE DILIGENCE

Multiple Clients – Multiple Locations, Wisconsin

As the due diligence authorized project reviewer (quality control) in Milwaukee, Blaine has directed performance and provided quality review for Transaction Screens, Phase I ESAs, and Limited Site Investigations for several hundreds of sites across Wisconsin. As a result of the quality of the due diligence group in Milwaukee, multiple lenders have turned to Terracon for support. Some of the larger banking clients include: JPMorgan Chase, FifthThird Bank, and BMO Harris Bank.

Professional Services Completed: Ongoing

Terracon Fees: >\$1 million

AGRICULTURAL

AgriLiance/United Cooperative – Johnson Creek, Wisconsin

Project manager for environmental site investigation and remediation at a large agricultural chemical facility. As a result of historical operations, significant quantities of herbicides and fertilizers were released to the subsurface at the facility. A large groundwater plume was identified. In response, the onsite potable well was abandoned and replaced and a groundwater extraction system with carbon absorption treatment was installed. Groundwater treatment and monitoring is ongoing due to the presence of down-gradient private and municipal water supply wells. Remediation efforts also involved soil excavation and landspreading.

Professional Services Completed: Ongoing

Project Cost: \$600,000

Terracon Fee: \$250,000

GOVERNMENT

Wisconsin Chromium – Kaukauna, Wisconsin

Performed a treatment system evaluation for an existing carbon absorption/ion exchange groundwater treatment system designed to remove solvents and chromium. Proposed improvements enhanced system performance dramatically, decreasing the required life of the system. The property is owned by Outagamie County and funded/managed by the Wisconsin Department of Natural Resources.

Professional Services Completed: 2002-2005 and 2012-2015

Project Cost: \$1.6 million

Terracon Fee: \$245,000

EDUCATION

Master of Science, Civil Engineering,
University of Minnesota, 1999

Bachelor of Science, Civil and
Environmental Engineering,
University of Wisconsin, 1991

REGISTRATIONS

Professional Engineer: Wisconsin,
No. E31505; Minnesota, No. 24803

PECFA Consultant, No. 253922

AFFILIATIONS

American Society of Civil Engineers

WORK HISTORY

Terracon Consultants, Inc., Terracon,
Office Manager, 1997-present;
Environmental Engineer, 1994-
1997; Environmental Engineer, 1992

USGS/University of Minnesota,
Hydrologist/Research Assistant,
1992-1994

Bureau of Land Management, Land
Surveyor, 1990-1991

PRESENTATIONS/PUBLISHED ARTICLES

See Endnote.¹

UTILITIES

Wisconsin Public Service – Green Bay, Wisconsin

Managed site visits, evaluated compliance status, and prepared spill prevention, control and countermeasures (SPCC) plans for substations, hydroelectric generation facilities, coal-fired plants, natural gas plants, diesel plants, a nuclear plant, warehouses, and operations facilities. Over 200 SPCC plans were generated.

Professional Services Completed: 2002

Terracon Fee: \$135,000

SOLID WASTE

Herbrand Sand and Gravel Pit – Middleton, Wisconsin

Prepared an investigative work plan to determine whether or not a former demolition landfill which had accepted paint solvents and medical waste had impacted groundwater to the extent that could necessitate active remediation. After determining the groundwater was only minimally impacted, we designed the landfill cap and implemented capping and closure of the landfill. The cap plan was coordinated with plans for surrounding development so the landfill could be repurposed as a park.

Professional Services Completed: 2014

Construction Completed: 2013

Construction Cost: \$1.4 million

Terracon Fee: \$250,000

ENERGY

Explorer Pipeline – East Caddo Creek, Texas

Researched and developed a stream bed sediment sampling plan for a large petroleum spill. More than 500,000 gallons of unleaded gasoline containing nine percent methyl tert-butyl ether (MTBE) was released to an intermittent stream bed extending approximately 28 miles to a water supply reservoir. Assessment of the stream bed sediments for the entire 28 miles was complete within seven days of initiation. Sediment sampling was repeated on affected reaches two more times. A cross-sectional sampling plan was implemented, perennial pool sampling was conducted, and monitoring wells were installed to assess the stream/groundwater interactions. The data was utilized to evaluate appropriate remedial actions for the stream bed sediments. As a result of the data obtained, active cleanup of the stream bed sediments was avoided.

Professional Services Completed: 2003

Terracon Fee: \$200,000

ⁱ Blaine R. Schroyer, P.E. M.ASCE, *Talk to a Local*, February 2014, CE News, pp. 27-28.

Engineers Remediate Land Polluted with Fertilizer, Pesticide – by Brett Hanson. Civil Engineering, Vol. 76, No. 3, March 2006. Article highlights an environmental project and innovative solution designed and permitted by Mr. Schroyer.

Schroyer, Blaine R., *Remediation of Chlorinated Pesticides using Thermal Desorption* (Presentation), presented at the State Approaches to Agricultural Cleanups, Minnesota Department of Agriculture Conference in St. Paul, Minnesota, February 18-19, 2000.

Schroyer, Blaine R., G.N. Delin, M.K. Landon, K.J. Nelson, R.B. Wanty, R.W. Healy, H.W. Olsen, J.K. Bohlke and P.D. Capel, *Hydrogeologic and Water Quality Data Used to Evaluate the Effects of Focused Recharge on Groundwater Quality Near Princeton, Minnesota, 1991-1995*. U.S. Geological Survey, Open file report 97-21.

Schroyer, Blaine R. and Paul D. Capel, *A High-Performance Liquid Chromatography-Based Screening Method for the Analysis of Atrazine, Alachlor, and Ten of Their Transformation Products* (Proceedings of American Chemical Society, 1996), pp. 34-42.

Schroyer, Blaine R., Paul D. Capel, Lin Ma, Steven J. Larson and Therese A. Gilchrist, *Analysis and Detection of the New Corn Herbicide Acetochlor in River Water and Rain*. Environmental Science and Technology, Vol. 29, No. 6, 1995.

Timothy P. Welch, P.G.

ENVIRONMENTAL DEPARTMENT MANAGER

PROFESSIONAL EXPERIENCE

Mr. Welch is a professional geologist with 25 years diverse experience in project management, environmental due diligence, site investigation and remediation of environmental projects. As Environmental Department Manager for Terracon's Milwaukee, Wisconsin office, his responsibilities include administering staff and scheduling projects covering the range of environmental services. Mr. Welch provides client development, project management, technical input, project cost management, and report review services. His technical expertise includes conducting subsurface investigations, providing hydrogeological oversight and support, preparing remedial action plans, and developing and implementing innovative remediation strategies. His primary role at Terracon is to identify client objectives; map project strategy; and develop a project scope, schedule and budget that meets client needs and, where applicable, satisfies regulatory agency requirements.

PROJECT EXPERIENCE

Village of Whitefish Bay – Whitefish Bay, Wisconsin

Managed the subsurface investigation and feasibility study of the Village's abandoned solid and hazardous waste landfill that contained chlorinated, petroleum hydrocarbon and metals contamination. Performed vapor intrusion assessment of surrounding residences and school.

Alterra Coffee Roasters – Milwaukee, Wisconsin

Developed and implemented a Remedial Action Plan (RAP) for hazardous chlorinated hydrocarbon impacted soils and groundwater, prior to construction. The remedial action consisted of the pre-treatment of soils in roll-offs with a chemical oxidant to acceptable Subtitle D landfill criteria, excavation of non-hazardous soils to below site-specific direct-contact standards, installation of a subsurface amendment distribution system, installation of sub-slab vapor monitoring points in a residence, performance of vapor and indoor air quality monitoring, and implementation of a groundwater sampling and analysis plan to document contaminant plume stability and attenuation.

Sears Holding Company – Sheboygan, Wisconsin

Performed a site investigation, developed and implemented a RAP for chlorinated and petroleum impacted soils and groundwater remediation, and prepared plans and specifications for building demolition at a former K-Mart facility. In preparation of the RAP, numerous stakeholders were involved in negotiations, including the regulator, the developer and their consultants, proposed tenants, their consultants and residents. The RAP included in-situ remediation, utilizing zero-valent iron and emulsified vegetable oil, to enhance anaerobic bioremediation of the down gradient dissolved phase chlorinated plume toward a subdivision. Implemented a groundwater sampling and analysis plan to document contaminant plume stability and attenuation.

Former Camelot Cleaners – Wausau, Wisconsin

Developed a RAP, and prepared plans and specifications for the installation of a soil vapor extraction system to address chlorinated impacted soils. The RAP included vapor intrusion assessment, and the installation of off-site groundwater monitoring wells to delineate contaminant plume extent and document contaminant attenuation.

Redevelopment Authority – Milwaukee, Wisconsin

Provided fiscal and technical program management for the Redevelopment Authority City of Milwaukee contract of Phase II Environmental Site Assessments, Subsurface Investigations, and Remediation of Brownfield projects ranging in contract value from \$5,000-\$200,000.

EDUCATION

Hydrogeology, Wright State University, Dayton, Ohio 1993-1994

Bachelor of Science, Geological Sciences, University of Wisconsin-Milwaukee, 1985

REGISTRATIONS

Professional Geologist: Wisconsin, No. 558-013

CERTIFICATIONS

40-Hour Health and Safety

8 Hour OSHA refresher training

PECFA Consultant

FRA Railroad Training and E-RAIL Safe Certified

AFFILIATIONS

American Association of Petroleum Geologists

National Ground Water Association

Wisconsin Ground Water Association

WORK HISTORY

Terracon Consultants, Inc., Environmental Department Manager, 2013-Present

Terracon Consultants, Inc., Senior Project Manager, 2010-2013

Shaw Environmental & Infrastructure, Inc., Program Manager, 2004-2010;

Giles Engineering Associates, Inc., Project Hydrogeologist/Manager, 2002-2004

Sigma Environmental Services, Inc., Project Hydrogeologist/Manager, 1989-2002

H.G. Weber – Kiel, Wisconsin

Managed the Voluntary Party Liability Exemption site investigation at the 50,000-square foot manufacturing facility. Commingled contaminant plumes were delineated beneath the building prompting a vapor intrusion assessment. The WDNR issued a Certificate of Completion, and the \$200,000 project was completed within budget and ahead of schedule.

Redi-Quick Cleaners – West Allis, Wisconsin

Managed the subsurface investigation and subsequently developed a RAP for vapor intrusion mitigation and in-situ amendment injection for chlorinated compound-impacted soils and groundwater. Installed sub-slab vapor points in three residences, performed vapor and indoor air quality monitoring of residences, completed an in-situ amendment injection, installed a vapor mitigation system, and prepared and implemented a groundwater sampling and analysis plan to document remediation effectiveness.

Caleffi-North America – Milwaukee, Wisconsin

Performed a methane study and designed a vapor mitigation system for the 35,000-square foot building in the Milwaukee River Valley. Evaluated vapor mitigation alternatives, designed, and prepared technical drawings for the installation of a passive subsurface venting system network covered by a cold-sprayed, rubberized asphaltic geomembrane.

King Drive Commons – Milwaukee, Wisconsin

Prepared and implemented a Remedial Action Plan for the City of Milwaukee-EPA Brownfield project. Characterized petroleum and chlorinated hydrocarbon contaminated soils as hazardous and non-hazardous waste streams, documented source soil excavation, prepared a soil management plan for construction, and installed a passive vapor mitigation system concurrent with construction.

Wendy's Restaurant – Chicago, Illinois

Conducted a subsurface investigation/geotechnical exploration with subsequent remedial action implementation of a vapor mitigation system to meet an aggressive construction schedule.

Coachella Elementary School District – Coachella, California

Performed a Preliminary Endangerment Assessment for the proposed West Coachella Elementary School. The risk assessment included the performance of risk/hazard calculations for chemicals of potential concern including metals, pesticides, and dioxins.

Condon Companies – Markesan, Wisconsin

Conducted a subsurface investigation and subsequent remedial action of two petroleum bulk distributors adjacent to the Del Monte Foods high capacity production well. Negotiated the first cost partitioning strategy with the Wisconsin Department of Commerce, Condon Companies, and Grand River Cooperative. Performed a pump test on the Del Monte well during production, excavated and landfilled approximately 8,800 tons of petroleum-impacted soils at three former bulk petroleum storage facilities, and implemented a groundwater sampling and analysis plan to document contaminant attenuation and dissolved phase plume stability. Performed a pump test on the Del Monte Foods high-capacity production well that pumps 2 to 2.5 million gallons of water per day during production season, and is located 200 feet down-gradient of the contaminant source. The pump test was performed to evaluate the vertical flow of groundwater relative to the dissolved phase contaminant plume during Del Monte's canning season.

Milwaukee Metropolitan Sewerage District – Milwaukee, Wisconsin

Performed rock core logging, formation permeability testing, and curtain grouting on the MMSD deep tunnel project.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

1/1/2019

5/9/2018

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 have ADDITIONAL INSURED provisions or 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: Lexington Insurance Company		19437
INSURER B: Travelers Property Casualty Co of America		25674
INSURER C: The Travelers Indemnity Company		25658
INSURER D:		
INSURER E:		
INSURER F:		

COVERAGES MAIN CERTIFICATE NUMBER: 13881552 REVISION NUMBER: XXXXXXXX

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
B	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> CONTRACTUAL LIAB <input checked="" type="checkbox"/> XCU COVERAGE GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC <input type="checkbox"/> OTHER:	N	N	TC2J-GLSA-1118L293	1/1/2018	1/1/2019	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 1,000,000 MED EXP (Any one person) \$ 25,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 \$
B	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY	N	N	TC2J-CAP-131J3858	1/1/2018	1/1/2019	COMBINED SINGLE LIMIT (Ea accident) \$ 2,000,000 BODILY INJURY (Per person) \$ XXXXXXXX BODILY INJURY (Per accident) \$ XXXXXXXX PROPERTY DAMAGE (Per accident) \$ XXXXXXXX \$ XXXXXXXX
B	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input type="checkbox"/> RETENTION \$	N	N	ZUP-91M46583 (EXCLUDES PROF. LIAB.)	1/1/2018	1/1/2019	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000 \$ XXXXXXXX
B C C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	N/A	TC2JUB131J374218 (AOS) TRKUB131J384618 (AZ,MA,WI) TC2JUB131J374218 (CA)	1/1/2018 1/1/2018 1/1/2018	1/1/2019 1/1/2019 1/1/2019	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000
A	PROFESSIONAL LIABILITY	N	N	26030216	1/1/2018	1/1/2019	\$1,000,000 EACH CLAIM & \$1,000,000 ANNUAL AGGREGATE

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
 THIS CERTIFICATE SUPERSEDES ALL PREVIOUSLY ISSUED CERTIFICATES FOR THIS HOLDER, APPLICABLE TO THE CARRIERS LISTED AND THE POLICY TERM(S) REFERENCED.
 PROOF OF COVERAGE. THE UMBRELLA LIABILITY IS FOLLOW FORM OVER THE GENERAL LIABILITY, AUTO LIABILITY, AND EMPLOYER'S LIABILITY PER THE POLICY TERMS, CONDITIONS, AND EXCLUSIONS.

CERTIFICATE HOLDER 13881552 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
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