Shaw Environmental, Inc.
111 West Pleasant Street, Suite 105
Milwaukee, WI 53212-3939
Tel: 414.291.2350
Fax: 414.291.2385

Shaw™ Shaw Environmental, Inc.

December 15, 2008

Application received 12/17/2008

Ms. Victoria Stovall
Program Assistant
Wisconsin Department of Natural Resources
2300 N. Dr. Martin Luther King Jr., Drive
Milwaukee, Wisconsin 53212-3128

Re: Redi-Quick Dry Cleaner
9508 West Greenfield Avenue
West Allis, Wisconsin
BRRTS No.: 02-41-000676 FID #241170490
Shaw Environmental Project No.: 133480

Dear Ms. Stovall:

Shaw Environmental, Inc. is submitting the following for Mr. Binyoti Amungwafor's review and approval:

- *Remedial Action Work Plan*
- Temporary Exemption Request for Remedial Action via Injection
- Permit Application for WPDES General

If you have any questions, please contact me at (414) 291-2359.

Sincerely,
SHAW ENVIRONMENTAL, INC.

Timothy P. Welch, P.G.
Project Manager

cc: Mr. Sam Gruichich

Enclosures

Shaw Environmental, Inc.
111 West Pleasant Street, Suite 105
Milwaukee, WI 53212-3939
Tel: 414.291.2350
Fax: 414.291.2385

Shaw™ Shaw Environmental, Inc.

December 10, 2008

Mr. Binyoti Amungwafor
Wisconsin Department of Natural Resources
2300 North Martin Luther King Jr. Drive
Milwaukee, Wisconsin 53212

Subject: **Temporary Exemption Request: Remedial Action via Injection**
Redi-Quick Dry Cleaners
9508 West Greenfield Avenue
West Allis, Wisconsin
BRRTS #02-41-000676
Shaw Project No. 133480

Dear Mr. Amungwafor:

The purpose of this letter is to receive Wisconsin Department of Natural Resources (WDNR) approval for the subsurface injection of an electron donor for groundwater remediation at Redi-Quick Dry Cleaners, 9508 West Greenfield Avenue, West Allis, Wisconsin site (Site). Because this process involves injecting material into the waters of the state (i.e., groundwater), the process requires a temporary exemption under Chapter NR 140.28(5) and a variance from Chapter NR 812.05 of the Wisconsin Administrative Code (WAC). On behalf of Dorothy G. Corporation, Shaw Environmental, Inc. ("Shaw") is requesting a temporary exemption and variance for groundwater remediation at the Site.

Shaw was retained by the Dorothy G. Corporation in September, 2008 to perform remediation activities associated with the chlorinated hydrocarbon contamination at the Site. Shaw presented the amendment injection strategy in the March 9, 2007 document entitled *Remedial Action Plan Proposal.* The WDNR approved of the remedial action in a letter date April 17, 2007.

PROJECT BACKGROUND

Based on information supplied by others, the Site was a dry cleaner facility from the 1950's until present. One 1,000-gallon dry cleaner solvent underground storage tank (UST) was formerly used on the Site. Although no longer in use, the UST is still located below the footprint of the facility. **Figure 1** presents the Site Location, and **Figure 2** presents the Site Plan View Map.

Prior to the late 1950s, a retail gasoline station operated on the Site. Four USTs were formerly used by the gasoline station, and included one 1,000-gallon fuel oil UST, one 260-gallon waste oil UST, and two 4,000-gallon gasoline USTs. All four petroleum USTs were removed in December 1989.

In 1990, Miller Engineers, Inc. was contracted by the owner's agent to perform a site investigation to determine the extent of petroleum contamination from the former petroleum USTs. Based on the investigation, a remedial action was performed to remove the petroleum contaminated soil. The investigation also revealed evidence of chlorinated solvent contamination.

The following is a brief chronology of recent environmental activities performed in relation to the chlorinated solvent release at the Site. Other environmental activities related to the petroleum contamination site investigation and remedial activities may have been performed. The reporting of such activities is available for further review at the WDNR.

October and November 2003

The field investigation included the installation of six soil borings at various location on- and off-site on October 24, 2003. Four of the soil borings (GP-1 through GP-4) were installed with a direct push Geoprobe® sampling device. The two remaining borings were installed using hollow-stem augers and were completed as a groundwater monitoring well (MW-21) and piezometer (PZ-20). MW-21 and PZ-20 were developed on November 17, 2003 and sampled on November 24, 2003. At the time of sampling, the depth to groundwater was approximately 9.5 feet in MW-21 and 16.4 feet below ground surface (bgs) in PZ-20.

February and March, 2005

Mr. Henry Nehls-Lowe from the Department of Health and Family Services (DHFS) performed indoor air quality monitoring at the Dauer residence (1361 N. 95th Street) and perchloroethylene (PCE) was reported at concentrations of 34 and 74 parts per billion (ppb) in air samples collected from the basement, and at concentrations of 27 and 29 ppb in samples collected from the kitchen and bedroom, respectively. The Dauer residence is located immediately north of the Site.

April 20, 2006

The WDNR approved the Shaw workplan to install a sub-slab depressurization system (VMS), and implement an Indoor Air Quality (IAQ) program for the Dauer, Pokos and Steger residences. The IAQ program consisted of three rounds of ambient air soil vapor samples being collected using 6-liter evacuated SUMMA canisters, with each canister's regulator and restrictor adjusted to draw samples over a 24 hour period. The SUMMA canisters collected during the ambient air sampling events were submitted to Test America, Inc. for analysis by gas chromatography/mass spectroscopy following EPA Method TO-14 (EPA, 1999).

May 17, 2006

An immediate action for vapor intrusion was performed in the Dauer residence in conjunction with continued vapor intrusion monitoring. Shaw retained Radon Abatement to install a sub-slab depressurization/vapor mitigation system (VMS) in the southwest corner of the Dauer basement.

June 9, 2006

Shaw purged and sampled five groundwater monitoring wells (MW-2, MW-8, MW-10, MW-11, and MW-12) and two piezometers (PZ-10 and PZ-20) using low-flow sampling technique. The collected groundwater samples were submitted to Test America for VOC (EPA Method SW846 8260B), nitrate/nitrite as nitrogen (EPA Method 353.2), sulfate (EPA Method 300.0), and dissolved iron (EPA Method 236.1) laboratory analysis.

June 20-21, 2006

The first round of IAQ monitoring program took place in the Dauer basement, the Steger basement and living room, and the Pokos basement and living room.

June 22-23, 2006

Shaw performed supplementary subsurface investigation activities. The subsurface investigation consisted of advancing nine Geoprobe® soil borings (designated as Geoprobe® boring numbers P-1 through P-9) and collecting soil samples at respective locations and depths. The nine Geoprobe® soil borings (P-1 through P-9) were advanced to depths of 12 to 20 feet bgs. Geoprobe® borings P-1, P-2, P-3, P-6, P-7 and P-8 were advanced in the driveway of the Dauer residence (1361 South 95th Street). Geoprobe® borings P-4 and P-5 were advanced in the driveway of the Pokos residence (1349 South 95th Street), and Geoprobe® boring P-9 was advanced in the driveway of the Steger residence (1356 South 95th Street).

July 31, 2006

Shaw performed the second round of IAQ monitoring in the Dauer basement, and a background outdoor air sample was collected from the Dauer porch.

January 23, 2007

Shaw performed the third round of IAQ monitoring in the Dauer basement and background outdoor air from the porch, the Steger basement and living room, and the Pokos basement and living room. A Sub-slab soil vapor sample was also collected.

Soil Impacts

Soil samples collected from previous boring SB-3 and from P-2, P-3, P-6, and P-8 are all in exceedence of the WDNR hazardous waste "contained out" concentration levels for tetrachloroethene PCE (33,000 ppb). PCE concentration ranged from 29,000 to 1,900,000 ppb in soil from beneath for Dauer driveway (1361 South 95th Street).

TCLP analysis indicates that the soil samples collected from P-2, P-3, P-6, P-7, and P-8 are in exceedence of the 40 CFR 261.42 Table 1 value for PCE; therefore, if removed from the Site or from the subsurface and stockpiled on-site, these soils would be classified as a hazardous waste.

Figure 2 presents the Site Plan View, and **Figure 3** presents the Sectional View of the soil borings located along the former Dauer residence driveway. **Figure 3** depicts the PID field screening; laboratory analytical results; approximate location of the abandoned solvent UST, and the approximate extent of the Dauer basement in relation to the contaminated soils.

Groundwater Impacts

The extent of the dissolved phase chlorinated VOC (CVOC) plume is defined. The CVOC plume measures approximately 90 feet west-east and approximately 70 feet north-south, and extends off-site to the north and east, beneath South 95th Street.

The PCE detected in the most recent sampling round in MW-2, MW-10, MW-12, PZ-10 and PZ-20 is considered the "source" product. The common degradation pathway for PCE is reductive dechlorination to trichloroethylene (TCE), cis-1, 2-DCE (and less commonly trans-1, 2-DCE and 1, 1-DCE), vinyl chloride, and finally ethane. These subsequent compounds are considered "break-down" compounds and their presence indicates that the source product is degrading over time (WDNR PUB-RR-699, April 2003). TCE, cis-1, 2-DCE and vinyl chloride are present in MW-2 and MW-10, while TCE alone is detected in PZ-20. There were no detectable concentrations of source or breakdown compounds in MW-8 or MW-11.

Based on the results of the geochemical parameter analysis, the temperature and pH levels are optimal for reductive dechlorination. The low levels of dissolved oxygen in MW-2, MW-8, and MW-11 and the lower values of nitrate (less than 1 mg/L) in all wells except MW-10 indicate favorable conditions for reductive dechlorination. Although these results indicate that reductive dechlorination is occurring, multiple sampling events will better determine a trend in each groundwater monitoring well.

PROPOSED REMEDIAL ACTION

The proposed remedial strategy to address the soil and groundwater impacts identified at the Site includes the installation of an electron donor formulation injection system to enhance in-situ biodegradation of chlorinated solvents, using vertically installed, direct push Geoprobe® temporary injection points. The injection strategy is designed to enhance reductive dechlorination by injecting a carbon source into the groundwater. The carbon source that will be injected is a formulation solution consisting of natural food-grade soybean oil, sodium lactate and food grade additives (Newman Zone®). Newman Zone® is similar to HRC and carbohydrates (molasses); however, the formulation provides both a rapidly utilized electron donor and a slow release, long term electron donor. The proposed injection point locations are presented on **Figure 4**. A description of the Remedial Action is presented below.

Description of Remedial Action

The approved Remedial Action for the Site includes the following:

1. Install one groundwater monitoring well (MW-14) in former Dauer driveway between soil boring locations P-6 and P-7.

2. Perform baseline groundwater sampling of the groundwater monitoring well/piezometer network prior to pilot test amendment injection.

3. Perform an amendment injection pilot test, utilizing four (4) Geoprobe® injection points within the most highly impacted zone of the aquifer.

4. Initiate performance groundwater monitoring on select groundwater monitoring wells monthly for a three month period after pilot test amendment injection. The WDNR R&R project manager will be consulted on pilot test results prior to the initiation of full scale amendment injection.

5. Initiate full scale amendment injection of Newman Zone® formulation, which is a dilute natural food-grade, emulsified edible oil solution

6. Perform a post injection quarterly monitoring program to evaluate the progress of remediation, and document contaminant attenuation.

These remedial activities are presented in the Shaw document entitled *Remedial Action Plan,* dated March 9, 2007, which was approved by the WDNR and is discussed in detail below.

Groundwater Monitoring Well Installation

A 20-foot, 2-inch diameter PVC groundwater monitoring well will be installed in the former Dauer driveway, between soil borings P-6 and P-7. This location differs from the location proposed in the March 9, 2007 *Remedial Action Plan Proposal* for several reasons. First, Ms. Dauer had objected to a groundwater monitoring well being installed in her driveway; however, Ms. Dauer sold her property to Redi-Quick, so location is no longer an issue. Secondly, PCE soil concentrations in borings P-3, P-6 and P-7 are 1,900,000; 1,000,000 and 29,000 ppb, respectively. The high PCE concentrations are close to soil saturation capacities; therefore, there is a concern that dense non-aqueous phase product (DNAPL) may be present in groundwater in this area. Finally, a Shelby Tube can be pushed during boring advancement, and soil be tested for microbes, nutrients and physical soil properties testing to enhance full scale amendment injection.

Baseline Groundwater Monitoring

Prior to pilot test amendment injection, groundwater samples will be collected from the eight existing monitoring wells (MW-2, MW-8, MW-10, MW-11, MW-12, MW-13, PZ-10 and PZ-20). Also, groundwater will be collected from the newly installed MW-14.

Groundwater will be submitted for VOC, sulfate, nitrate-nitrite, ferrous iron and total organic compound laboratory analysis.

Pilot Testing

In order to demonstrate the efficacy of the proposed technology, a pilot scale in-situ enhanced bioremediation study will be conducted in the contaminated portion of the unconfined aquifer at the Site. The pilot test will entail the injection of Newman Zone® electron donor formulation. Newman Zone® provides both a rapidly utilized electron donor and a slow release, long term electron donor. The formulation will be injected into the most contaminated portion of the aquifer (adjacent to groundwater monitoring well MW-14), followed by performance groundwater monitoring for VOCs and geochemical parameters.

The conceptual design of the pilot test entails the installation of four (4) 2-inch direct push, injection points. The injection wells will be installed in a 10 foot grid pattern (5 foot radius of influence) around groundwater monitoring well MW-14. The proposed location of the pilot test is the chlorinated contaminant plume hot spot, in order to test the efficacy of the technology on the highest levels of contamination. The formulation will be injected into the four (4) injection points at a diluted concentration, and allowed to disperse across the plume via ambient groundwater flow.

The target in-situ concentration of formulation will be calculated using site-specific chemical and geochemical parameters. Sufficient formulation will be added to provide an adequate supply of organic carbon to consume competing electron acceptors, provide reducing equivalents for the reductive dechlorination of the chlorinated solvents, and establish anaerobic, methanogenic conditions that favor the complete dechlorination of PCE and its daughter products to ethene.

Groundwater Performance Monitoring

To document the effectiveness of the formulation pilot test injection, post-injection data will be compared to the baseline levels for evidence of CVOC reduction and overall attainment of the pilot study objectives.

Post-injection groundwater monitoring will be conducted from MW-12 and MW-14 on a monthly basis, for a period of three months, starting at one month post-injection. Although this timeframe is sufficient to meet the objectives of the pilot study, additional sampling would be required to determine the overall longevity of the formulation, and the permanency of the treatment.

Groundwater samples will be collected using low-flow sampling techniques and analyzed in the field for the standard purge parameters (dissolved oxygen, oxidation-reduction potential, temperature, pH, turbidity, and specific conductivity). Groundwater samples will also be shipped off-site to a laboratory for analysis of VOCs, sulfate, nitrate, ferrous iron and total organic carbon and metabolic acids. The metabolic acids, which are monitored to track the distribution and biodegradation of the emulsified oil substrate include, acetic, butanoic, formic, lactic, propionic, pyruvic, and valeric acids. Significant decreases in VOCs concentrations are expected to occur over two to three months. Dissolved oxygen, nitrate, and sulfate concentrations are expected to

decrease as reducing conditions are established in the subsurface, while concentrations of ferrous iron, total organic carbon, and methane are expected to increase.

Upon completion of the post-injection groundwater monitoring program, Shaw will submit data tables, maps and recommendations to proceed with the full scale formulation injection on the Site.

Full Scale Amendment Injection: Groundwater Treatment

The groundwater treatment system will include the advancement of direct push soil borings and/or the construction of temporary injections points at the Dauer residence driveway and within the Redi-Quick building interior. **Figure 4** illustrates the proposed temporary injection point locations. The groundwater treatment system will consist of a series of vertical pipes (temporary injection points) surrounded by a clean porous filter media. The vertical piping will be perforated to allow for the exfiltration of injected fluids. The vertical perforated piping will be accessible at the ground surface by risers that are contained in a flush-mount man way. A bentonite seal will be placed at a depth of 1 to 3 feet bgs to eliminate the potential for migration of surface runoff or spills to enter the subsurface. The injection risers will be equipped with caps that can be locked to restrict unauthorized injections. All piping used in the construction of the treatment system will be high-density polyethylene pipe. The vertical piping will be installed beneath the groundwater surface (approximately 8 feet bgs) at a depth of approximately 20 feet bgs. Alternatively, the amendment will be injected directly into the subsurface through the direct push rods, utilizing the approved grid pattern.

Amendment Application

Following groundwater treatment system installation, a diluted, natural food-grade soybean oil\sodium lactate formulation (Newman Zone®) will be pumped through the perforated injection piping and surrounding porous media. A permanent loading injection system will not be installed; instead the one-time injection will be completed using a portable plastic tank and pump brought to the Site for each injection. The actual volume of the formulation (Newman Zone®) solution injected will be determined based on measurements of total organic carbon (TOC), oxidation-reduction potential, and/or metabolic acid analysis, and the results of the pilot test.

The emulsified oil will be injected in-line with water from the water tank. One of two pumps will be used to deliver the appropriate amount of water from the water tank to the injection system components. A second pump will be used to meter the required amount of emulsified oil and water and deliver it to the subsurface using the direct push rods. The emulsified oil demand was calculated by RNAS, the supplier of Newman Zone® amendment.

Unfortunately, calculating the quantity of emulsified oil is not exactly straightforward. Approximately 8,400 pounds of Newman Zone® is recommended to be injected beneath the former Dauer drive, Redi-Quick building and south and east sides of the building using the

injection grid depicted on **Figure 4**. The quantity per injection point can be refined after review of pilot testing the four injection points. For this application, a 4:1 dilution of water Newman Zone® formulation will be utilized. This one-time application will be a total fluid volume of approximately 11,000 gallons of water/Newman Zone® amendment.

The amount of formulation should provide sufficient carbon to the contaminated areas to induce anaerobic biodegradation of PCE and TCE within both the treatment area to form the innocuous product ethene.

The selected method to deliver the formulation into the subsurface is to inject the material through direct push rods using hydraulic equipment. This approach aids distribution by spreading the source material. For optimum results, the installation of the amendments should span the entire vertical contaminated saturated thickness.

Groundwater Performance Monitoring

To document the effectiveness of the formulation pilot test injection, post-injection data will be compared to the baseline levels for evidence of CVOC reduction and overall attainment of the pilot study objectives.

Post-injection performance monitoring will be conducted quarterly for one year to evaluate the effectiveness of the emulsified oil injection and it contribution to the reduction of CVOCs.

Groundwater from ten groundwater sampling point (MW-2, MW-4, MW-8, MW-10, MW-11, MW-12, MW-13, MW-14, MW-21, and PZ-10) and a duplicated sample will be collected. The groundwater samples will be collected using low-flow sampling techniques and analyzed in the field for the standard purge parameters (dissolved oxygen, oxidation-reduction potential, temperature, pH, turbidity, and specific conductivity). All groundwater samples will be submitted for VOC, sulfate, nitrate-nitrite, methane, ethane, and ethene laboratory analysis.

If contaminant concentrations do not decrease to below WAC NR 140 Groundwater Enforcement Standards, Shaw may petition the WDNR to perform another amendment injection which may include bioaugmentation.

EXEMPTION REQUEST

Chapter NR 140.28(5) identifies prerequisites and criteria for granting a temporary exemption when infiltration or injection is utilized for a remedial action. The following sections provide information required by Paragraphs NR 140.28(5)(c) and (d).

NR 140.28(5)(c) – Exemption Prerequisites

This section addresses the exemption prerequisites listed in Paragraphs 1 through 6 of NR 140.28(5)(c):

1. Reasonable Period of Time: This prerequisite requires the remedial action to achieve the applicable response objectives required by NR 140.24(2) (compliance with Preventive Action Limits) or NR 140.26(2) (compliance with Enforcement Standards) within a reasonable period of time. The remedial strategy being implemented at the Site should produce a significant reduction in dissolved constituent concentrations. The time frame for active groundwater remediation is anticipated to be approximately 1-2 years.

   Chapter NR 722.07(4)(a) provides criteria for determining restoration time frames. The expected time frame needed to achieve necessary restoration is generally related to the presence of receptors and contaminant mobility. As there are no potential receptors of impacted groundwater present at the Site and the extent of impacted groundwater appears to be stable based on available data, the remedial time frame appears reasonable. Groundwater sampling will also be conducted during the remediation to further assess plume stability and document contaminant attenuation.

2. Minimization of Injected Remedial Material: A one-time application of an amendment solution, a natural, food-grade emulsified soy bean oil (Newman Zone®) will be injected via temporary injection points. After one year of quarterly groundwater monitoring is completed, an assessment will be made to determine if another amendment application is needed.

3. Impacts to Public Health or Welfare: The amendment solution, prepared from potable water and Newman Zone® formulation, does not represent a threat to public health or welfare. The reductive dechlorination of TCE does form vinyl chloride; however, vinyl chloride in turn degrades to ethene, carbon dioxide, and water. A site specific health and safety plan will be prepared to address exposure during the implementation process. The shallow groundwater in this area is not used for human consumption and no receptors have been identified; therefore, there is no threat to public health or welfare. Also, a vapor mitigation system is operating in the former Dauer residence; therefore, vapor accumulation during injection is not an issue.

4. Presence of Floating Non-Aqueous Phase Liquid: Light, non-aqueous phase liquid (LNAPL) was not observed during the investigation. Therefore, this prerequisite is not applicable.

5. Expansion of Groundwater Contamination: The injection process will only occur in the area of known or suspected impacted groundwater. The proposed injection methodology will introduce volumes of Newman Zone® formulation into the impacted area of the aquifer. During the injection event, up to 11,000 gallons of water and 8,400 pounds of formulation is proposed to be injected.

   As a result of low injection volumes compared to the total volume of water being treated, the remedial process is not anticipated to create mounding of the groundwater table or have a significant effect on groundwater flow. Monitoring well water levels will be measured during

groundwater monitoring events to evaluate site groundwater flow patterns and identify changes that could be associated with the injection events.

6. Other Permits and Licenses: A variance from the WDNR under Section NR 812.05 is required and is addressed below. The application for a Wisconsin Pollutant Discharge Elimination System (WPDES) permit has been submitted to the WDNR under separate cover.

NR 140.28(5)(d) – Remedial Action Design, Operation and Monitoring Criteria

This section addresses the design, operation and monitoring criteria listed in Paragraphs 1 through 5 of NR 140.28(5)(d):

1. Design, Operation, and Monitoring Procedures: Procedures will be established to comply with NR 140.28(5)(c) and (d). As previously described, Newman Zone® formulation will be injected into the aquifer via vertically installed, perforated, temporary injection piping or directly through the drill rod. The pilot test injection treatment zone will be present near groundwater monitoring well MW-14, (**Figure 4**). The treatment zone will contain 4 injection points spaced 10-foot on center. The depth of the injection points will be approximately 20 feet bgs.

   The one-time injection will distribute the formulation in the impacted groundwater source area. A groundwater monitoring program will be implemented to evaluate the progress of remediation. VOC results will provide an indication of the rate of biodegradation, contraction or expansion of the dissolved plume, and constituent concentration relative to Chapter NR 140 Enforcement Standards. Water level data will be used to evaluate the remedial process' effect, if any, on groundwater flow. Natural attenuation indicator data (including organic carbon, DO and ORP) will be used to evaluate biological conditions.

   Reporting of the monitoring well results will be conducted in accordance with Chapter NR 724 of the WAC. A completed WDNR Form 4400-194 will be submitted to the WDNR on an annual basis.

2. Pre-Treatment of Contaminated Groundwater: The remedial system will utilize a solution of potable water and Newman Zone® formulation. Groundwater from the Site will not be extracted, reinfiltrated, or reinjected. Therefore, this criterion is not applicable.

3. Remedial Material Proposed for Injection: A 4:1 solution of potable water and Newman Zone® formulation will be used as the amendment/remedial material at the Site. A MSDS for Newman Zone® is included in **Attachment A**.

4. Volume and Rate of Injection: Up to 11,000 gallons of the diluted Newman Zone® formulation may be introduced into the aquifer via the vertical perforated injection points at a rate of 10 to 15 gallons per minute during each injection event.

5. Locations of Injection: **Figure 4** illustrates the proposed injection locations for the groundwater remediation process.

VARIANCE REQUEST

NR 812.05 – Disposal of Pollutants; Injection Prohibition

Based on NR 812.05, "the use of any well, drillhole or water system for the placement of any waste, surface or subsurface water or any substance, as defined in s. 160.01 (8), Stats., underground is prohibited unless… the placement is a department-approved activity necessary for… the remediation of contaminated soil, groundwater or an aquifer".

Since the injection of Newman Zone® formulation at the Site is a department-approved activity necessary for the remediation of contaminated groundwater, a variance under NR 812.05 is requested for this process.

CLOSING

Shaw appreciates your assistance with this application. Should you have any questions regarding this information please contact us at (414) 291-2359.

Sincerely,
SHAW ENVIRONMENTAL, INC.

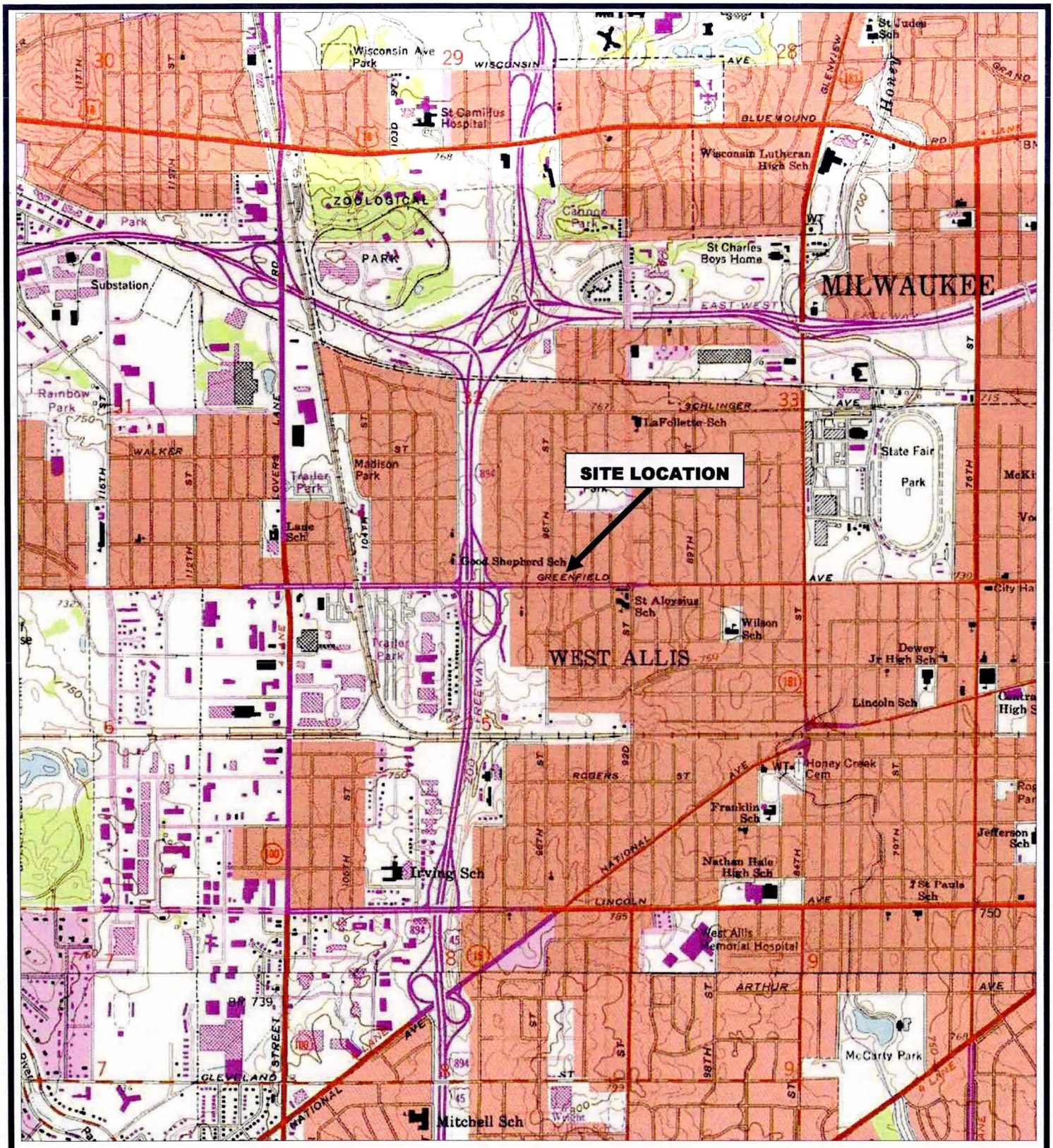
Timothy P. Welch, P.G.
Program Manager

Enclosures: Figure 1 – Site Location Map
Figure 2 – Site Plan View Map
Figure 3 – Sectional View A – A' Former Dauer Residence Driveway
Figure 4 – Proposed Injection Point and Monitoring Well Location Map

Attachment A – MSDS: Newman Zone®

cc: Mr. Sam Gruichich, Dorothy G. Corporation
Mr. Carl Sinderbrand, Axely Brynelson

FIGURES



Source: USGS *Wauwatosa, Wisconsin* 7.5-minute Series (topographic) Quadrangle Map
Scale: 1:24,000
Contour Interval: 10 feet

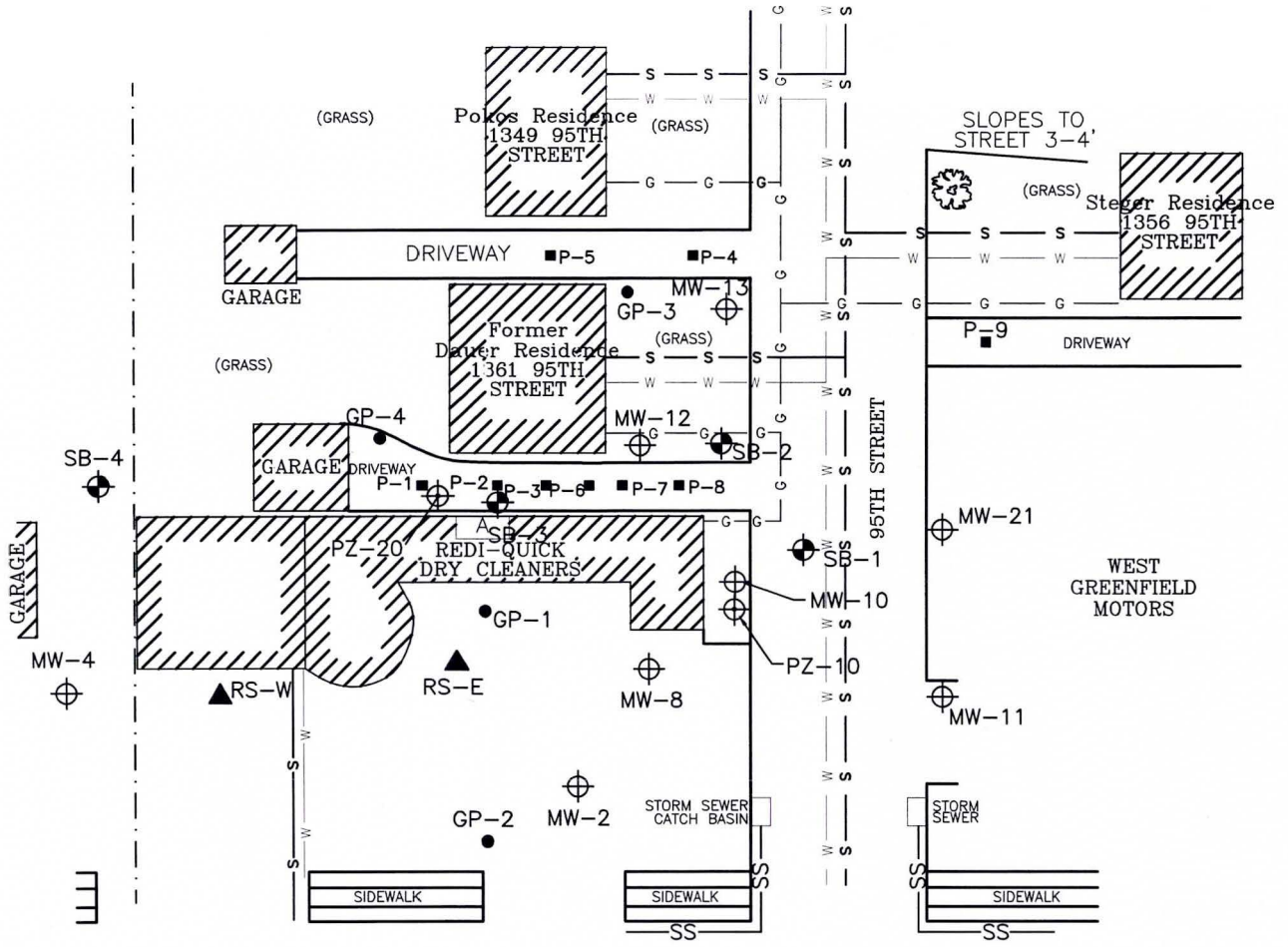
N

Shaw

Project No. 121814-01

Redi-Quick Dry Cleaners Site
9805 West Greenfield Avenue
West Allis, Wisconsin

Figure 1
Site Location Map



WEST GREENFIELD AVENUE

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- FORMER UNDERGROUND STORAGE TANK (UST)
- MONITORING WELL
- TEST BORING, DRILLED 5/19/99 BY JJS & ASSOCIATES
- PIEZOMETER
- RECOVERY SUMP
- GEOPROBE BORING
- PROBE
- —W— WATER LINE
- —S— SEWER LINE
- —G— GAS LINE

TANK KEY

A 1,000-GALLON DRY CLEANER SOLVENT UST (NO LONGER IN USE)

APPROXIMATE SCALE IN FEET

0 20 40 60

N

Shaw® The Shaw Group, Inc.®

Shaw Environmental, Inc.
111 W. Pleasant St. Suite 105
Milwaukee, Wisconsin 53212-3939
(414) 291-2350

TITLE: **SITE PLAN VIEW MAP**

CLIENT: **Redi-Quick Dry Cleaners**

LOCATION: **Redi-Quick Dry Cleaners Site**
9508 West Greenfield Avenue
West Allis, Wisconsin

DRWN	CHKD	REVD BY	APPRVD BY	PROJECT NO.	FIGURE NO.
BEB	HAW	BEB	-	133480	2
		REVISION DATE 12/04/08		DATE 11-05-08	

File: Q:\Projects\100000\133480 (Redi-Quik)\CAD\133480-02.dwg Layout: FIG 2 (A) User: bruce.benoit Dec 10, 2008 - 3:00pm

LEGEND

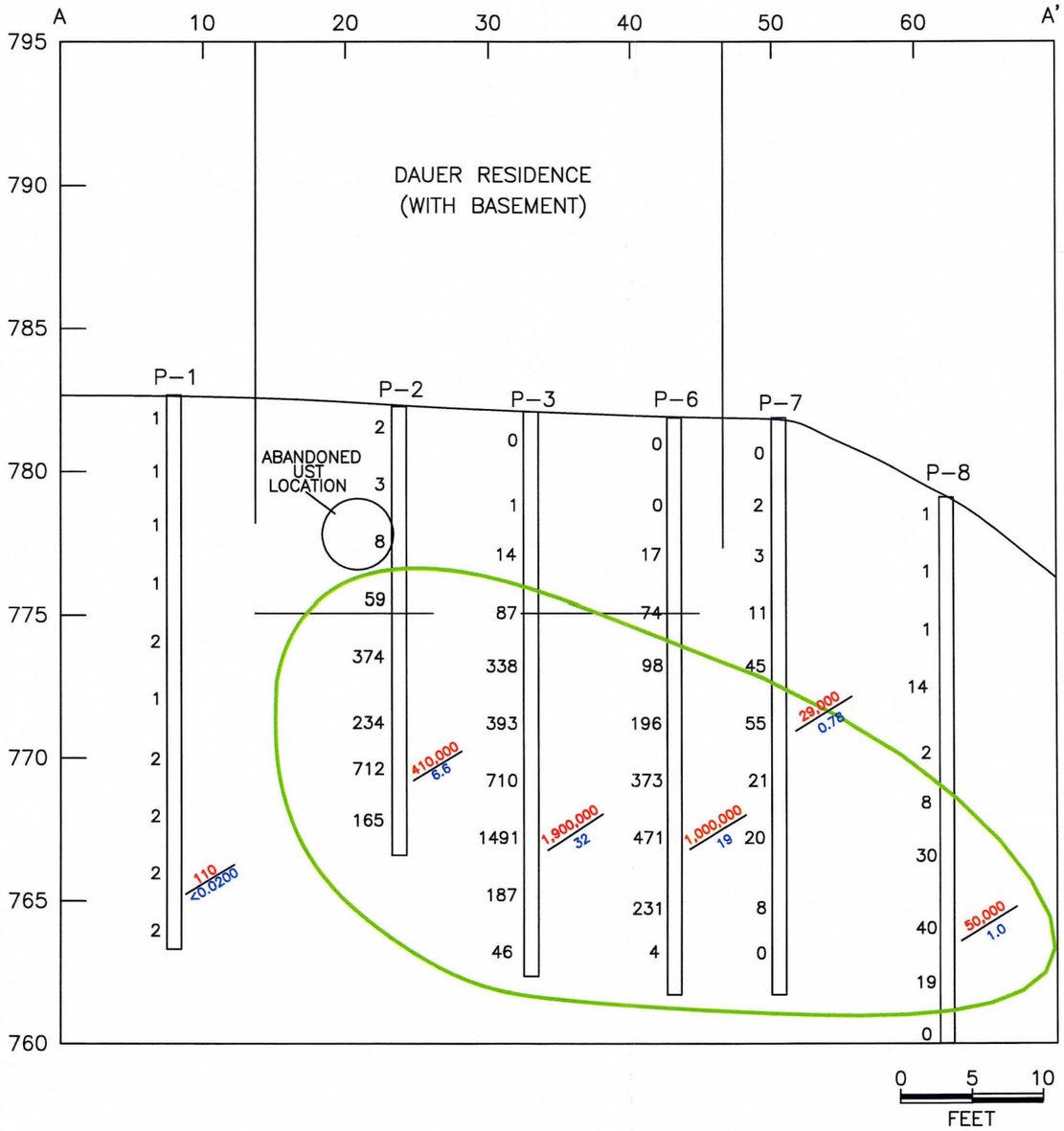
50,000 / 1.0 = PCE CONCENTRATIONS (TOTAL (µG/KG) / TCLP (MG/L))

2 ‖ = PID READING

——— = APPROXIMATE BASEMENT LOCATION ASSUMING HEIGHT OF 8' WITH 1' ABOVE GROUND

——— = ASSUMED PCE TANK LOCATION BASED ON 1,000 GAL UST LOCATED 3' BELOW GROUND

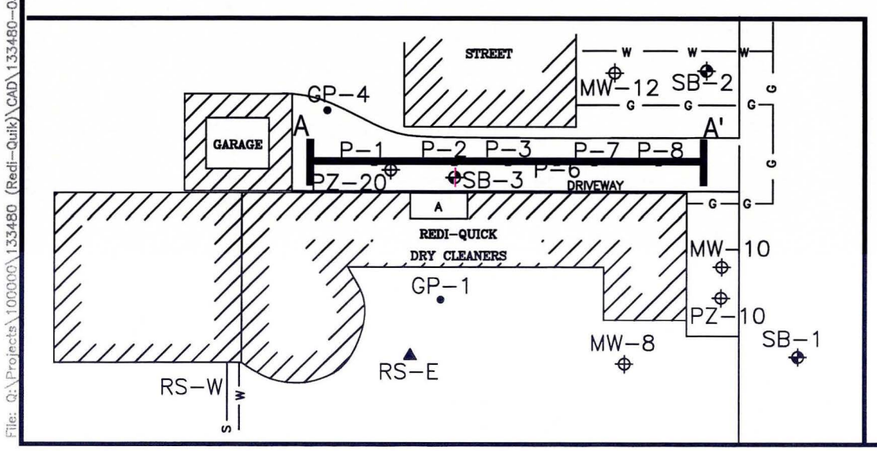
——— = APPROXIMATE EXTENT OF SOIL CONSIDERED HAZARDOUS WASTE



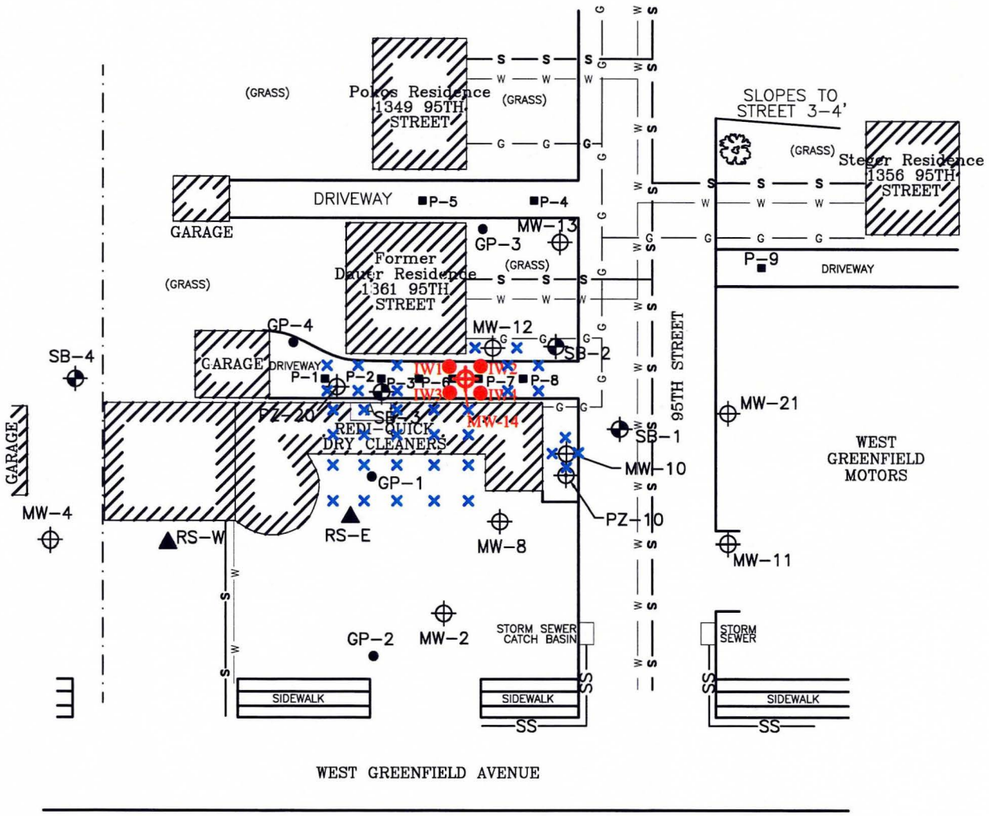
N

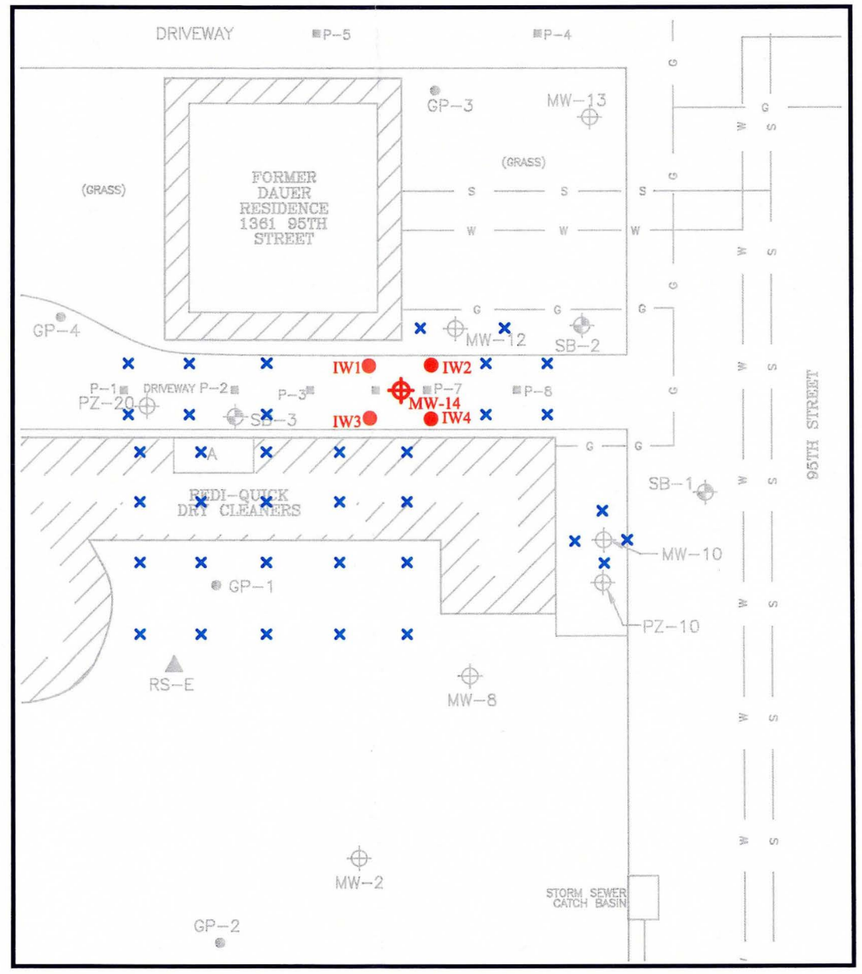
SECTIONAL VIEW LOCATION MAP

NOT TO SCALE



Shaw® The Shaw Group, Inc.®	Shaw Environmental, Inc. 111 W. Pleasant St. Suite 105 Milwaukee, Wisconsin 53212-3939 (414) 291-2350	TITLE	**SECTIONAL VIEW A - A'** **FORMER DAUER RESIDENCE** **DRIVEWAY**
CLIENT	**Redi-Quick Dry Cleaners**		
LOCATION	**Redi-Quick Dry Cleaners Site** 9508 West Greenfield Avenue West Allis, Wisconsin	DRWN: BEB; CHKD: HAW; REVD BY: BEB; APPRVD BY: -; PROJECT NO.: 133480; FIGURE NO.: 3; REVISION DATE: 12/04/08; DATE: 11-05-08	





EXPLODED VIEW
SCALE 1" = 20'

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- FORMER UNDERGROUND STORAGE TANK (UST)
- MONITORING WELL
- TEST BORING, DRILLED 5/19/99 BY JJS & ASSOCIATES
- PIEZOMETER
- RECOVERY SUMP
- GEOPROBE BORING
- PROBE
- WATER LINE
- SEWER LINE
- GAS LINE
- MW PROPOSED MONITORING WELL
- IW PROPOSED TEMPORARY INJECTION WELL (PILOT TEST)
- PROPOSED TEMPORARY INJECTION WELL (FULL SCALE INJECTION)

TANK KEY

A 1,000-GALLON DRY CLEANER SOLVENT UST (NO LONGER IN USE)

APPROXIMATE SCALE IN FEET
0 20 40 60

N

Shaw The Shaw Group, Inc.®

Shaw Environmental, Inc.
111 W. Pleasant St. Suite 105
Milwaukee, Wisconsin 53212-3939
(414) 291-2350

CLIENT: Redi-Quick Dry Cleaners

LOCATION: Redi-Quick Dry Cleaners Site
9508 West Greenfield Avenue
West Allis, Wisconsin

TITLE
PROPOSED INJECTION POINT AND MONITORING WELL LOCATION MAP

DRWN	CHKD	REVD BY	APPRVD BY	PROJECT NO.	FIGURE NO.
BEB	HAW	BEB	-	133480	4
		REVISION DATE 12-5-08		DATE 11-05-08	

ATTACHMENT A
MSDS: Newman Zone®

RNAS
REMEDIATION & NATURAL ATTENUATION SERVICES, INC.
Innovative Remediation Products and Services

RNAS Home»
Newman Zone Emulsified Vegetable Oil (EVO)»
Neutral Zone Insoluble Colloidal Buffer»
O_2Zone Oxygenation System»
Rental Injection Equipment for Newman Zone and Neutral Zone»
Search
Product Description»
Enhanced Anaerobic Bioremediation»
Injecting Newman Zone»
Patents, Presentations, and References»
Advantages of Newman Zone
Frequently Asked Questions
Product Ingredients
Physical Properties
Newman Zone Formulations
Packaging Options
Prices
MSDS & Spill Response

PRODUCT INGREDIENTS (MORE)

Sodium Lactate – the Fast Release Electron Donor

Newman Zone® contains 4% sodium lactate by weight or 40,000 mg/L (31,880 mg/L lactate). Newman Zone® is normally diluted by a factor of 10 to 100 prior to injection, which results in a concentration of sodium lactate that ranges from 400 to 4,000 mg/L. Lactate releases approximately 45 grams of hydrogen per kilogram of lactate. The lactate in Newman Zone® contains 1.8 grams of hydrogen per kilogram of Newman Zone® or about 3.3% of the total available hydrogen equivalents.

Vegetable Oil – the Slow Release Electron Donor

Newman Zone® contains 50% vegetable oil by volume or 46% by weight (460,000 mg/L of vegetable oil). In most cases the vegetable oil is soybean oil although other vegetable oils such as canola oil may be used for overseas production if desired. Vegetable oil releases approximately 115 grams of hydrogen per kilogram when it ferments to hydrogen and acetic acid. The vegetable oil in each kilogram of Newman Zone® contains more than 52.9 grams of hydrogen, or about 96.7% of the total available hydrogen equivalents.

Food Grade Additives and Stabilizing Agents

All food additives have their strengths and weakness and no single surfactant or additive can produce optimal results in a wide range of conditions. The proprietary blend of surfactants in Newman Zone® creates a stable emulsion over a wide range of pH, temperature, water hardness, and dissolved salt concentrations.

An emulsified vegetable oil (EVO) that uses a single surfactant such as lecithin becomes vulnerable to failure from hard water, high or low pH, high sodium concentrations, and premature adsorption onto soil particles. Some practitioners have chosen to compensate for the weakness of a single surfactant by providing emulsions with site-specific surfactants, by pre-treatment and post-treatment solutions, etc. Bench scale testing and multiple-step injections greatly add to the cost and complexity of such methods. By using better surfactant science Newman Zone® remains stable in a wide variety of environments and allows for a simple one-step injection.

Hydrogen Produced by Fermentation Reactions of Commo

Substrate	Molecular Formula	Molecular Weight (gm/mole)
Lactate (Lactic Acid)	$C_3H_6O_3$	90.1
Acetate (Acetic Acid)	C_2H_4O	44.1
Butyrate (Butyric Acid)	$C_4H_8O_2$	88.1
Ethanol	C_2H_6O	46.1
Methanol	CH_4O	32.0
Refined Sugars (Fructose)	$C_6H_{12}O_6$	180
Complex Sugars (Sucrose)	$C_{12}H_{22}O_{11}$	342
Hydrogen Release Compound®	$C_{39}H_{56}O_{39}$	956
Linoleic Acid (Soybean Oil, Corn Oil, Cotton Oil)	$C_{18}H_{32}O_2$	281

Hydrogen Content for Common Organic Substra

Substrate	Molecular Formula
Lactate (Lactic Acid)	$C_3H_6O_3$
Acetate (Acetic Acid)	C_2H_4O
Butyrate (Butyric Acid)	$C_4H_8O_2$
Ethanol	C_2H_6O
Methanol	CH_4O
Refined Sugars (Fructose)	$C_6H_{12}O_6$
Complex Sugars (Sucrose)	$C_{12}H_{22}O_{11}$
Hydrogen Release Compound®	$C_{39}H_{56}O_{39}$
Linoleic Acid (Soybean Oil, Corn Oil, Cotton Oil)	$C_{18}H_{32}O_2$

6712 West River Road, Brooklyn Center, MN 55430 | 763.585.6191

Remediation and Natural Attenuation Services Incorporated
6712 West River Road
Brooklyn Center, MN 55430

Product Information: 763-585-6191 Issue Date: December 7, 2007

==========

Section 1: IDENTIFICATION

1.1 Product Name: Newman Zone -Nonionic Formulation 190-6725
1.2 Product Type: Edible Industrial Nutrient for Microbial Organisms
1.3 Hazard Rating: Health: 1 Fire: 1 Reactivity: 1
1.4 Formula: Proprietary

Substances Subject to SARA 313 Reporting Are Indicated by "#"

It is our opinion that the above named product does not meet the definition of "hazardous Chemical" as defined in the OSHA "Hazard Communication Standard" regulation 29 CFR 1910.1200. This material Safety Data Sheet is provided as general information for health and safety guidelines.

==========

Section 2: INGREDIENTS/COMPOSITION

	CAS No.	%	PEL	(mg/m^3) TWA
Soybean Oil (food grade)	8001-22-7	46	15(Mist)	10(Mist)
Sodium-L-Lactate	867-56-1	4		
Food Additives/Emulsifiers/Preservatives	(Proprietary)	<10		
Water		<45		

EMERGENCY ONLY, 24-HOUR SERVICE: CHEMTREC: 1-800-424-9300

==========

Section 3: PHYSICAL AND CHEMICAL CHARACTERISTICS

This section completed per formulation ingredient data unless stated.

- Solubility: Dispersible in water (product)
- PH: 6.5 (product)
- Specific Gravity: 0.99 (product)
- Boiling Point: NA
- Vapor Pressure: NA
- Vapor Density: NA
- Percent Volatile By Volume (%): NA
- Evaporation Rate: NA
- Viscosity: 23.6 cps @ 68°F (Brookfield)(product)
- Product Appearance and Odor: White opaque liquid, vegetable oil odor.

==========

Section 4: FIRE AND EXPLOSION HAZARDS

This section completed per formulation ingredient data unless stated.

4.1 Special Fire Hazards: Product - none, does not support combustion.

Flash Point: >540 degrees F (Pure Soybean Oil Closed Cup).
Flammable Limits
LEL ND
UEL ND

4.2 Fire Fighting Methods: Use method appropriate for surrounding fire.

4.3 Extinguishing Media: Dry Chemical or CO_2 Preferable; water may cause spattering or spreading.

==========

Section 5: HEALTH HAZARD DATA

5.1 THIS PRODUCT IS USED FOR SOIL AND GROUND WATER REMEDIATION BUT IS FORMULATED USING FOOD AND FOOD GRADE ADDITIVES. PROCESSING, PACKAGING, SANITATION AND STORAGE OF THE PRODUCT FOLLOWS THE BEST PRACTICES USED FOR FOOD PRODUCTS.

5.2 Effects of Overexposure: NA

5.3 Emergency and First Aid Procedures: If inhaled, remove from contaminated atmosphere. For eye contact immediately flush eyes with large amounts of water. Ensure rinsing entire surface of eye & under lid. For skin contact wash affected areas thoroughly with soap and water. Seek medical help for persistent irritation.

5.4 Hydrolyzed soy protein has been identified by the United States Food and Drug Administration as a food allergen. Symptoms include swelling of the lips, stomach cramps, vomiting, diarrhea, skin hives, rashes, eczema and breathing problems.

5.5 Occupational Exposure Limits [8-hour time weighted averages (TWA)]:

	CAS No.	mg/m^3 OSHA PEL/ACGIH TLV
Soybean Oil (food grade)	8001-22-7	15(Mist)/10(Mist)

==========

Section 6: REACTIVITY DATA

This section completed per formulation ingredient data unless stated.

6.1 Stability: Stable under normal conditions.

6.2 Conditions to Avoid: NA

6.3 Incompatibilities: None known

6.4 Hazardous Decomposition Products: Product - None identified. Ingredients - Carbon oxides. Biological decomposition (spoilage) may result in offensive odors.

6.5 Hazardous Polymerization; None known

==========

Section 7: SPILL OR LEAK PROCEDURES

This section completed per formulation ingredient data unless stated.

7.1 Spill Response: Water dispersible. Same as for vegetable oil spills: isolate spill, prevent from entering waterways, and sewer systems. Sorb or remove spilled materials as soon as possible. Oils and specific quantities of oils may be reportable under federal, state, or local regulations.

7.2 Waste Disposal Method: This product is not hazardous, however, wastes must be disposed in accordance with local, state or federal regulations. Consult with local sewer authority, or solid waste facility prior to disposition.

==========

Section 8: SPECIAL PRECAUTIONS

No protective equipment is necessary under normal use conditions.

8.1 Eyes: If splashing may occur, eye protection recommended.
8.3 Skin: Wear impervious gloves for prolonged or repeated exposure.
8.4 Respiratory: Avoid breathing mists of this product

==========

Section 9: TRANSPORTATION PRECAUTIONS

This section completed per formulation ingredient data unless stated.

9.1 Transportation Considerations: This product is not classified as dangerous in the meaning of transport regulations. Shippers and transporters may need to meet packaging and transportation requirements for certain oils and respective quantities under CFR 49 Part 130.

The above information is believed to be correct with respect to the formula used to manufacture the product in the country of origin. As data, standards, and regulations change, and conditions of use and handling are beyond our control, NO WARRANTY, EXPRESS OR IMPLIED, IS MADE AS TO THE COMPLETENESS OR CONTINUING ACCURACY OF THIS INFORMATION.