REMEDIAL ACTION WORK PLAN

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

BRRTS #02-41-000676

Shaw Project No. 133480

December 10, 2008

Prepared for:

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1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) prepared this Remedial Action Work Plan (RAWP) for the Redi-Quick Dry Cleaners (Redi-Quick) facility located in West Allis, Wisconsin (herein referred as the Site – see **Figure 1**). The focus of this RAWP is to develop a cost-effective remedial strategy to receive regulatory closure from the Wisconsin Department of Natural Resources (WDNR). The scope of work presented herein was developed by Shaw based on the preparation of the *Supplemental Subsurface Investigation Report*, preparation of the March 9, 2007 *Remedial Action Plan Proposal* (*RAPP*), subsequent April 17, 2007 WDNR approval of the RAPP, and experience with other similar projects. The scope of work proposed by Shaw, as presented in this RAWP, consists of the following:

- Preparation of this Remedial Action Work Plan (RAWP), and Injection Permitting Variance to the WDNR for their review and approval;
- Subsurface injection of a carbon source amendment to degrade the chlorinated affected soils and groundwater;
- Groundwater monitoring of the monitoring well network to document contaminant attenuation;
- Indoor air quality monitoring to document the effectiveness of the vapor mitigation system in the former Dauer residence; and
- Reporting and submittal of a closure request to the WDNR.

The scope of work and estimated project schedule are presented in the following sections of this RAWP.

2.0 Background

2.1 Site History

From the late 1950s until the present, the Site has been operated as a dry cleaning facility. 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. The Site Plan View is presented as **Figure 2.**

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 1000-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., (Miller Engineers) was contracted by the owner's agent to perform a site investigation to determine the extent of petroleum contamination due to the use of 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. Groundwater monitoring for petroleum contamination has been ongoing since 1990.

The following chronology summarizes those environmental activities associated with the investigation of the chlorinated solvent contamination from dry cleaning operations on-Site. Other environmental activities related to the petroleum contamination site investigation and remedial activities may have been performed.

December 1, 1989

Four petroleum USTs were removed. In addition, a recovery sump (RS-E) was installed in the excavation containing the two gasoline USTs. Another recovery sump (RS-W) was installed in the excavation containing the fuel oil and the waste oil USTs.

February 14-18, 1990

Petroleum contaminated soils were excavated and removed from the Site by Buteyn Excavating and Grading under the direction of Miller Engineers.

April 17-18, 1990

Miller Engineers advanced eight borings at the Site. Three of the borings were completed as groundwater monitoring wells (MW-2, MW-4, and MW-8). Eight soil samples were collected and analyzed for total petroleum hydrocarbons (TPH) and benzene, ethylbenzene, toluene, and total xylenes (BETX). Groundwater samples from the three monitoring wells were analyzed for volatile organic compounds (VOCs).

September 17, 1992

Miller Engineers collected groundwater samples from monitoring wells, MW-2, MW-4, and MW-8, and recovery sumps, RS-E and RS-W. Samples were analyzed for VOCs.

February 23, 1993

Miller Engineers collected groundwater samples from monitoring wells, MW-2, MW-4, and MW-8, and recovery sumps, RS-E and RS-W. Samples were analyzed for VOCs.

August 12, 1998

Environmental Professionals collected groundwater samples from monitoring wells, MW-2, MW-4, and MW-8, and recovery sumps, RS-E and RS-W. Samples were analyzed for VOCs.

May 10, 1999

JJS Environmental, Inc., (JJS Environmental) collected groundwater samples from monitoring wells, MW-2, MW-4, and MW-8, and recovery sumps, RS-E and RS-W. Samples were analyzed for VOCs.

October 28, 1999

JJS Environmental collected groundwater samples from monitoring wells, MW-2, MW-4, and MW-8, and recovery sumps, RS-E and RS-W. Samples were analyzed for VOCs.

May 19, 1999

JJS Environmental drilled four borings (SB-1 through SB-4) at the Site. One soil sample was collected from each boring and submitted for laboratory analysis for VOCs.

August 30-31, 2000

Envirogen advanced five soil borings at and adjacent to the Site. Four borings were completed as groundwater monitoring wells (MW-10 through MW-13). One boring was completed as a piezometer (PZ-10). Soil samples were collected and submitted to a WDNR-certified laboratory for analysis for VOCs.

September 14, 2000

Groundwater monitoring wells, MW-4, MW-8, MW-10 through MW-13 and piezometer PZ-10 were sampled and water level measurements recorded. Groundwater samples were submitted to a WDNR-certified laboratory for analysis for VOCs.

November 15, 2000

Monitoring wells were surveyed to a mean sea level datum, and water levels measurements were recorded for all wells at the Site.

October 24, 2003

Six soil borings were installed on- and off-Site. Four of the soil borings (GP-1 through GP-4) were installed with a Geoprobe® sampling device. The two remaining borings were installed using hollow-stem augers and were completed as a monitoring well (MW-21) and a piezometer (PZ-20).

March 10, 2004

The eight groundwater monitoring wells and two piezometers were sampled and static water level measurements recorded. Groundwater samples were submitted for VOC laboratory analysis.

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 and perchloroethylene (PCE) was reported at concentrations of 34 and 74 parts per billion (ppb) in air samples collected for the basement, and at concentrations of 27 and 29 ppb in samples collected from the kitchen and bedroom, respectively.

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 VMS in the southwest corner of the Dauer residence 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 indoor air quality (IAQ) monitoring took place in the Dauer basement, the Steger basement and living room, and the Pokos basement and living room. Due to regulator valve failure, a background outdoor air sample was not analyzed from the Dauer porch.

June 22-23, 2006

Shaw performed supplementary subsurface investigation activities. The subsurface investigation consisted of advancing nine Geoprobe® soil borings (designated as Geoprobe® [P] 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 ft below ground surface (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. Sub-slab soil vapor sample were also collected.

2.2 Site Geology

Site geology consists primarily of brown silty clay, ranging from ground surface to approximately 20 to 25 feet below ground surface (bgs). This silty clay layer is underlain by a grey sandy clay layer, approximately 15 feet in thickness. The grey sandy clay layer dips to the north and is underlain by brown silty clay to the maximum depth of investigation, 45 feet bgs. Bedrock was not encountered during investigation activities.

2.3 Soil Contaminant Distribution

The highest soil contaminant concentrations are located near the former chlorinated solvent UST, in the driveway of the adjacent former Dauer residence (1361 95th Street). Soil contamination was also detected on the eastern edge of the facility and the adjacent property to the north.

The maximum Tetrachloroethene (PCE) concentration from all soil samples collected at the Site to date is 1,900,000 parts per billion (ppb) detected at 14 to 16 feet bgs in soil boring P-3 near the former chlorinated solvent UST, in the Dauer driveway. PCE was also reported at concentrations of 410,000, 1,000,000, 29,000 and 50,000 ppb in soil from P-2, P-6, P-7 and P-8, respectively. Trichloroethene (TCE) was present in these soil samples at concentrations ranging from 62-610 ppb. A sectional view, showing PID screens and laboratory analytical results of the soil borings installed in the former Dauer driveway is presented as **Figure 3**.

To the north of the former Dauer driveway, analytical results indicate a PCE concentration of 129,000 ppb and a TCE concentration of 180 ppb between 10 to 12 feet bgs at MW-12, located on Dauer residence. A sample collected between 24-26 feet bgs at MW-12 indicated less than detectable contaminant concentrations. Further north, PCE and TCE were not detected at MW-13 in a sample collected between 20-22 feet bgs.

To the west of the building, PCE concentrations were below detection limits and TCE was detected at 30 ppb in soil sample collected in SB-4 from 16 to 18 feet bgs. To the east of the building, PCE was detected at 230 ppb and no TCE was detected in a sample collected from 18-20 feet bgs in SB-1. No PCE or TCE were detected in the sample collected from MW-11, at 14 to 16 feet bgs.

PCE was also detected in shallow soils between 2 to 4 feet bgs at a concentration of 3,090 ppb, at PZ-10, located at the eastern end of the Redi-Quick building. It is possible that past solvent cleaning practices used by previous operators involved handling and/or disposing of spent solvent in this area.

2.4 Site Hydrogeology

The depth to groundwater varies between 3 and 14 feet bgs. A groundwater contour map, generated from the June 9, 2006 sampling event, indicates that groundwater flow direction appears to be toward the east-northeast. Two data points (MW-12 and MW-10) are considered to be anomalous due to their location in permeable soils, as opposed to the concrete and/or asphalt surfaces that the other wells are placed in.

2.5 Groundwater Contaminant Distribution

During the most recent sampling event in June 2006, the highest chlorinated contaminant concentrations were reported in groundwater monitoring well MW-10, located on the east side of the Red-Quick building. PCE (17,000 ppb), TCE (4,670 ppb), cis-1,2-Dichloroethene (DCE) (2,630 ppb), and vinyl chloride (9.13 ppb) were reported in groundwater collected from MW-10. These concentrations exceed their respective Wisconsin Administrative Code (WAC) NR 140 Enforcement Standards (ES). Piezometer PZ-10, nested with groundwater monitoring well MW-10, reported PCE at a concentration of 15 ppb

Piezometer PZ-20, which is located in the former Dauer driveway, reported PCE at a concentration of 59 ppb. PCE was reported at concentrations above the NR 140 ES in groundwater from MW-2 which is located on the south side of the Redi-Quick building.

3.0 SCOPE OF WORK

The Shaw approach for the Redi-Quick Site will include the implementation of this RAWP following approval by the WDNR. A description of each task is presented below.

3.1 Task 1 – Pre-Remedial Implementation Planning and Coordination

Remedial Action Work Plan

In accordance with NR 169.09(1)(C)(3), Shaw will notify the WDNR of the selection of our firm to complete the remediation activities at the Site, upon receipt of authorization to proceed. In accordance with the DERP regulations, this Remedial Action Work Plan will be submitted to the WDNR. The Work Plan will comply with the requirements of NR 169(1)(C)(5). Field activities will not be initiated until written approval to proceed has been received from the WDNR.

Subcontractor Procurement, Utility Clearance, and Health and Safety Plan Preparation

In accordance with NR 169, three written contractor bids will be obtained by Shaw for all contracted services. The service providers will be selected on a competitive (i.e., low-cost) basis.

Shaw will contact Diggers Hotline and utilize a private underground utility marking contractor prior to performing any invasive work.

Shaw will prepare a Site-specific Health & Safety Plan to be followed during all field activities. This plan will provide information to ensure the health and safety of all personnel working on the project and the other Site occupants. The health and safety plan will be prepared in accordance with 29 CFR 1910.120.

Injection Permitting

Shaw will prepare the injection permitting for the delivery of the electron donor into the groundwater at the Site. The injection permitting, consisting of the NR 140 variance and the WPDES application, will be submitted to the WDNR for their review and approval.

Monitoring Well Installation

A 20 foot groundwater monitoring well (MW-14) will be installed in the former Dauer driveway between soil borings P-6 and P-7 to evaluate chemical groundwater quality, check for the presence of dense non-aqueous phase product, better define the local hydrogeology, and provide a monitoring point to track the distribution and biodegradation of the emulsified oil during pilot test injection.

Baseline Groundwater Sampling Event

Groundwater was last sampled in March 2006; therefore, prior to pilot test injection of the formulation, 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 monitoring well MW-14. This sampling event will provide a baseline for evaluating the effectiveness of the technology and determine the effect of the formulation injection on the groundwater geochemistry.

Groundwater will be analyzed for laboratory analysis of VOCs, and the geochemical indicator parameters: sulfate, nitrate-nitrite, ferrous iron, and total organic carbon [TOC]. Field measurements, consisting of dissolved oxygen [DO], oxidation–reduction potential [ORP], temperature, conductivity, turbidity, and pH, will be collected from all groundwater monitoring wells.

3.2 Task 2 – Remedial Action Plan

The remedial action consists of the injection of an amendment to enhance reductive dechlorination and implementation of a two (2) year monitored natural attenuation groundwater program to document contaminant attenuation. A general overview of the remedial action follows.

Pilot Test Conceptual Design

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 area located north of the Redi-Quick Dry Cleaners building, adjacent to groundwater monitoring well MW-14. The Newman Zone® MSDS, and other product information, is provided in **Appendix A**.

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

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.

Pilot Test Objectives

The principal objective of the Newman Zone® formulation pilot test is to demonstrate the effectiveness of the formulation in reducing the concentrations of chlorinated ethenes (PCE, TCE, cis-1, 2-DCE, and VC) in Site groundwater to regulatory cleanup levels through enhancing anaerobic biodegradation, to Wisconsin Administrative Code (WAC) NR 140 groundwater quality preventive action limits (PALs) for PCE, TCE and VC. The performance monitoring events will provide the data necessary to obtain the Site-specific biodegradation rates under enhanced anaerobic conditions. These degradation rates can then be used to estimate the time required to attain regulatory cleanup levels for a full-scale application.

Another objective of the pilot study is to demonstrate the effectiveness of the formulation in stimulating the complete reductive dechlorination of PCE, TCE, cis-1,2-DCE, and VC to desirable degradation end products (ethene and ethane). The concentrations of end products (mainly ethene) should increase throughout the duration of the pilot study. The monitoring period should be sufficient to determine if reductive dechlorination is proceeding to completion.

The third goal of the pilot test study is to develop criteria for full-scale implementation, such as carbon loading rates and injection well spacing to treat chlorinated ethenes at the Site to below WAC NR 140 Enforcement Standard.

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 two months 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.

Location of Injection Points

Full scale amendment injection points are proposed in three areas, final injection point locations, and amendment volumes may be modified based on the results of the pilot test. Injection point locations are presented on **Figure 4**. The preliminary design plan that was utilized for calculating formulation demand and pricing includes the following assumptions:

- Dauer Driveway\Redi-Quick Interior:
  - Assume a treatment zone of 60 feet long x 10 feet wide in the Dauer driveway;
  - Sixteen (16) injection points, spaced 5 foot on center, with a radius of influence of 5 foot. Ten (10) injection points will be installed in the interior.
  - Treatment zone of 4 -20 feet bgs
- Red-Quick East Property Line:
  - Assume a treatment zone of 25 feet x 10 feet directly east of the Redi-Quick Building;
  - Four (4) injection points;
  - Treatment zone of 3 -10 feet bgs
- Redi-Quick South Parking Lot:
  - Assume a treatment zone of 40 feet x 45 south of the Redi-Quick building;
  - Ten (10) injection points;
  - Treatment zone of 4 -20 feet bgs

The formulation will be injected into approximately 40 points within the injection zones using direct push rods. It is calculated that 8,400 pounds of amendment formula will be used.

The amount of formulation should provide sufficient carbon and microorganisms to the contaminated areas to induce anaerobic biodegradation of PCE, TCE, and cis-1,2-DCE 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.

Post-Injection Groundwater Monitoring Program

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

Groundwater from the 11 groundwater sampling points (MW-2; MW-4; MW-8, MW-10, MW-11, MW-12, MW-13, MW-14, MW-21, PZ-10, and PZ-20) and a duplicate will be submitted for VOC, sulfate, nitrate-nitrite, methane, ethane and ethene laboratory analysis.

Field measurements, consisting of dissolved oxygen [DO], oxidation–reduction potential [ORP], temperature, conductivity, turbidity, and pH, will be collected from all groundwater monitoring wells.

Reporting

Following completion of the injections and the three month performance monitoring, a pilot study report will be prepared to present the findings and conclusions as they relate to the objectives, and provide recommendations for a full scale implementation of the technology, as applicable.

The *Pilot Study Report of Findings* will include a summary of the Site description and regulatory history, vapor mitigation system installation and indoor air quality monitoring, pilot study approach, locations of injection points, quantities of amendments added to the subsurface, documentation of performance monitoring analytical results, interpretation of results, conclusions, and recommendations for larger scale implementation of the technology, as applicable. The draft pilot study report will be submitted to the WDNR within three weeks of receipt of the 3-month performance monitoring results.

A report will be generated following completion of the first year of groundwater monitoring to evaluate remediation progress, and petition the WDNR for closure if applicable.

If closure can not be achieved after completion of the first year activities, additional amendment injection and/or bioaugmentation will be evaluated prior to the continuation of the natural attenuation monitoring program

Indoor Air Quality Monitoring Program

To document the effectiveness of the Vapor Mitigation System located in the Dauer basement, three rounds of ambient air samples are proposed to be collected using 6-liter evacuated SUMMA canisters obtained from Air Toxics, Ltd., Folsom, California. 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 will be submitted for analysis by gas chromatography/mass spectroscopy following EPA Method TO-14 (EPA, 1999).

3.3 Task 3 – Monitoring Well Abandonment & DERP Claim Preparation

- Upon receipt of case closure from the WDNR, the groundwater monitoring well network will be abandoned.
- It is anticipated that a Dry Cleaner Reimbursement package will be completed and submitted to the WDNR at the following milestones:

    1. Completion of the three month groundwater performance sampling;
    2. Completion of the first year of groundwater monitoring subsequent to full scale amendment injection; and
    3. Notification of case closure by the WDNR.

4.0 PROJECT SCHEDULE

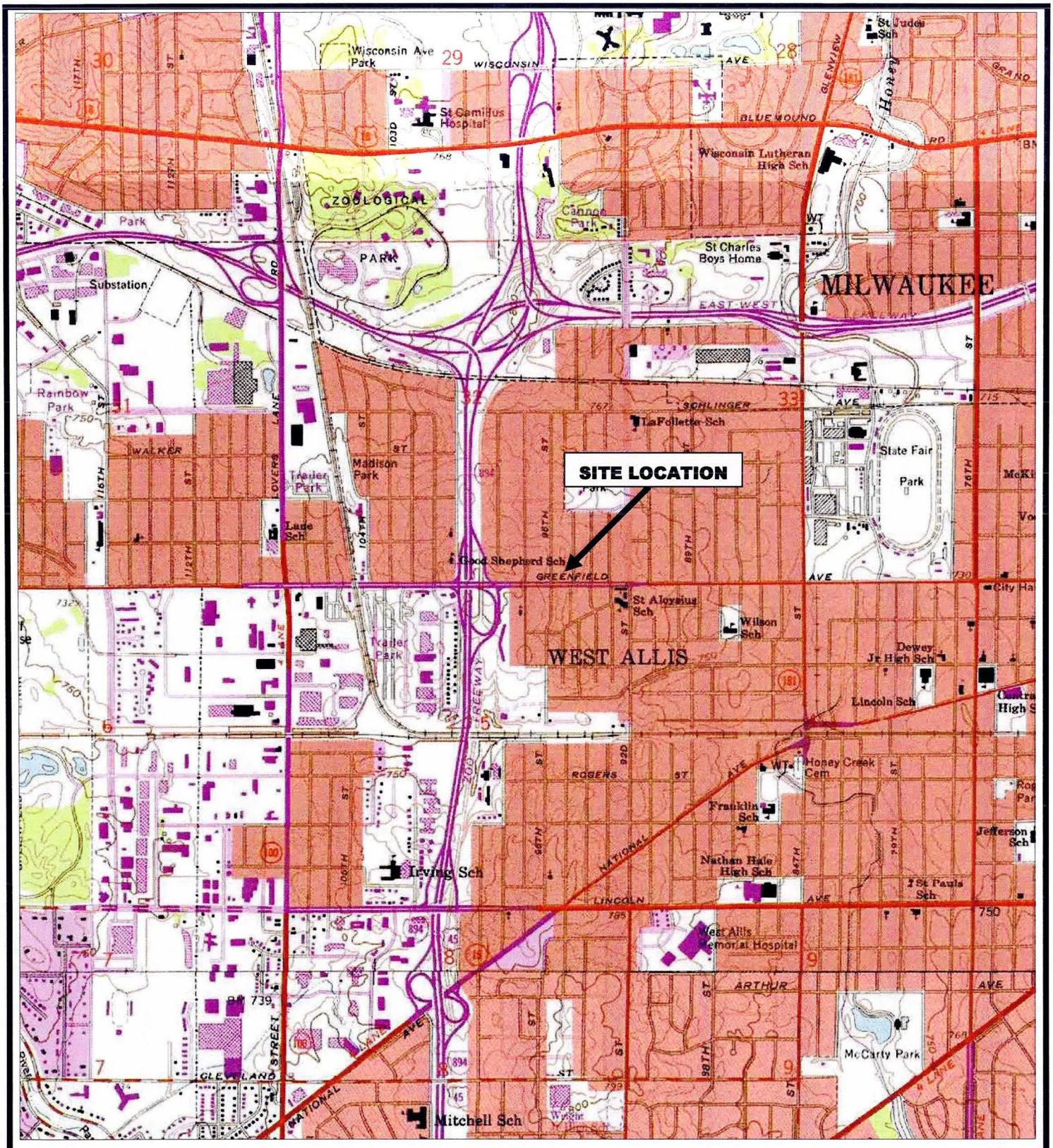
A preliminary project schedule is included in **Table 1**. Shaw will initiate the proposed scope of work immediately upon receipt of written authorization to proceed from the WDNR.

Tables

TABLE 1
Remediation Schedule
Redi-Quick Dry Cleaners
West Allis, Wisconsin
Project # 133480
December 9, 2008

2nd Year Groundwater Monitoring: November 2009, February 2010, May 2010; August 2010

Figures



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

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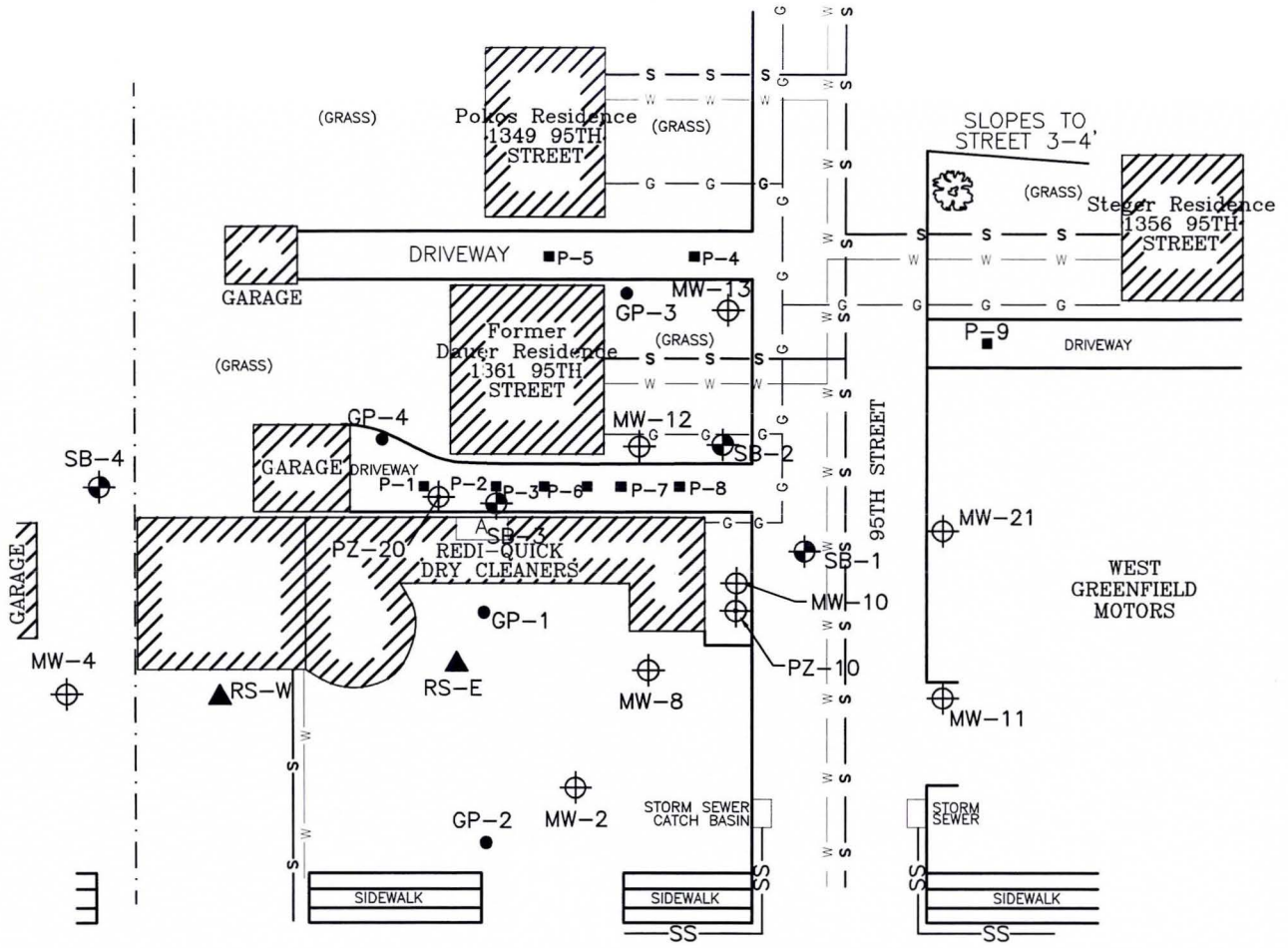
Shaw®

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

Project No.
121814-01

Figure 1
Site Location Map



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
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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		DATE	
			12/04/08	11-05-08	

File: Q:\Projects\100000\133480 (Redi-Quik)\CAD\133480-02.dwg Layout: FIG 2 (A) User: bruce.benoit Dec 10, 2008 - 3:11pm

LEGEND

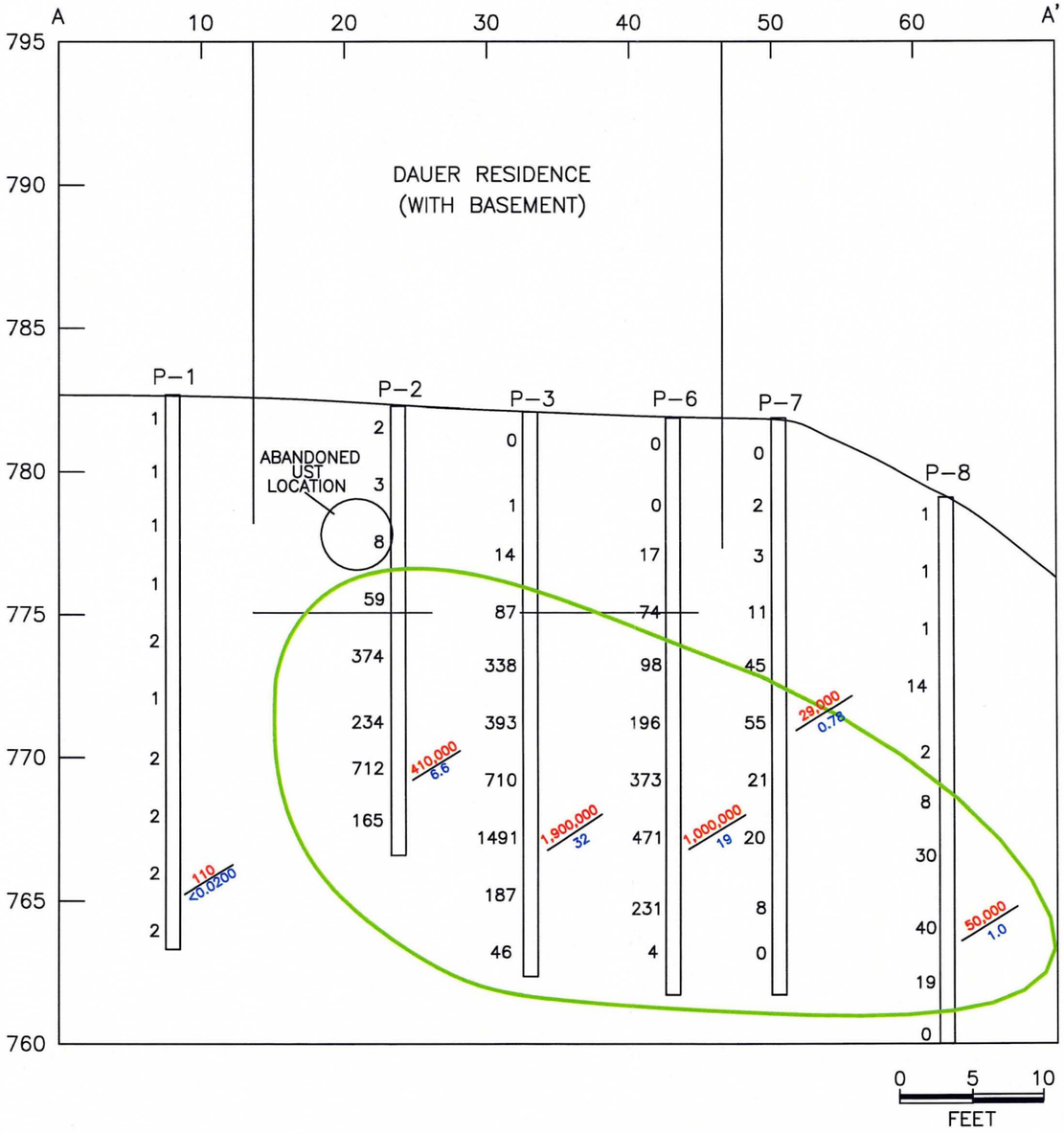
50,000 / 1.0 = PCE CONCENTRATIONS (TOTAL (µG/KG) / TCLP (MG/L))

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



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SECTIONAL VIEW LOCATION MAP

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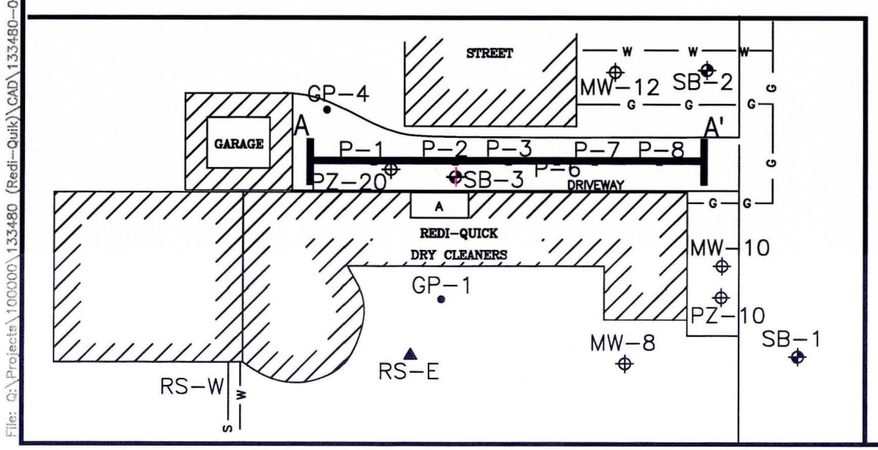
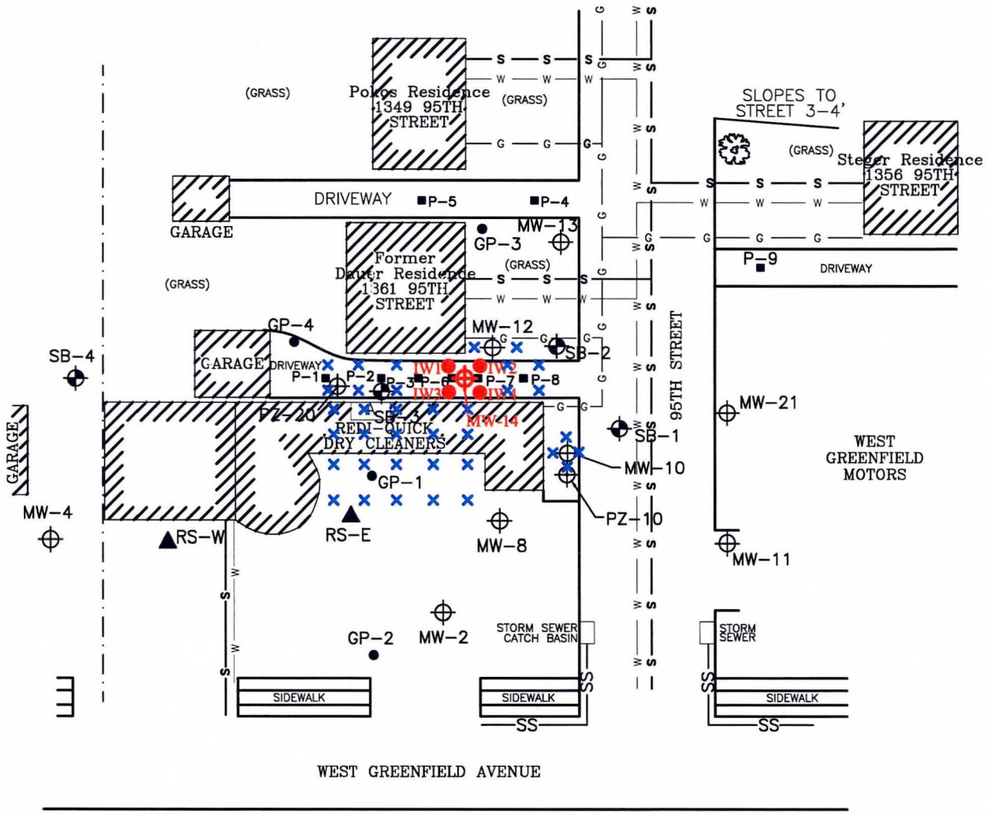
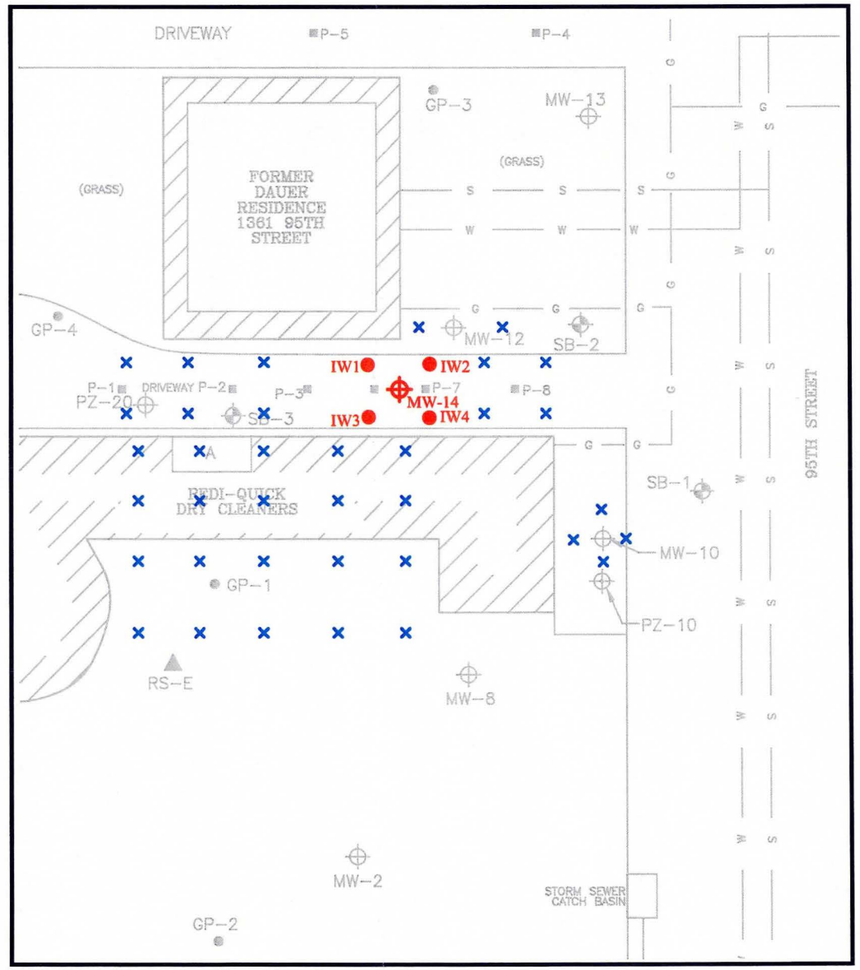


Shaw® The Shaw Group, Inc.®	Shaw Environmental, Inc. 111 W. Pleasant St. Suite 105 Milwaukee, Wisconsin 53212-3939 (414) 291-2350	TITLE	**SECTIONAL VIEW A - A'** **FORMER DAUER RESIDENCE** **DRIVEWAY**
CLIENT	**Redi-Quick Dry Cleaners**		
LOCATION	**Redi-Quick Dry Cleaners Site** 9508 West Greenfield 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

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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	

Appendices

Appendix A
MSDS: Newman Zone®

RNAS
REMEDIATION & NATURAL ATTENUATION SERVICES, INC.

Innovative Remediation Products and Services

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Newman Zone Emulsified Vegetable Oil (EVO)»
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Prices
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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.

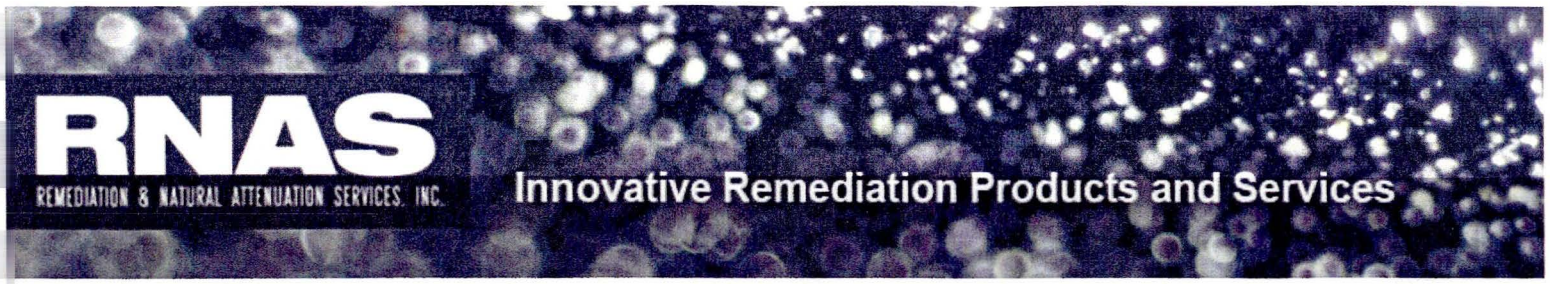
Hydrogen Produced by Fermentation Reactions of Commo

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



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NEWMAN ZONE FORMULATIONS

Standard Formulation

All Newman Zone® formulations contain 46% soybean oil by weight (50% oil by volume), 4% sodium lactate, and emulsification additives and preservatives. The standard formulation is the original product first manufactured in February of 2002. It contains both ionic (lecithin) and nonionic surfactants to produce a very stable emulsion that can be retained even on clean sand soils.

Nonionic Formulation

The first full scale production run of Newman Zone® Nonionic emulsion was completed in November of 2004. Ionic surfactants such as lecithin can adsorb very strongly to clays and silts which may make distribution of an emulsion through them difficult with ionic surfactant blends. The nonionic emulsion has very low adsorption for injection into low permeability silts and clay soils.

Buffered Nonionic Formulation

Optimal pH for reductive dechlorination usually falls in the range of 6.5 to 8.5; dechlorination can be severely retarded at pH values below 6. Injection of an electron donor at sites with little natural buffering capacity commonly results in a drop in pH, sometimes as low as a pH of 5 or less. The buffered nonionic formulation contains 1% sodium bicarbonate to help maintain pH within the 6.5 to 8.5 range.

Ingredients/Composition	Standard	Nonionic	Buffered Nonionic
	190-6722	190-6725	190-6730
Food Grade Soybean Oil	46% +/-1% wt	46% +/-1% wt	46% +/-1% wt
Food Grade Sodium Lactate	4% wt	4% wt	4% wt
Surfactant Content	<10% wt	<10% wt	<10% wt
Food Grade Nonionic Surfactants	Yes	Yes	Yes
Food Grade Surfactants Lecithin	Yes	No	No

Newman Zone® is past
sanitation practices to e
neutral product. All ingr
Unlike larger droplet em
Zone® is kinetically stat
in either dilute or concer
exceeds three years, an
packaging or stainless s
months. The Newman Z
microbes are introduced
surfactants that maintair

We recommend the star
maximum retention in sa
formulation (190-6730) f
We can add yeast extra
Zone® at our cost for in

Food Grade Sodium Bicarbonate	No	No	1% wt
pH	6.5	6.5	8.3

 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

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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.

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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

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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.

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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.

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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)

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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

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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.

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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

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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.