From: Chad Fradette
To: DuFresne, Kristin I - DNR
Subject: V&L Stripping 02-05-216722
Date: Wednesday, April 19, 2017 6:16:25 AM
Attachments: 02-05-216722 Remedial Action Plan Proposal.pdf

Hi Kristin,

Attached is the Remedial Action Plan Proposal. It is the same as the Shaw Proposal from 2011 with the same costs less per diem and mileage expenses.

We are ready to have the vapor mitigation system installed under interim action after approval is complete. The building is currently vacant.

I will have a paper copy dropped off for you as well.
Thanks
Chad

Chad M Fradette, EP, Chem
Director of Environmental Services
WI DNR Professionally Assured Wetland Delineator

Mach IV Engineering
2260 Salscheider Court
Green Bay, Wisconsin 54313
920-615-0019 Cell
920-569-5765 Office
920-569-5767 Fax
cfradette@mach-iv.com
www.mach-iv.com

REMEDIAL ACTION PLAN PROPOSAL

Former V&L Stripping
864 Mather Street
Green Bay, Wisconsin
BRRTS #02-05-216722
April 1, 2017

Prepared For:
Mr. Ken Juza
1478 Norfield Road
Suamico, Wisconsin

Submitted To:
Ms. Kristin DuFresne
Wisconsin Department of Natural Resources
2984 Shawano Avenue
Green Bay, Wisconsin

Prepared By:

Mach IV
Engineering & Surveying LLC

Joel Ehrfurth, PE & Chad M Fradette, EP, Chemist
2260 Salscheider Ct
Green Bay, Wisconsin 54313
(920) 569-5765 jehrfurth@mach-iv.com
cfradette@mach-iv.com

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1.0 INTRODUCTION

Mach IV Engineering & Surveying, LLC (Mach IV) is pleased to submit this proposal for implementation of a remedial action for the former V&L Stripping facility located in Green Bay, Wisconsin (Site). The focus of this proposal is to develop a cost-effective remedial strategy to reduce concentrations of chlorinated organic compounds at the Site and to receive regulatory closure from the WDNR. The scope of work presented herein was developed by Mach IV based on results from the Site's soil and groundwater investigation and sampling data and on our successful experience with other similar projects. The scope of work proposed by Mach IV, as presented in this proposal consists of the following:

- Preparation of a Remedial Action Work Plan (RAWP) and Injection Permitting Proposal 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;
- Installation of a sub-slab depressurization system (VMS) to mitigate chlorinated solvent vapor intrusion;
- Vapor intrusion sampling to verify the effectiveness of the VMS; and
- Reporting and submittal of a closure request to the WDNR.

The scope and cost estimate is presented in the following sections of this proposal.

2.0 SITE HISTORY

The project Site was formerly utilized as a gasoline service station from the 1930s to the 960s, followed by use as a One Hour Martinizing Dry Cleaner facility from 1967 until 1973. More recently, the Site was the location of the V&L Stripping furniture repair business until 1999. Site investigation work has been conducted at the Site starting in 1997 for the investigation of possible petroleum contamination. Chlorinated compounds were detected in the groundwater resulting in site investigation efforts, interim remedial efforts, and quarterly groundwater monitoring having been conducted at the Site between 1999 and 2010.

2.1 Site Geology

Site geology consists primary of sand and gravel fill material to a depth of approximately five feet below ground surface (bgs) and underlain by silty sand, sandy silt, and sands to a depth of seven feet bgs. Clays and clayey silts were identified at the boring terminus to a depth of 25 feet bgs, the maximum depth explored. Bedrock was not encountered during investigation activities.

2.2 Soil Contaminant Distribution

The highest soil contaminant concentrations being detected at the Site were located beneath the central and eastern portions of the on-Site building. The maximum Tetrachloroethene (PCE) concentrations from soils samples collected at the Site was 124,000 parts per billion (ppb) located in soil boring B1400 (TW1400) located in the eastern portion of the building at 0 to 2 feet bgs. Elevated PCE concentrations were also reported in two additional soil borings located near the eastern property boundary of B1600 at 48,100 ppb and B1900 at 25,900 ppb.

Trichloroethene (TCE) was also detected in the soils at the Site in location B900 (TW900) at 37.4 ppb. Cis- and trans- 1,2-dichloroethene (DCE) were not reported in the soil above the laboratory detection levels.

2.3 Site Hydrogeology

The depth to groundwater varies between 4 and 10 feet bgs. A groundwater contour map, generated from the September 28, 2010 sampling event, indicates that groundwater flow direction appears to be toward the south-southwest.

2.4 Groundwater Contaminant Distribution

During the most recent sampling event conducted on September 28, 2010, the highest chlorinated contaminant concentrations were reported in monitoring well TW-900, located with the on-Site building. PCE (21,000 ppb), TCE (6,200 ppb), and cis-1,2-dichloroethene (780 ppb) were reported at concentrations above the respective Wisconsin Administrative code (WAC) NR 140 enforcement standards (ES). Monitoring wells MW-100, MW-200, MW-300, MW-400, TW-800, TW-900, and TW-1300 also had reported concentrations of PCE, TCE, and DCE above the respective ES. Off-Site wells did not report any concentrations of chlorinated compounds greater than the ES for PCE, however, TCE was reported above the preventative action limits (PALS) and vinyl chloride (VC) was reported above the ES in MW-2100.

3.0 SCOPE OF WORK

The Mach IV approach for the former V&L Stripping site will include the implementation of this remedial action plan (RAP) following approval of the RAP by the WDNR. A description of each task is presented below.

3.1 Task 1- Pre-Remedial Implementation Planning and Coordination Subcontractor Procurement, Utility Clearance, and Health and Safety Plan Preparation

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

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

Mach IV 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.

3.2 Task 2- Remedial Action Work Plan and Injection Permitting

Mach IV will prepare the remedial action work plan and 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 WPDES application will be submitted to the WDNR for their review and approval prior to any Site remedial work.

3.3 Task 3- Amendment Injection

The Site remedial action consists of the injection of an amendment to enhance reductive dechlorination. The amendment selected for the Site remedial activities is a non-emulsified edible oil.

The injection work will be followed by the implementation of a two (2) year monitored natural attenuation groundwater program. A general overview of the remedial action follows.

Injection of Electron Donor

The electron donor solution of CAP 18 ME anaerobic bioremediation product will be injected at the Site via 30 1-inch direct push soil borings. The borings will be installed with 10 foot space and a radios of influence of 5 feet. The final injection point locations and spacing may be modified based on site conditions. The CAP 18 ME is a non emulsified edible oil which is refined from vegetable oils. CAP 18 ME dissolves slowly in the subsurface and releases fatty acids which are used to stimulate microbial hydrogen production. Other microbes in the subsurface then use the released hydrogen to reduce the contaminant mass through reductive dechlorination. **Appendix A** presents the technical overview for CAP 18 ME. The solution will be injected

equally into each geoprobe well location and allowed to disperse across the plume via ambient groundwater flow. No chase water will be needed for the injection of the CAP 18 ME.

Location of Injection Points

The amendment injection points are proposed to be installed across the site, including up to four points within the building. The interior points will be installed inside the overhead doors on the west and southeast sides of the building.

The preliminary design plan that was utilized for calculating formulation demand and pricing this RAP includes the following assumptions:

- Assume a 105 feet by 90 feet treatment area (area extends from the Site south into Velp Avenue)
- Up to 30 injection points to 12 feet bgs
- Treatment zone of 4 to 12 feet bgs

This formulation will be will injected into 30 points within the injection zone using direct push rods. It is calculated that the 1,675 pounds of amendment will be used, and that it will take four (4) days to complete the injection process.

The amount of amendment injected should provide sufficient hydrogen and carbon to the contaminated areas to induce anaerobic biodegradation of PCE, TCE, and cis-1,2-DCE within the treatment area to form the innocuous products of ethane and chloride.

The selected method to deliver the formulation into the subsurface is to inject the material into the subsurface through temporary well points using hydraulic equipment and expendable tips. This approach aids distribution by spreading the source material through the saturated thickness; amendment will be injected as the probe head is retracted through the bore hole.

Amendment Injection Objectives

The objective of injecting the CAP 18 ME is to effectively reduce the concentration of chlorinated ethenes (PCE, TCE, cis-1,2-DCE, and VC) in the groundwater at the Site through enhanced biodegradation to the Wisconsin Administrative Code (WAC) NR 140 groundwater quality preventative action limits (PALs) for the chlorinated ethenes.

3.4 Task 4- Performance Monitoring

To document the effectiveness of the injection, post-injection data will be compared to the baseline levels for evidence of CVOC reduction.

Post-injection performance monitoring will be conducted quarterly for two years to evaluate the effectiveness of the amendment and bacterial cultures and their contribution to the reduction of CVOCs.

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 the analysis of VOCs, nitrate, sulfate, ferrous iron, total organic carbon, chlorides, manganese, fatty acids, methane, ethane, and ethene. Groundwater samples will be collected from monitory wells TW-800, TW-900, TW-1300, TW-1400, MW-100. MW-200, MW-300, MW-400, MW-600, MW-1000, MW-2000, MW-2100, MW-3200, and piezometer PZ-1700.

Significant decreases in VOCs concentrations are expected to occur over three to five months post injection. 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, chloride, and methane are expected to increase.

Due to road work conducted on Velp Avenue by the Wisconsin Department of Natural Resources, it may be necessary to conduct a well reconnaissance prior to the 1st quarterly groundwater sampling event. Road construction may have paved over or damaged existing wells. Mach IV will prepare a correspondence to the WDNR on the status of any missing or damaged monitoring wells.

3.5 Task 5- Vapor Mitigation Installation

A sub-slab depressurization vapor mitigation system (VMS) will be installed within the on-Site building as requested by the WDNR. The VMS will be installed by a contractor to eliminate any potential for vapor entering the interior space of the building.

To document the effectiveness of the VMS, Mach IV will collect three ambient air samples within the building and one outdoor background sample three months and six months from the initial setup of the VMS. The ambient air samples will be collected as 8-our summa canisters and will be analyzed for CVOC compounds under Method TO-15. The air sampling events will be coordinated with the quarterly groundwater sampling to minimize mobilization costs.

3.6 Task 6- Reporting

Following completion of the amendment injections at the 1st quarter of groundwater natural attenuation monitoring, a summary report will be prepared to present the findings and conclusions as they relate to the objects, and provide recommendations as applicable.

The Summary Report will include a summary of the vapor mitigation system installation and indoor air quality monitoring, locations of injection points, quantities of amendments added to the subsurface, documentation of performance monitory analytical results, interpretation of results, conclusions, and recommendations as applicable.

A report will also 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 cannot be achieved after completion of the first year activities, a natural attenuation monitoring program will be continued, and quarterly reports will be submitted to the WDNR during year two.

3.7 Task 7- Monitoring Well Abandonment & DERP Claim Preparation

- Upon Receipt of case closure from the WDNR, the groundwater monitoring well network will be abandoned.
- A Dry Cleaner Reimbursement package will be completed and submitted to the WDNR upon the completion of the injection activities and the first round of groundwater sampling.
- A Dry Cleaner Reimbursement package will also be completed and submitted to the WDNR upon the completion of groundwater sampling and closure request activities.

4.0 Project Team

The personnel assigned to implement the scope of work were selected because of their experience in the following areas:

- Knowledge of the DERP, WDNR guidance, and administrative rules;
- Experience in conducting site investigation and remediation activities at dry cleaning facilities;
- Technical expertise and experience with chlorinated solvent compounds in soil and groundwater; and
- Experience with in-situ and ex-situ remediation.

Mr. Joel Ehrfurth, PE, Senior Engineer, will serve as the Project Advisor. Mr. Chad M Fradette, Environmental Professional, Chemist, Scientist will serve as the Project Manager, will coordinate the remediation, and be responsible for managing the technical and administrative tasks, and communications with MR. Ken Juza and the WDNR. Ms. Mary Jo Pankratz, Geologist, will provide field oversight and conduct sampling activities with Ms. Shyann Nieland, Environmental Specialist.

5.0 Project Costs

Costs associated with the investigation and remediation of the former V&L Stripping Site are eligible for reimbursement under DERP. Mach IV will prepare the reimbursement applications in conjunction with the RAP activities for submittal to the WDNR. Claims are estimated to be prepared after the completion of Task 3, Task 4, Task 5, and Task 7.

The estimated cost to execute the proposed scope of work as described herein is approximately $104,149.00. This costs includes reporting, project management, and remedial action. Please note that final costs may be modified, dependent upon site activities and field data. In accordance with NR 169.21(3)(a), the cost breakdown is presented on **Table 1**.

6.0 Certificate of Insurance

This proposal has been prepared in accordance with the requirements of NR 169.23. In accordance with NR 169.23(6), Mach IV certifies the following:

- If selected to complete the scope of work described herein, Mach IV will comply with the applicable requirements of Chapters NR 169 and Chapters NR 700 to NR 728 of the WAC.
- Mach IV will make available to the WDNR upon request, for inspection and copying, all of the documents and records related to the contract services.

Also in accordance with NR 169.23(6), a copy of Mach IV's *Certificate of Insurance* is presented in **Appendix D.**

7.0 Closing

A *Services Agreement* is included in **Appendix C.** Mach IV will initiate the proposed scope of work immediately upon receipt of written authorization to proceed.

TABLES

Table 1
Cost Breakdown
Former V&L Stripping
Green Bay, Wisconsin

Task 1: Pre-Remedial Implementation Planning and Coordination

Mach IV Services

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

Administrative Assistant	4 hrs @	$44.00	$176.00
Staff Scientist 2	8 hrs @	$77.00	$616.00
Project Manager	4 hrs @	$130.00	$520.00
		Subtotal	**$1,312.00**
	TOTAL COST TASK 1:		**$1,312.00**

Task 2: Remedial Action Work Plan and Injection Permitting

Mach IV Services

Injection Permitting

Administrative Assistant	4 hrs @	$44.00	$176.00
Staff Scientist 3	25 hrs @	$77.00	$1,925.00
Project Manager	6 hrs @	$130.00	$780.00
WDNR Fees	1 ea @	$500.00	$500.00
		Subtotal	**$3,381.00**

Preparation of Remedial Action Work Plan

Administrative Assistant	4 hrs @	$44.00	$176.00
Staff Scientist 3	20 hrs @	$77.00	$1,540.00
Drafter	2 hrs @	$57.00	$114.00
Project Manager	6 hrs @	$130.00	$780.00
Principal Review	2 hrs @	$139.00	$278.00
Miscellaneous Expenses	1 lump @	$100.00	$100.00
		Subtotal	**$2,988.00**
	TOTAL COST TASK 2:		**$6,369.00**

Task 3: Amendment Injection

Mach IV Services

Field Services- Injection Point Installation

Administrative Assistant	0 hrs @	$44.00	$0.00
Staff Scientist 3	45 hrs @	$77.00	$3,465.00
Project Manager	10 hrs @	$130.00	$1,300.00
Mileage	0 mi @	.51	$0.00
Per Diem	0 nights @	$100.00	$0.00
		Subtotal	**$4,765.00**

Subcontractor Services

Injection Point Installation

Geoprobe Point Installation and Injection	4 day @	$2,300.00	$9,200.00
Electron Donor Amendment- CAP 18 ME	1 lump @	$5,200.00	$5,200.00
		Subtotal	**$14,400.00**

Investigative Waste Disposal

Soil Drums	3 each @	$250.00	$750.00
		Subtotal	**$750.00**
	TOTAL COST TASK 3:		**$19,915.00**

Task 4: Performance Monitoring- 1st Year Quarterly

1st Quarter

Field Services				
Staff Scientist 3	14 hrs @	$77.00	$1,078.00	
Staff Scientist 2	15 hrs @	$77.00	$1,155.00	
Project Manager	3 hrs @	$130.00	$390.00	
Principal Review	1 hrs @	$139.00	$139.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,962.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	
Methane, Ethane, Ethen	14 units @	$50.00	$693.00	
Sulfate, Nitrate, Iron, Manganese	14 units @	$54.00	$756.00	
Alkalinity	14 units @	$17.00	$238.00	
Chlorides	14 units @	$14.00	$189.00	
TOC	14 units @	$39.00	$546.00	**Subtotal: $3,478.00**
			SUBTOTAL 1ST QUARTER SAMPLE	**$6,440.00**

2nd Quarter

Field Services				
Staff Scientist 3	13 hrs @	$77.00	$1,001.00	
Staff Scientist 2	14 hrs @	$77.00	$1,078.00	
Project Manager	2 hrs @	$130.00	$260.00	
Principal Review	0 hrs @	$139.00	$0.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,539.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	
Methane, Ethane, Ethen	14 units @	$50.00	$693.00	
Sulfate, Nitrate, Iron, Manganese	14 units @	$54.00	$756.00	
Alkalinity	14 units @	$17.00	$238.00	
Chlorides	14 units @	$14.00	$189.00	
TOC	14 units @	$39.00	$546.00	**Subtotal: $3,478.00**
			SUBTOTAL 2ND QUARTER SAMPLE	**$6,017.00**

3rd Quarter

Field Services				
Staff Scientist 3	13 hrs @	$77.00	$1,001.00	
Staff Scientist 2	14 hrs @	$77.00	$1,078.00	
Project Manager	2 hrs @	$130.00	$260.00	
Principal Review	0 hrs @	$139.00	$0.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,539.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	
Methane, Ethane, Ethen	14 units @	$50.00	$693.00	
Sulfate, Nitrate, Iron, Manganese	14 units @	$54.00	$756.00	
Alkalinity	14 units @	$17.00	$238.00	
Chlorides	14 units @	$14.00	$189.00	
TOC	14 units @	$39.00	$546.00	**Subtotal: $3,478.00**
			SUBTOTAL 3rd QUARTER SAMPLE	**$6,017.00**

4th Quarter

Field Services				
Staff Scientist 3	13 hrs @	$77.00	$1,001.00	
Staff Scientist 2	14 hrs @	$77.00	$1,078.00	
Project Manager	4 hrs @	$130.00	$520.00	
Principal Review	1 hrs @	$139.00	$139.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,938.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	
Methane, Ethane, Ethen	14 units @	$50.00	$693.00	
Sulfate, Nitrate, Iron, Manganese	14 units @	$54.00	$756.00	
Alkalinity	14 units @	$17.00	$238.00	
Chlorides	14 units @	$14.00	$189.00	
TOC	14 units @	$39.00	$546.00	**Subtotal: $3,478.00**
			SUBTOTAL 4TH QUARTER SAMPLE	**$6,416.00**

SUBTOTAL TASK 4: Laboratory Analytical 1st Year: $13,912.00

SUBTOTAL TASK 4: Mach IV Services 1st Year: $10,978.00

Task 4: Performance Monitoring- 2nd Year Quarterly

1st Quarter

Field Services				
Staff Scientist 3	13 hrs @	$77.00	$1,001.00	
Staff Scientist 2	14 hrs @	$77.00	$1,078.00	
Project Manager	2 hrs @	$130.00	$260.00	
Principal Review	0 hrs @	$139.00	$0.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,539.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	
Methane, Ethane, Ethen	14 units @	$50.00	$693.00	
Sulfate, Nitrate, Iron, Manganese	14 units @	$54.00	$756.00	
Alkalinity	14 units @	$17.00	$238.00	
Chlorides	14 units @	$14.00	$189.00	
TOC	14 units @	$39.00	$546.00	**Subtotal: $3,478.00**
			SUBTOTAL 1ST QUARTER SAMPLE	**$6,017.00**

2nd Quarter

Field Services				
Staff Scientist 3	13 hrs @	$77.00	$1,001.00	
Staff Scientist 2	14 hrs @	$77.00	$1,078.00	
Project Manager	2 hrs @	$130.00	$260.00	
Principal Review	0 hrs @	$139.00	$0.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,539.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	
Methane, Ethane, Ethen	14 units @	$50.00	$693.00	
Sulfate, Nitrate, Iron, Manganese	14 units @	$54.00	$756.00	
Alkalinity	14 units @	$17.00	$238.00	
Chlorides	14 units @	$14.00	$189.00	
TOC	14 units @	$39.00	$546.00	**Subtotal: $3,478.00**
			SUBTOTAL 2ND QUARTER SAMPLE	**$6,017.00**

3rd Quarter

Field Services				
Staff Scientist 3	12 hrs @	$77.00	$924.00	
Staff Scientist 2	13 hrs @	$77.00	$1,001.00	
Project Manager	2 hrs @	$130.00	$260.00	
Principal Review	0 hrs @	$139.00	$0.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,385.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	**Subtotal: $1,056.00**
			SUBTOTAL 3rd QUARTER SAMPLE	**$3,441.00**

4th Quarter

Field Services				
Staff Scientist 3	12 hrs @	$77.00	$924.00	
Staff Scientist 2	13 hrs @	$77.00	$1,001.00	
Project Manager	4 hrs @	$130.00	$520.00	
Principal Review	1 hrs @	$139.00	$139.00	
Equipment	1 lump @	$200.00	$200.00	**Subtotal: $2,784.00**
Laboratory Analytical				
VOCs (2 QA/QC samples)	16 units @	$66.00	$1,056.00	**Subtotal: $1,056.00**
			SUBTOTAL 4th QUARTER SAMPLE	**$3,840.00**

Subtotal Task 4: Laboratory Analytical 2nd Year: $9,068.00

Subtotal Task 4: Mach IV Field Services 2nd Year: $10,247.00

Subtotal Cost Task 4: Year 1 and 2 Monitoring: $44,205.00

Investigative Waste Disposal

Groundwater Drums	3 ea @	$250.00	$750.00	**Subtotal: $750.00**
			SUBTOTAL TASK 4: WASTE DISPOSAL:	**$750.00**

TOTAL COST TASK 4: $44,955.00

Task 5: VMS Installation and Air Sampling

Mach IV Services

Field Services Oversight VMS Installation

Staff Scientist 3	10 hrs @	$77.00	$770.00
Project Manager	2 hrs @	$130.00	$260.00
		Subtotal	**$1,030.00**

Field Services Vapor Intrusion Sampling (2 Events)

Staff Scientist 3	8 hrs @	$77.00	$616.00
Project Manager	2 hrs @	$130.00	$260.00
Equipment	1 ea @	$75.00	$75.00
		Subtotal	**$951.00**
	SUBTOTAL TASK 5: MACH IV SERVICES		**$1,981.00**

Subcontractor Services

Laboratory Analytical- Vapor Intrusion (2 Events)

Air- TO 15 (includes summa canister with controller	8 ea @	$275.00	$2,200.00

Vapor Mitigation Installation- Subcontractor

Diagnostic Testing	1 lump @	$600.00	$600.00
System Installation and Equipment	1 lump @	$3,750.00	$3,750.00
	SUBTOTAL TASK 5: SUBCONTRACTOR SERVICES		**$6,650.00**
		TOTAL COST TASK 5:	**$8,631.00**

Task 6: Reporting

Mach IV Services

Reporting- Status Report, 1st Year Report, Closure Report

Administrative Assistant	12 hrs @	$44.00	$528.00
Drafter	12 hrs @	$57.00	$684.00
Staff Scientist 2	30 hrs @	$77.00	$2,310.00
Staff Scientist 3	65 hrs @	$77.00	$5,005.00
Project Manager	30 hrs @	$130.00	$3,900.00
Principal Review	6 hrs @	$139.00	$834.00
WDNR FEES	1 lump @	$1,700.00	$1,700.00
Copying and Shipping	3 ea @	$100.00	$300.00
		Subtotal:	**$15,261.00**
		TOTAL COST TASK 6:	**$15,261.00**

Task 7: Monitoring Well Abandonment and DERP Claim Preparation

Mach IV Services

Monitoring Well Abandonment- Includes Injection Point Abandonment

Staff Scientist 2	12 hrs @	$77.00	$924.00
Project Manager	2 hrs @	$130.00	$260.00
Equipment (Bentonite)	1 ea @	$100.00	$100.00
		Subtotal:	**$1,386.00**

DERP Claim Prep (Estimated 4 Claims)

Administrative Assistant	120 hrs @	$44.00	$5,280.00
Project Manager	8 hrs @	$130.00	$1,040.00
		Subtotal:	**$6,320.00**
		TOTAL COST TASK 7:	**$7,706.00**

Total Estimated Subcontractor Cost: $45,530.00
Total Estimated Mach IV Cost: $58,619.00
TOTAL Estimated Project Cost: $104,149.00

APPENDIX A
CAP 18 ME OVERVIEW

CAP 18® Anaerobic Bioremediation Product

TECHNICAL OVERVIEW

BACKGROUND

CAP 18® anaerobic bioremediation product is a formulation of food-grade, long-chain (C18) fatty acids, refined from natural vegetable oils, for environmental remediation solutions. CAP 18 can be used for cost-effective, rapid treatment of chlorinated solvents, perchlorate, nitrate, and explosives, found as contaminants in soil and groundwater. CAP 18 remediation is accomplished in-place without high capital costs, disruptive site activities, or complex engineered delivery systems.

CAP 18 stimulates microbes living in the soil and aquifer to naturally degrade contaminants under anaerobic (oxygen-free) conditions. The long-chain fatty acids are consumed via a process known as beta-oxidation, which establishes optimal anaerobic conditions for contaminant degradation, and produces hydrogen over a sustained period of time (many months to years). The hydrogen is utilized by microbes to biologically destroy contaminants by stripping chlorine or nitrogen atoms from the molecule. Unlike many other bioremediation substrates, CAP 18 inhibits microbial reduction of acetate to methane, thereby providing more substrate for hydrogen generation, and reducing microbial reduction of carbon dioxide with hydrogen.

ADVANTAGES

Low capital cost. CAP 18 can be applied with standard direct-push techniques or via standard monitoring wells. No permanent equipment is required.

Low maintenance cost. After CAP 18 injection, the only continuing costs are routine sampling common to all remediation systems. In some cases, more than one application may be necessary.

Low cost. Normalized to the cost of hydrogen produced, CAP 18 is the same cost or often less expensive than other soluble or insoluble substrates.

Minimal site disruption. CAP 18 is emplaced rapidly (typically in hours or days) with mobile equipment. No equipment is left onsite to be maintained, occupy valuable space, or disrupt site operations.

Viscosity similar to vegetable oil. CAP 18 is a liquid that can be injected via monitoring wells or temporary points using standard grout pumps or diaphragm pumps.

Hydrogen source that lasts for months. CAP 18 dissolves slowly and provides a long-term hydrogen source that lasts for months. Unlike more soluble or less viscous amendments, frequent re-injection or recirculation systems are not necessary.

Ideal for diverse aquifer conditions. CAP 18 is a metabolically diverse substrate composed of C18 fatty acids, which produces a wide range of compounds for microbial hydrogen production ideal for diverse aquifer conditions.

Concentrated hydrogen source. CAP 18 provides fuel to establish optimal groundwater conditions and overcome competitive demand.

Hydrogen utilization for contaminant destruction. CAP 18 contains natural compounds that inhibit microbial reduction of acetate to methane. Compared to other substrates, CAP 18 yields efficient hydrogen utilization for contaminant destruction rather than for methane production.

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Fax + 1 815 224 6697

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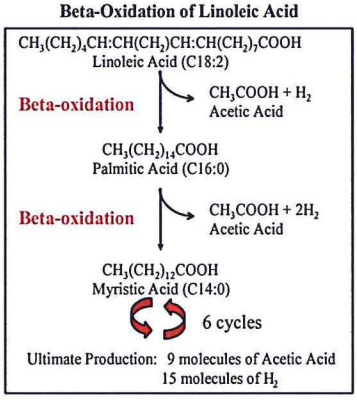
HOW CAP 18 WORKS

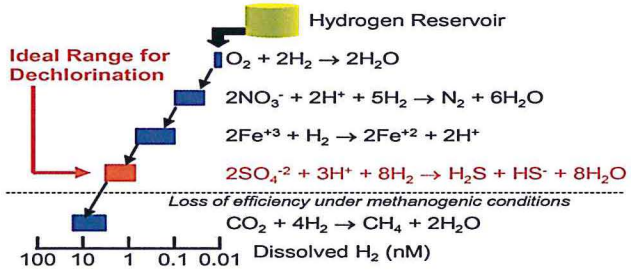
CAP 18® anaerobic bioremediation product dissolves slowly to release C18 fatty acids. The C18 fatty acids stimulate microbial hydrogen production. Other microbes then use the hydrogen produced to reduce the contaminants. The steps involved are as follows:

Step 1. Beta-Oxidation. Long-chain fatty acids are natural components of vegetable oils. Microbes digest long-chain fatty acids, derive energy, and produce hydrogen by a process known as beta-oxidation. Beta-oxidation is a four-step, enzyme-mediated sequence of oxidation, hydrolysis, and thiolysis reactions that occurs in all microbes and animals. During beta-oxidation, the fatty acid molecule is cleaved to produce acetic acid and hydrogen, and the parent fatty acid is shortened by a two-carbon sequence. The shortened fatty acid molecule continues to repeat this cycle, and is ultimately reduced to either acetic or proprionic acid. Each cycle produces two to four hydrogen atoms, which are then available for reduction of organic contaminants. For example, beta-oxidation of linoleic acid, a C18 fatty acid and component of CAP 18, produces 9 molecules of acetic acid and 15 molecules of H_2. The hydrogen yield is approximately 1 lb H_2 per 9.7 lbs of CAP 18.



Step 2. Microbial Hydrogen Utilization. Microbes first utilize the hydrogen produced to reduce oxygen, followed sequentially by nitrate (and perchlorate, if present) and iron. The aquifer then moves into sulfate-reducing conditions, resulting in optimal conditions for reduction of the targeted contaminants.

Microbial Hydrogen Utilization Sequence



The most efficient hydrogen utilization for contaminant degradation generally occurs under sulfate-reducing conditions; if the aquifer becomes too strongly reducing and enters methanogenic conditions, hydrogen is utilized by bacteria to produce methane (CH_4) rather than contaminant degradation. CAP 18 inhibits microbial methane generation, resulting in efficient hydrogen utilization for contaminant degradation.

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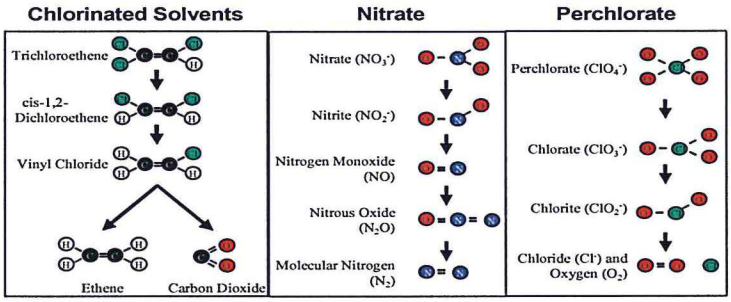
Step 3. Contaminant Reduction. Once the aquifer conditions are appropriate, microbes known as dehalorespirers utilize the hydrogen to reduce common chlorinated solvents such as perchloroethylene, trichloroethylene, and trichloroethane. Other microbes can reduce additional contaminants, such as nitrate, perchlorate, and explosives. Biological reduction proceeds sequentially through a series of intermediates. The steps involved in reduction of chlorinated solvents results in sequential replacement of one chlorine atom with one hydrogen atom (a process known as reductive dechlorination). Similar intermediates occur for reduction of nitrate and perchlorate, in which oxygen is stripped from the nitrogen or chlorine atom.

Microbial Degradation Pathways



Step 4. Inhibition of Methanogenesis. One of the major problems with many bioremediation amendments is that the aquifer becomes so anaerobic that microbes known as methanogens compete more effectively for hydrogen than do the contaminant-destroying microbes. Two pathways exist for microbial methane production: acetoclastic methanogenesis, in which microbes reduce acetate to methane and carbon dioxide and hydrogenotrophic methanogenesis, in which microbes reduce carbon dioxide with hydrogen:

Acetoclastic Methanogenesis: $CH_3COOH \rightarrow CH_4 + CO_2$
Hydrogenotrophic Methanogenesis: $CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$

Acetoclastic methanogenesis is believed to account for most (65-80%) natural methane production. Unsaturated C18 fatty acids, which primarily comprise CAP 18® anaerobic bioremediation product, are known to inhibit acetoclastic methanogenesis. This provides two key benefits:

1) Acetate is available for further hydrogen production, rather than utilized for methanogenesis
2) Less CO_2 is produced to feed hydrogenotrophic methanogens, thus preserving hydrogen for reductive dechlorination.

Inhibition of methanogenesis does not harm the dehalorespirers or other microbes that reduce targeted contaminants, and is a unique attribute of unsaturated C18 fatty acids. Inhibition of methanogenesis is not reported for molasses, lactic acid, or other common bioremediation additives.

Specific references on microbial degradation of long-chain fatty acids, and mechanisms for inhibition of methanogenesis by C18 fatty acids, are provided under "Fatty Acid Degradation" in the references section at the end of this technical brochure.

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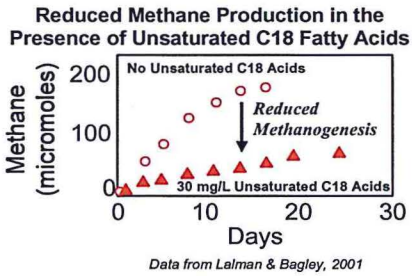

Data from Lalman & Bagley, 2001

LIMITATIONS OF CAP 18

CAP 18® anaerobic bioremediation product offers numerous advantages over other products. However, all bioremediation products share certain limitations, such as application to dense non-aqueous phase liquids (DNAPLs), distribution in impermeable aquifer matrices, adequate site characterization, etc. If water is used in the injection process, ensure the water is unchlorinated or dechlorinated to reduce disinfectant properties.

HOW TO APPLY CAP 18

CAP 18 project design is based first upon an accurate site characterization. Once the site is characterized, widely published protocols are useful for determining if a site is appropriate for stimulating natural biodegradation in general, including:

U.S. Environmental Protection Agency. 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water. Report EPA/600/R-98/128, available for download at: www.afcee.brooks.af.mil/er/erhome.asp.

U.S. Environmental Protection Agency. 2000. Engineered Approaches to *In Situ* Bioremediation of Chlorinated Solvents: Fundamentals and Field Applications. Report EPA/542/R-00/008, available for download at: www.clu-in.org/download/remed/engappinsitbio.pdf.

The following are important design criteria that should be evaluated specifically prior to CAP 18 application:

Contaminant Mass and Distribution. This requires consideration of the concentration of contaminants in the dissolved and sorbed phase, and the volume of groundwater and soil present within the treatment area. Calculations also require estimates of factors such as total and effective porosity, and bulk density.

Background Demand. The background hydrogen demand is generally higher than the contaminant demand. Background demand includes accounting for hydrogen that is consumed for reduction of oxygen, nitrate, manganese, iron, and sulfate in groundwater and soil. Water hardness (calcium and magnesium concentration) must also be accounted for.

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DESIGN TYPES

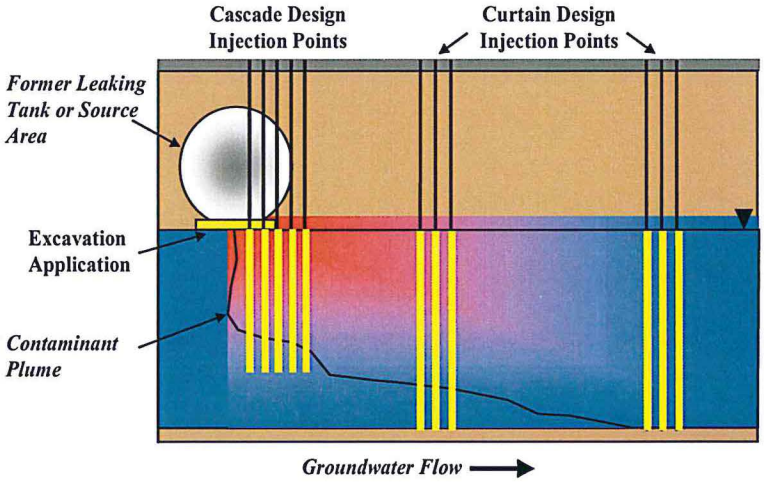
CAP 18® anaerobic bioremediation product can be applied in many designs: across treatment areas with a grid pattern of injection points (cascade design), as a barrier through which groundwater moves (curtain design), or directly into excavated areas. CAP 18 has a viscosity similar to vegetable oil. It can often be injected via standard monitoring wells, or via temporary well points installed by direct-push techniques. Although general design options are provided, application methods are very flexible with CAP 18.

Cascade Design. Injection points are spaced in a grid pattern covering the horizontal and vertical extent of the treatment area. The volume of CAP 18 injected per point can vary based upon the contaminant concentrations.

Curtain Design. In some cases the size of the plume or use of complimentary remediation technologies make the cascade design less appropriate than the curtain design. With the curtain design, injection points are placed in one or more rows perpendicular to the plume migration direction. The number of rows is determined by the groundwater seepage velocity and the desired frequency of injection events.

Excavations. CAP 18 can also be applied directly at the base of open excavations, following removal of the most contaminated materials. This type of application is ideal for providing a preemptive remedy to addressing residual sorbed and dissolved contaminants directly at the source before the contaminants disperse in a groundwater plume.

CAP 18 Application Designs



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MATERIAL HANDLING AND SAFETY

CAP 18® anaerobic bioremediation product is shipped in 55-gallon poly drums (425 lbs), totes (2,100 lbs), or by bulk truck (10,000+ lbs). The product has a specific gravity of approximately 0.93 (density of approximately 7.7 lbs per gallon). CAP 18 has a viscosity very similar to vegetable oil, which at room temperature is approximately 53.6 centipoise. Viscosity is temperature dependent, and increases at lower temperatures. Most double diaphragm or grout pumps will easily pump CAP 18. CAP 18 can be warmed for easier application (an immersion heater placed in a drum or an intermediate holding tank is very effective), but care should be taken not to overheat the product above a temperature of approximately 80°F to prevent the risk of skin burns. CAP 18 is delivered in opaque containers and should not be exposed to direct sunlight. Pumping systems can be cleaned after use with hot water and environmentally safe detergents.

A material safety data sheet is provided with every shipment. CAP 18 is a food-grade product. However, field personnel should wear appropriate personal protective equipment, especially eye protection. Only trained, experienced personnel should handle pressurized pumping systems, electrical immersion heaters, and other equipment onsite.

The U.S. Environmental Protection Agency regulates storage of vegetable oil products including CAP 18 as oils under the Clean Water Act, 40 CFR Part 112. This may apply if storage exceeds 1,320 gallons of CAP 18, including aggregate storage in 55-gallon drums, and the potential exists for discharge to navigable waters or their shorelines.

APPLICATION METHODS

As with any intrusive subsurface activity, ensure that overhead and underground utilities are cleared to prevent damage or personnel injury. Only trained, experienced personnel should operate drilling and pumping equipment. CAP 18 is not an extremely thick liquid and thus does not require pre-heating, specialized high-pressure pumps, or subassemblies for injection.

Direct-Push Injection. Injection can be readily accomplished through direct-push equipment. CAP 18 can be transferred directly to a grout pump hopper, or can be pumped from a drum or intermediate holding tank, using centrifugal or double diaphragm pumps. After advancing the drill rods to depth and displacing the disposable tip, connect an appropriate hose from the pump with a threaded or quick-connect fitting to the top rod. CAP 18 can be injected in place or as the rods are extracted. Double diaphragm pumps and grout pumps work effectively for injection. Injection volumes should be monitored to ensure placement of the desired volume of CAP 18 in each interval. Drill rods may be filled with water or CAP 18 prior to injection to prevent running sands and to displace air within the rods, and air should also be displaced from the transfer hose before connecting to the rods. Be aware of aquifer refusal, particularly in relatively impermeable formations; do not allow high pressures to build and exceed hose or fitting capacities, or present a safety risk.

Temporary / Permanent Well Injection. The viscosity of CAP 18 is sufficiently low that injection can be accomplished through existing or newly installed, permanent or temporary well points. Selection of an injection method depends primarily on the formation and head; gravity systems are typically sufficient in highly permeable formations and with sufficient head (generally at least 15 ft) to overcome hydrostatic pressure. Pressurized injection requires an appropriate, threaded connection at the well head; packer systems are not recommended due to the potential for slippage in the well from insufficient inflation or the presence of the CAP 18 reagent. Pressurized injection can be accomplished with a double diaphragm pump or grout pump, with supply directly from the reagent drum, or with an intermediate storage tank that is supplied from a bulk tanker truck. Be aware of aquifer refusal, particularly in relatively impermeable formations; do not allow high pressures to build and exceed hose or fitting design capacities, or present a safety risk.

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GROUNDWATER ANALYTES RECOMMENDED

Important factors for estimating the amount of CAP 18® anaerobic bioremediation product required for a site include evaluation of the volume of the treatment area and basic hydrological and soil parameters such as bulk density, porosity, hydraulic conductivity, and gradient. The concentrations of all contaminants that undergo anaerobic degradation should be measured in both soil and groundwater (groundwater concentrations can be utilized to estimate soil concentrations using distribution coefficients). Analytes recommended in order to estimate the natural background demand include dissolved oxygen, nitrate, total iron, manganese (available for reduction), sulfate, and calcium (or hardness) concentrations.

Guidance on parameters that can be measured to evaluate performance of *in situ* bioremediation is provided in U.S. Environmental Protection Agency documents cited previously. The types and numbers of analytes measured at a site can vary widely based upon project scope and data quality objectives. In addition to the contaminants, useful and relatively easily measured analytes include dissolved oxygen, oxidation-reduction potential, and pH of the groundwater. Other analytes can include nitrate, iron (total and Fe(II)), sulfate, manganese, alkalinity, or concentration of dissolved gases, including hydrogen, ethene, ethane, methane, and carbon dioxide; and carboxylic acid concentrations.

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Peru, IL U.S.A.
Tel. + 1 815 223 1500
1 800 435 6856 (Toll free US Only)
Fax + 1 815 224 6697

Carus Europe
Asturias, Spain
Tel + 34 985 78 55 13
Fax + 34 985 78 55 10

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E-Mail: salesmkt@caruscorporation.com

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CAP 18® Anaerobic Bioremediation Product
Volatile Organic Compounds Site

CASE HISTORY

SITE CONDITIONS AND APPROACH

Site Name, Location: YSI, Incorporated, Yellow Springs, Ohio
Consultant: BHE Environmental, Inc., Cincinnati, Ohio

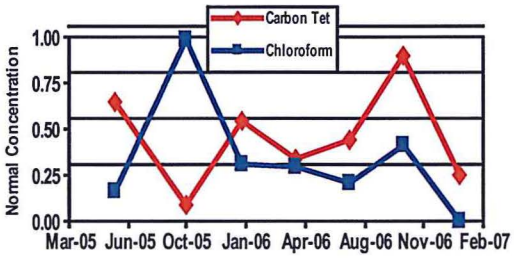
Groundwater impacted with volatile organic compounds (VOCs) is present in two areas of the site: the former loading dock (FLD) with carbon tetrachloride (CT) and chloroform (CF), and the current loading dock (CLD) with 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (DCE), and 1,1-dichloroethane (DCA). Soils at the site are glacial till materials overlying limestone bedrock at 20-25 feet below grade.

- Carbon tetrachloride and chloroform concentrations up to 32 ug/L
- TCA, DCA, and DCE concentrations up to 600 ug/L
- Glacial till soil, low permeability
- Direct push injection with 25 injection points per area
- 8,500 lbs CAP 18® anaerobic bioremediation product

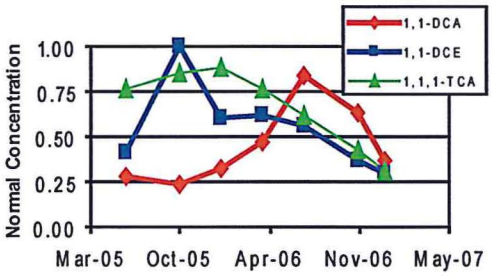
There were 25 injection points in each area. Access in the CLD was limited because many of the locations were in the building's basement. Each point received approximately 170 pounds of CAP 18 injected via direct-push methods.

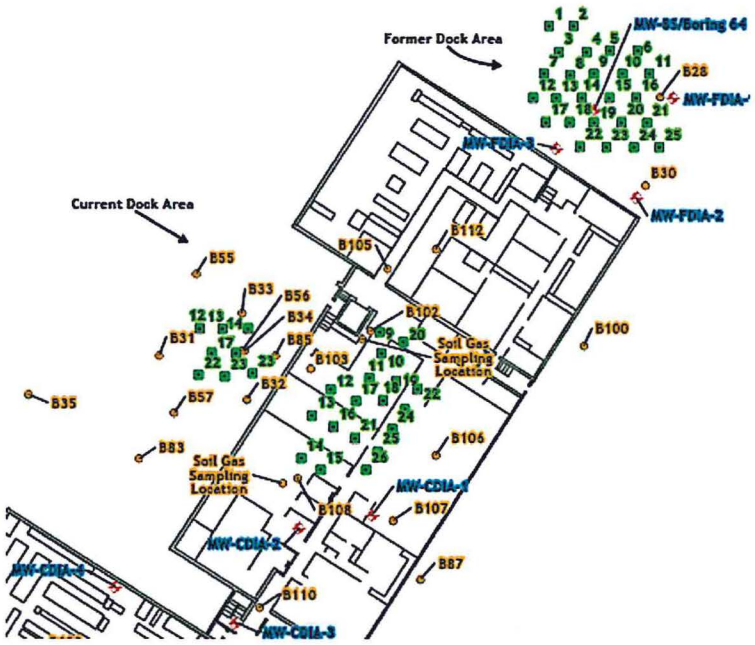
TREATMENT RESULTS

At the FLD, average normalized CT concentrations initially increased after injection but have decreased by 75% since then, with a current maximum concentration of 7.04 ug/L. CT degradation has been matched with CF formation, which has subsequently also degraded and is currently not detected.



At the CLD, average normalized TCA concentrations have decreased by 70%. Concentrations of DCA and DCE initially increased, but have subsequently decreased by 64% and 70%, respectively, relative to their maximum concentrations. TCA concentrations are below cleanup goals.





Single injection of CAP 18
Strongly reducing conditions maintained for 1.5 years to date
Complete dechlorination of carbon tetrachloride and of trichloroethane occurring

Carus Corporation
Peru, IL U.S.A.
Tel. + 1 815 223 1500
1 800 435 6856 (Toll free US Only)
Fax + 1 815 224 6697

Certified Company
Carus Europe
Asturias, Spain
Tel + 34 985 78 55 13
Fax + 34 985 78 55 10

Web: www.caruscorporation.com
E-Mail: salesmkt@caruscorporation.com

APPENDIX B
INSURANCE CERTIFICATE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/17/16

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

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

PRODUCER

Maurer Insurance Agency
2835 W College Ave
Appleton, WI 54914
Phone (920) 560-5800 Fax (920) 560-5438

CONTACT NAME: Michael Gordee
PHONE (A/C, No, Ext): (920) 560-5800 **FAX (A/C, No):** (920) 560-5438
E-MAIL ADDRESS: scott@maurer-insurance.com

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A :	Lloyds London	
INSURER B :	Auto Owners	
INSURER C :	Indiana Ins. Co.	
INSURER D :		
INSURER E :		
INSURER F :		

INSURED

MACH IV ENGINEERING AND SURVEYING, LLC
211 N. Broadway, Ste 114
Green Bay, WI 54303 (920) -5695765

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

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

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
C	**GENERAL LIABILITY** ☑ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☑ OCCUR ☐ ☐ GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☑ PRO-JECT ☑ LOC	Y	Y	BKS55253170 CG2037/CG8810	08/22/2016	08/22/2017	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG 	$ 1,000,000.00 $ 50,000.00 $ 5,000.00 $ 1,000,000.00 $ 2,000,000.00 $ 2,000,000.00 $
B	**AUTOMOBILE LIABILITY** ☐ ANY AUTO ☐ ALL OWNED AUTOS ☑ SCHEDULED AUTOS ☐ HIRED AUTOS ☑ NON-OWNED AUTOS ☐ ☐	Y	Y	48165920	09/04/2016	09/04/2017	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$ 1,000,000.00 $ $ $ $
C	☑ **UMBRELLA LIAB** ☑ OCCUR ☐ **EXCESS LIAB** ☐ CLAIMS-MADE ☐ DED ☑ RETENTION $ 10,000.00	Y	Y	US055253170	08/22/2016	08/22/2017	EACH OCCURRENCE AGGREGATE 	$ 5,000,000.00 $ 5,000,000.00 $
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	61042793	09/04/2016	09/04/2017	☑ WC STATU-TORY LIMITS ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYE E.L. DISEASE - POLICY LIMIT	 $ 100,000.00 $ 100,000.00 $ 500,000.00
A	Prof Liab / E & O			EL00-53-00752017 Retro Date 10/11/2007	10/11/2016	10/11/2017	$1,000,000 ea claim/$2,000,000 aggregate	

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

CERTIFICATE HOLDER

General COI

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

Scott Maurer

APPENDIX C
SERVICES AGREEMENT

SHORT FORM OF AGREEMENT BETWEEN OWNER AND ENGINEER FOR PROFESSIONAL SERVICES

THIS IS AN AGREEMENT effective as of April 1, 2017 ("Effective Date") between

Ken Juza ("Owner")

and Mach IV Engineering & Surveying LLC ("Engineer")

Engineer agrees to provide the services described below to Owner for Former V&L Stripping Remedial Action – 02-05-216722 DERF Fund ("Project").

Description of Engineer's Services:

Scope of Services:
Per Remedial Action Plan – April 1, 2017

Owner and Engineer further agree as follows:

1.01 Basic Agreement

A. Engineer shall provide, or cause to be provided, the services set forth in this Agreement, and Owner shall pay Engineer for such Services as set forth in Paragraph 9.01. This Agreement is open for acceptance for 30 days from the Effective Date.

2.01 Payment Procedures

A. *Preparation of Invoices*: Engineer will prepare a monthly invoice in accordance with Engineer's standard invoicing practices and submit the invoice to Owner.

B. *Payment of Invoices*: Invoices are due and payable within 30 days of receipt. If Owner fails to make any payment due Engineer for services and expenses within 30 days after receipt of Engineer's invoice, the amounts due Engineer will be increased at the rate of 1.0% per month (or the maximum rate of interest permitted by law, if less) from said thirtieth day. In addition, Engineer may, without liability, after giving seven days written notice to Owner, suspend services under this Agreement until Engineer has been paid in full all amounts due for services, expenses, and other related charges. Payments will be credited first to interest and then to principal.

3.01 Additional Services

A. If authorized by Owner, Engineer shall furnish services in addition to those set forth above.

B. Owner shall pay Engineer authorized for such additional services as follows: For additional services of Engineer's employees engaged directly on the Project an amount equal to the cumulative hours charged to the Project by each class of Engineer's employees times standard hourly rates for each applicable billing class; plus reimbursable expenses and Engineer's consultants' charges, if any.

4.01 Termination

A. The obligation to provide further services under this Agreement may be terminated:

1. For cause,

a. By either party upon 30 days written notice in the event of substantial failure by the other party to perform in accordance with the Agreement's terms through no fault of the terminating party.

b. By Engineer:

1) upon seven days written notice if Engineer believes that Engineer is being requested by Owner to furnish or perform services contrary to Engineer's responsibilities as a licensed professional; or

2) upon seven days written notice if the Engineer's services for the Project are delayed or suspended for more than 90 days for reasons beyond Engineer's control.

3) Engineer shall have no liability to Owner on account of such termination.

c. Notwithstanding the foregoing, this Agreement will not terminate as a result of a substantial failure under paragraph 4.01.A.1.a if the party receiving such notice begins, within seven days of receipt of such notice, to correct its failure and proceeds diligently to cure such failure within no more than 30 days of receipt of notice; provided, however, that if and to the extent such substantial failure cannot be reasonably cured within such 30 day period, and if such party has diligently attempted to cure the same and thereafter continues diligently to cure the same, then the cure period provided for herein shall extend up to, but in no case more than, 60 days after the date of receipt of the notice.

2. For convenience, by Owner effective upon the receipt of notice by Engineer.

B. The terminating party under paragraphs 4.01.A.1 or 4.01.A.2 may set the effective date of termination at a time up to 30 days later than otherwise provided to allow Engineer to demobilize personnel and equipment from the Project site, to complete tasks whose value would otherwise be lost, to prepare notes as to the status of completed and uncompleted tasks, and to assemble Project materials in orderly files.

5.01 Controlling Law

A. This Agreement is to be governed by the law of the state in which the Project is located.

6.01 Successors, Assigns, and Beneficiaries

A. Owner and Engineer each is hereby bound and the partners, successors, executors, administrators, and legal representatives of Owner and Engineer (and to the extent permitted by paragraph 6.01.B the assigns of Owner and Engineer) are hereby bound to the other party to this Agreement and to the partners, successors, executors, administrators, and legal representatives (and said assigns) of such other party, in respect of all covenants, agreements, and obligations of this Agreement.

B. Neither Owner nor Engineer may assign, sublet, or transfer any rights under or interest (including, but without limitation, moneys that are due or may become due) in this Agreement without the written consent of the other, except to the extent that any assignment, subletting, or transfer is mandated or restricted by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement.

7.01 General Considerations

A. The standard of care for all professional engineering and related services performed or furnished by Engineer under this Agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality. Engineer makes no warranties, express or implied, under this Agreement or otherwise, in connection with Engineer's services. Engineer and its consultants may use or rely upon the design services of others, including, but not limited to, contractors, manufacturers, and suppliers.

B. Engineer shall not at any time supervise, direct, or have control over any contractor's work, nor shall Engineer have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected or used by any contractor, for safety precautions and programs incident to a contractor's work

progress, nor for any failure of any contractor to comply with laws and regulations applicable to contractor's work.

C. Engineer neither guarantees the performance of any contractor nor assumes responsibility for any contractor's failure to furnish and perform its work in accordance with the contract between Owner and such contractor.

D. Engineer shall not be responsible for the acts or omissions of any contractor, subcontractor, or supplier, or of any contractor's agents or employees or any other persons (except Engineer's own employees) at the Project site or otherwise furnishing or performing any of construction work; or for any decision made on interpretations or clarifications of the construction contract given by Owner without consultation and advice of Engineer.

E. The general conditions for any construction contract documents prepared hereunder are to be the "Standard General Conditions of the Construction Contract as prepared by the Engineers Joint Contract Documents Committee (No. C-700, 2002 Edition).

F. All design documents prepared or furnished by Engineer are instruments of service, and Engineer retains an ownership and property interest (including the copyright and the right of reuse) in such documents, whether or not the Project is completed.

G. To the fullest extent permitted by law, Owner and Engineer (1) waive against each other, and the other's employees, officers, directors, agents, insurers, partners, and consultants, any and all claims for or entitlement to special, incidental, indirect, or consequential damages arising out of, resulting from, or in any way related to the Project, and (2) agree that Engineer's total liability to Owner under this Agreement shall be limited to $250,000 or the total amount of compensation received by Engineer, whichever is greater.

H. The parties acknowledge that Engineer's scope of services does not include any services related to a Hazardous Environmental Condition (the presence of asbestos, PCBs, petroleum, hazardous substances or waste, and radioactive materials). If Engineer or any other party encounters a Hazardous Environmental Condition, Engineer may, at its option and without liability for consequential or any other damages, suspend performance of services on the portion of the Project affected thereby until Owner: (i) retains appropriate specialist consultants or contractors to identify and, as appropriate, abate, remediate, or remove the Hazardous Environmental Condition; and (ii) warrants that the Site is in full compliance with applicable Laws and Regulations.

I. Insurance. Engineer shall provide Owner a certificate of insurance, including coverage for Commercial General Liability, Auto, Worker's Compensation, and Contractor's Pollution Liability and Professional Liability. The certificate shall show Owner as additional insured for Commercial General Liability and Auto.

J. Indemnity. To the fullest extent permitted by law, Engineer shall indemnify and hold harmless Owner and its officers, directors, agents, servants, employees, and others as required by this Agreement from all claims for bodily injury and property damage that may arise from the performance of the Services caused by the negligent acts or omissions of the Engineer, the Engineer's subcontractors, or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable. Notwithstanding the foregoing, Engineer assumes no liability or responsibility for any pre-existing site conditions on or beneath the property or any claims, fines, penalties, or liability arising from said conditions.

8.01 Total Agreement

A. This Agreement (consisting of pages 1 to 4 inclusive together with any expressly incorporated appendix), constitutes the entire agreement between Owner and Engineer and supersedes all prior written or oral understandings. This Agreement may only be amended, supplemented, modified, or canceled by a duly executed written instrument.

9.01 Payment (Lump Sum Basis)

A. Using the procedures set forth in paragraph 2.01, Owner shall pay Engineer as follows:

1. A Lump Sum amount of $13,400.00

2. Subcontracted services, submittal fees, review fees and project expenses will be billed at actual cost plus 10%. Estimated fees are: $

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, the Effective Date of which is indicated on page 1.

OWNER:	ENGINEER:
By:	By: Joel A. Ehrfurth
Title:	Title: Managing Member
Date Signed:	Date Signed:
	License or Certificate No. and State: Wisconsin E-35719
Address for giving notices: Ken Juza 1478 Norfield Road Suamico, WI 54173	Address for giving notices: Mach IV Engineering & Surveying 2260 Salscheider Court Green Bay, WI 54313