



September 18, 2008

Project Reference #8857

Ms. Brenda Boyce  
Wisconsin Department of Natural Resources  
Bureau for Remediation and Redevelopment  
Waukesha Service Center  
141 NW Barstow Street, Room 180  
Waukesha, WI 53188

RE: Cost Estimate for Additional Monitoring  
Former Fabricare  
323 West Sunset Drive  
Waukesha, Wisconsin

**BRRTS #02-68-305374**

Dear Ms. Boyce:

On July 24, 2008, Sigma Environmental Services, Inc. (Sigma) issued a report titled Remediation Action Completion Report, Former Fabricare Site, 323 West Sunset Drive, Waukesha Wisconsin. The report detailed the remediation activities completed by Sigma from May 2005 through December 2007.

Relatively high residual source area impacts appear to continue to degrade the groundwater quality at the site. The total mass of KMnO<sub>4</sub> (5,900 lbs) introduced into the subsurface during the in situ treatment program is expected to address the potential contribution from the residual source area. Therefore, Sigma recommends additional groundwater monitoring to further evaluate the source area groundwater quality trends, identify any post-treatment rebound effect, and collect additional groundwater data to support case closure via natural attenuation. The proposed monitoring program would include sampling the entire monitoring well and injection well network (27 wells) for VOCs, methane, ethane, ethane, chloride and natural attenuation parameters (Redox, DO and pH) on an annual basis and select monitoring wells (MW-1 thru MW-4 and MW-8), piezometer PZ-1R and infiltration wells (IW-1 thru IW-3 and IW-7 thru IW-10) (13 wells) for VOCs, methane, ethane, ethane, chloride and natural attenuation parameters on a semi-annual basis for a period of two years. The data will be used to demonstrate on-going natural attenuation of the subsurface impacts.

Specifically, Sigma recommends the following tasks:

- 1) Sample all of the monitoring wells and the piezometer for volatile organic compounds (VOCs), methane, ethane, ethane, chloride on an annual basis. Additionally, collect groundwater samples from select wells and piezometer semi-annually for VOCs, methane, ethane, ethane, chloride and natural attenuation parameters (a groundwater sampling table is attached). Update the groundwater analytical isoconcentration map and results table, complete Mann-Kendall Statistical Test forms.
- 2) Complete a summary report after each sampling event to document the findings for submittal to the WDNR for review.

- 3) Evaluate whether the tetrachloroethene contamination poses a vapor intrusion threat to the building at the site by collecting sub-slab vapor samples.

A cost estimate for the aforementioned tasks is provided in **Table 1**. Sigma is requesting WDNR approval of **\$29,805.00** for the additional items proposed

If you have any questions, please call me at (414) 643-4126.

Respectfully submitted,

**SIGMA ENVIRONMENTAL SERVICES, INC.**



Mark H. Krueger, P.G., P.H.  
Senior Project Hydrogeologist



Randy E. Boness, P.G.  
Manager- Geosciences Group

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Attachments

**TABLE 1**  
**COST ESTIMATE**  
**FOR ADDITIONAL SITE INVESTIGATION ACTIVITIES**  
**FORMER FABRICARE**  
**323 WEST SUNSET DRIVE**  
**WAUKESHA, WISCONSIN**  
**Project Reference #8857**

	Item Description	Unit Price	Quantity	Units	Total Cost
<b>TASK 1</b>	<b>Two years of Semi-Annual Groundwater Sampling</b>				
	Senior Project Manager	\$ 125.00	12	hour	\$ 1,500.00
	Field Technician	\$ 75.00	88	hour	\$ 6,600.00
	<b>Equipment / Supplies</b>				
	Drums	\$ 30.00	14	drum	\$ 420.00
	WLI	\$ 15.00	4	day	\$ 60.00
	Bailer Kits	\$ 15.00	80	each	\$ 1,200.00
	<b>Groundwater Analytical</b>				
	VOCs	\$ 60.00	80	sample	\$ 4,800.00
	Methane, Ethane, Ethene Chloride	\$ 125.00	12	sample	\$ 1,500.00
		\$ 12.00	80	sample	\$ 960.00
	VOCs, Dup 1	\$ 60.00	8	sample	\$ 480.00
	VOCs, Equip 1	\$ 60.00	8	sample	\$ 480.00
	VOCs, Trip 1	NC			NC
	<b>Groundwater Disposal to POTW</b>				
	Field Technician	\$ 75.00	12	hour	\$ 900.00
					<b>Subtotal Task 1 \$ 18,900.00</b>
<b>TASK 2</b>	<b>Groundwater Monitoring Report (three semi-annual reports and one comprehensive report)</b>				
	Senior Hydrogeologist	\$ 125.00	30	hour	\$ 3,750.00
	Staff Hydrogeologist	\$ 75.00	50	hour	\$ 3,750.00
	CADD Technician	\$ 65.00	12	hour	\$ 780.00
					<b>Subtotal Task 2 \$ 8,280.00</b>
<b>TASK 3</b>	<b>Vapor Intrusion Evaluation</b>				
	Senior Hydrogeologist	\$ 125.00	4	hour	\$ 500.00
	Staff Hydrogeologist	\$ 75.00	12	hour	\$ 900.00
	<b>Equipment / Supplies</b>				
	Core barrel	\$ 250.00	1	day	\$ 250.00
	PID	\$ 75.00	1	day	\$ 75.00
	<b>Air Analytical</b>				
	VOCs -suma canisters	\$ 300.00	3	sample	\$ 900.00
					<b>Subtotal Task 3 \$ 2,625.00</b>
<b>TOTAL COST ESTIMATE</b>					<b>\$ 29,805.00</b>

**GROUNDWATER SAMPLING PROGRAM - ANNUAL**

**FORMER FABRICARE**

Monitoring Well	Water Level	VOC (Method 8260)	Methane/Ethane /Ethene	Chloride
MW-1	X	X		X
MW-2	X	X	X	X
MW-3	X	X		X
MW-4	X	X		X
WM-5	X	X		X
MW-6	X	X		X
MW-7	X	X		X
MW-9	X	X		X
MW-10	X	X		X
MW-11	X	X		X
MW-12	X	X		X
MW-13	X	X		X
PZ-1	X	X		X
PZ-3	X	X		X
IW-1	X	X		X
IW-2	X	X		X
IW-3	X	X	X	X
IW-4	X	X		X
IW-5	X	X		X
IW-6	X	X		X
IW-7	X	X		X
IW-8	X	X		X
IW-9	X	X		X
IW-10	X	X		X
IW-11	X	X	X	X
IW-12	X	X		X
IW-13	X	X		X
DUP 1	X	X		
DUP 2	X	X		
EQUIP 1	X	X		
EQUIP 2	X	X		
TRIP 1	X	X		



Groundwater sampling program - Semi Annual  
Former Fabricare

Monitoring Well	Water Level	VOC (Method 8260)	Methane/Ethane/Ethene/Carbon Dioxide	Chloride
MW-1	X	X		X
MW-2	X	X	X	X
MW-3	X	X		X
MW-4	X	X		X
MW-8	X	X		X
PZ-1R	X	X		X
IW-1	X	X		X
IW-2	X	X		X
IW-3	X	X	X	X
IW-7	X	X		X
IW-8	X	X		X
IW-9	X	X		X
IW-10	X	X	X	X
Dup1/Equip1		X		
Trip		X		