



LINCOLN

May 13, 1994

MAY 16 11 02 AM '94

APPLIED GEOLOGY, INC.
ENVIRONMENTAL CONSULTANTS

HAZARDOUS MATERIALS
MANAGEMENT DIVISION

Mr. Kevin McGargham
Union Mutual of Vermont
P.O. Box 158
Montpelier, Vt. 05601-0158

RE: Summary of Emergency Measures completed at the Burke Residence,
Forestdale, Vermont (Claim #67809) (VDEC Spill File #94-010).

Dear Mr. McGargham:

Lincoln Applied Geology, Inc. (LAG) has completed the installation of a vapor extraction system to mitigate fuel oil spill impacts at the Burke Residence in Forestdale, VT. It was proposed as an emergency measure in our March 2, 1994 fuel oil spill evaluation letter which was subsequently verbally approved by you on March 7, 1994. Tasks completed during this work phase:

1. The proper removal, storage, and disposal of the remaining fuel oil from the basement,
2. the installation of five vapor extraction wells and six vapor monitor points, and
3. the installation, start-up, and monitoring of the vapor extraction system.

During the initial visit on February 28, 1994 LAG evaluated the fuel oil impacts to the soils in basement of the residence. During that visit LAG hand installed five test pits to evaluate the subsurface conditions beneath the basement. As a result of this work, LAG recommended the installation of a vapor extraction system (VES) to remove fuel oil, as vapor, from the subsurface soils in the basement. Prior to the installation of the VES, LAG removed and properly disposed of the remaining fuel oil which was stored in unregulated containers in the basement. LAG also polyencapsulated the basement to prevent fuel oil vapors from entering the inhabited second floor of the residence. **Figure 1** shows the general location of the Burke Residence in Forestdale.

The VES was installed on March 23 and 24, 1994 and the system was initiated on April 6, 1994. Since this time the VES has been successfully reducing source area contamination and maintaining low to background vapor levels in both the lower and upper levels of the residence, allowing it to be continually inhabitable.

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The VES system was installed by hand digging (augering) five vapor extraction points throughout the basement. During hand installation of the VES wells the soils removed were assayed with a photoionization detector (PID) equipped with an 11.7 eV lamp. In general the majority of soils evaluated contained significantly elevated levels of fuel oil constituents. **Figure 2** shows the location of the vapor extraction wells and the extent of contamination noted in our March 2, 1994 correspondence. Polyvinyl chloride (PVC) materials were used for each VES well and the constructed wells were placed within the hand borings and backfilled with clean silica sand. A bentonite seal was placed above the sand pack to prevent surface air from entering the well through the sand pack.

The VES was connected by manifolding the VES wells together utilizing 4" PVC materials. The manifolded wells were then connected to a 1.5 horsepower Rotron blower discharging to two 55-gallon granular activated carbon (GAC) drums for vapor treatment prior to atmospheric discharge. The blower was connected to the building's existing electric service.

The system was started on April 6, 1994. Since that time the VES has been running effectively and reducing source area contamination. **Tables 1 and 2** contain photoionization detector (PID) and vacuum data obtained from the VES. **Chart 1** presents the cumulative gallons recovered and the influent PID levels over time. To date approximately 9 gallons of fuel oil have been recovered from the impacted soils. Please note that this value is only a relative estimate based on PID assays and vapor flow rates.

The site was initially monitored on a weekly schedule for the first 5 weeks of operation. We have since initiated a bi-weekly site visit schedule. During each monitoring visit vacuum, flow, and PID readings will be obtained. The GAC units will be replaced as they become saturated with fuel oil vapors. These data collected over the next several months will be used to estimate the cleanup time.

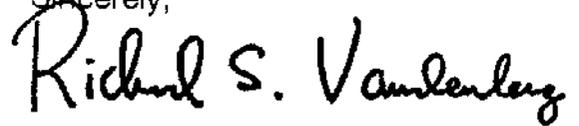
In conclusion, influent PID concentrations have declined throughout the monitoring, however, they are still significant enough to warrant continued VES operation. As a result of these conditions LAG recommends that the residence and VES continue to be monitored every two weeks throughout the early summer when another brief status report will be prepared with our conclusions and recommendations for the site. **Appendix A** contains a cost estimate for monitoring visits, GAC drum replacement, project evaluation, and our next brief summary report to be prepared in early August.



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If you have any questions, comments, or concerns with regard to this matter, please do not hesitate to call me or John Amadon, LAG Project Manager, at 453-4384.

Sincerely,



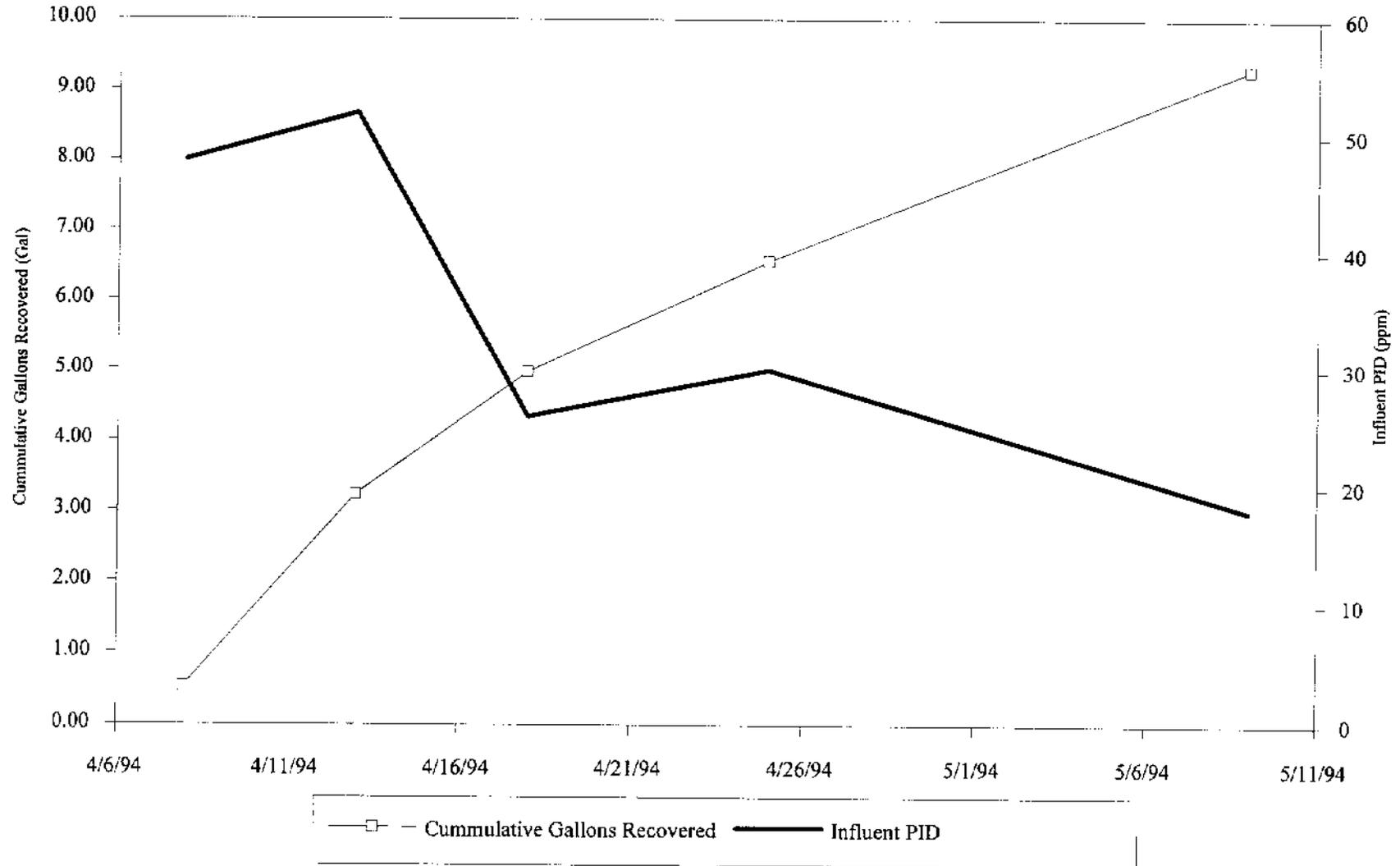
Richard S. Vandenberg
Hydrogeologist

RSV/smd
cc: Bob Haslam-VDEC



Burke Residence
Forestdale, VT

Cummulative Gallons Recovered and Influent PID vs. Date



Project: Burke Residence
 Location: Forestdale, Vermont

Table 1
 VDEC Site #NA
 Sheet 1 of 1

Photoionization Results (PID - ppm)

Data point	4/5/94	4/8/94	4/13/94	4/18/94	4/25/94	5/9/94
VP-1	30	28	5.2	1.4	0.2	BG
VP-2	32	30	3.8	0.6	0.2	2.0
VP-3	26	24	4.2	0.6	6.0	3.0
VP-4	30	34	3.8	1.0	2.0	1.8
VP-5	2.2	15.0	0.2	3.0	6.8	0.2
VMP-1		BG	0.2	BG	BG	BG
VMP-2		BG	BG	BG	1.4	BG
VMP-3		40	6.0	2.0	10	BG
VMP-4		20.0	20.0	8.4	19	0.2
VMP-5		6.0	0.8	0.4	BG	0.2
VMP-6		BG	0.6	0.6	BG	BG
After Rotron		48	52	26	30	18.0
Mid Treatment		BG	1.2	1.6	0.4	0.2
Effluent		BG	BG	BG	BG	BG
Basement		1.0	0.4	0.6	0.6	BG
Entrance			BG	BG	BG	BG
Kitchen			BG	BG	BG	BG
Bathroom			BG	BG	BG	BG

Notes:
 BG - Background
 SL - Saturated Lamp

Project: Burke Residence
Location: Forestdale, Vermont

Table 2
VDEC Site #
Sheet 1 of 1

Vaccum Data (inches of water)

Data Point	4-8-94	4-13-94	4-18-94	4-25-94	5-9-94	
VP-1	2.4	2.4	2.0	2.5	4	
VP-2	2.6	2.3	2.0	2.0	2.5	
VP-3	0.16	0	0.2	0.19	0.3	
VP-4	2.4	2.2	2.0	2.5	2.4	
VP-5	0.04	0	0.11	0.1	0.2	
VMP-1	0.02	0.2	0.01	0.02	0.02	
VMP-2	0	0	0.01	0.01	0	
VMP-3	0.12	0.1	0.1	0.04	0.01	
VMP-4	0	0	0.01	0.0	0	
VMP-5	0	0.2	0.0	0.0	0	
VMP-6	0	0.4	0.01	0.0	0	
Total System Vac.	4.9	4.9	4.5	4.0	12	

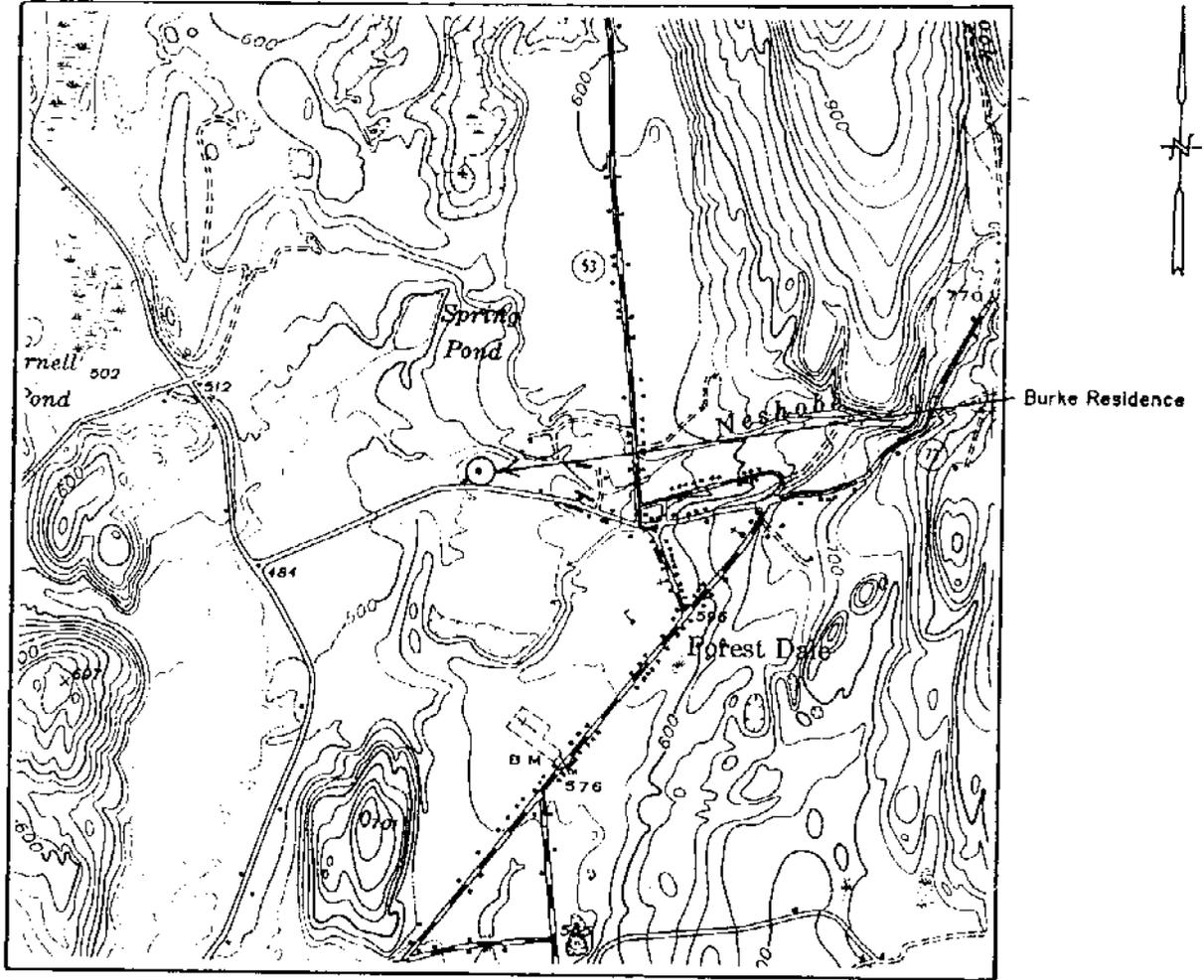
Project: Burke Residence
Location: Forestdale, Vermont

Table 3
VDEC Site #:
Page 1 of 1

Vapor Extraction System Flow Rates (cfm)

Data Point	4/8/94	4/13/94	4/18/94	4/25/94	5/9/94	
Total flow	100	106	575	348	389	
VP-1	25	22	123.86	78.65	30.36	
VP-2	29	25	100	32.56	35.2	
VP-3	0	0	0	0	0	
VP-4	20	59	417	0	34.54	
VP-5	0	0	0	311	0	
VP-2,3,4,5	49	85	489	330.6	120	
VP-3,4,5	49	98.31	417	69.96	110	
VP-3,5	0	69.6	0	0	85	
After Rotron	101	96.25	123.86	69.96	100.1	

Burke Residence GENERAL LOCATION MAP



Source: U.S.G.S. 7.5 min.
Topo Series
Brandon, VT Quad.

Scale: 1" = 2000'

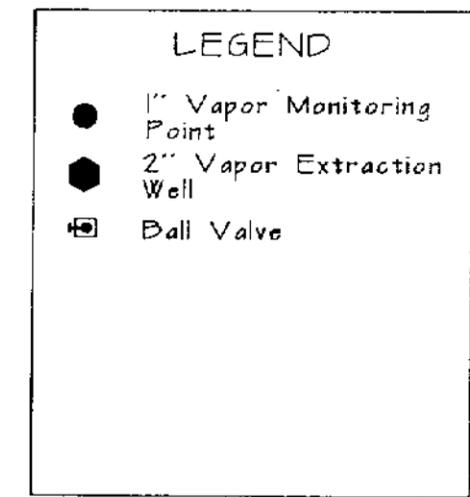
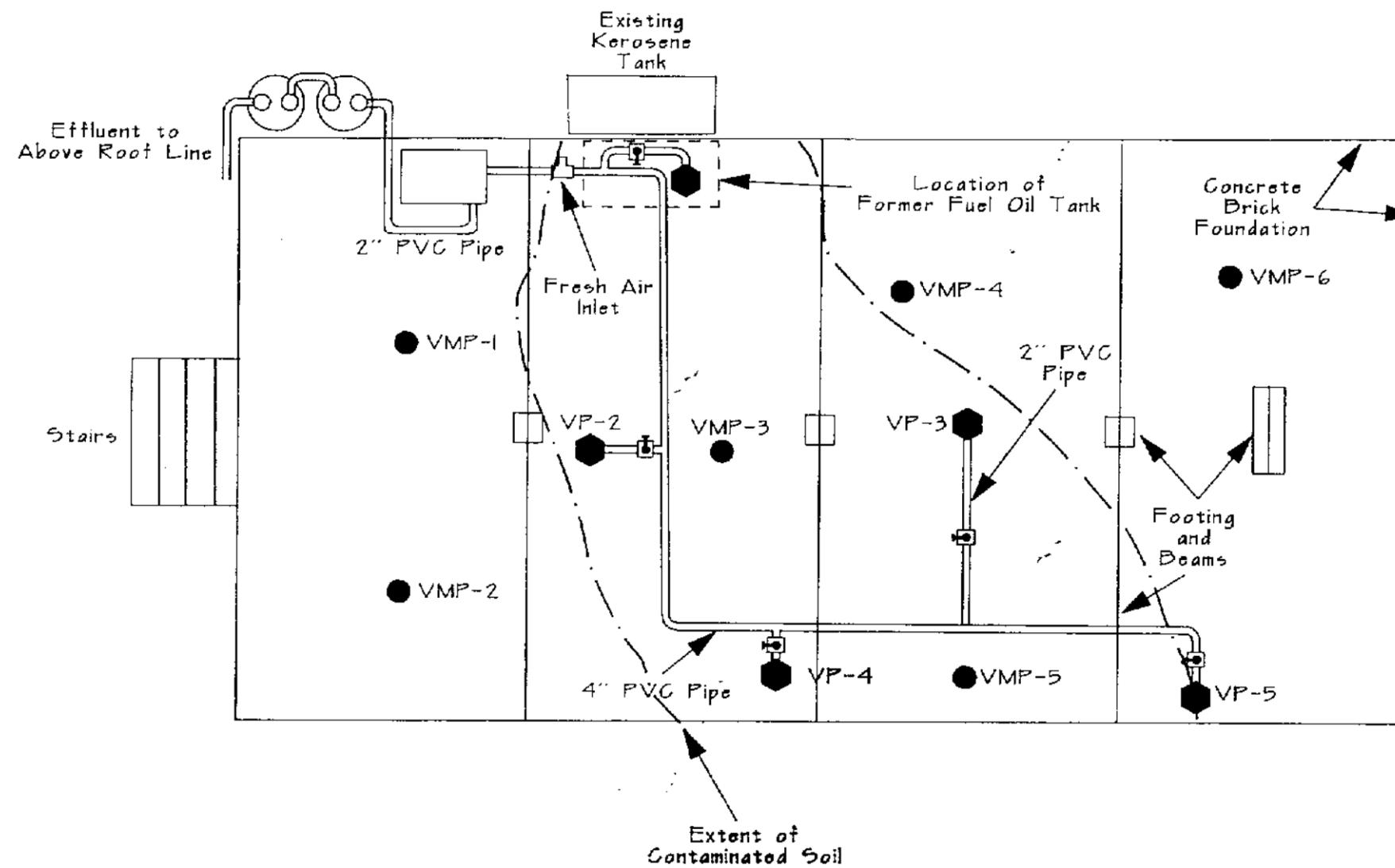


Figure 2

Burke Property	
Location: Forestdale, Vermont	Scale: 1" = 5'
VAPOR EXTRACTION SYSTEM MAP	
Date: April 1994	Job Type: Petroleum Contamination



Appendix A
Cost Estimate

**Cost Estimate for 3 months of System Operation and Maintenance
Burke Residence**

A. Biweekly Monitoring Visits (per event)

Field Tech -	2.5	hr(s) @	\$30.00	per hour	\$75.00
Mileage -	40.0	miles @	\$0.30	per mile	\$12.00
PID -	0.5	day @	\$75.00	per day	\$37.50
					<u>\$124.50</u>
				X 6 events	\$747.00
				Subtotal A	\$747.00

B. GAC Cannister Replacement

4 Cannisters -		@	\$580.00		\$2,320.00
Disposal of Cannisters -					\$1,200.00
				Subtotal B	\$3,520.00

C. Project Evaluation and Summary Report

Senior Hydrogeologist -	1.0	hr(s) @	\$75.00	per hour	\$75.00
Project Manager -	2.0	hr(s) @	\$50.00	per hour	\$100.00
Hydrogeologist -	8.0	hr(s) @	\$45.00	per hour	\$360.00
Comp. Technician -	6.0	hr(s) @	\$30.00	per hour	\$180.00
Admin. Assistant -	4.0	hr(s) @	\$30.00	per hour	\$120.00
				Subtotal C	\$835.00

