



**Soils and Environmental Services, Inc.**

# Corrective Action Plan Implementation

*Site:*

[Redacted site information]

VDEQ Pollution Complaint No.: PC2003-3187

*Submitted to:*

Mr. Randy Chapman  
Virginia Department of Environmental Quality  
Northern Virginia Office  
13901 Crown Court  
Woodbridge, VA 22192

*Prepared by:*

Soils & Environmental Services, Inc.  
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Nokesville, Virginia 20182  
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Senior Hydrogeologist

*January 2004*

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## **Executive Summary**

The remediation activities included the application of sealant on the base of the western wall of the basement and infiltration / flushing of the house foundation tile drainage system and tank basin with "Spill Remed" solution and aerated water over a 8-hour period (Figure 2). These activities included baseline and post-remediation soil sampling at and immediately beneath the house foundation tile drainage system backfill and monthly influent and effluent carbon treatment system sampling. These soil and influent sampling results were used to assess performance of the remediation.

Laboratory analysis of soil samples collected at and immediately beneath the house foundation drainage system backfill indicated 18,800 and 8,300 ppm TPH-DRO for samples taken before remediation and 290 and 210 ppm TPH-DRO for samples taken after remediation. Based on these results, the remediation effort appears to have significantly mitigated soil contaminant concentrations at and immediately beneath the house foundation drainage system. The remaining detected soil contamination is below the remedial endpoint proposed in the CAP (i.e., 500 ppm TPH-DRO) and are believed to be at levels where natural attenuation can be more efficient.

Monthly influent and effluent samples for the carbon treatment system (i.e., which is connected to the house sump) were collected before and after the remedial effort at the site. Laboratory results of these samples appear to indicate that a source of contamination to the sump remains at the site. After two monthly samples showing nondetect concentrations of TPH-DRO after remediation, the latest monthly sample indicated 3.2 ppm TPH-DRO. However, based on the soil sample results, the source of the detected sump contamination appears to be localized and may not have the potential of being a long-standing source of contamination to the sump. Thus, SES recommends the influent and effluent sampling for the carbon treatment system (as required by the VDEQ Discharge Permit) is continued for a minimum of three months. At the end of this period of monitoring, a decision should be rendered as to whether further remediation, monitoring, or case closure should be pursued.

## **1.0 INTRODUCTION**

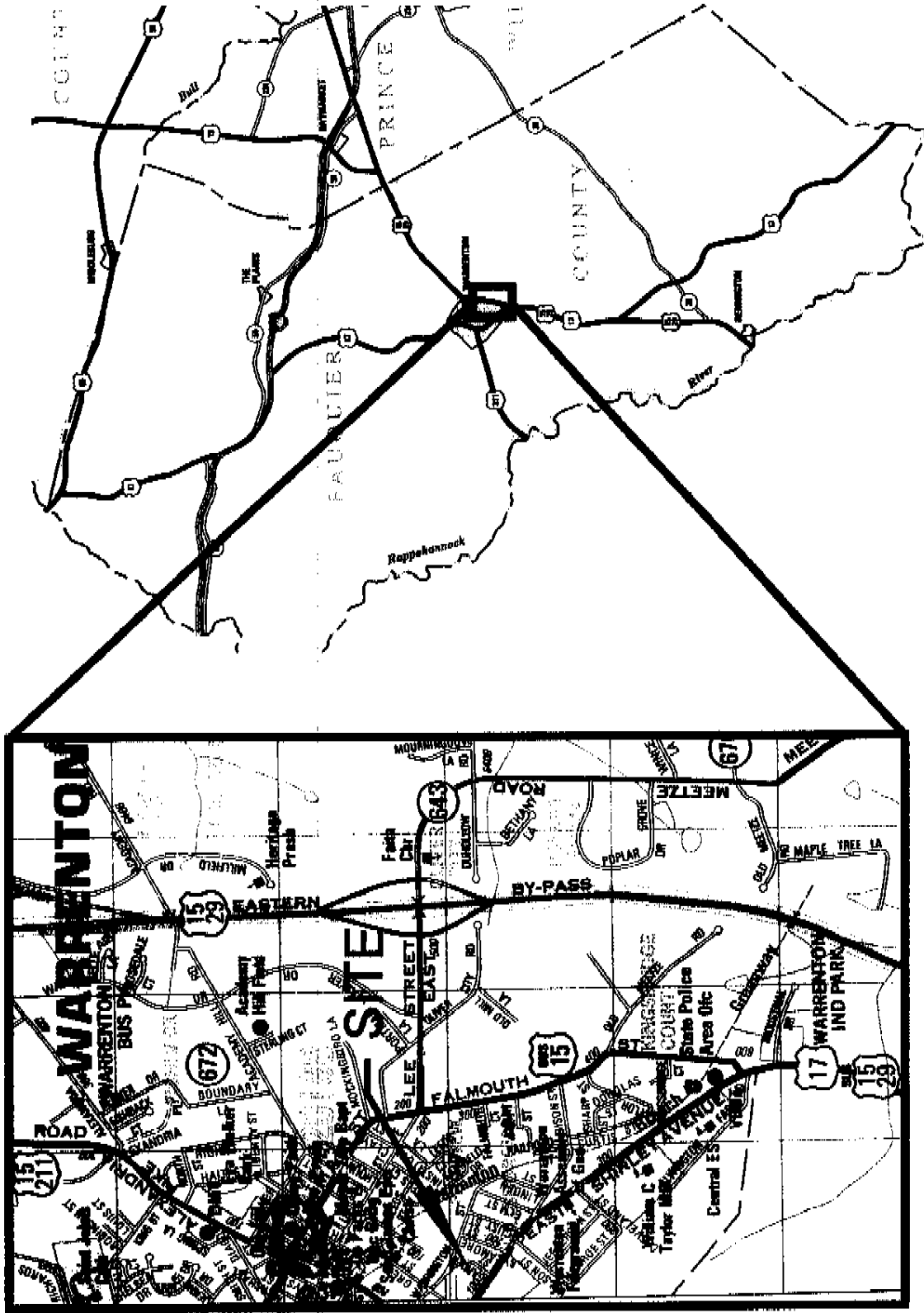
Mr. Oswald Vallespir retained Soils and Environmental Services, Inc. (SES) to implement the Corrective Action Plan (CAP) dated July 2003. The CAP and its implementation address the cleanup of a number 2 heating oil release from a leaky underground storage tank (UST) at the Vallespir Residence in Warrenton, Virginia. This CAP Implementation Report has been prepared based on information provided from remediation field activities conducted at the site. Activities approved by the Virginia Department of Environmental Quality (VDEQ) are included in the attached Activity Authorization Form (Appendix A).

## **2.0 BACKGROUND**

The Vallespir residence is located at 186 Garden Street in Warrenton, Virginia in the City of Warrenton (Figure 1). The house is a white aluminum-sided home with a basement. The former UST was located adjacent to the north side of the house beneath the asphalt-paved driveway. Public water and sewer serve the subject and surrounding properties.

A description of the nature of the UST release and the investigation conducted up to May 26, 2003 may be found in the SCR previously submitted to VDEQ. In summary, on February 24, 2003, SES inspected the site and observed the presence of heating oil in the sump well of the house. The detected release of oil was reported to VDEQ on February 24, 2003. The discovery of petroleum contamination prompted the removal of the 300-gallon underground storage tank (UST) used for storing heating oil for the home. Prior to the tank removal, a total of 137 gallons of heating oil and water were removed from the tank and sump on March 25, 2003. Upon removing the tank, two soil samples were taken directly beneath the tank at 5 feet below the ground surface. The results of the laboratory analysis of the two samples indicated 14,300 mg/kg total petroleum hydrocarbons, diesel range organics (TPH-DRO) for both samples.

A total of 21.8 tons of petroleum-contaminated soil was removed from the tank pit. After removing the contaminated soil, a soil sample was taken at the base of the tank pit at eleven feet below the ground surface. The result was 536 mg/kg TPH-DRO. The tile drain



**FIGURE 1**  
Site Location Map



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ADC The Map People  
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186 Garden Street  
Warrenton, Virginia

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system surrounding the foundation perimeter of the house was located beneath the tank, which lead to the conclusion that the petroleum contamination identified in the sump well was the result of the identified release of petroleum from the UST.

A general petroleum discharge permit was obtained by the responsible party to address the discharge of the petroleum-contaminated water from the sump. A 55-gallon drum of activated carbon was placed online with the sump outfall to treat contaminated water discharging from the sump to the ground surface.

Based on the results of the SCR, a CAP was prepared to address the tile drain system and soils immediately surrounding the tile drain and tank basin (Figure 2). The development of the CAP included the implementation of feasibility studies at the site. These studies included an infiltration test and field measurements of the groundwater chemistry.

Referring to Figure 2, the feasibility studies were focused on the house foundation tile drainage system and tank basin. Knowing that the gravel backfill of the tile drain system is adjacent to the gravel backfill of the tank excavation, these studies included an infiltration test (using tap water) into the tank basin and tile drain system to empirically measure the sustained rates of infiltration into the gravel backfill of the tank basin and recovery from the sump pump. To facilitate the infiltration study, a temporary monitoring point (hand auger boring) was bored into the gravel backfill of the foundation tile drain system on the front side of the house. The infiltration test was implemented by empirically stepping down the infiltration rate to find the maximum infiltration rate that can be sustained. Based on the results of the infiltration test, the maximum sustained infiltration rate was considered to be approximately 5 gpm. At this rate of infiltration, water level measurements in the temporary monitoring point indicated that the foundation perimeter tile drain system and sump are satisfactorily draining infiltrated water.

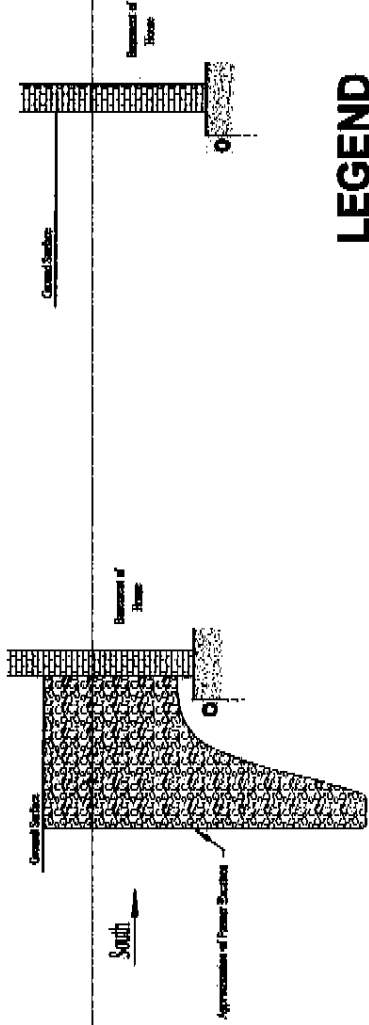
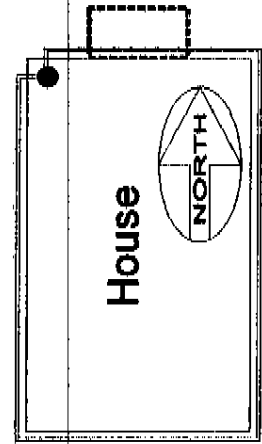
After the completion of the infiltration test, water from the temporary monitoring point (i.e., above-referenced hand auger boring) was field-tested using a Horiba U-22 meter. Water was field tested at that time to determine the chemical properties of the infiltrated water, which chemically equalize with the soils surrounding the gravel backfill. Parameters measured included pH, dissolved oxygen, ORP, conductivity, total dissolved solids, salinity,

# Cross Sections

# Plan View

Target Area for Corrective Action Adjacent to Tank Excavation

Target Area for Corrective Action Adjacent to other House Tile Drain Areas



## LEGEND

- Sump Pump
- House Foundation
- Perimeter Tile Drain
- - - Tank Pit Excavation
- Target Area for Corrective Action

## Notes

The house foundation drainage pipe that extends from the sump to the west wall observed to the only source of sump water during the infiltration test and remediation.

## LEGEND

- ▨ Concrete Footer
- ▨ Gavel Backfill
- ▨ Cinder Block Wall
- Foundation Perimeter Tile Drainage Pipe
- Target Area for Corrective Action

## LEGEND

- ▨ Concrete Footer
- ▨ Cinder Block Wall
- Foundation Perimeter Tile Drainage Pipe
- Target Area for Corrective Action
- ▨ Gavel Backfill / Target Area for Corrective Action

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# FIGURE 2

## Target Area for Corrective Action



turbidity, and temperature. Results of the field measurements indicated that subsurface conditions were satisfactory for the application of infiltrated biological enhancement agents.

The remediation technique chosen for the site included the infiltration/flushing of the house foundation tile drainage system and tank basin with "Spill Remed" solution and aerated water. This technical approach was considered to be a cost and technically effective means of addressing the remaining "residual-phase contamination" and "dissolved-phase contamination" surrounding the foundation tile drain and tank basin. In the following sections, this report discusses remedial activities and results, followed by conclusions and recommendations.

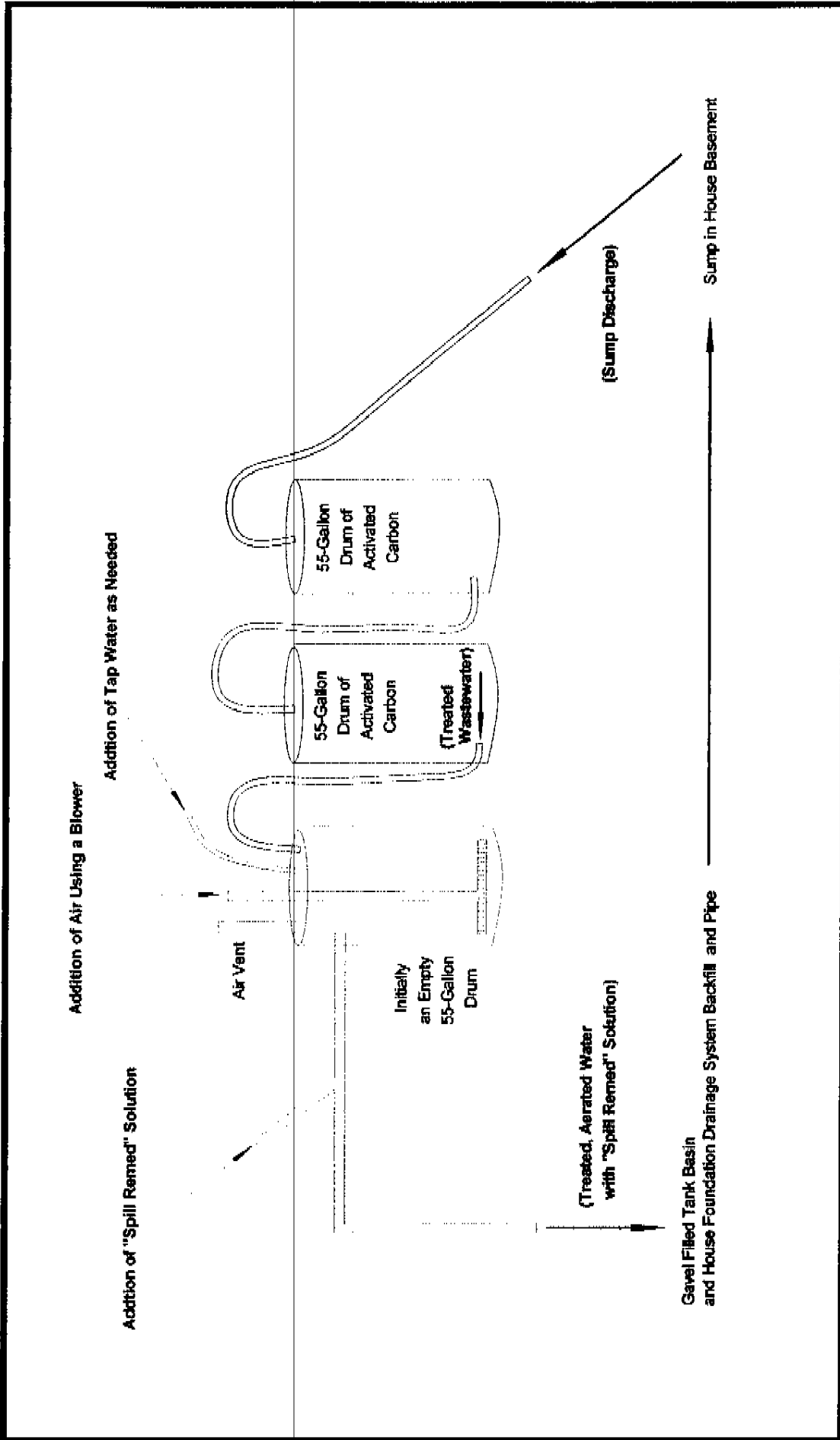
### **3.0 REMEDIAL ACTIVITIES**

The remediation activities included the application of sealant on the base of the western wall of the basement and infiltration/flushing of the house foundation tile drainage system and tank basin with "Spill Remed" solution and aerated water over a 8-hour period (Figure 2). These activities included baseline and post-remediation soil sampling at and immediately beneath the house foundation tile drainage system backfill and monthly influent and effluent carbon treatment system sampling. These soil and influent sampling results were used to assess performance of the remediation. Due to the temporary freezing up of the carbon treatment system, the treatment system was temporarily taken off line and only a sump effluent sample was taken on January 9, 2004.

The remediation activities included the setup and implementation of a closed loop infiltration and recycling system. This system included: carbon treatment of the extracted sump water, aeration of treated water and addition of Spill Remed, infiltration of aerated treated water with added "Spill Remed" solution into the tank basin and house foundation drain system, and the extraction of water from the sump, which gravity drained into the sump from the house foundation drainage system. An illustration of the closed loop infiltration and recycling system is provided in Figure 3.

The "Spill Remed" solution remediates oil by breaking down the oil into smaller globules, then biochemical action transforms the dispersed molecules into an assimilable





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**FIGURE 3**  
 Infiltration and Recycling System

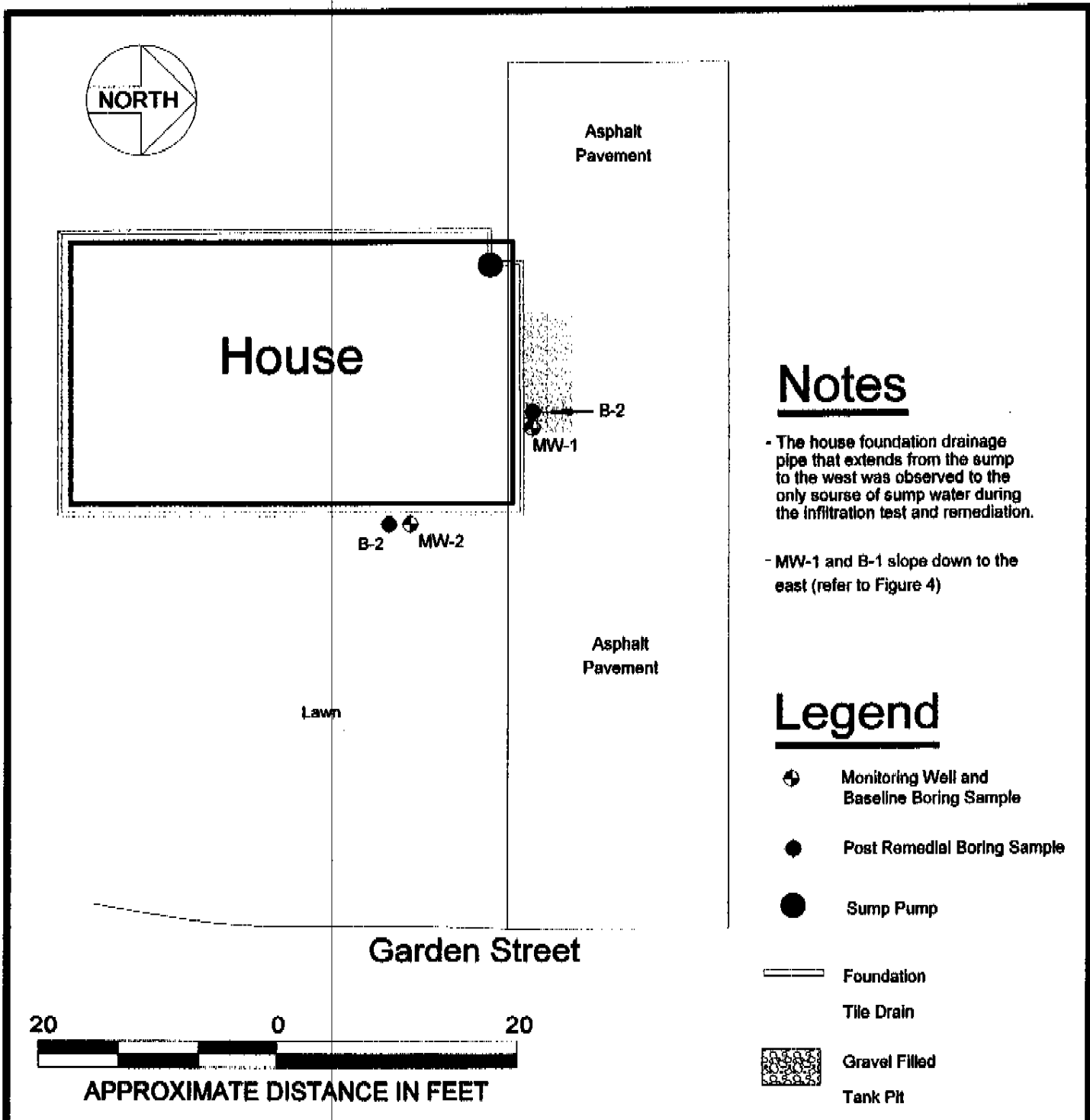


form. A metabolic stage subsequently turns the assimilated molecules into glucose before finally breaking down the oil into carbon dioxide and water. The action of the bacteria in the "Spill Remed" solution is almost instantaneous and does not require any additional nutrients for their growth and multiplication. Since these bacteria are aerobic, dissolved oxygen in the infiltrated water was maintained at levels greater than approximately three mg/l using a field-constructed bubbler. According to the company who provided the "Spill Remed" solution, the solution would not be filtered out by activated carbon treatment and thus would recycle through the above-referenced closed loop infiltration and recycling system.

The infiltration with "Spill Remed" solution was conducted on Monday, October 13, 2004 over an eight-hour period. The infiltration was conducted at MW-1. The rate of infiltration was set initially at approximately 10 gallons per minute (gpm).

At approximately one hour into the infiltration effort, five gallons of "Spill Remed" solution was added to the infiltrate over a period of 10 minutes. For approximately two hours during the initial infiltration, water was not observed coming into the sump. The absence of water coming into the sump was believed to be a result of the tank basin filling up with infiltrate. At the time water was discovered coming into the sump, the flow rate of tap water into the system was adjusted to approximately four to five gpm, and 10 gallons of "Spill Remed" solution was added to the infiltrate over a period of 10 minutes. At approximately, four hours after the initiation of the infiltration, five more gallons of "Spill Remed" solution was added to the infiltrate over a period of 20 minutes. Finally, at approximately six hours after the initiation of the infiltration, five more gallons of "Spill Remed" solution was added to the infiltrate over a period of 20 minutes. The re-infiltration of water with "Spill Remed" solution was stopped at eight hours from the start of infiltration.

During the infiltration effort, site activities were conducted to maximize the amount of the infiltrate in the house foundation drainage backfill and avoid over pressuring the drainage system. Before infiltration, Monitoring wells MW-1 and MW-2 were installed using a hand auger (Figure 4). Logs of wells are included in Appendix B. A relative elevation survey of water in MW-2 and the pipes entering the basement sump was conducted. The survey indicated that the sump pipes were approximately 1.5 feet below the elevation of the water level at MW-2. During the infiltration, water levels in the foundation drainage system backfill



### Notes

- The house foundation drainage pipe that extends from the sump to the west was observed to be the only source of sump water during the infiltration test and remediation.
- MW-1 and B-1 slope down to the east (refer to Figure 4)

### Legend

- ⊕ Monitoring Well and Baseline Boring Sample
- Post Remedial Boring Sample
- Sump Pump
- ▬ Foundation
- ▬ Tile Drain
- ▨ Gravel Filled
- ▭ Tank Pit

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**FIGURE 4**  
 Monitoring Well and Remedial Performance Boring Sample Map



(MW-2) and the sump were monitored as an added assurance to avoid the over pressuring of the foundation tile drainage system.

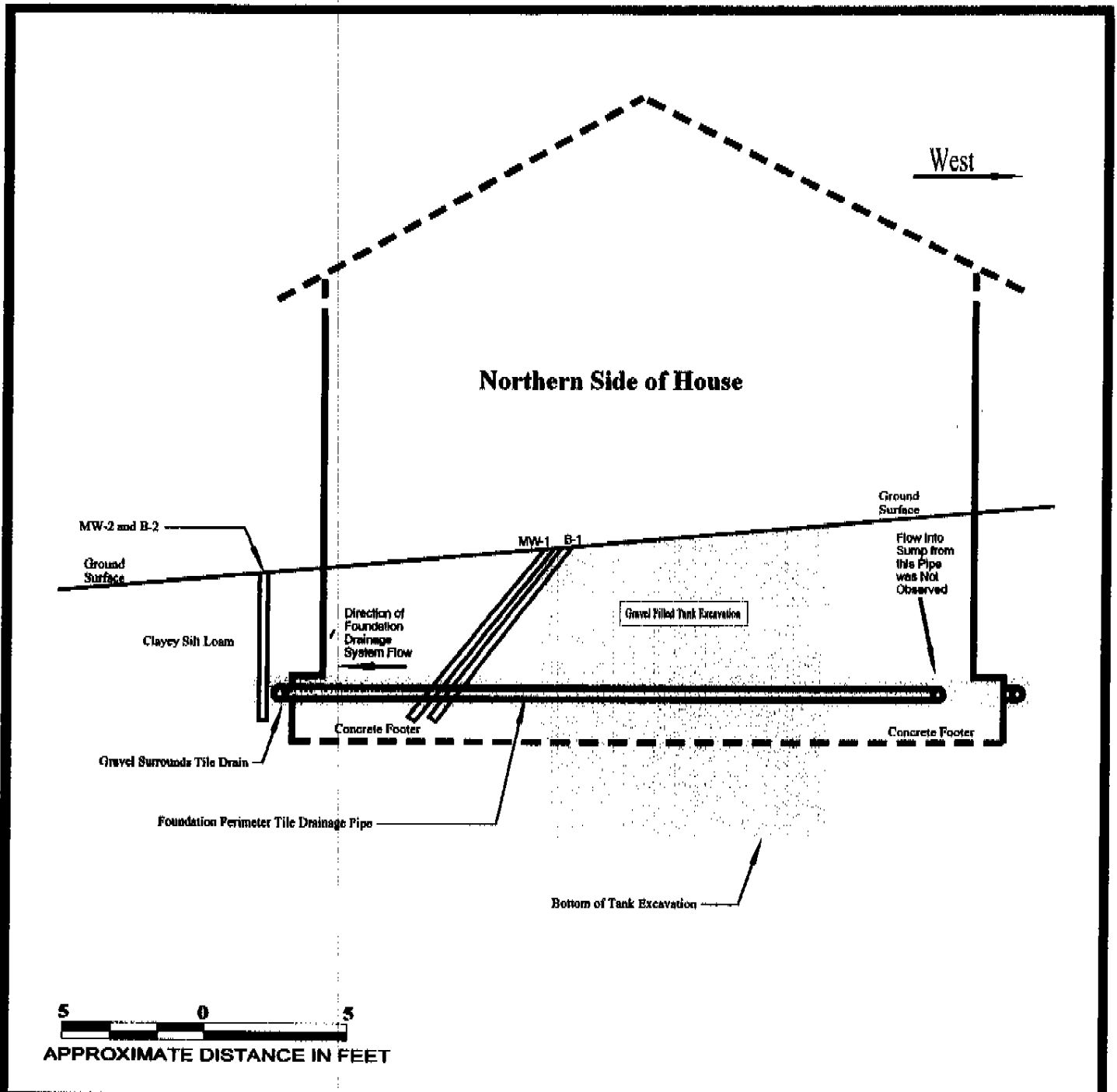
Due to the presence of the stone backfilled tank basin and the asphalt surrounding the tank basin at the ground surface, MW-1 and B-1 were hand augered at the edge of exposed stone backfilled tank basin and angled into soil down to the house foundation drainage system backfill (Figure 5). Since water had not been observed to be draining into the sump from the foundation drainage pipe that directly extends to the northern portion of the east side of the house, borings and monitoring wells (i.e., down to the foundation drainage system backfill) were not placed along the northern portion of the east side of the house.

The remediation program was designed to remediate the site and decrease contaminant concentrations to predetermined numerical endpoints. To demonstrate the achievement of the endpoints proposed in the CAP and the effectiveness of the remediation effort, house foundation drainage system backfill soil samples and sump effluent samples were taken before and after remediation.

#### **4.0 REMEDIATION RESULTS**

The results of remediation are shown in the results of the sampling performed before and after remediation. Soil Samples were collected at and immediately beneath the house foundation tile drain backfill at B-1 and B-2. Samples collected after the completion of remediation will be collected in similar areas where the initial samples were taken. A summary of these results is shown in Table 1 above and associated laboratory reports are included in Appendix C. The results indicate that the remediation was successful in reaching the proposed residual phase endpoint of 500 ppm TPH-DRO.

Monitoring of dissolved phase hydrocarbons was conducted using monthly influent sample analysis results as required by the current petroleum discharge permit. Influent and effluent samples for the carbon treatment system (i.e., which is connected to the house sump) were collected before and after the remedial effort at the site. Laboratory results of



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**FIGURE 5**  
 Cross Section with Locations of  
 Hand Augered Monitoring Wells and Borings



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these samples appear to indicate that a source of contamination to the sump remains at the site. After two monthly samples showing nondetect concentrations of TPH-DRO after remediation, the third monthly sample indicated 3.2 ppm TPH-DRO. A summary of these results is shown in Table 2 and associated laboratory reports are included in Appendix C.

<b>Table 2</b>						
<b>Laboratory Sample Results of Carbon Treatment Influent and Effluent</b>						
(Carbon treatment is connected to the sump in the basement of the house at the site. The sump is connected to the house foundation tile drainage system)						
DMR Month Covered by Sample	Sample Date		TPH-DRO (ppm)		Napthalene (ppb)	
			Influent	Effluent	Influent	Effluent
Jun-03	8/30/2003	<b>Before Remediation</b>	1.5	0.10	BQL	BQL
Jul-03	8/1/2003		1.0	BQL	BQL	BQL
Aug-03	9/2/2003		0.9	BQL	BQL	BQL
Sep-03	9/25/2003		31.3	BQL	BQL	BQL
<b>10/13/03 - Remediation of House Foundation Tile Drain System with "Spill Remed"</b>						
Oct-03	10/31/2003	<b>After Remediation</b>	BQL	BQL	13.0	BQL
Nov-03	12/3/2003		BQL	BQL	BQL	BQL
Dec-03	1/9/2004		3.2*		BQL*	

DMR - Virginia Department of Environmental Quality Discharge Monitoring Report  
 ppm - milligrams per liter  
 ppb - micrograms per liter  
 BQL -Below Quantification Limit  
 \* Sample taken from sump effluent (carbon treatment system was taken off-line temporarily to address the freezing up of the system)

## **5.0 CONCLUSIONS AND RECOMENDATIONS**

SES offers the following conclusions and recommendations:

Laboratory analysis of soil samples collected at and immediately beneath the house foundation drainage system backfill indicated 18,800 and 8,300 ppm TPH-DRO for samples taken before remediation and 290 and 210 ppm TPH-DRO for samples taken after remediation. Based on these results, the remediation effort appears to have significantly mitigated soil contaminant concentrations at and immediately beneath the house foundation drainage system. The remaining detected soil contamination is below the remedial endpoint proposed in the CAP (i.e., 500 ppm TPH-DRO) and are believed to be at levels where natural attenuation can be more efficient.

Monthly influent and effluent samples for the carbon treatment system (i.e., which is connected to the house sump) were collected before and after the remedial effort at the site. Laboratory results of these samples appear to indicate that a source of contamination to the sump remains at the site. After two monthly samples showing nondetect concentrations of TPH-DRO after remediation, the latest monthly sample indicated 3.2 ppm TPH-DRO. However, based on the soil sample results, the source of the detected sump contamination appears to be localized and may not have the potential of being a long-standing source of contamination to the sump. Thus, SES recommends the influent and effluent sampling for the carbon treatment system (as required by the VDEQ Discharge Permit) is continued for a minimum of three months. At the end of this period of monitoring, a decision should be rendered as to whether further remediation, monitoring, or case closure should be pursued.

## **6.0 LIMITATIONS**

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with customary principles and practices in the field of geology and environmental science. Soils & Environmental Services, Inc. makes no warranty either expressed or implied. This company is not responsible for the independent conclusions, opinions or recommendations made by others based on the field data presented in the report.

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The work performed in conjunction with this report and the data developed, are intended as a description of available information at the dates and locations given. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.



## **Appendix A**

### **VDEQ AAF**



Virginia Department of Environmental Quality  
**Petroleum Cleanup**

# Activity Authorization Form for 198 UCRs

PC #: 2003-3187 Site Name: Vallespir Residence Consultant: SES  
 Regional Office: NRO RP/Consultant's Phone No.: Billy Willard (703) 594-3752 / Tom Lancaster (804) 559-8870  
 Fax No: Billy Willard (703) 594-3815 / Tom Lancaster (804) 559-8870

Check only one Phase below:

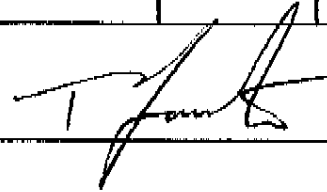
- CAP Development                       CAP Addendum                       CAP Implementation  
 Site Closure

## Activity Authorization Form for 198 UCRs

To use this form, the Phase or Reimbursement Period must have started on or after January 1, 1998.  
 Costs for Work Performed units on this AAF which started before January 1, 1998 will be denied.

**Note: Approval of work is not DEQ approval of reimbursable costs.**

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Task	Comments
				Hour	T001	Free Phase Product Removal Using a Vacuum Truck	
				Hour	T002	Monitor for Vapor Hazards	
				Blower	T003	Emergency Mitigation of Vapor Hazards - Set-Up	
				Day per Blower	T004	Emergency Mitigation of Vapor Hazards-Operation and Maintenance	
				Hour	T006	Free Product (Liquid Phase) Recovery from a Monitoring Well - Manual	
				Foot of Boom	T007	Install Boom in Surface Waters	
				Week	T008	Bottled Water with Bottled Water Dispenser	
				Ton	T012	Soil Treatment at an Incineration or Bioremediation Facility	
				Ton	T013	Petroleum Contaminated Soil Disposal at a Landfill	

RP Signature:   
 DEQ Initial: \_\_\_\_\_

Date: 10/7/03  
 Date: \_\_\_\_\_

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 Effective: 1/1/98 (Rev. 11/04/02)

Petroleum Cleanup Authorization n, 198AAF continued

PC#: 2003-3187

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Task	Comments
				Site	T014	Site Reconnaissance/Initial Site Map	
				Tank System	T015	Underground Storage Tank (UST) System Tightness Testing for Leak Confirmation	
				Gallon	T017	Free Product/Contaminated Water Disposal	
				Hour	T018	Boom Inspection	
				Foot of New Boom	T019	Boom Replacement	
				Day	T021	Site History Research	
				Survey	T022	Subsurface Line Location Prior to Drilling and Excavation	
				Mob / Demob	T023	Drill Rig Mob/Demob	
				Linear Foot	T024	Soil Boring with Drill Rig - 5 foot Sampling Interval	
				Linear Foot	T025	Monitoring Well Installation - Two-Inch Diameter	
				Linear Foot	T026	Monitoring Well Installation - Four-Inch Diameter	
				Linear Foot	T027	Recovery Well Installation - Six-Inch Diameter	
3	1			Hour	T028	Logging Soil Borings	During the installation of a temporary monitoring wells/piezometers. The temporary wells will be installed next to the foundation tile drain.
4	2			Sample	T030	Soil Sampling	Next to the foundation tile drain during the hand augering of the temporary monitoring wells/piezometers and post-op sampling
				Well	T031	Monitoring Well Sampling - Two-Inch Diameter	

RP Signature: 

Date: 10/7/03

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DEQ Initial: \_\_\_\_\_

Date: \_\_\_\_\_

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Petroleum Cleanup Authorization m, 198AAF continued

PC#: 2003-3187

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Task	Comments
				Well	T032	Monitoring Well Sampling - Four-inch Diameter	
3	1			Hour	T033	Survey - Monitoring Wells/Recovery Wells	Temporary monitoring wells, sump, and basement floor to mitigate potential basement wall leakage and optimize infiltration rate
				Hour	T034	Survey - Property	
				Agreement	T035	Site Access Agreement	
2				Round Trip per Piece of Equipment	T036	Heavy Equipment Mob/Demob	Delivery and pickup of treatment system
				Ton	T038	Debris Disposal	
1				5% of Reimbursed Costs	T040	General Site Management	
				Hour	T041	Well Rehabilitation	
				Cubic Yard	T042	Backfilling	
				Square Foot	T047	Reseeding < 1 Acre	
				Square Foot	T048	Reseeding > or = 1 Acre	
				Survey	T049	Receptor Survey	
				Sample Point	T050	Soil Gas Survey	
				Day	T051	Direct Push Technology (DPT) - Ground Water/Soil Survey	
				Hour	T052	Ground Penetrating Radar (GPR)	
				Hour	T053	Slug Test	

RP Signature: 

Date: 6/12/03

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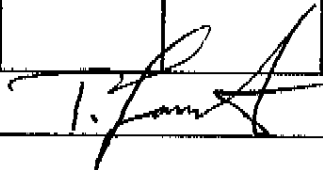
Date: \_\_\_\_\_

Effective: 1/1/98 (Rev. 11/04/02)

Petroleum Cleanup Authorization m, 198AAF continued

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Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Task	Comments
				Hour	T058	Terrain Conductivity	
1				Phase or Reimbursement Period	T064	Reimbursement Claim Preparation	
				Mob/Demob	T069	Dual Phase Extraction System Mob/Demob	
				Ton	T070	Soil Loading - Up to 2,200 Tons	
				Ton	T071	Soil Loading - More than 2,200 Tons	
				Cubic Yard	T072	Excavating/Trenching	
				Cubic Yard	T073	Bulk Excavating	
				Cubic Yard	T074	Hand Excavating	
TN	TN	TN	TN	Ton/Mile	T075	Soil Hauling < 75 Tons the First 100 Miles (use	
MI	MI	MI	MI				
TN	TN	TN	TN	Ton/Mile	T076	Soil Hauling < 75 Tons Over 100 Miles (use only when	
MI	MI	MI	MI				
TN	TN	TN	TN	Ton/Mile	T077	Soil Hauling > 75 Tons the First 100 Miles (use	
MI	MI	MI	MI				
TN	TN	TN	TN	Ton/Mile	T078	Soil Hauling > 75 Tons Over 100 Miles (use only	
MI	MI	MI	MI				
				Linear Foot	T079	Well Installation Using Air Rotary - Two Inch Well	
				Linear Foot	T080	Well Installation Using Air Rotary - Four Inch Well	
				Linear Foot	T081	Well Installation Using Air Rotary - Six Inch Well	
				Linear Foot	T082	Well Abandonment - Two Inch Well	



RP Signature: \_\_\_\_\_

Date: 10/7/03

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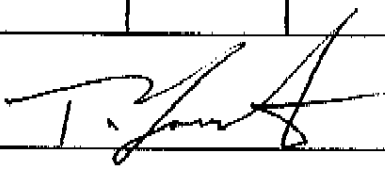
Date: \_\_\_\_\_

Effective: 1/1/98 (Rev. 11/04/02)

Petroleum Cleanup Authorization n, 198AAF continued

PC#: 2003-3187

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Task	Comments
				Linear Foot	T083	Well Abandonment - Four Inch Well	
				Linear Foot	T084	Well Abandonment - Six Inch Well	
				Hour	T085	Pump Test	
				Sample	T086	Domestic Well Sampling	
4	1			Sample	T087	Surface Water Sampling	
				Linear Foot	T088	Direct Push Technology (DPT) Permanent Well Installation	
				Day	T089	Direct Push Technology (DPT) Daily Cost & Mobilization	
				Square Foot	T090	Asphalt Removal - Up to 6" Thick, Areas Less than 4,500 SF	
				Square Foot	T091	Asphalt Removal - Up to 6" Thick, Areas Greater than 4,500 SF	
				Square Foot	T092	Concrete Pavement Removal - Up to 6" Thick, Less than 4,500 SF	
				Square Foot	T093	Concrete Pavement Removal - Up to 6" Thick, Greater than 4,500 SF	
				Square Foot	T094	Asphalt Paving	
				Square Foot	T095	Concrete Paving	
				Square Foot	T096	Removal of Patio/Walkway Type Pavements	
				Square Foot	T097	Replacement of Patio/Walkway Pavements	
				Linear Foot	T098	Silt Fencing Installation	

RP Signature: 

Date: 10/7/03

Page 5 of 8

DEQ Initial: \_\_\_\_\_

Date: \_\_\_\_\_

Effective: 1/1/98 (Rev: 11/04/02)

Petroleum Cleanup Authorization Form, 198AAF continued

PC#: 2003-3187

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Task	Comments
				Cubic Yard	T099	Landfilling Less Than 20 Cubic Yards of Petroleum Contaminated Soil	
20	4			Hour of Report Preparation	T100	Report Preparation	
600				Pound	T101	Spent Carbon Changeout	
				Drum	T113	Disposal of Drummed Petroleum Contaminated Soils	
				Hour	T115	Small UST Pump-Out	

The following section is to be used for Material Items only.

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Activity	Comments
6	2			Hour	M0002	Senior-level Professional	
32	4			Hour	M0003	Project Manager	Data analysis; supervision and oversight of field work, remedial system setup and implementation; equipment specification review, selection, and design
32	4			Hour	M0005	Junior Level Professional	field work preparation, remedial system setup and implementation, installation of temporary monitoring wells, and post operational and post-operational soil sampling
4	1			Sample	M1366	8015B TPH-DRO water	Influent and effluent samples
4	1			Sample	M1373	Napthalene	Influent and effluent samples
4	2			Sample	M1366	8015B TPH-DRO soil	Op. and Post-Op. soil samples next to tile drain
280	40			Mile	M0618	Pickup Truck	
720	180			Mile	M0619	Van	
7	1			Hour	M1481	Project Manager Travel	
16	4			Hour	M1483	Junior Level Travel	
2	1			10 foot length	M1281	2" PVC casing	

RP Signature: 

Date: 10/7/03

Page 6 of 8

DEQ Initial: \_\_\_\_\_

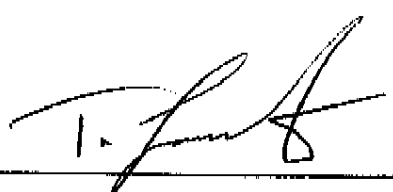
Date: \_\_\_\_\_

Effective: 1/1/98 (Rev. 11/04/02)

Petroleum Cleanup Authorization I , 198AAF continued

PC#: 2003-3187

Proposed Units	Contingent Units	Work Performed	DEQ Verified Units	Unit Type	Code	Activity	Comments
2	1			10 foot length	M1285	2" PVC well screen	
2	1			each	M0563	2" well plugs -bottom	
2	1			each	M0522	2" locking well plugs - top	
2				day	M0331	Discharge hose	
2	1			each	M0053	Pad Locks	
2	1			100 pound	M0511	Sand	
1	1			50 pound	M0504	Bentonite Pallets	
2	1			Day	M0288	Oil/Water interface Probe	
2	1			Day	M0304	PID	
1				day	M0277	Hand auger	Installation of temporary monitoring wells / peizometers
2				unit	M1127	Carbon Drum - 200 lb.	
2				day	X0001	Drum Dolly	
1				unit	X0002	Water Aeration 55-gallon drum	
25				gallons	X0003	SpillRemed - dispersant / bioremediation solution	
2	1			each	X0004	2" flex coupling	
4	2			gallons	X0005	DryLok Sealer for Wall	
1				each	X0006	Paint Brush for Sealer	
1				each	X0007	Roller for Sealer	
1				each	X0008	Tray for Sealer	

RP Signature: 

DEQ Initial: \_\_\_\_\_

Date: 10/7/03

Date: \_\_\_\_\_

Page 7 of 8

Effective: 1/1/98 (Rev. 11/04/02)



Petroleum Cleanup Authorization Form, 198AAF continued

PC#: 2003-3187

Notes:

[Empty rectangular box for notes]

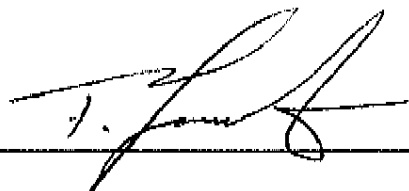
DEQ Use Only:

[Table with 10 empty rows for DEQ use only]

RP Signature:

Name: Billy Willard / Tom Lancaster

Signature:



Date: 10/7/03

DEQ Regional Office Authorization:

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **Appendix B**

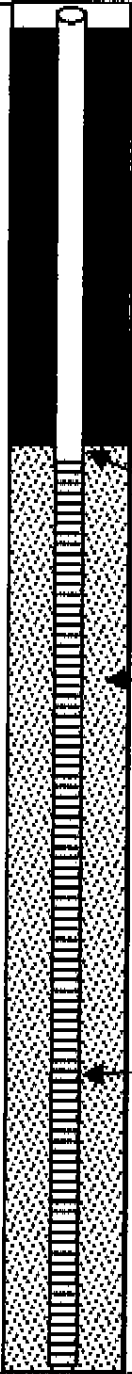
### **Well Logs**

<b>Site</b>	Valespir Residence	<b>Well #</b>	MW-1	<b>Date Drilled</b>	10/10/03
<b>Address</b>	186 Garden Warrenton VA	<b>Client</b>	Mr. And Rs. Vallespir	<b>County</b>	Fauquier
<b>Total Depth of Well (bgs)</b>	5.5 feet	<b>Verticle or Non-Vertical Well</b>	Non-Vertical Well	<b>Consultant</b>	SES
<b>Sample Type</b>	Soil/Vapor	<b>Driller</b>	TRL		

DEPTH (FEET BGS)	LITHOLOGY	Well Diagram	WELL DESCRIPTION	PID (ppm)	SAMPLE INTERVAL (FEET BGS)
-Feet					
-	Clayey Silt with some Sand				3.5 to 4
-5	Stone with Clayey Silt with some Sand (damp)		Sand Schedule 40 well screen	96.2	5 to 5.5
-					
-10			Note: Well was place through edge of gravel filled tank basin and angled into soil adjacent to the basin		
-					
-15					
-					
-20					
-					
-25					
-					
-30					
-					
-35					

<b>Site</b>	Valespir Residence	<b>Well #</b>	MW-2	<b>Date Drilled</b>	10/10/03
<b>Address</b>	186 Garden Warrenton VA	<b>Client</b>	Mr. And Rs. Vallespir	<b>County</b>	Fauquier
<b>Total Depth of Well (bgs)</b>	3.5 feet (42 inches)	<b>Depth to GW (bgs)</b>	2.8 feet (33.6 inches)	<b>Consultant</b>	SES
<b>Sample Type</b>	Soil/Vapor	<b>Driller</b>	TRL		

DEPTH (INCHES BGS)	LITHOLOGY	Well Diagram	WELL DESCRIPTION	PID (ppm)	SAMPLE INTERVAL (FEET BGS)
-Inches					
-5			Bentonite		
-10	Clayey Silt with some Sand				12 to 16
-15			2" schedule 40 well casing		
-20			Sand		
-25	Clayey Silt with some Sand			3.8	24 to 28
-30			Schedule 40 well screen		
-35	Stone with Clayey Silt with some Sand (wet)			89.4	36 to 40
			Screened Interval and Sand extent to Well Bottom - 42 inces		

**Appendix C**  
**Laboratory Reports**

# RJ Lee Group, Inc.

2600 N. 26<sup>th</sup> Ave. Pasco, WA 99301  
Phone (509) 545-4989 Fax (509) 545-3939

## LABORATORY REPORT

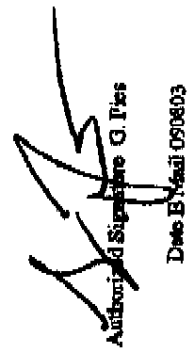
Soils & Environmental Services  
P.O. Box 570  
Noblesville, VA 20162  
Attention: Mr. Billy Wilbard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW 309010  
Samples Received: 3-Sep-03  
Report Date: 8-Sep-03  
Client Project: 03-2341  
Purchase Order No.:

Analysis: Naphthalene  
Method: EPA 8218-G  
Matrix: Aqueous

Client	Sample Identification		Naphthalene		Reporting Units
	RJ Lee Group		Concentration		
803-OV-DC	1021449		< 1.0		µg/L
803-OV-SP	1021450		< 1.0		µg/L

*These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples.*

  
Authorized Signature: G. Pies  
Date: 8/25/03

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

**LABORATORY REPORT**

Soils & Environmental Services, Inc.  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW308017  
Samples Received: 1-Aug-03  
Report Date: 8-Aug-03  
Client Project: 03-2341  
Purchase Order No.: N/A

Analysis: DRO Diesel range organics  
Method: EPA SW846-8015b

Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
Client	RJ Lee Group			
703-OV-SP	1019298	1.0	0.1	mg/L (ppm)
703-OV-DC	1019299	BQL	0.1	mg/L (ppm)

BQL Below Quantization Limit  
N/A Not Applicable

*These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples.*

Authorized Signature S. Schlager

Date E Mail 080803

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

**LABORATORY REPORT**

Soils & Environmental Services, Inc.  
P.O. Box 570  
Notkeville, VA 20182  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW308017  
Samples Received: 1-Aug-03  
Report Date: 8-Aug-03  
Client Project: 03-2341  
Purchase Order No.: N/A

Analysis: Naphthalene  
Method: EPA SW846-8021B

Sample Identification		Naphthalene Concentration	Quantitation Limit	Reporting Units
Client	RJ Lee Group			
703-OV-SP	1019298	BQL	5	µg/L (ppb)
703-OV-DC	1019299	BQL	5	µg/L (ppb)

BQL Below Quantitation Limit  
N/A Not Applicable

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Authorized Signature S. Schiager

Date E Mail 080803

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA



**LABORATORY REPORT**

Soils & Environmental Services, Inc.  
 P.O. Box 570  
 Nokesville, VA 20182  
 Attention: Mr. Billy Willard  
 Phone: 703-594-3752  
 Fax: 703-594-3815

RJ Lee Group Job No.: ACW306262  
 Samples Received: 30-Jun-03  
 Report Date: 9-Jul-03  
 Client Project: 03-2341  
 Purchase Order No.: N/A

Analysis: **DRO Diesel Range Organics / Naphthalene**  
 Method: **EPA SW846-8015b/8021b**

Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
Client	RJ Lee Group			
603-OV-SP	2372802	1.5	0.1	mg/L (ppm)
603-OV-DC	2372803	0.1	0.1	mg/L (ppm)

Sample Identification		Naphthalene Concentration	Quantitation Limit	Reporting Units
Client	RJ Lee Group			
603-OV-SP	2372802	BQL	5	µg/L (ppm)
603-OV-DC	2372803	BQL	5	µg/L (ppm)

BQL Below Quantitation Limit  
 N/A Not Applicable

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Authorized Signature **S. Schlager**  
 Date E-Mail 070903

**LABORATORY REPORT**

Soils & Environmental Services, Inc.  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: (703) 594-3752  
Fax: (703) 594-3815

RJ Lee Group Job No.: ACW 312015  
Samples Received: 3-Dec-03  
Report Date: 10-Dec-03  
Client Project No.: 03-2341  
Purchase Order No.:

Analysis: Diesel Range Organics (DRO)  
Method: EPA SW846 8015B

Matrix	Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
	Client	RJ Lee Group			
Soil	Front House	1026301	210	10	ug/kg (Dry Wt.)
Soil	Side House	1026302	290	10	mg/kg (Dry Wt.)

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Authorized Signature G. Fies

Date E-Mailed 121003

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

**LABORATORY REPORT**

Soils & Environmental Services  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW310091  
Samples Received: 10-Oct-03  
Report Date: 20-Oct-03  
Client Project: 03-2341  
Purchase Order No.: N/A

Analysis: **DRO Diesel range organics**  
Method: **EPA SW846-8015b**

Client	Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
	RJ Lee Group				
OV-B1	1023901		8,380	10	mg/kg (ppm)
OV-B2	1023902		18,800	10	mg/kg (ppm)

N/A Not Applicable

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Authorized Signature S. Schlager

Date E Mail 102003

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

# RJ Lee Group, Inc.

2600 N. 20th Ave., Pasco, WA 99301  
Phone (509) 545-4989 Fax (509) 545-3939

## LABORATORY REPORT

Soils & Environmental Services, Inc.  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: (703) 594-3752  
Fax: (703) 594-3815

RJ Lee Group Job No.: ACW 401036  
Samples Received: 9-Jan-04  
Report Date: 18-Jan-04  
Client Project No.: 03-2341  
Purchase Order No.:

Analysis: Diesel Range Organics (DRO)  
Method: EPA SW846 8015B

Matrix	Client	Sample Identification	DRO Concentration	Quantitation Limit	Reporting Units
Aqueous	1203-OV-SP1	RJ Lee Group 1027713	3.2	0.50	mg/L

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Authorized Signature R. Hermann

Date E-Mailed 011804

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

# RJ Lee Group, Inc.

2600 N. 20th Ave., Pasco, WA 99301  
Phone (509) 545-4989 Fax (509) 545-3939

## LABORATORY REPORT

Soils & Environmental Services, Inc.  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: (703) 594-3752  
Fax: (703) 594-3815

RJ Lee Group Job No.: ACW 401036  
Samples Received: 9-Jan-04  
Report Date: 18-Jan-04  
Client Project No.: 03-2341  
Purchase Order No.:

Analysis: **Naphthalene**  
Method: **EPA SW846 8021B**

Matrix	Sample Identification		Naphthalene Concentration	Quantitation Limit	Reporting Units
	Client	RJ Lee Group			
Aqueous	1203-OV-SP1	1027713	< 1.0	1.0	ug/L

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Authorized Signature R. Hermann

Date E-Mailed 011804

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

# RJ Lee Group, Inc.

2600 N. 20th Ave., Pasco, WA 99301  
Phone (509) 545-4989 Fax (509) 545-3939

## LABORATORY REPORT

Soils & Environmental Services, Inc.  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: (703) 594-3752  
Fax: (703) 594-3815

RJ Lee Group Job No.: ACW 312019  
Samples Received: 3-Dec-03  
Report Date: 10-Dec-03  
Client Project No.: 03-2341  
Purchase Order No.:

Analysis: Diesel Range Organics (DRO)  
Method: EPA SW846 8015B

Matrix	Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
	Client	RJ Lee Group			
Aqueous	1103-OV-SP	1026312	<0.50	0.50	mg/L
Aqueous	1103-OV-DC	1026313	<0.50	0.50	mg/L

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Authorized Signature G. Fies

Date E-Mailed 12/10/03

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

# RJ Lee Group, Inc.

2600 N. 20th Ave., Pasco, WA 99301  
Phone (509) 545-4989 Fax (509) 545-3939

## LABORATORY REPORT

Soils & Environmental Services, Inc.  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: (703) 594-3752  
Fax: (703) 594-3815

RJ Lee Group Job No.: ACW 312019  
Samples Received: 3-Dec-03  
Report Date: 10-Dec-03  
Client Project No.: 03-2341  
Purchase Order No.:

Analysis: Naphthalene  
Method: EPA SW846 8021B

Matrix	Sample Identification		Naphthalene Concentration	Quantitation Limit	Reporting Units
	Client	RJ Lee Group			
Aqueous	1103-OV-SP	1026312	<1.0	1.0	ug/L
Aqueous	1103-OV-DC	1026313	<1.0	1.0	ug/L

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Authorized Signature G. Fies

Date E-Mailed 12/10/03

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

**LABORATORY REPORT**

Soils & Environmental Services  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW310265  
Samples Received: 31-Oct-03  
Report Date: 10-Nov-03  
Client Project: 03-2341  
Purchase Order No.: N/A

Analysis: DRO Diesel range organics  
Method: EPA SW846-8015b

Client	Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
	RJ Lee Group				
1003-OV-INE	1024857		< 0.5	0.5	mg/L (ppm)
1003-OV-EFF	1024858		< 0.5	0.5	mg/L (ppm)

N/A Not Applicable

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Authorized Signature S. Schlager

Date E Mail 111003

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA



350 Hochberg Road, Monroeville, PA 15146  
 Phone (724) 325-1776 Fax (724) 733-1799

**LABORATORY REPORT**

Soils & Environmental Services  
 P.O. Box 570  
 Nokesville, VA 20182  
 Attention: Mr. Billy Willard  
 Phone: 703-594-3752  
 Fax: 703-594-3815

RJ Lee Group Job No.: ACW310263  
 Samples Received: 31-Oct-03  
 Report Date: 10-Nov-03  
 Client Project: 03-2341  
 Purchase Order No.: N/A

Analysis: Naphthalene  
 Method: EPA SW846-8021b

Client	Sample Identification		Naphthalene Concentration	Quantitation Limit	Reporting Units
	RJ Lee Group				
1003-OV-1NF	1024857	13	5	µg/L (ppb)	
1003-OV-EFF	1024858	<5	5	µg/L (ppb)	

N/A Not Applicable

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Authorized Signature S. Schlager

Date E Mail 11/10/03

LABORATORY REPORT

Soils & Environmental Services  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW309203  
Samples Received: 25-Sep-03  
Report Date: 22-Jan-04  
Client Project: 02-2341  
Purchase Order No.: N/A

Analysis: DRO Diesel range organics  
Method: EPA SW846-8015b

Client	Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
	RJ Lee Group				
903-OV-EFF	1023106		< 0.5	0.5	mg/L (ppm)
903-OV-INF	1023107		31.3	0.5	mg/L (ppm)

Results are reissued due to decimal place error in original report dated 10/07/03, results originally reported a thousand fold higher.

N/A Not Applicable

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Authorized Signature S. Schlager

Date E Mail 012204

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA

# RJ Lee Group, Inc.

350 Hochberg Road  
Monroeville, PA 15146  
Phone (724) 325-1776 Fax (724) 733-1799

## LABORATORY REPORT

Soils & Environmental Services  
P.O. Box 570  
Nokesville, VA 20182  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACW309203  
Samples Received: 25-Sep-03  
Report Date: 7-Oct-03  
Client Project: 02-2341  
Purchase Order No.: N/A

Analysis: Naphthalene  
Method: EPA SW846-8021b

Client	Sample Identification		Naphthalene Concentration	Reporting Units
	RJ Lee Group			
903-OV-EFF	1023106	<1	µg/L (ppb)	
903-OV-ENF	1023107	<1	µg/L (ppb)	

N/A Not Applicable

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Authorized Signature S. Schlager

Date E Mail 032703

# RJ Lee Group, Inc.

350 Hochberg Road Monroeville, PA 15146  
Phone (724) 325-1776 Fax (724) 733-1799

## LABORATORY REPORT

Solis & Environmental Services, Inc.  
P.O. Box 570  
Monroeville, VA 28112  
Attention: Mr. Billy Willard  
Phone: 703-594-3752  
Fax: 703-594-3815

RJ Lee Group Job No.: ACV309010  
Samples Received: 2-Sep-03  
Report Date: 5-Sep-03  
Client Project: 03-2341  
Purchase Order No.: N/A

Analysis: DRO Diesel range organics  
Method: EPA SW846-8015b

Client	Sample Identification		DRO Concentration	Quantitation Limit	Reporting Units
	RJ Lee Group				
803-OV-DC	1021449	BQL	0.1	mg/L (ppm)	
803-OV-SP	1021450	0.9	0.1	mg/L (ppm)	

BQL Below Quantitation Limit  
N/A Not Applicable

*These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples.*

Authorized Signature: S. Schlager  
  
Date: E Mail 090503

Monroeville, PA - San Leandro, CA - Washington, DC - Pasco, WA