GW - 101

REPORTS

YEAR(S):

1990

GW-101

SMITH ENERGY SERVICES

ENVIRONMENTAL ASSESSMENT REPORT

2198 BLOOMFIELD HIGHWAY

FARMINGTON, NEW MEXICO

AUGUST, 1990

ENERLOG/TIS Inc.
7950 SOUTH LINCOLN STREET, SUITE 106
LITTLETON, COLORADO 80122
(303) 798-4361

Introduction

An environmental assessment of the Smith Energy facility located in Farmington, New Mexico, was conducted in April, 1990. This initial work evaluated the operational procedures and some shallow subsurface work. However, two concerns became apparent as a result of that assessment. The first was the deeper subsurface areas under and around the rinse pit needed to be assessed for any contamination/degradation as the result of using the pit. The second was that the subsurface areas around the three underground storage tanks (1-4,000 gallon gasoline; 1-10,000 gallon waste acid; 1-30,000 gallon diesel) needed to be evaluated as well as the tanks themselves (see Exhibit 1). Because of these concerns, the subsurface soils in these areas were evaluated by the use of drilling equipment. Also, precision tank tightness testing was conducted on the two underground fuel storage tanks.

Appendices A, B, C, D contain the supporting data for the laboratory and field tests which were completed as a part of this report.

SMITH ENERGY SERVICES

FARMINGTON, NEW MEXICO

Introduction

An environmental assessment of the Smith Energy facility located in Farmington, New Mexico, was conducted in April, 1990. This initial work evaluated the operational procedures and some shallow subsurface work. However, two concerns became apparent as a result of that assessment. The first was the deeper subsurface areas under and around the rinse pit needed to be assessed for any contamination/degradation as the result of using the pit. The second was that the subsurface areas around the three underground storage tanks (1-4,000 gallon gasoline; 1-10,000 gallon waste acid; 1-30,000 gallon diesel) needed to be evaluated as well as the tanks themselves (see Exhibit 1). Because of these concerns, the subsurface soils in these areas were evaluated by the use of drilling equipment. Also, precision tank tightness testing was conducted on the two underground fuel storage tanks.

Discussion

The geological conditions around and under the Smith facility consists of large cobbles and boulders, mixed with gravel and sand, and as such, makes any drilling difficult.

The first drilling was begun July 19, 1990. Three test holes were drilled on July 19 and 20 - two around the waste acid tank and one into the pit area. (See Site Diagram - Exhibit 1) The drilling rig which was used was equipped with a casing string which is extended downward and therefore keeps the hole "open" continuously. The drilling apparatus is a cylindrical drill bit which grinds cobbles and boulders while being hammered via air pressure. The advantages of this type of drilling method in such difficult geological conditions, is that it is able to drill quicker and once the desired depth is reached, the hole may be cased for use as a well. Conventional drilling equipment such as an auger cannot drill effectively in these coarse boulder deposits.

When the subsurface evaluation was begun, it was started as subsurface exploration and sampling only. However, after approximately two days of drilling the decision was made by the concerned parties (Smith International and Smith Energy), to complete some of the holes for groundwater monitoring wells.

On July 24, drilling was continued to install monitor wells in the areas of concern; i.e. the disposal pit and the underground storage tanks.

Results - Subsurface Evaluation

(Please refer to the Site Diagram)

The test holes around the waste acid tank were evaluated for chloride and total recoverable petroleum hydrocarbons (TRPH) - chloride being an indicator for hydrochloric acid, and TRPH an indicator for oil related contamination.

Test Hole #1 - Waste Acid Tank

This hole was drilled at the southern and east side of the 10,000 gallon waste acid tank. This area showed a lesser degree of suspected contamination, i.e. visual and odor indicators were not as evident as observed on the west side of this tank. A sample was taken at 15 feet. (See Table 1)

Test Hole #2 - Waste Acid Tank

This hole was drilled at the southern end of the tank approximately five feet south and five feet west of the tank, adjacent to the asphalt/soil interface. The field observations made at the time of drilling indicated contamination at various levels, especially Total Recoverable Petroleum Hydrocarbons(TRPH).

TABLE 1

Test Holes (TH) Subsurface

Waste Acid Tank Area

Parameter: Chloride	Depth (Ft.)	Concentration(ppm)
TH #1	15	131
TH #2	10	256
	15	184
	20	132

Parameter:

Total Recoverable Petroleum Hydrocarbons

TH #2	10	1460
	15	7730
	20	2055

Parameter: Volatile Organics

Analysis		Concentration (ppb)
TH #2		
Methylene chloride	20	14
Total Xylenes	20	35

Test Hole #1 - Unlined Pit Area

This hole was drilled to a depth of eighteen (18) feet from the concrete ramp which was cleared of mud and other debris This hole was drilled down through the pit and field observations made during the drilling indicated contamination was present at various levels (see Table 2). Upon the completion of drilling, the hole was filled with cuttings and bentonite pellets and grout to help prevent any downward migration through the borehole.

MONITOR WELLS

Monitor Well #1

This monitoring well as drilled and installed at a location adjacent to the north and east property boundary midway between the unlined pit and the east fence line.

During the construction of monitor well #1, groundwater was encountered at approximately twenty-five (25) feet with the underlying blue clay/shale at thirty-three (33) feet.

Sampling was conducted during drilling (see Table 3). The total depth of well #1 is approximately thirty-four (34) feet.

The well was cased with PVC slotted pipe from the total depth (T.D.) to fifteen (15) feet subsurface and solid PVC

TABLE 2

Test Holes (TH) Subsurface

Unlined Disposal Pit

Parameter:	Depth (Ft.)	Concentration (ppm)
Total Recoverable Petroleum Hydrocarbons		
TH #1	5	2965
	10	3662
	15	3467
	18	14

Parameter: Volatile Organic Analysis		Concentration (ppb)
TH #1	18	14
Total Xylenes	18	44

Sampling was conducted during drilling (see Table 3).

The total depth of well #1 is approximately thirty-four (34) feet.

The well was cased with PVC slotted pipe from the total depth (T.D.) to fifteen (15) feet subsurface and solid PVC from nineteen (19) feet subsurface to surface.

Monitor Well #2

This well was drilled and installed at the south and west corner of the fuel island concrete pad to a depth of approximately 40 feet.

The construction of monitoring well #2 was routine. Groundwater was encountered at approximately thirty (30) feet and the underlying blue clay shale at thirty-nine (39) feet. Total depth of this well was constructed to approximately forty (40) feet.

The well was cased with PVC slotted pipe from T.D. to eighteen (18) feet with solid pipe from eighteen (18) feet to surface.

No significant subsurface contamination was detected during drilling (see Table 3).

TABLE 3

Monitor Well (MW) 1

Unlined Pit Area

Parameter:	Depth	Concentration (ppm)
Total Recoverable Petroleum Hydrocarbons		
MW #1	10	157
	20	24.0

Underground Fuel Tank Area

MW #2	10	9.0
	20	5.0
MW #3	10	2660
	20	319

Monitor Well #3

This well was drilled and installed at the north and west corner of the concrete fuel island to a depth of forty (40) feet.

When the well was constructed groundwater was encountered at approximately twenty-eight (28) feet with blue clay shale at approximately thirty-nine (39) to forty (40) feet. The well is approximately forty (40) feet deep with PVC slotted pipe from T.D. to twenty (20) feet and solid PVC from twenty (20) feet to the surface.

Some significant petroleum hydrocarbons were detected at ten (10) feet during drilling. These were later identified as being diesel however, given the method of air drilling, the results could have shown residual gasoline which had volatilized during drilling.

All of the monitoring wells were developed using standard industry practice of "cleaning up" the wells, by removing any sand, silt and turbidity. After the wells were developed they were allowed to equilibrate and stabilize for approximately two weeks.

On August 14, 1990, the wells were purged and the groundwater was sampled for petroleum hydrocarbon contamination.

All of the wells were installed with locking devices to prevent any unauthorized access.

RESULTS

Groundwater Monitoring/Sampling

The monitoring wells numbered MW-1, MW-2 and MW-3 were purged and sampled on August 14, 1990.

MW-1 was analyzed for total recoverable petroleum hydrocarbons (TRPH), and wells MW-2 and MW-3 were both analyzed for diesel and gasoline contamination. The results follow:

Well	Analysis	Concentration (mg/l)
MW-1	TRPH	<.10
MW-2	Diesel	Undetected
	Gasoline	Undetected
MW-3	Diesel	Undetected
	Gasoline	Undetected

These test results indicated no petroleum contamination. (See Appendix C).

Tank Tightness Test

The two underground fuel storage tanks (1-4,000 gallon gasoline and 1-30,000 gallon diesel) were precision tested on August 14, 1990. A precision tank test requires that the tanks be full of product. The pressurized product lines were tested on

August 15, 1990. The results of these tests are contained in Appendix D).

The results indicated that all of the product lines were tight when pressurized to minimum of 1.5 times the operating pressure. Such line tests are required on underground pressurized fuel systems.

The tank tightness tests indicated the diesel tank to be tight at the time of the test. However, the gasoline tank showed a 0.6 gallon per hour leak rate, which is greater than allowed. Therefore the tank, at the time of the test, (totally full), was not tight.

CONCLUSIONS

As a result of the environmental assessment on the Smith Energy Services property, the following conclusions may be made.

1. The subsurface area under the waste pit showed petroleum hydrocarbon contamination, but no significant volatile organic contaminants. Also, the deepest part of the test hole, which was drilled in the pit to 18 feet, had indications of only 14 ppm of petroleum hydrocarbons and less than 50 ppb of total xylenes.
2. The subsurface area around the buried waste acid tank showed the greatest concentration of total petroleum hydrocarbons throughout Test Hole #2. No monitor well was installed adjacent to the acid tank because the test holes had been done prior to the decision to install monitoring wells, and contamination was obvious in Test Hole #2.
3. During installation of the two monitor wells, subsurface area around the fuel tanks had indications of petroleum at ten (10) feet in the northwest corner of fuel island, with a lesser amount at twenty (20) feet. The groundwater was sampled from these two wells and there were no petroleum hydrocarbons detected as a result of that sampling.

RECOMMENDATIONS

1. In our opinion, the waste acid tank, because of its frequent use and indications of subsurface contaminants, should be (1) evaluated further, (2) excavated further and or (3) removed. This tank has a history of leakage and it is not known whether the contamination is from any past problems or a current condition. Obviously, if the levels of petroleum hydrocarbons are occurring as a result of using the acid tank, the situation should be mitigated. Further evaluation of the area may be necessary to determine if any contaminants have spread.

   Also, as pointed out in the first report (April, 1990), past installations of fiberglass tanks were not scrutinized as is commonly done today. For this reason, many older fiberglass tanks have been found to be leaking from faulty installation or incompatibility with the substances stored.

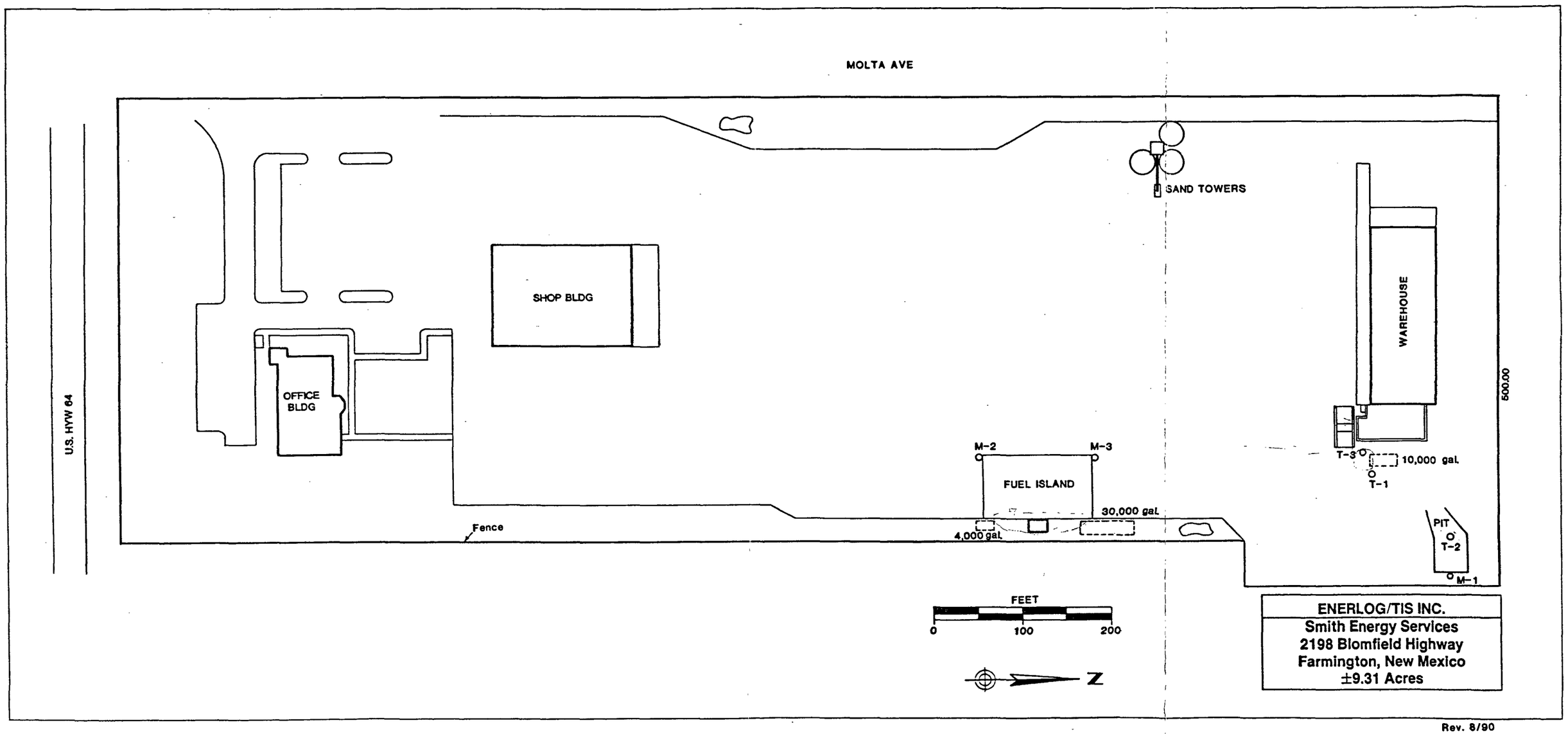
2. The gasoline tank should be evaluated further. The leaking condition may only occur at the full test level, however proper fuel inventory methods would probably indicate if a problem was present during day-to-day operations. During the initial assessment, it was indicated that fuel inventory reconciliation was needed and that "a dispenser meter" was not functioning. The totalizer meter on dispensing equipment is critical to proper fuel inventory, which is required to meet the state or federal

release detection requirements. All dispenser totalizers should be checked for proper operation and all dispenser totalizers should be read daily and recorded. This may show loss of product from the gasoline tank. At any rate, determining the location of the leak and repair or replacement as needed must be considered. Indications of petroleum contamination at the northwest corner of the fuel island may need to be evaluated.

3. The use of the unlined pit should be discontinued. Given the regulatory attitude toward the protection of groundwater, (with the containment and proper disposal of generated wastes) provisions should be made to minimize waste with possible pre-treatment of generated wastes on site.

Some additional evaluation may be needed to assess any migration which may have occurred from the area of the unlined pit.

EXHIBIT 1



Rev. 8/90

APPENDICES

APPENDIX A

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA

Client Sample Number	: 90-17 A-2-3A		
Lab Sample Number	: X23931	Client Project No.	: 90-17
Date Received	: 07/21/90	Lab Project No.	: 8539
Date Sampled	: 07/17/90	Effective Dilution	: 5.19
Date Extracted/Prepared	: 07/30/90	Method	: 8260(8240)
Date Analyzed	: 07/30/90	Matrix	: SOIL
Methanol Extract?	: N	Lab File No.	: >V2799
Percent Loss on Drying	: 3.59	Method Blank No.	: RB073090

Compound Name	Cas Number	Conc. ug/Kg		PQL* ug/Kg
Chloromethane	74-87-3		U	52
Bromomethane	74-83-9		U	52
Vinyl Chloride	75-01-4		U	52
Chloroethane	75-00-3		U	52
Methylene Chloride	75-09-2	14	J	26
Acetone	67-64-1		U	520
Carbon Disulfide	75-15-0		U	26
1,1-Dichloroethene	75-35-4		U	26
1,1-Dichloroethane	75-34-3		U	26
Trans 1,2-Dichloroethene	156-60-5		U	26
Chloroform	67-66-3		U	26
1,2-Dichloroethane	107-06-2		U	26
2-Butanone	78-93-3		U	520
1,1,1-Trichloroethane	71-55-6		U	26
Carbon Tetrachloride	56-23-5		U	26
Bromodichloromethane	75-27-4		U	26
Vinyl Acetate	108-05-4		U	26
1,2-Dichloropropane	78-87-5		U	26
Trans 1,3 Dichloropropene	10061-02-6		U	26
Trichloroethene	79-01-6		U	26
1,1,2-Trichloroethane	79-00-5		U	26
Benzene	71-43-2		U	26
Dibromochloromethane	124-48-1		U	26
Cis,1,3-Dichloropropene	10061-01-5		U	26
2-Chloroethylvinyl Ether	110-75-8		U	52
Bromoform	75-25-2		U	26
4-Methyl-2-Pentanone	108-10-1		U	260
2-Hexanone	591-78-6		U	260
1,1,2,2-Tetrachloroethane	79-34-5		U	26
Tetrachloroethene	127-18-4		U	26
Toluene	108-88-3		U	26
Chlorobenzene	108-90-7		U	26
Ethyl Benzene	100-41-4		U	26
Styrene	100-42-5		U	26
Total Xylenes	1330-20-7	35		26

Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	94%	(70-121)
Toluene-d8	90%	(81-117)
Bromofluorobenzene	97%	(74-121)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
= Compound found in blank and sample. Compare blank and sample data.
= Compound is detected at a concentration outside the calibration limits.
= Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.
Unless otherwise noted all concentrations and PQL's for soils are Quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____ _____
John D Parker — Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
4036 Youngfield St. Wheat Ridge, CO 80033
(303)425-6021

Chloride Analysis

Date Received : 7/21/90
Date Sampled : 7/17/90
Date Prepared : 7/24/90
Date Analyzed : 7/27/90

Client Project No. : 90-17
Lab Project No. : 8539
Method : EPA 300.0

Evergreen Sample No.	Client Sample No.	Matrix	Chloride mg/Kg
X23927	90-17-A1	Soil	131
X23928	90-17-A2-1	"	256
X23929	90-17-A2-2	"	184
X23930	90-17-A2-3	"	132

Approved

Quality Assurance Officer

EVERGREEN ANALYTICAL, INC
4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Date Received : 7/21/90
Date Sampled : 7/17/90
Date Prepared : 7/23/90
Date Analyzed : 7/23/90

Client Project : 90-17
Lab Project No.: 8539
Method : EPA 418.1

Evergreen Sample No.	Client Sample No.	Matrix	TRPH*
X23928	90-17 A2-1	Soil	1460 mg/Kg
X23929	90-17 A2-2	"	7730 "
X23930	90-17 A2-3	"	2055 "
X23932	90-17 P-1	"	2965 "
X23933	90-17 P-2	"	3662 "
X23934	90-17 P-3	"	3467 "
X23935	90-17 P-4	"	13.6 "

*Reported values based on specific gravity of 1.0; Detection limit 3.03 mg/Kg for soils.

Approved

Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA

Client Sample Number	: 90-17 P-3-A		
Lab Sample Number	: X23936	Client Project No.	: 90-17
Date Received	: 07/21/90	Lab Project No.	: 8539
Date Sampled	: 07/17/90	Effective Dilution	: 5.13
Date Extracted/Prepared	: 07/30/90	Method	: 8260(8240)
Date Analyzed	: 07/30/90	Matrix	: SOIL
Methanol Extract?	: N	Lab File No.	: >V2800
Percent Loss on Drying	: 2.55	Method Blank No.	: RB073090

Compound Name	Cas Number	Conc. ug/Kg		PQL* ug/Kg
Chloromethane	74-87-3		U	51
Bromomethane	74-83-9		U	51
Vinyl Chloride	75-01-4		U	51
Chloroethane	75-00-3		U	51
Methylene Chloride	75-09-2	14	J	26
Acetone	67-64-1		U	510
Carbon Disulfide	75-15-0		U	26
1,1-Dichloroethene	75-35-4		U	26
1,1-Dichloroethane	75-34-3		U	26
Trans 1,2-Dichloroethene	156-60-5		U	26
Chloroform	67-66-3		U	26
1,2-Dichloroethane	107-06-2		U	26
2-Butanone	78-93-3		U	510
1,1,1-Trichloroethane	71-55-6		U	26
Carbon Tetrachloride	56-23-5		U	26
Bromodichloromethane	75-27-4		U	26
Vinyl Acetate	108-05-4		U	26
1,2-Dichloropropane	78-87-5		U	26
Trans 1,3 Dichloropropene	10061-02-6		U	26
Trichloroethene	79-01-6		U	26
1,1,2-Trichloroethane	79-00-5		U	26
Benzene	71-43-2		U	26
Dibromochloromethane	124-48-1		U	26
Cis,1,3-Dichloropropene	10061-01-5		U	26
2-Chloroethylvinyl Ether	110-75-8		U	51
Bromoform	75-25-2		U	26
4-Methyl-2-Pentanone	108-10-1		U	260
2-Hexanone	591-78-6		U	260
1,1,2,2-Tetrachloroethane	79-34-5		U	26
Tetrachloroethene	127-18-4		U	26
Toluene	108-88-3		U	26
Chlorobenzene	108-90-7		U	26
Ethyl Benzene	100-41-4		U	26
Styrene	100-42-5		U	26
Total Xylenes	1330-20-7	44		26

Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	91%	(70-121)
Toluene-d8	106%	(81-117)
Bromofluorobenzene	88%	(74-121)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
B = Compound found in blank and sample. Compare blank and sample data.
E = Compound is detected at a concentration outside the calibration limits.
* = Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.

Unless otherwise noted all concentrations and PQL's for soils are quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____ _____
John D Parker — Quality Assurance Officer

APPENDIX B

EVERGREEN ANALYTICAL, INC
4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Date Received	: 7/27/90	Client Project	: 90-17
Date Sampled	: 7/24,25/90	Lab Project No.	: 8603
Date Prepared	: 7/29/90	Method	: EPA 418.1
Date Analyzed	: 7/29/90		

Evergreen Sample No.	Client Sample No.	Matrix	TRPH *
X24423	M-1-A	Soil	157
X24424	M-1-B	"	23.9
X24425	M-2-A	"	9.22
X24426	M-2-B	"	4.66
X24427	M-3-A	"	2660
X24428	M-3-B	"	319

* Reported values based on specific gravity of 1.0; Detection limit 3.03 mg/Kg for soils.

Approved

Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

TOTAL VOLATILE HYDROCARBONS (TVH)
BY 5030/Modified 8015(Purge & Trap)

Client: Enerlog /TIS
Client Project No.: 90-17
Laboratory Project No.: 8747
Date of Report: August 13,1990

Evergreen Sample #	Client Sample #	(TVH) ppm	MDL* ppm
x25005	m-1-A	0.1	0.1
x25006	m-3-A	0.6	0.1

Qualifiers

U= TVH analyzed for but not detected
B= TVH found in blanks as well as sample (blank data should be compared).
*=MDL Method Detection Limit

Approved Steven L. Zyn QAO J. Stephens

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

TOTAL VOLATILE HYDROCARBONS (TVH)
BY 5030/Modified 8015(Purge & Trap)

Client: Enerlog/TIS
Client Project No.: 90-17
Laboratory Project No.: 8603
Date of Report: August 1, 1990

Evergreen Sample #	Client Sample #	(TVH) ppm	MDL* ppm
x24429	M-2-C	U	0.1

QUALIFIERS

U=TVH analyzed for but not detected.
B=TVH found in blank as well as sample (blank data should be compared).
*=MDL Method Detection Limit

Approved _____ QAO _____

TVH8603.FMT::DATA

APPENDIX C

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge, CO 80033
(303)425-6021

TOTAL PETROLEUM HYDROCARBONS (TPH) BY CALIFORNIA DEPARTMENT of HEALTH SERVICES DIESEL METHOD

Client: Enerlog/TIS
Client Project No.: 9017
Laboratory Project No.: 8816
Date of Report: August 22, 1990

Evergreen Sample #	Client Sample #	(TPH) ppm	MDL* ppm
x25283	9017 FS	U	0.5
x25284	9017 FN	U	0.5

QUALIFIERS

U=TPH analyzed for but not detected.
B=TPH found in blank as well as sample (blank data should be compared).
*=MDL method detection level for this method.

Approved _____ QAO _____

CALDIESEL8816.FMT::DATA

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

TOTAL VOLATILE HYDROCARBONS (TVH)
BY 5030/Modified 8015(Purge & Trap)

Client: Enerlog /TIS Inc.
Client Project No.: 9017
Laboratory Project No.: 8816
Date of Report: August 20,1990

Evergreen Sample #	Client Sample #	(TVH) ppm	MDL* ppm
x25283	9017 FS	U	0.1
x25284	9017 FN	U	0.1

Qualifiers

U= TVH analyzed for but not detected
B= TVH found in blanks as well as sample (blank data should be compared).
*=MDL Method Detection Limit

Approved _____ QAO _____

EVERGREEN ANALYTICAL, INC
4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Date Received : 8/16/90
Date Sampled : 8/14/90
Date Prepared : 8/17/90
Date Analyzed : 8/17/90

Client Project : 9017
Lab Project No.: 8816
Method : EPA 418.1

Evergreen Sample No.	Client Sample No.	Matrix	TRPH*
X25285	9017 NE	Water	<0.100 mg/L

*Reported values based on specific gravity of 1.0; Detection limit 0.100 mg/L for waters.

Approved

Quality Assurance Officer

APPENDIX D

ENERLOG/TIS INC. PRECISION TANK TEST RESULTS

TANK OWNER/ OPERATOR

NAME: SMITH ENERGY SERVICES PHONE: (505)334-7531
ADDRESS: 2198 BLOOMFIELD HIGHWAY
CITY: FARMINGTON STATE: N.M. ZIP: 87401

TANKS TESTED

IDENTIFICATION	CAPACITY GALS	MANUFACTURER	STEEL/FRP	AGE
DIESEL (NORTH)	15,000	EATON	STEEL	?
UNLEADED (SOUTH)	4,000	EATON	STEEL	?

SPECIAL NOTES OR PRECAUTIONS

TEST RESULTS

ALL TESTS WERE PERFORMED IN ACCORDANCE WITH PROCEDURES DESCRIBED IN SOILTEST'S INSTRUCTION BOOK. CRITERIA FOR TIGHTNESS ARE ESTABLISHED BY NATIONAL FIRE PROTECTION ASSOCIATION BULLETIN NFPA 329 AND MEET EPA REQUIREMENTS.

TANK IDENT	TANK IS TIGHT	TANK IS NOT TIGHT	LEAK RATE G.P.H.	TEST DATE
DIESEL (NORTH)	X		-0.006	8/14/90
UNLEADED (SOUTH)		X	+0.585	8/14/90

CERTIFICATION

THIS CERTIFIES THAT THE TANKS DESCRIBED WERE TESTED BY THE UNDERSIGNED AND THAT THE STATED RESULTS REPRESENT THE TRUE STATE OF THE TANKS ON THIS DATE TO THE BEST OF MY KNOWLEDGE.

CERTIFICATE NUMBER 1487
SIGNED: [signature] DATE: 8/27/90 ISSUE DATE 09/13/89
ENERLOG/TIS INC., 7950 S. LINCOLN ST., SUITE 106
LITTLETON, CO 80122 PHONE: (303) 798-4361

ENERLOG/TIS INC. LINE TEST RESULTS

LINE OWNER/ OPERATOR

NAME: SMITH ENERGY SERVICES PHONE: (505)334-7531
ADDRESS: 2198 BLOOMFIELD HIGHWAY
CITY: FARMINGTON STATE: NEW MEXICO ZIP: 87401

LINES TO BE TESTED

NO.	IDENTIFICATION	SUCTION	PRESSURE	STEEL/FRP	AGE
1	UNLEADED PUMP TO DISPENSER		X	STEEL	?
2	DIESEL-PUMP TO FARTHEST		X	STEEL	?
3	DISPENSER				
4					
5					
6					
7					
8					
9					
10					
11					
12					

OFFICIALS TO BE CONTACTED

NAME ADDRESS PHONE

SPECIAL NOTES

TEST RESULTS

ALL TESTS WERE PERFORMED IN ACCORDANCE WITH PROCEDURES DESCRIBED IN NEPTEK INC. OPERATION'S MANUAL. CRITERION FOR TIGHTNESS IS ESTABLISHED BY NATIONAL FIRE ASSOCIATION PROTECTION BULLETIN N.F.P.A. 329 AND MEET EPA REQUIREMENTS.

NO.	LINE	LINE IS TIGHT	LINE NOT TIGHT	LEAK RATE G.P.H.	TEST DATE
1	UNLEADED	X		0	8/15/90
2	DIESEL	X		-0.004	8/15/90
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

CERTIFICATION

THIS CERTIFIES THAT THE LINES DESCRIBED WERE TESTED BY THE UNDERSIGNED AND THAT THE STATED RESULTS REPRESENT THE TRUE STATE OF THE LINES ON THIS DATE TO THE BEST OF MY KNOWLEDGE.

SIGNED: J. Fries DATE: 8/27/90.

ENERLOG/TIS INC., 7950 S. LINCOLN ST., SUITE 106
LITTLETON, CO 80122 PHONE: (303) 798-4361

TANK TIGHTNESS TEST - FIELD DATA (LARGE TANK)

10 TANK I.D.

TANK ID _____ LOCATION: FARMINGTON PRODUCT: DIESEL TESTER SERIAL NO.: 96 ET659

TANK DIAMETER: 132 INCHES. FILL PIPE LENGTH: 46 INCHES. TOP OF FILL PIPE +/- GROUND LEVEL -3 INCHES.

PROBES

PROBES=TANK DIA. X (0.852)= ~~T1, X (0.5)=~~ ~~T2, X (0.149)=~~ ~~T3. TOTAL~~ TANK BOTTOM TO TOP FILL 178

11 WATER IN TANK

a. START WATER IN TANK 0 INCHES. c. END WATER IN TANK 0 INCHES.

b. START WATER IN TANK 0 GALLONS. d. END WATER IN TANK 0 GALLONS.

12 PRODUCT VOLUME

a. NOMINAL CAPACITY 30000 GALLONS. c. DEDUCT WATER IN TANK..... 0 GALLONS.

b. ACTUAL CAPACITY 29910 GALLONS. d. TOTAL PRODUCT VOLUME IN TANK. 29910 GALLONS.

e. PRODUCT IN PIPE 10 GALLONS. U-T 25' f. TOTAL PRODUCT VOLUME IN SYSTEM 29920 GALLONS.

13 FILL PIPE EXTENSION

a. HEIGHT OF WATER TABLE ABOVE TANK BOTTOM _____(h)inches. b. DENSITY OF TANK PRODUCT .029 (w)LB/CU.IN.

DENSITY OF EXTERNAL WATER = 0.036 LB/CU.IN. c. ADDIT. HEAD REQUIRED = (h) x 0.036/(w) = ___x0.036/___ = ___INS.

PRESSURE AT WATER LEVEL ___LBS/SQ.IN. PRESSURE AT TANK BOTTOM ___LBS/SQ.IN. SHOULD NOT EXCEED 5.0 LBS/SQ.IN.

14 PRELIM. TEST DATA

a. TANK FILLED 3 AM/(PM) 8/13/90. b. TIME SINCE LAST LIQUID ADDED 17 HRS. c. AMOUNT ADDED — GALLONS.

d. A.P.I. GRAVITY 37.3 AT 62.5 °F. e. A.P.I. GRAVITY 37.1 AT 60°F. f. COEFFICIENT OF EXPANSION .000 46985

g. START TEMPERATURE CHECK 7:15 (AM)/PM. h. END TEMPERATURE CHECK 8:00 (AM)/PM.

15 TEST DATA

a. START TEST 8:00 (AM)/PM. END TEST 11:00 (AM)/PM. TEST TIME MINUTES 180.

BEGINNING AVE. TEMP. 73.089 ENDING AVE. TEMP. 73.189 FROM GRAPH PLOT.

Product level 1/2".

TIME	START	STOP	+/-	CUMULATIVE	TIME	START	STOP	+/-	CUMULATIVE	MISCELLANEOUS
8:00	LEVEL				10:00	.002	.038	-.036	-.985	
:05	.023	.079	-.056	-.056	:05	.038	.081	-.043	-1.028	
:10	.023	.076	-.053	-.109	:10	.008	.036	-.028	-1.056	
:15	.025	.059	-.034	-.143	:15	.037	.071	-.034	-1.090	
:20	.001	.040	-.039	-.182	:20	.016	.042	-.026	-1.116	
:25	.040	.079	-.039	-.221	:25	.046	.074	-.028	-1.144	
:30	.034	.082	-.048	-.269	:30	.002	.053	-.051	-1.195	
:35	.012	.050	-.038	-.307	:35	.053	.086	-.033	-1.228	
:40	.050	.097	-.047	-.354	:40	.008	.046	-.038	-1.266	
:45	.012	.055	-.043	-.397	:45	.046	.083	-.036	-1.302	
:50	.055	.092	-.037	-.434	:50	.005	.052	-.047	-1.349	
:55	.008	.051	-.043	-.477	:55	.052	.082	-.030	-1.379	
9:00	.051	.093	-.042	-.519	11:00	.026	.063	-.037	-1.416	
:05	.003	.043	-.040	-.559	:05					
:10	.043	.083	-.040	-.599	:10					
:15	.019	.058	-.039	-.638	:15					
:20	.058	.097	-.039	-.677	:20					
:25	.012	.044	-.032	-.709	:25					
:30	.044	.092	-.048	-.757	:30					
:35	.004	.039	-.035	-.792	:35					
:40	.089	.078	-.039	-.831	:40					
:45	.043	.085	-.042	-.873	:45					
:50	.010	.061	-.051	-.924	:50					
:55	.041	.088	-.027	-.951	:55					

b. TOTAL TEMPERATURE CHANGE (AVG END.TEMP.-AVG START TEMP.) = 73.189 - 73.089 = (+)/- .100 °F.

c. VOL. CHANGE DUE TO TEMP = PRODUCT VOL x TEMP. CHANGE x COEFF. EXP

= 29920 (12f) x .100 (15b) x .000 46985 (14f) = ... (+)/- 1.406 GALS.

d. TOTAL LIQUID VOL. ADDED/SUBTRACTED DURING TEST..... = +(-) 1.424 GALS.

e. VOL. CHANGE NOT DUE TO TEMP [(c)+(d)]..... +1.406 / 1.424 = +(-) .018 GALS.

f. LEAK RATE = (e) x 60 / TIME OF TEST (MINS)..... = .018 x 60/180 = .006 G.P.H.

THE LEAK RATE [redacted]/DOES NOT EXCEED THE STANDARD OF 0.05 G.P.H. DESCRIBED IN N.F.P.A 329.

THE TANK IS TIGHT [X] /THE TANK IS NOT TIGHT [ ] TESTER: FREERS

ENERLOG/TIS Inc., 7950 S. LINCOLN ST. SUITE 106 DATE: 8/14/90 TANK ID: 30,000 DIESEL TEST # 900801

LITTLETON, CO 80122, PHONE (303) 798-4361 CLIENT: SMITH ENERGY LOCATION: FARMINGTON FILE # _____

TANK TIGHTNESS TEST - FIELD DATA

10 TANK I.D.

TANK ID _____ LOCATION: FARMINGTON PRODUCT: UNLEADED TESTER SERIAL NO.: P941

TANK DIAMETER: 84 INCHES. FILL PIPE LENGTH: 44.5 INCHES. TOP OF FILL PIPE +/- GROUND LEVEL -3 INCHES.

PROBES

PROBES=TANK DIA. X (0.852)= 71.6 T1, X (0.5)= 42 T2, X (0.149)= 12.5 T3. TOTAL TANK BOTTOM TO TOP FILL 128½

11 WATER IN TANK

a. START WATER IN TANK 0 INCHES.
b. START WATER IN TANK 0 GALLONS.
c. END WATER IN TANK 0 INCHES.
d. END WATER IN TANK 0 GALLONS.

12 PRODUCT VOLUME

a. NOMINAL CAPACITY 4000 GALLONS.
b. ACTUAL CAPACITY 4031 GALLONS.
c. DEDUCT WATER IN TANK..... 0 GALLONS.
d. TOTAL PRODUCT VOLUME IN TANK. 4031 GALLONS.
e. PRODUCT IN PIPE 5 GALLONS. WT 25'
f. TOTAL PRODUCT VOLUME IN SYSTEM 4036 GALLONS.

13 FILL PIPE EXTENSION

a. HEIGHT OF WATER TABLE ABOVE TANK BOTTOM 0 (h)inches. b. DENSITY OF TANK PRODUCT .026 (w)LB/CU.IN.
DENSITY OF EXTERNAL WATER = 0.036 LB/CU.IN. c. ADDIT. HEAD REQUIRED = (h) x 0.036/(w) = ___ x0.036/___ = ___INS.
PRESSURE AT WATER LEVEL ___LBS/SQ.IN. PRESSURE AT TANK BOTTOM 3.2 LBS/SQ.IN. SHOULD NOT EXCEED 5.0 LBS/SQ.IN.

14 PRELIM. TEST DATA

a. TANK FILLED 4 AM/PM 8/13/90. b. TIME SINCE LAST LIQUID ADDED 3 HRS. c. AMOUNT ADDED 5 GALLONS.
d. A.P.I. GRAVITY 61.8 AT 80 °F. e. A.P.I. GRAVITY 59.2 AT 60°F. f. COEFFICIENT OF EXPANSION .0067913
g. START TEMPERATURE CHECK 1:10 AM/PM. h. END TEMPERATURE CHECK 2:40 AM/PM.

15 TEST DATA

a. START TEST 2:00 AM/PM. END TEST 3:00 AM/PM. TEST TIME MINUTES _____.
BEGINNING AVE. TEMP. 77.630 ENDING AVE. TEMP. 77.674 FROM GRAPH PLOT.

Product level 4".

TIME	START	STOP	+/-	CUMULATIVE	TIME	START	STOP	+/-	CUMULATIVE	MISCELLANEOUS
2:00	LEVEL		0	0	:00					
:05	.090	.045	+.045	.045	:05					
:10	.045	.002	+.043	.088	:10					
:15	.121	.074	+.047	.135	:15					
:20	.074	.03	+.044	.179	:20					
:25	.089	.052	+.037	.216	:25					
:30	.052	.016	.036	.252	:30					
:35	.119	.083	.036	.288	:35					
:40	.083	.045	.038	.326	:40					
:45	.119	.085	.034	.360	:45					
:50	.085	.050	.035	.395	:50					
:55	.060	.020	.040	.435	:55					
3:00	.080	.051	.029	.464	:00					
:05					:05					
:10					:10					
:15					:15					
:20					:20					
:25					:25					
:30					:30					
:35					:35					
:40					:40					
:45					:45					
:50					:50					
:55					:55					

b. TOTAL TEMPERATURE CHANGE (AVG END.TEMP.-AVG START TEMP.) = 77.674 - 77.630 = (+) .044 °F.
c. VOL. CHANGE DUE TO TEMP = PRODUCT VOL x TEMP. CHANGE x COEFF. EXP
= 4036 (12f) x .044 (15b) x .0067913 (14f) = ... = (+) .121 GALS.
d. TOTAL LIQUID VOL. ADDED/SUBTRACTED DURING TEST..... = (+) .464 GALS.
e. VOL. CHANGE NOT DUE TO TEMP [(c)+(d)]..... .121 + .464 = (+) .585 GALS.
f. LEAK RATE = (e) x 60 / TIME OF TEST (MINS)..... = .585 x 60/60 = .585 G.P.H.

THE LEAK RATE DOES/DOES NOT EXCEED THE STANDARD OF 0.05 G.P.H. DESCRIBED IN N.F.P.A 329.
THE TANK IS TIGHT [ ] /THE TANK IS NOT TIGHT [X] TESTER: FREERS

ENERLOG/TIS Inc., 7950 S. LINCOLN ST. SUITE 106 DATE: 8/14/90. TANK ID: SOUTH (UNLEAD) TEST # 900802
LITTLETON, CO 80122, PHONE (303) 798-4361 CLIENT: SMITH ENERGY. LOCATION: FARMINGTON FILE # SEFU 21

ENERLOG/TIS Inc.
LINE TEST DATA SHEET

COMMENTS - REPAIRS	TIME 15 MIN.	PRESSURE or VACUUM START	PRESSURE or VACUUM STOP	CHANGE + or -	VOLUME START	VOLUME STOP	CHANGE + or -
WAYNE - PUMP	8:25	50			.04		
	8:40		50	0		.04	0
	8:45	50			.04		
	9:00		50	0		.04	0
	9:05	50			.04		
OPER. PRESSURE: 22							
BLOW BACK VOLUME (+/- .02 gallons	9:20		50	0		.04	0
LINE TESTED (DESCRIBE)							
SUCTION (PRESSURE)	9:21	~~.50~~ 50			.04		
	9:36		50	0		.04	0
	TOTAL TIME (a)	TOTAL PRESSURE CHANGE + or -			TOTAL NET VOLUME CHANGE + or -		
	60	0			(b)	0	

VOLUME CHANGE (b) X 60 / TOTAL MINUTES (a) = leak rate gallons per hour. ____(b) x 60 / ____(a)= 0 gph.

LINE IS TIGHT ☒ LINE IS NOT TIGHT ☐ ALLOWABLE N.F.P.A. RATE 0.05 GPH.

TESTER: FREEZE

SKETCH LOCATION

SEE DATA SHEET FOR L900802

ENERLOG/TIS Inc., 7950 S. LINCOLN ST. SUITE 106 DATE: 8/5/90. LINE TEST #: L900801
LITTLETON, CO 80122, PHONE (303) 798-4361

CLIENT: SMITH ENERGY LOCATION: FARMINGTON LINE: NO. 1-UNLEADED

ENERLOG/TIS Inc.
LINE TEST DATA SHEET

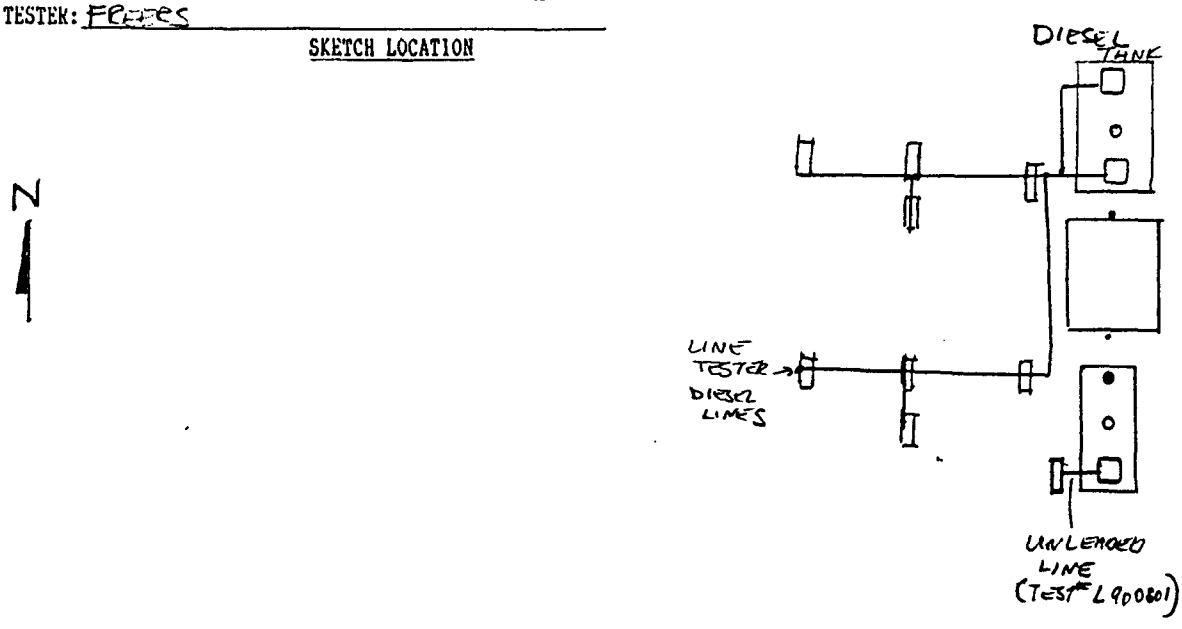
COMMENTS - REPAIRS	TIME 15 MIN.	PRESSURE or VACUUM START	PRESSURE or VACUUM STOP	CHANGE + or -	VOLUME START	VOLUME STOP	CHANGE + or -
SHUT ALL FIRE VALVES, INSERTED PLUG IN North pump. WAYNE PUMPS	9:45	50			.040		
	10:00		49	-1		.039	-.001
	10:05	50			.04		
	10:20		49	-1		.039	.001
OPER. PRESSURE: 24	10:21	50			.04		
BLOW BACK VOLUME (A)- .015 gals	10:46		48.5	-1.5		.039	-.001
LINE TESTED (DESCRIBE) SUCTION (PRESSURE)	10:47	50			.04		
	10:02		49	-1		.039	.001
	TOTAL TIME (a)	TOTAL PRESSURE CHANGE + or -			TOTAL NET VOLUME CHANGE + or -		
		-4.5			(b) .004		

VOLUME CHANGE (b) X 60 / TOTAL MINUTES (a) = leak rate gallons per hour. .004 (b) x 60 60 (a)= .004 gph.

LINE IS TIGHT ☒ LINE IS NOT TIGHT ☐ ALLOWABLE N.F.P.A. RATE 0.05 GPH.

TESTER: FREES

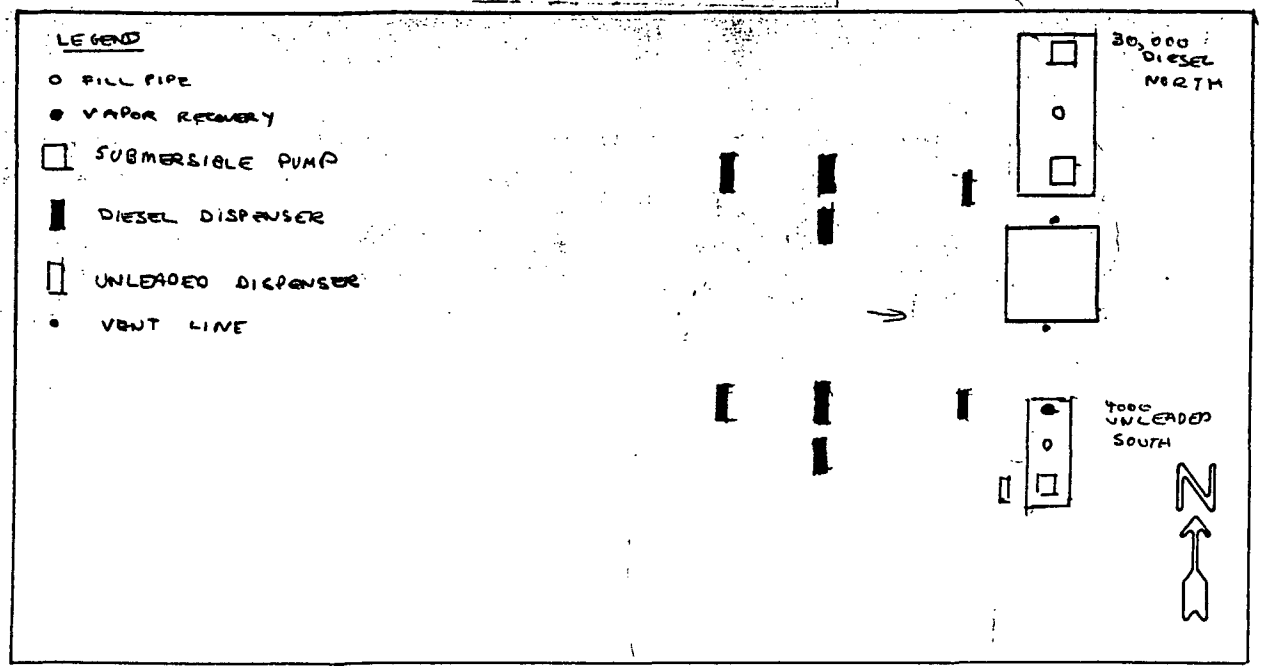
SKETCH LOCATION

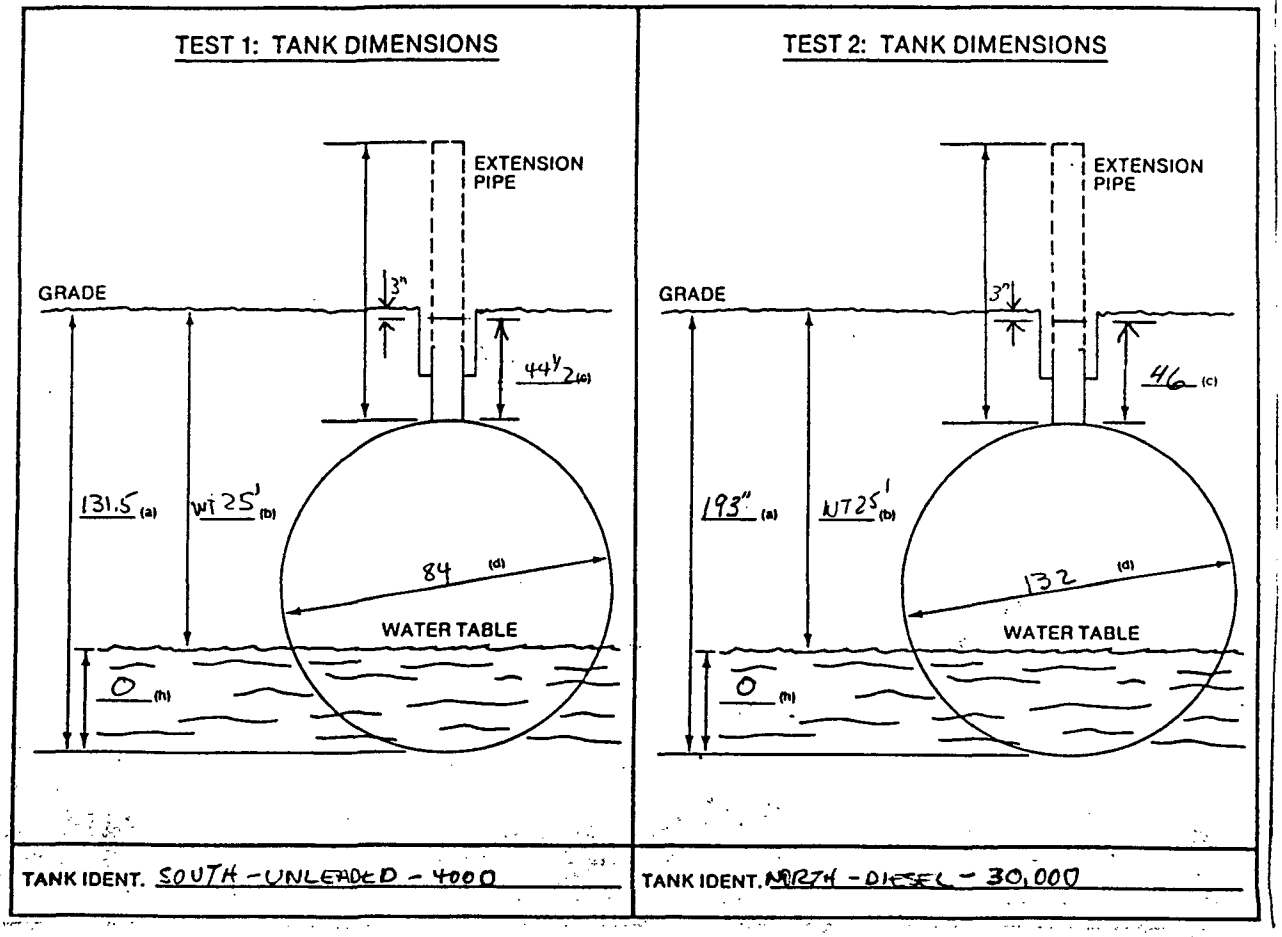


ENERLOG/TIS Inc., 7950 S. LINCOLN ST. SUITE 106 DATE: 8/15/90. LINE TEST #: L900802
LITTLETON, CO 80122, PHONE (303) 798-4361

CLIENT: SMITH ENERGY LOCATION: FARMINGTON LINE: NO. 2 - DIESEL LINE

TEST SITE LAYOUT





ENERLOG/TIS INC., 7950 S. LINCOLN ST, SUITE 106
LITTLETON, CO 80122 PHONE (303) 798-4361

TESTER: FREERS
CLIENT: SMITH ENERGY LOCATION: FARMINGTON, NM DATE: 8/14/90

GW-101

SMITH ENERGY SERVICES
ENVIRONMENTAL ASSESSMENT
FARMINGTON, NEW MEXICO

APRIL, 1990

ENERLOG/TIS Inc.
7950 SOUTH LINCOLN STREET, SUITE 106
LITTLETON, COLORADO 80122

INTRODUCTION

ENERLOG/TIS, Inc. was retained by Mr. Chuck Hagen of Dimmick Realty, Farmington, New Mexico, to conduct an environmental assessment for the Smith Energy Services Facility in Farmington New Mexico. This assessment was conducted on April 26 and 27, 1990. The property is located in the SE/SW Section 14, Township 29 North, Range 13 West, San Juan County New Mexico. The site is in an area midway between the Animas River and San Juan River at the address of 2198 Bloomfield Highway.

The main purpose of this assessment is to give a baseline environmental condition of the facility for a real estate transaction.

METHODS AND DISCUSSION

The assessment was completed by interviewing Smith Energy Services personnel who were (and are) familiar with the operation of the Farmington facility. The primary contact at the facility was Marshall Cain, Smith Energy's safety and training representative. Mr. Cain also interfaces with Environmental Regulatory Personnel for Smith Energy Services.

The first part of the assessment consisted of a walk through inspection which was conducted at the facility on April 26, 1990. There are four main categories of activities at this facility

1. Heavy equipment (Truck) Maintenance
2. Heavy equipment fueling
3. Chemical Storage
4. Chemical Mixing

However, the on-site inspection was categorized by the potential sources of environmental degradation. These are as follows:

- Underground Storage Tanks (UST'S)
  Vehicle Fueling
  Acid Rinse Tank

- Waste Steams\Generation of Wastes

The following are the observations of the walk through inspection on April 26, 1990.

A. UST'S

1. Need to maintain better inventory records. Such records are useful and are required for release detection /loss of fuel.
2. One dispenser does not register and total the gallons dispensed. This is an important part of the fuel inventory procedure, and must be repaired/replaced.

3. The systems were installed in 1979, when the facility was built. Both fuel lines have "red jacket" leak detectors, which are required.
4. The acid rinse tank has leaked in the past, in the area of the manway access. The top of the tank was uncovered in the Spring of 1989, and according to Smith personnel, was repaired.
5. The acid rinse tank is not registered with the state of New Mexico as a regulated UST. Comparing this facility with that of other related facilities, this tank could (in all probability does contain regulated substances) and should be registered.
6. The gasoline and diesel product lines were tested in June 1988. The gasoline line had an indication of a leak. According to Smith personnel, this line was abandoned and a new line was installed. It is not known if the gasoline product line has been re-tested.
7. There is oil stained soil adjacent to the area above the tanks.
8. The gasoline and diesel tanks were also tested in May 1988. The 30,000 gallon tank should be re-evaluated due to its large size. The larger the tank, the more difficult to test and as size increases - so does the error factor.

For these reasons it is recommended that another

volumetric test method be used for a more current test.

B. Generation/Use of Chemicals/Waste Streams

1. Waste oil is stored in 55 gallon drums and in a 4 X 8 square vertical container. The oil is recycled by Mesa Oil (EPA NMD 0071090805). The last pick up for recycling was December 1989 (± 900 gallons)

2. Batteries are recycled by H & C Batteries in Durango, Colorado

3. Oil/Sand Trap (fifteen feet deep)

   The current practice is to skim oil from the surface of the liquid and deposit it into the waste oil stream for recycling. The disposal of the water is through the waste water treatment system. The sump is emptied one to two times a year, however regulatory requirements are making this increasingly difficult to do.

   One sample (90-17-S) of the oily layer on the surface of the water was collected. The laboratory analysis showed only volatile organics which are components of diesel fuel i.e., toluene 150 ppm, ethyl benzene 370 ppm and total xylenes 3900 ppm, all of which would be expected to be present.

4. Truck Wash Basin

Wash solution is "SOLVS-IT"

Mud and debris are rinsed to the middle drain area, removed manually, and dumped into the disposal pit at the northeast corner of property.

One sample (90-17-P-3) of this mud was collected in the pit area. The results showed petroleum hydrocarbons at 3390 ppm. This accumulation of oily material has contributed to the present condition of the pit.

5. Degreaser and Parts Cleaning

All liquids associated with this are handled by Safety-Kleen for recycling and replenishing regularly. There is no disposal on the premises.

6. Unlined Pit (photo)

-Used for disposal of truck wash sediments.

-Appearance of stained soils throughout. Two areas were sampled - results are in the subsurface investigation section.

-Unused sand stockpiled near pit.

-Possible high seasonal groundwater should be considered as a potential environmental

receptor for any contaminants from the pit. This area is defined by the state of New Mexico as a "vulnerable area" for groundwater. Any sources of potential or actual groundwater contamination are being eliminated.

7. Acid Rinse Tank (photo)

-Receives acid spillage from normal operations in small quantities. Precipitation, run off water and other small amounts of chemicals become part of this waste steam as well as mud, sediment and sand.

-At the time of inspection acid vapors were not being properly emitted (open access with pump and hose).

-Removal of the material from this tank is apparently for beneficial use and injected into producing wells in the area as a fracturing procedure.

-The tank currently contains ± 6% HCl acid solution according to the most recent analysis.

8. Warehouse (photo)

A. Wet chemical side

- Chemicals are mixed in this area with a minimal amount of spillage.

- Any chemical spillage flows to an outdoor concrete basin and eventually to the UST acid rinse tank.

  Chemicals mixed/used here are identified by number and are: CIA 02, EPS 09,SAA3, which contain toluene, xylene, methanol, at varying concentrations.

B. Dry Chemical Side

- Storage primarily for dry chemicals which are added in the field.
- There is no mixing of chemicals on this side.

All other chemicals listed as stored on the property are (according to Smith personnel) added in the field on specific well locations. All remaining unused chemicals are brought back to the facility for use on other facilities- no wastes are generated from chemical usage, other than minor spillage/drainage to the tank.

9. A radiation survey was conducted at the storage bunker. Only background levels of radiation were detected.

10. Solid Waste Disposal-

- A Careful evaluation should be made and personnel should be trained to dispose of only conventional solid wastes in dumpsters.
- The current disposal agreement states that no "special" wastes will be disposed into the dumpster. If such "special" wastes or hazardous wastes are disposed by this method these practices must be changed to avoid potential future liability.

11. The electrical transformer on the southwest corner of the building has never been tested for PCB's. It is recommended that this be done.

The second part of the assessment consisted of subsurface investigations around the subject property. The area is identified by a preponderance of cobblestones - six to eight inches in diameter. The use of conventional drilling equipment for subsurface investigations was deemed more time consuming and not cost effective. Drilling in this type of subsurface material requires specialized types of drilling equipment. It can be done, however, the costs associated with drilling in this cobble material and the time needed to drill and complete a well are increased significantly. Therefore, subsurface sampling was done by the use of a backhoe to excavate in designated areas of the property, to

determine, on a relatively shallow basis, contaminants present at that time. Generally, less than 50 parts per million (ppm) of petroleum contamination would be considered non contaminated. However, each site is specific for the levels of potential environmental degradation.

The first area evaluated was the waste pit area located in the northeast corner of the property (refer to facility diagram). Two excavations were made in the pit area. The contaminants sampled and analyzed for were total recoverable petroleum hydrocarbons (TRPH) and volatile organic analysis (VOA). The results of the sampling are as follows.

A. The first excavation was near the east side and was approximately seven to eight feet deep (samples 90-17-P1 and P2).

VOA	concentration (ppm)	
toluene	0.13	P-1
ethyl benzene	0.69	
total xylenes	30.00	
TRPH	15,900.00	P-2

There is a high concentration of petroleum contamination shown here. The volatile could be higher in other areas of the pit.

The second excavation in the northeast pit was closer to the spill way where substances are placed prior to being pushed into the pit.

This excavation was approximately five to six feet in depth (sample P4). The results of the sampling of this area are as follows:

VOA	concentration (ppm)
toluene	1.3
ethyl benzene	0.8
total xylenes	16.0

The appearance of the soil was similar to the first excavation (oily). Therefore, this sample was analyzed for volatile organics.

The third area to be evaluated under the subsurface investigation was an area adjacent to the underground storage tanks. This area is located north of the 30,000 gallon underground storage diesel tank. The area was excavated to a depth of six to seven feet, sampled (90-17-E1)and analyzed for hydrocarbon contaminants. The results of that sampling are as follows:

TRPH 797ppm

This area showed relatively high concentrations of petroleum contamination - sources unknown.

The fourth area which was evaluated was an area along the west side of the property line within the property boundaries outside of the fence. The results of that sampling effort (90-17-W1)are contained below:

TRPH	46.1ppm

CONCLUSIONS AND RECOMMENDATIONS

The facility operations are consistent with oil field service companies. The operations which were observed and the areas of the facility which were excavated and sampled, indicated petroleum contamination in the pit area - probably from past as well as current practices of depositing materials into the unlined pit as a method of disposal. There were no chlorinated compounds found by sampling.

In our opinion, the greatest risk of any possible underlying contamination could be from the underground storage tanks (UST's). The best method by which to determine subsurface contamination at the desired level is by drilling. Given the subsurface conditions, however, drilling time and costs could be protracted. The reasons for concern in the underground storage tank areas are:

1. The gasoline product line has a history of leakage. This is a pressurized product line, and, as such, the leak(s) in the line could have resulted in a "forced" contamination plume - depending upon the duration of the

leak(s).

2. The acid rinse tank has a history of leakage. Also, similar fiberglass (FRP) tanks have a history of leakage because of breakage due to many factors including poor installation. The odds are in favor of this tank leaking, given both the subsurface material which is present (large cobbles) and past experience with these tank installations.

3. Another tank tightness test should be conducted on all of the tank systems as leaks may develop at any time.

Recommendations

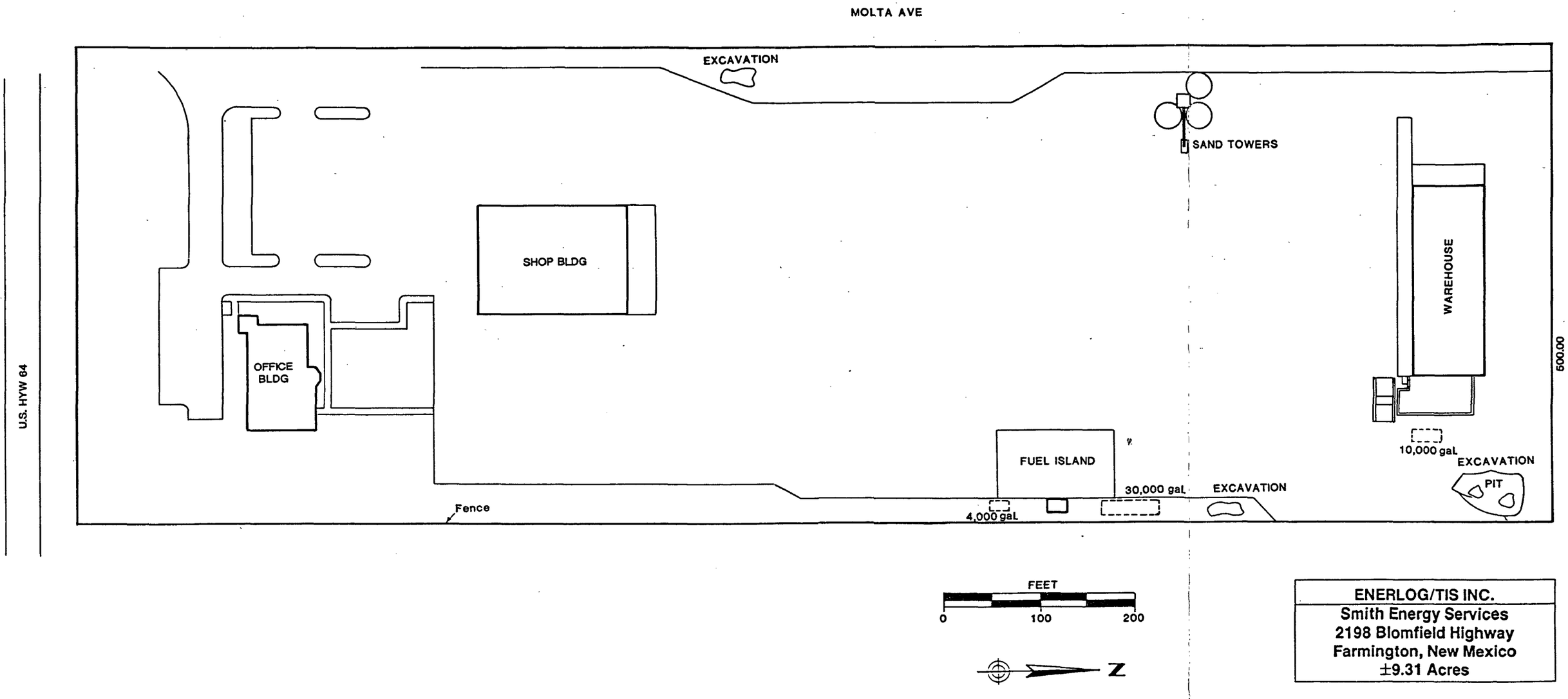
We would recommend the following be done as a minimal method to better ascertain any subsurface contamination on the facility.

Drill into the areas surrounding the underground storage tanks (UST's) to better define if any contamination is present from the sources located on the property.

Drill to groundwater to define the depth of any contaminants in the area of the Smith facility. This would lend itself to the overall protection of the defined vulnerable area.

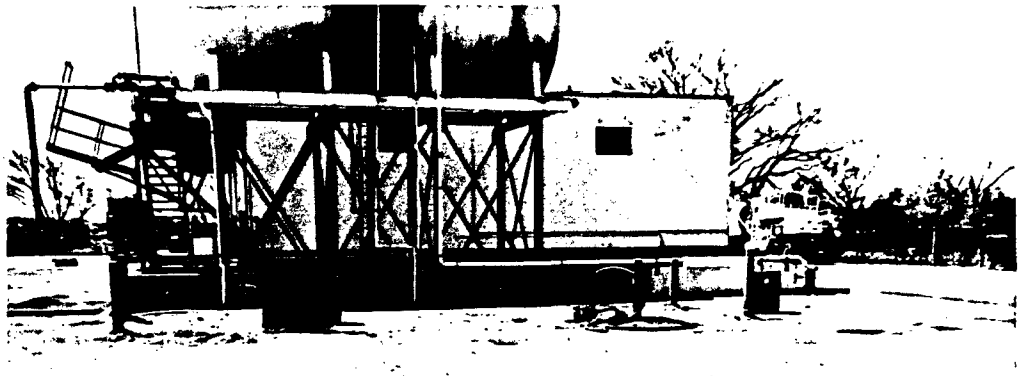
Drill into and around the pit area to define both the depth and lateral extent of contamination.

Test all UST's for tightness.



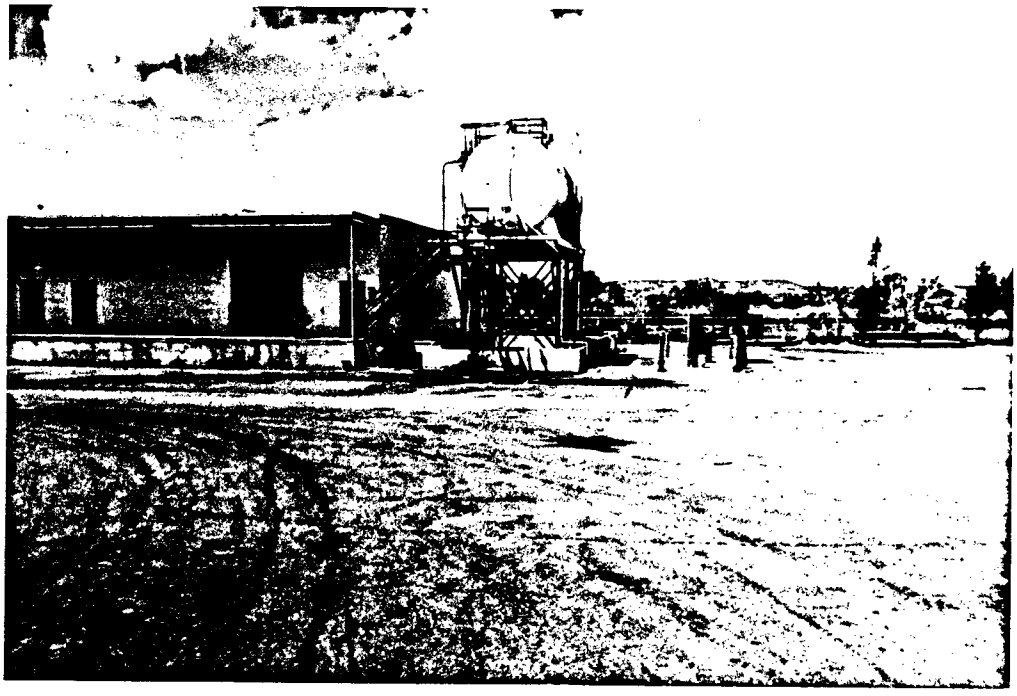
ENERLOG/TIS INC.
Smith Energy Services
2198 Blomfield Highway
Farmington, New Mexico
±9.31 Acres

Bunker for radioactive storage

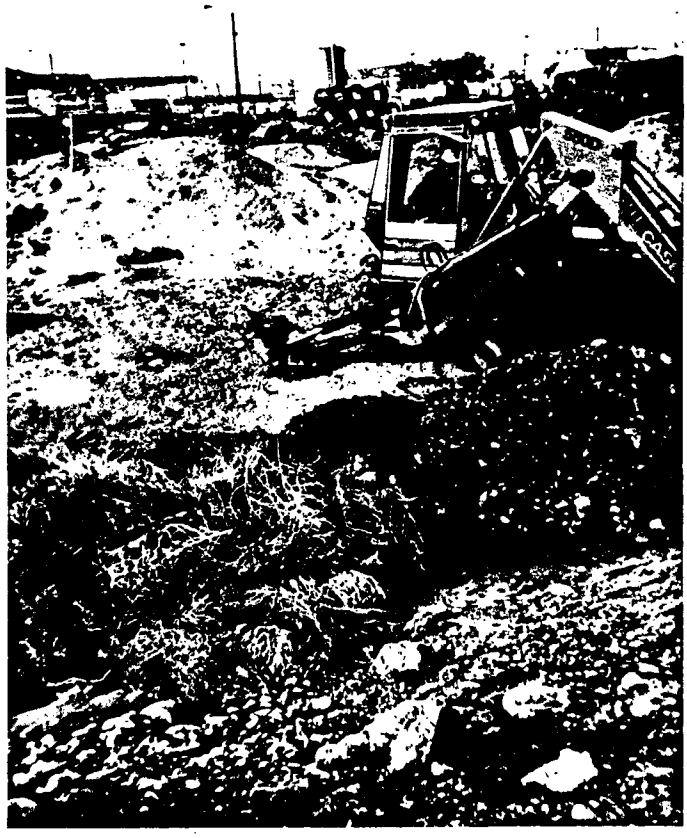


Area showing location of buried acid rinse tank

Pit area in N.E. corner of property



Elevated acid tank and east end of warehouse



First excavation in pit area

First excavation in pit area

Second excavation in pit area

Second excavation in pit area

Excavation north of fuel tanks

Excavation on west side of property

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA

Client Sample Number	: 90-17 S		
Lab Sample Number	: X20519	Client Project No.	: 40-17
Date Received	: 04/28/90	Lab Project No.	: 7752
Date Sampled	: 04/27/90	Effective Dilution	: 5,465.37
Date Extracted/Prepared	: 05/02/90	Method	: 8260(8240)
Date Analyzed	: 05/02/90	Matrix	: SOIL
Methanol Extract?	: Y	Lab File No.	: >V1272
Percent Loss on Drying	: 7.6	Method Blank No.	: MB050290

Compound Name	Cas Number	Conc. ug/Kg		PQL* ug/Kg
Chloromethane	74-87-3		U	55,000
Bromomethane	74-83-9		U	55,000
Vinyl Chloride	75-01-4		U	55,000
Chloroethane	75-00-3		U	55,000
Methylene Chloride	75-09-2		U	27,000
Acetone	67-64-1		U	550,000
Carbon Disulfide	75-15-0		U	27,000
1,1-Dichloroethene	75-35-4		U	27,000
1,1-Dichloroethane	75-34-3		U	27,000
Trans 1,2-Dichloroethene	156-60-5		U	27,000
Chloroform	67-66-3		U	27,000
1,2-Dichloroethane	107-06-2		U	27,000
2-Butanone	78-93-3		U	550,000
1,1,1-Trichloroethane	71-55-6		U	27,000
Carbon Tetrachloride	56-23-5		U	27,000
Bromodichloromethane	75-27-4		U	27,000
Vinyl Acetate	108-05-4		U	27,000
1,2-Dichloropropane	78-87-5		U	27,000
Trans 1,3 Dichloropropene	10061-02-6		U	27,000
Trichloroethene	79-01-6		U	27,000
1,1,2-Trichloroethane	79-00-5		U	27,000
Benzene	71-43-2		U	27,000
Dibromochloromethane	124-48-1		U	27,000
Cis,1,3-Dichloropropene	10061-01-5		U	27,000
2-Chloroethylvinyl Ether	110-75-8		U	55,000
Bromoform	75-25-2		U	27,000
4-Methyl-2-Pentanone	108-10-1		U	270,000
2-Hexanone	591-78-6		U	270,000
1,1,2,2-Tetrachloroethane	79-34-5		U	27,000
Tetrachloroethene	127-18-4		U	27,000
Toluene	108-88-3	150,000		27,000
Chlorobenzene	108-90-7		U	27,000
Ethyl Benzene	100-41-4	370,000		27,000
Styrene	100-42-5		U	27,000
Total Xylenes	1330-20-7	3,900,000	E	27,000

Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	105%	(70-121)
Toluene-d8	111%	(81-117)
Bromofluorobenzene	110%	(74-121)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
B = Compound found in blank and sample. Compare blank and sample data.
E = Compound is detected at a concentration outside the calibration limits.
* = Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.
Unless otherwise noted all concentrations and PQL's for soils are quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____
John D Parker

_____
Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA

Client Sample Number	: 90-17 P-4		
Lab Sample Number	: X20516	Client Project No.	: 40-17
Date Received	: 04/28/90	Lab Project No.	: 7752
Date Sampled	: 04/27/90	Effective Dilution	: 122.85
Date Extracted/Prepared	: 05/02/90	Method	: 8260(8240)
Date Analyzed	: 05/02/90	Matrix	: SOIL
Methanol Extract?	: Y	Lab File No.	: >V1273
Percent Loss on Drying	: 6.1	Method Blank No.	: MB050290

Compound Name	Cas Number	Conc. ug/Kg		PQL* ug/Kg
Chloromethane	74-87-3		U	1,200
Bromomethane	74-83-9		U	1,200
Vinyl Chloride	75-01-4		U	1,200
Chloroethane	75-00-3		U	1,200
Methylene Chloride	75-09-2		U	610
Acetone	67-64-1		U	12,000
Carbon Disulfide	75-15-0		U	610
1,1-Dichloroethene	75-35-4		U	610
1,1-Dichloroethane	75-34-3		U	610
Trans 1,2-Dichloroethene	156-60-5		U	610
Chloroform	67-66-3		U	610
1,2-Dichloroethane	107-06-2		U	610
2-Butanone	78-93-3		U	12,000
1,1,1-Trichloroethane	71-55-6		U	610
Carbon Tetrachloride	56-23-5		U	610
Bromodichloromethane	75-27-4		U	610
Vinyl Acetate	108-05-4		U	610
1,2-Dichloropropane	78-87-5		U	610
Trans 1,3 Dichloropropene	10061-02-6		U	610
Trichloroethene	79-01-6		U	610
1,1,2-Trichloroethane	79-00-5		U	610
Benzene	71-43-2		U	610
Dibromochloromethane	124-48-1		U	610
Cis,1,3-Dichloropropene	10061-01-5		U	610
2-Chloroethylvinyl Ether	110-75-8		U	1,200
Bromoform	75-25-2		U	610
4-Methyl-2-Pentanone	108-10-1		U	6,100
2-Hexanone	591-78-6		U	6,100
1,1,2,2-Tetrachloroethane	79-34-5		U	610
Tetrachloroethene	127-18-4		U	610
Toluene	108-88-3	1,300		610
Chlorobenzene	108-90-7		U	610
Ethyl Benzene	100-41-4	800		610
Styrene	100-42-5		U	610
Total Xylenes	1330-20-7	16,000		610

Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	115%	(70-121)
Toluene-d8	107%	(81-117)
Bromofluorobenzene	109%	(74-121)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
B = Compound found in blank and sample. Compare blank and sample data.
E = Compound is detected at a concentration outside the calibration limits.
* = Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.
Unless otherwise noted all concentrations and PQL's for soils are quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____
John D Parker

_____
Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

VOLATILE ORGANICS ANALYSIS DATA

Client Sample Number	: 90-17 P-1		
Lab Sample Number	: X20513	Client Project No.	: 40-17
Date Received	: 04/28/90	Lab Project No.	: 7752
Date Sampled	: 04/27/90	Effective Dilution	: 124.38
Date Extracted/Prepared	: 05/02/90	Method	: 8260(8240)
Date Analyzed	: 05/02/90	Matrix	: SOIL
Methanol Extract?	: Y	Lab File No.	: >V1271
Percent Loss on Drying	: 9.3	Method Blank No.	: MB050290

Compound Name	Cas Number	Conc. ug/Kg		PQL* ug/Kg
Chloromethane	74-87-3		U	1,200
Bromomethane	74-83-9		U	1,200
Vinyl Chloride	75-01-4		U	1,200
Chloroethane	75-00-3		U	1,200
Methylene Chloride	75-09-2		U	620
Acetone	67-64-1		U	12,000
Carbon Disulfide	75-15-0		U	620
1,1-Dichloroethene	75-35-4		U	620
1,1-Dichloroethane	75-34-3		U	620
Trans 1,2-Dichloroethene	156-60-5		U	620
Chloroform	67-66-3		U	620
1,2-Dichloroethane	107-06-2		U	620
2-Butanone	78-93-3		U	12,000
1,1,1-Trichloroethane	71-55-6		U	620
Carbon Tetrachloride	56-23-5		U	620
Bromodichloromethane	75-27-4		U	620
Vinyl Acetate	108-05-4		U	620
1,2-Dichloropropane	78-87-5		U	620
Trans 1,3 Dichloropropene	10061-02-6		U	620
Trichloroethene	79-01-6		U	620
1,1,2-Trichloroethane	79-00-5		U	620
Benzene	71-43-2		U	620
Dibromochloromethane	124-48-1		U	620
Cis,1,3-Dichloropropene	10061-01-5		U	620
2-Chloroethylvinyl Ether	110-75-8		U	1,200
Bromoform	75-25-2		U	620
4-Methyl-2-Pentanone	108-10-1		U	6,200
2-Hexanone	591-78-6		U	6,200
1,1,2,2-Tetrachloroethane	79-34-5		U	620
Tetrachloroethene	127-18-4		U	620
Toluene	108-88-3	130	J	620
Chlorobenzene	108-90-7		U	620
Ethyl Benzene	100-41-4	690		620
Styrene	100-42-5		U	620
Total Xylenes	1330-20-7	30,000		620

Surrogate Recoveries:		QC Limits
1,2 Dichloroethane-d4	109%	(70-121)
Toluene-d8	117%	(81-117)
Bromofluorobenzene	106%	(74-121)

Qualifiers:
U = Compound analyzed for, but not detected above reporting limits. Reporting limits are roughly the method detection limits for reagent water
J = Indicates an estimated value when the compound is detected, but is below the EPA Practical Quantitation Limit (PQL).
B = Compound found in blank and sample. Compare blank and sample data.
E = Compound is detected at a concentration outside the calibration limits.
* = Practical Quantitation Limits listed in EPA SW846, Vol. 1B, Part II, pa. 8240-4. The minimum instrument detection limits are less than the numbers shown in this column.
Unless otherwise noted all concentrations and PQL's for soils are quantitated on a dry weight basis. (NA = not applicable or not available)

Approved: _____ _____
John D Parker — Quality Assurance Officer

EVERGREEN ANALYTICAL, INC
4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Date Received : 4/28/90
Date Sampled : 4/27/90
Date Prepared : 4/30/90
Date Analyzed : 4/30/90

Client Project : 90-17
Lab Project No.: 7752
Method : EPA 418.1

Evergreen Sample No.	Client Sample No.	Matrix	TRPH* mg/Kg
X20514	90-17 P-2	Soil	15,900
X20515	90-17 P-3	Soil	3390
X20517	90-17 E-1	Soil	797
X20518	90-17 W-1	Soil	46.1

*Reported values based on specific gravity of 1.0; Detection limit 3.03 mg/Kg for soils.

Approved

Quality Assurance Officer