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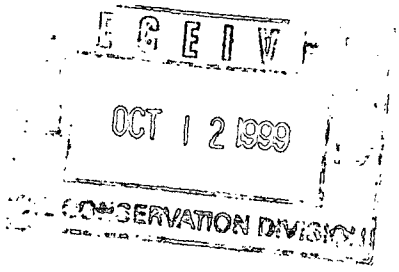
REPORTS

DATE:

1999

Highlander Environmental Corp.
Midland, Texas

October 7, 1999



Mr. Wayne Price
State of New Mexico
Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Titan Resources, L.C. - Closure Report, Former Greenhill Petroleum Landfarm, Lovington Paddock / San Andres Unit, Lea County, New Mexico

Dear Mr. Price,

On behalf of Titan Resources, L.C. (Titan), please find enclosed one copy of the above-referenced closure report prepared by Highlander Environmental Corp. (Highlander). The closure report details the remediation and sampling performed at the Site

Please call if you have any questions.

Sincerely,
Highlander Environmental Corp.

Ike Tavarez
Project Manager/Geologist

cc: Mr. Ron Lechwar - Titan Exploration, Inc.
Ms. Donna Williams - NMOCD- Hobbs, New Mexico

Highlander Environmental Corp.

Midland, Texas

CLOSURE REPORT
TITAN RESOURCES, L. P.
FORMER GREENFILL PETROLEUM LANDFARM
LOVINGTON PADDOCK / SAN ANDRES UNIT
LEA COUNTY, NEW MEXICO

Prepared for

Titan Resources, L.P.
500 West North Lorraine
Midland, Texas

October 1999

1910 N. Big Spring • Midland, Texas 79705 • (915) 682-4559 • Fax (915) 682-3946

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CLOSURE REPORT
OF
FORMER GREENHILL PETROLEUM LANDFARM
LOVINGTON PADDOCK / SAN ANDRES UNIT
LEA COUNTY, NEW MEXICO

PREPARED FOR

TITAN RESOURCES, L.P.

1.0 INTRODUCTION

Titan Exploration, Inc. (Titan) has retained Highlander Environmental Corp. (Highlander) to assess, remediate and monitor the former Greenhill landfarm. This report presents the results of remediation and sampling activities conducted at the Site. Based on the soil sample results, Highlander requests closure for the Site. The Site is located in the Lovington Paddock / San Andres Unit in the NE/4 of Section 1, T-17-S, R-36-E, Lea County, New Mexico. Figure 1 presents a Site location. Figure 2 presents the Site drawing.

2.0 BACKGROUND

Titan Resources, L.P. purchased production in the Lovington Paddock / San Andres Field in December 1997 from Pioneer Natural Resources. Pioneer had acquired this property from Greenhill Petroleum in early 1997. Conveyed along with this production was an ongoing bioremediation (landfarm) area at the Central Production Facility, which Greenhill had operated since 1994. This landfarm had been approved by the New Mexico Oil Conservation Division (NMOCD) to treat sludges and sediments from two open topped tanks and one unlined pit. The two tanks, labeled North Pit and South Pit, were being taken out of service at the Central Tank Battery. The North and South Pits were both polyethylene lined steel tanks, measuring 4' tall by 100' in diameter. The open unlined pit was designated the Getty-Walker Pit. Highlander personnel had sampled the North, South and Getty-Walker pits in 1992 and

the results showed elevated lead levels of 137 mg/kg, 64 mg/kg and 32 mg/kg respectively. A copy of Highlander's original report is included in Appendix A.

The open unlined pit was designated the Getty-Walker Pit. Highlander personnel had sampled these tanks and pits in 1992 and the results showed elevated lead levels.

On October 11, 1994, Safety and Environmental Solutions, Inc., submitted a closure request to the New Mexico Oil Conservation Division (NMOCD). However, the question of elevated lead and insufficient sampling were apparently causes for the denial of the closure request. The analysis of a composite sample for total lead had been submitted with the closure request and indicated a total lead level in composite of 37.3 mg/kg at the 3.0' depth. Toxicity Characteristic Leachate Procedure (TCLP) testing previously submitted did not indicate any leachability for the lead contained within this landfarm. Titan, upon closing the purchase of this property, retained Highlander Environmental Corp. to assist in closing this landfarm.

Highlander personnel Tim Reed and Gary Miller met with Wayne Price of the NMOCD at the site on February 27, 1998. Also present for the meeting were Ron Lechwar and Bill Hearne with Titan. At that time, it was agreed that additional profiling of the landfarm would be performed to determine if additional work and/or a risk assessment needed to be performed at this facility. It was agreed that the site would be gridded into six areas and samples taken with a backhoe at depths of 0-1.0', 3.0' and 5.0'. Additionally, samples were to be taken at a depth of 5.0' below the surface in the areas where the old tanks had been to confirm that no residual lead contamination existed.

On March 9, 1998, Lynn Ward with Highlander supervised the investigation of the landfarm area. The site was segregated into six areas as shown on the attached Figure 2. Discrete soil samples were taken with a backhoe at depths of 0-1.0', 3.0' and 5.0' in each of the six areas (18 samples in all). The prior location of the removed north and south pits (tanks) were ascertained and it was determined that only the north pit area was accessible. The south pit area is currently the site of a 5000-barrel storage

tank. On March 8, 1999, a backhoe trench was excavated in the area of the removed north pit and samples were collected at 0-1', 3.0' and 5.0' below surface.

All of the samples were placed in laboratory prepared containers and chilled to 4°C. The samples were shipped under standard Chain of Custody control to Trace Analysis, Inc. in Lubbock, Texas. The samples were analyzed for Total Petroleum Hydrocarbons (TPH), by EPA method 418.1, Benzene, Toluene, Ethylbenzene and Xylene (BTEX), by EPA method 8020 and total lead (Pb), by EPA SW 846-3015, 6010B. The results are summarized in Table 1. The laboratory reports are shown in Appendix D.

Table 1.

Location	Analysis (mg/kg)	0-1.0'	3.0'	5.0'
Area 1	Lead	7.0	5.2	<5.0
	BTEX	<0.050	<0.050	<0.050
	TPH	11,900	96.9	38.5
Area 2	Lead	13.0	<5.0	<5.0
	BTEX	0.435	1.66	<0.050
	TPH	21,900	14,100	139
Area 3	Lead	15.0	<5.0	<5.0
	BTEX	<0.050	<0.050	<0.050
	TPH	8,200	161	139
Area 4	Lead	15.0	<5.0	<5.0
	BTEX	<0.050	<0.050	<0.050
	TPH	7,120	916	235
Area 5	Lead	22.0	<5.0	<5.0
	BTEX	<0.050	<0.050	<0.050
	TPH	16,900	121	12.5
Area 6	Lead	7.6	<5.0	<5.0
	BTEX	<0.050	<0.050	<0.050
	TPH	4,240	133	<10

The samples taken from the test trench in the area of the removed North Pit were analyzed for total lead. The samples were taken from 0-1.0', 3.0' and 5.0' below surface. The reported total lead levels were 4.2 mg/kg, <2.0 mg/kg and <2.0 mg/kg respectively, indicating no residual lead contamination of soils.

Referring to Table 1, BTEX levels were below method detection limits for all samples except the 0-1.0' and 3.0' samples in Area 2, which exhibited total BTEX levels of 0.435 and 1.66 mg/kg respectively. No benzene was detected in either sample. These levels are well below the NMOCD RRAL level of 50-mg/kg total BTEX.

Due to the high TPH levels found in the 3.0' sample, the soils in Area 2 were turned to a depth of approximately 36" to 42" in order to bring the deeper contamination to the surface for treatment. All of the landfarm area soils were treated with a high nitrogen content fertilizer and watered. The shallow surface soils across the entire landfarm have been periodically watered and tilled to a depth of approximately 18".

The landfarm was re-sampled by Lynn Ward on January 22, 1999. In Areas 1,3,4,5 and 6, composite samples were taken from 0-1.0'. Composite samples were taken from 0-1.0' and 2.0' in Area 2. The results are summarized in Table 2.

Table 2.

(All results for TPH in mg/kg; March 8, 1998 sample results in parentheses)

Location	0-1.0'	2.0'
Area 1	10,200 (11,900)	N/A
Area 2	12,900 (21,900)	5,790 (14,100)
Area 3	3,200 (8,200)	N/A
Area 4	4,900 (7,100)	N/A
Area 5	8,910 (16,900)	N/A
Area 6	8,150 (4,240)	N/A

N/A: Not Analyzed

Referring to Table 2, areas 1, 2, 3, 4 and 5 showed a significant drop in TPH concentration. However, the samples were above the NMOCD RRAL TPH level of 1,000 mg/kg. Area 6 showed an increase in TPH concentration of 8,150 mg/kg and may be attributed to hot spots in the Area 6. The sample collected in Area 2 at 2.0' showed a TPH decreasing to 5,790 mg/kg.

Highlander submitted the Semi-Annual report dated April 27, 1999 to the NMOCD requesting closure of the Site. The NMOCD requested additional information and sampling for the Site, prior to closure. In our telephone conference with the NMOCD, another round of sampling was recommended from 0-1' below surface. Highlander requested the TPH (418.1) method changed to TPH (modified 8015) due to microbial activity and degradation of the hydrocarbon in the soil. Based on the previous soil samples collected for BTEX, trace of BTEX was only detected in Area 2 and BTEX analysis would not be necessary. The NMOCD response letter is enclosed in Appendix B.

3.0 SITE COORDINATES AND OWNERSHIP

The NMOCD in their response letter requested a legal survey point center of the landfarm. The NMOCD approved using a Global Positioning System (GPS) to determine longitude and latitude readings. The GPS reading of (32° 51' 59" N), (103° 18' 24" W) was recorded at the center of the landfarm. In addition, the land status ownership was also requested for the Site. The landowner is the City of Lovington. The City of Lovington has (2) water wells approximately 2,000' northwest of the landfarm. The landfarm is not a risk or environmental concern to the water wells. In addition there is no surface water located near the Site. Titan Resources will be monitoring the area for future development near the landfarm area.

4.0 REGULATORY

The NMOCD has regulatory authority for oil and gas operations in the State of New Mexico. Locally, the NMOCD's Hobbs, New Mexico office regulates oil and gas activity in Lea County, New Mexico. The NMOCD has developed guidelines for closure of unlined

surface impoundments (Unlined Surface Impoundment Closure Guidelines, February 1993). The guidelines require a risk-based evaluation of the site to determine recommended remediation action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. A risk-based evaluation was performed for the Site in accordance with the OCD guidelines, and the proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene and xylene). An RRAL of 1,000 ppm for TPH is proposed for the Site.

5.0 LANDFARM SOIL SAMPLING AND ANALYSIS

5.1 TPH and BTEX Sampling

On July 14, 1999, Highlander personnel collected soil composite samples at 0-1' from the Areas 1, 2, 3, 4, 5 and 6. A total of eight to nine grab samples were collected from each area to complete the composite. The soil samples results are shown in Table 3.

Table 3.

Location	TPH (0-1.0')	
	DRO (mg/kg)	GRO (mg/kg)
Area 1	612	<5
Area 2	440	<5
Area 3	56	<5
Area 4	660	<5
Area 5	<50	<5
Area 6	651	<5

Referring to Table 3, the soil sample results show a decrease in TPH in all areas ranging from <50 mg/kg and 660 mg/kg (DRO) and <5 (GRO), which are below the NMOCD RRAL TPH level of 1,000 mg/kg. Based on the soil sample results, the TPH and BTEX concentration have met the RRAL of 1,000 mg/kg TPH. Cumulative soil

sample results (Table 1 and 2) are shown in Appendix D. Figure 3 shows a linear regression curve for TPH.

5.2 Lead Sampling

Original testing of a composite sample of soil from the landfarm indicated a total lead level of 37.3 mg/kg. Referring to Table 1, the March 9, 1998 soil samples show a total lead ranging from 7 mg/kg to 22 mg/kg at 0-1' below surface in Areas 1, 2, 3, 4, 5 and 6. The deeper samples at 3' below surface were below the method detection limit, except for 5.2 mg/kg detected in Area 1. The soil samples at 5.0' did not show detectable levels of lead in the soil.

On July 14, 1999, Highlander personnel resampled the landfarm for lead evaluation. The total lead ranged from 6.8 mg/kg to 15 mg/kg at 0-1' below surface in Area 1, 2, 3, 4, 5 and 6.

Table 4.

Location	Total Lead Samples Collected on 3/9/98 (concentrations mg/kg)			Total Lead Samples Collected on 7/14/99 (concentrations in mg/kg)
	0-1'	3'	5'	0-1'
Area 1	7	5.2	<5.0	6.8
Area 2	13	<5.0	<5.0	13
Area 3	15	<5.0	<5.0	8.4
Area 4	7.6	<5.0	<5.0	9.7
Area 5	22	<5.0	<5.0	13
Area 6	7.6	<5.0	<5.0	15

Referring to Table 4, the highest lead concentration of 15 mg/kg was detected in the surface soil (0-1') on July 14, 1999. The deeper soil samples, collected on March 9, 1998, shown no lead levels above the test method detection in samples from 5.0' below

surface and only one sample from the 3.0' level was above the test method detection limit (5.2 mg/kg). Bases on the sample results, the lead content of the shallow soils is not leaching into the deeper soils at the landfarm.

To further evaluate the leachability for the lead, you multiply the target groundwater concentration by what is considered to be a conservative Concentration Reduction Factor (CRF) of 100, to yield the maximum theoretical contaminant concentration in the soil leachate (in mg/L), the result would be 5 mg/L of lead leachate. The soils at 3.0' do not exceed 5 mg/kg of Total Lead. In other words, the lead would have to be 100% soluble in order to reach the 5-mg/L leachate parameter. Given the relative insolubility of lead and the depth to groundwater in this area, it is virtually impossible for the lead levels found in the near surface soils to impact groundwater. As for soil levels in the near surface soils, the highest total lead concentration (15 mg/kg) is well below the soil cleanup level of 500 to 1,000 mg/kg, established by EPA for residential soil cleanup at CERCLA sites. (OSWER Directive 9355.4-02, September 7, 1989). A copy of the directive is enclosed in Appendix C.

6.0 CONCLUSIONS

1. The NMOCD guidelines require a risk-based evaluation of the site to determine recommended remediation action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. A risk-based evaluation was performed for the Site in accordance with the NMOCD guidelines, and the proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/Kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene and xylene). An RRAL of 1,000 ppm for TPH is proposed for the Site.

2. City of Lovington is the owner of the land at the Site. The Site is located in production field southwest of Titan's central tank battery surrounded by producing and gas wells. No receptor or surface water is located near the landfarm. Two (2) City of Lovington waterwells are located approximately 2,000'

northwest of the landfarm. The landfarm is not a risk or environmental concern to the water wells or groundwater. Titan will monitor the area for future development near or at the landfarm area.

3. The soil samples collected from Area 1, 2, 3, 4, 5 and 6 show a TPH ranges from <50 mg/kg to 660 mg/kg. The analytical results indicate TPH reduction below the RRAL levels of 1,000 mg/kg.

4. The BTEX levels were below the method detection limits for all samples except the 0-1.0' and 3.0' samples in Area 2, which exhibited total BTEX levels of 0.435 and 1.66 mg/kg respectively. No benzene was detected in either sample. These levels are well below the NMOCD RRAL level of 50-mg/kg total BTEX.

5. The highest lead concentration of 15 mg/kg was detected in the surface soil (0-1'). The deeper soil samples shown no lead levels above the test method detection in samples from 5.0' below surface and only one sample from the 3.0' level was above the test method detection limit (5.2 mg/kg). Based on the sample results, the lead content of the shallow soils is not leaching into the deeper soils at the landfarm.

Given the relatively insolubility of lead and the depth to groundwater in this area, it is virtually impossible for the lead levels found in the near surface soils to impact groundwater. As for soil levels in the near surface soils, the highest total lead concentration (15 mg/kg) is below the soil cleanup level of 500 to 1,000 mg/kg, established by EPA for residential soil cleanup at CERCLA sites. (OSWER Directive 9355.4-02, September 7, 1989).

7.0 RECOMMENDATIONS

We respectfully request that this Site be considered for closure. Considering the absence of any BTEX constituents, significant reduction in TPH levels and the absence of deep hydrocarbon impact. The TPH and BTEX levels are below the RRAL target level. As for soil levels in the near surface soils, the highest total lead concentration (15 mg/kg) is below the soil cleanup level of 500 to 1,000 mg/kg, established by EPA for residential soil cleanup at CERCLA sites.

Respectfully Submitted,
Highlander Environmental Corp.

By: _____
Ike Tavarez
Project Manager/ Geologist

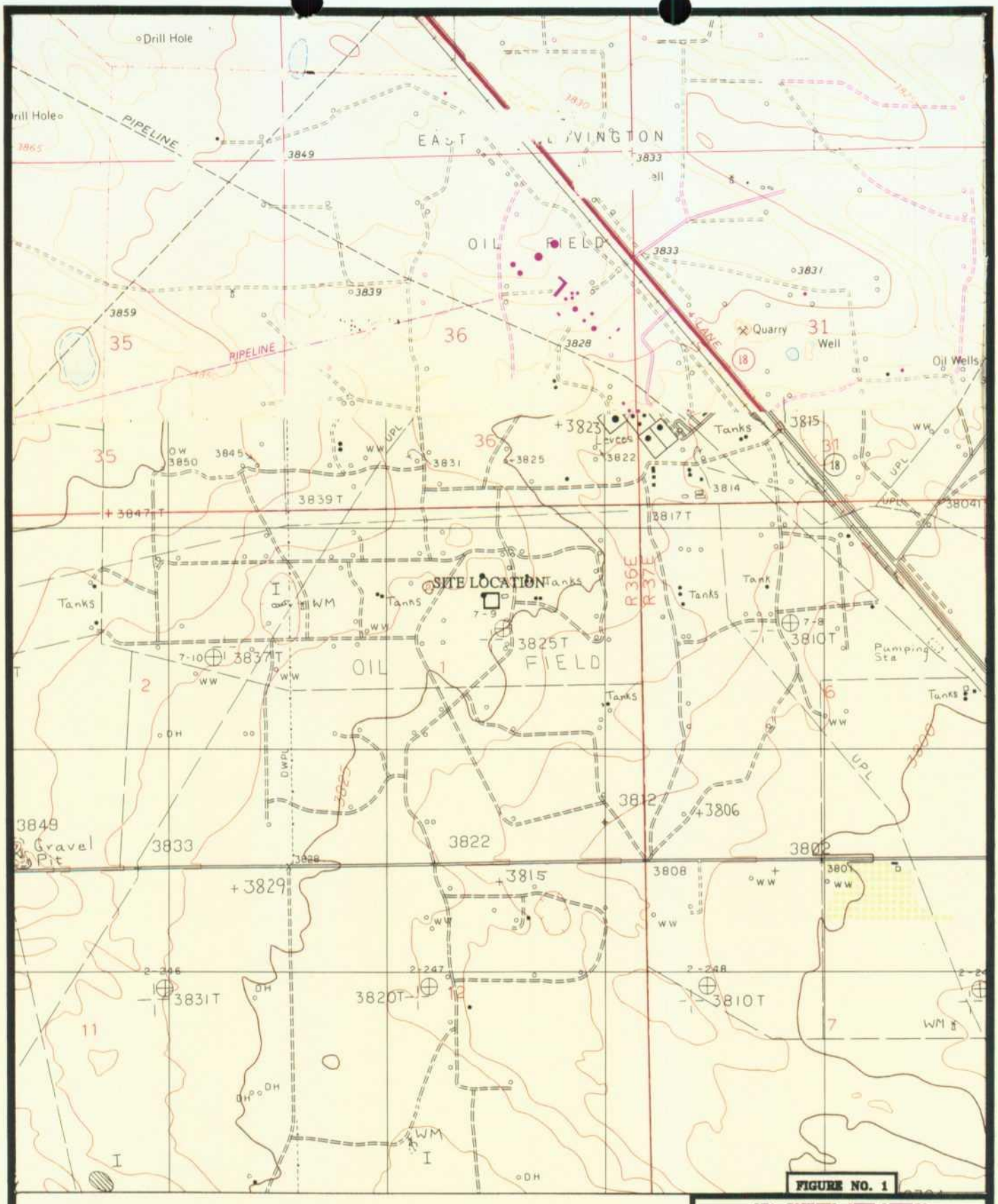


FIGURE NO. 1

LEA COUNTY, NEW MEXICO

TITAN RESOURCES, L.P.

TOPOGRAPHIC MAP

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

TAKEN FROM U.S.G.S.
LOVINGTON & LOVINGTON SE
NEW MEXICO
7.5' QUADRANGLE

LEGEND
☐ SITE LOCATION

SCALE: 1"=2000'

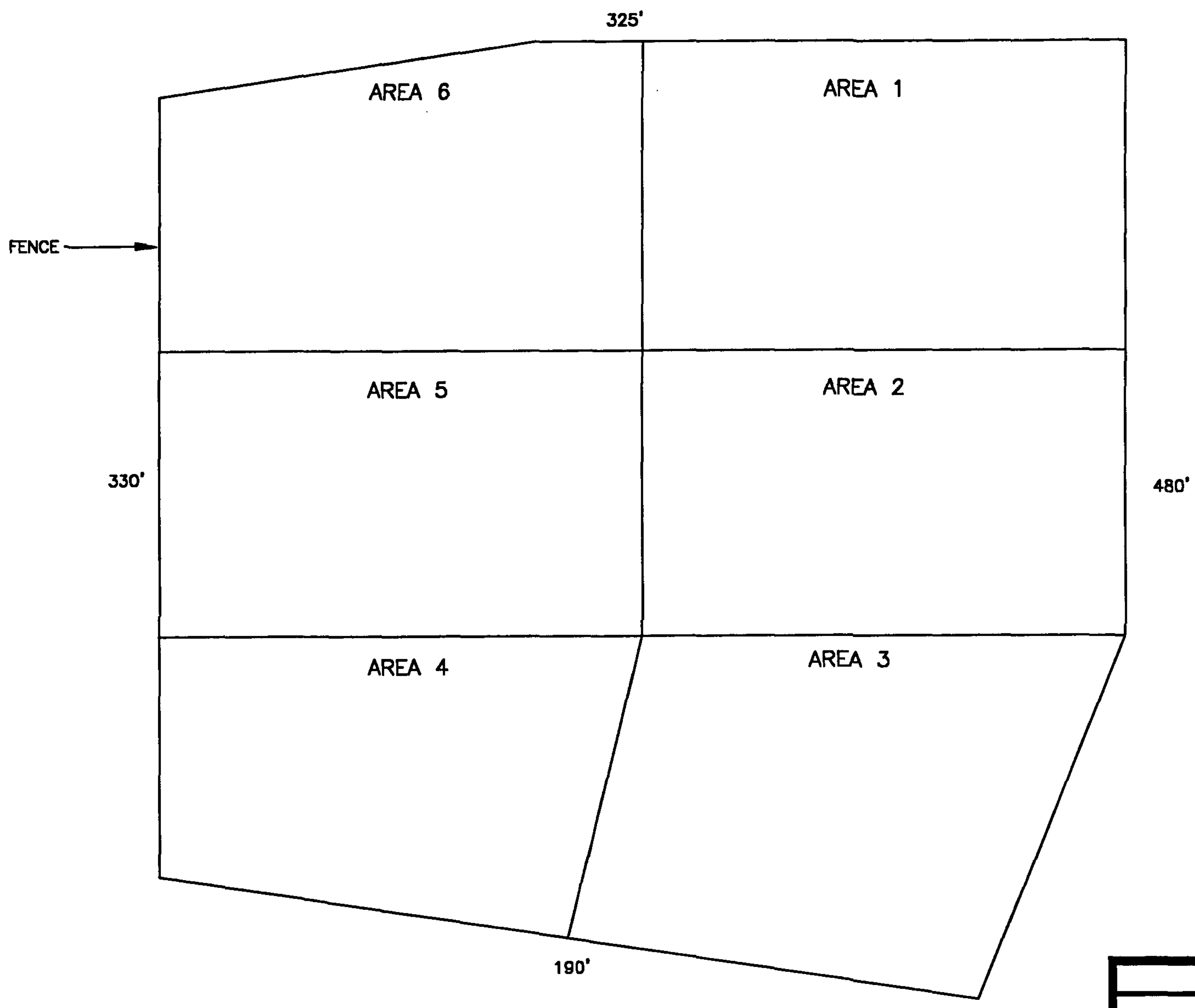


FIGURE NO. 2

LEA COUNTY, NEW MEXICO

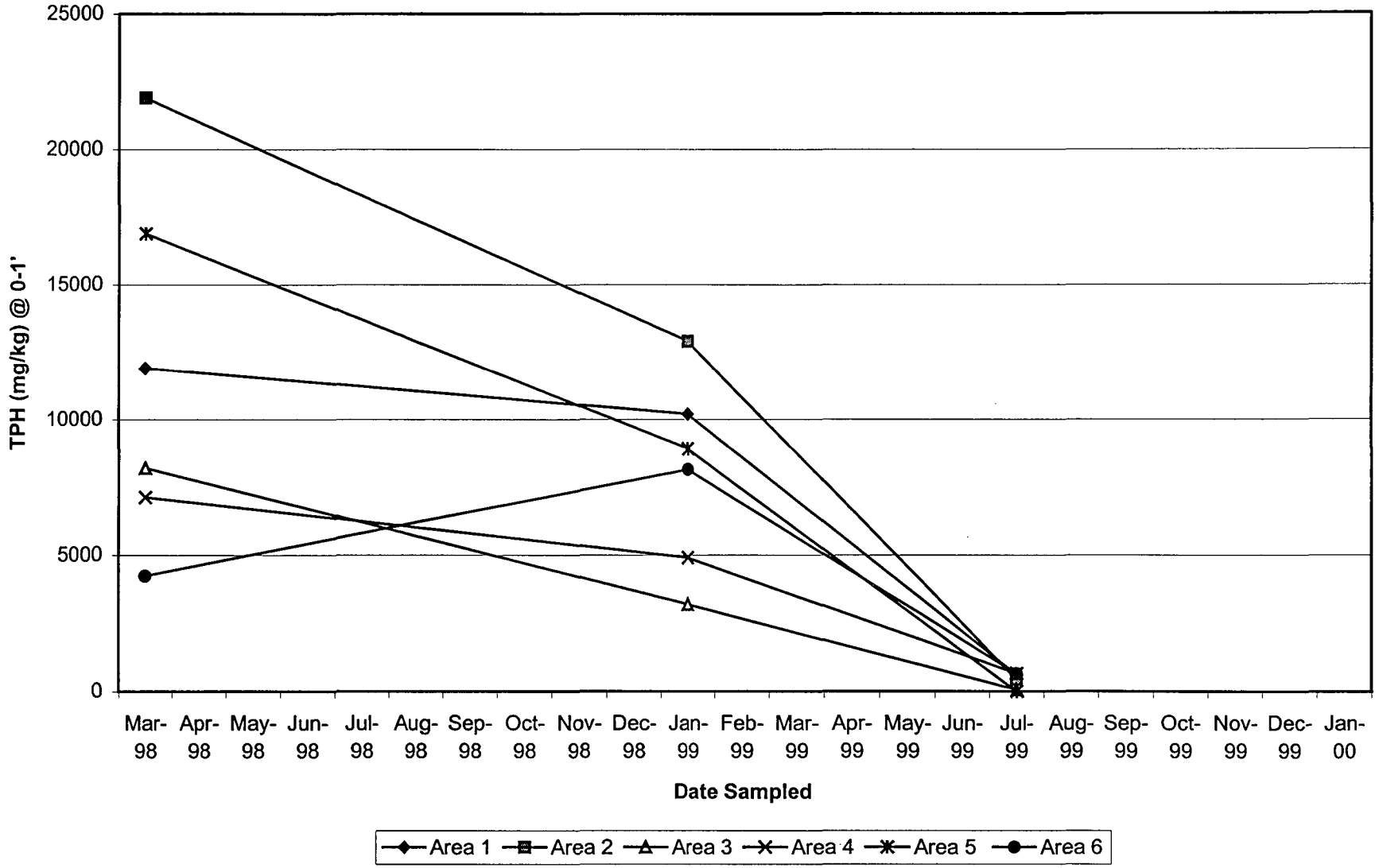
TITAN RESOURCES, L.P.

GREENHILL LANDFARM
LOVINGTON PADDOCK/SAN ANDRES

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

DATE: 4/2/98
DWN. BY: JDA

Figure 3: Titan Resources, L.P.



Highlander Environmental

Midland • Corpus Christi • San Angelo, Texas

September 22, 1992

Mr. Richard R. Myers
Greenhill Petroleum
11490 Westheimer, Suite 200
Houston, TX 77077

RE: Tank Bottom Material Reclamation and Treatment, Lovington, New Mexico

Dear Mr. Myers,

This report details the findings of the Greenhill Petroleum waste disposal pit sampling performed on July 28, 1992 by Highlander Services personnel Tim Reed and Vijay Kurki. The three pits are on leases near Lovington, New Mexico, and all three pits contained B. S. & W. materials.

The North Pond and South Pond are located on one lease approximately 200 feet apart. The third pit, the Getty/Walker, is located two to three miles east of the North and South Ponds. The North and South Ponds are polyethylene-lined steel tanks 100 feet in diameter and four feet tall, open-topped but netted. The Getty/Walker is an unlined earth pit approximately 40 x 60 feet and four feet deep.

The North Pond and South Pond both had chloride and pH levels within acceptable levels. The TPH levels in these two ponds were high--596,000 mg/kg in the North Pond and 626,000 mg/kg in the South Pond.

The lead levels in the North Pond, 137 mg/kg, and in the South Pond, 64 mg/kg, are above the regulatory levels specified for landfill disposal, which is 50 mg/kg. However, the TCLP levels may be below the 5 mg/kg regulatory level. Typically, the reduction from total level to TCLP levels is anywhere from 10 to 20 times the total level. Also, the North Pond high level of 137 mg/kg may be partially due to lead in the fluid. The North Pond has more fluid than the South Pond. The lead levels may be lowered once the fluid is extracted from the pits, as discussed later in this report. All other metals tested were below detection limits.

The third pit, the Getty/Walker, also had high TPH of 334,000 mg/kg with high volatile organic compounds, the organic compounds being benzene, toluene, ethylbenzene, and xylene (BTEX). Arsenic was detected at 5 mg/kg and lead at 32 mg/kg, but neither should present any problems. No other metals or semi-volatile organics were detected. As with the other two pits, the chloride and pH levels were within acceptable limits. Copies of the laboratory reports and the chain of custody are enclosed in Appendix A.

All three of the pits are open-topped, allowing rainwater to enter, and requiring that any free water be pumped into a storage tank before any method of treatment can begin. Removing free water will reduce the overall volume of material to be treated and, consequently, the cost of treatment. Pumping the free water may also reduce the pit lead level, which will be especially important in the North Pond and South Pond, which have high lead levels.

The bottom of the North Pond is a loosely packed layer of sludge about 1 1/2 feet thick and 440 cubic yards volume, with a high water content. The middle layer of the pit is free water, about 1 to 1 1/2 feet thick and about 360 cubic yards in volume. The top is a hard paraffin layer 4 to 6 inches thick with a volume of 120 cubic yards and low water content.

The South Pond contains a single sludge layer of 1 1/2 feet with a volume of about 440 cubic yards.

The Getty/Walker pit has three layers, the bottom of which was about 2 1/2 feet of loose sludge approximately 223 cubic yards volume. The middle layer is about 6 inches of free water and 44 cubic yards volume. The top paraffin layer is four inches thick and has a volume of 30 cubic yards. The estimation of these volumes is presented in Table 1.

Table 1
Estimated Volume of Sludge Components
North Tank (100 feet diameter)

Description	Layer Thickness (average)	Volume (cubic yards)
Top paraffin layer	5 in.	121.00
Free water	1.25 ft.	363.00
Bottom loose sludge	1.50 ft.	436.00

South Tank (100 feet diameter)

Description	Layer Thickness (average)	Volume (cubic yards)
Total sludge	1.5 ft.	436.00

Getty/Walker Pit (40 feet x 60 feet)

Description	Layer Thickness (average)	Volume (cubic yards)
Top paraffin layer	4 in.	30.00
Free water	0.5 ft.	44.00
Bottom sludge	2.5 ft.	223.00

Based on the contamination findings of these three pits, the following remedial alternatives are proposed:

1. Transportation of sludge from all pits to an off-site disposal
2. Enhanced in-situ bio-remediation with micro-organisms
3. In-situ bio-remediation with indigenous bacteria

1. Transportation of the sludge to an off-site disposal facility will require moving the sludge either in barrels or a viscuine lined truck to the nearest disposal facility. The nearest disposal facility is CRI, between Hobbs, New Mexico and Carlsbad, New Mexico. The estimated cost for this transportation and disposal is $30,308, and does not include loading and unloading expenses. Another factor in considering off-site disposal is that the generator is liable for cleanup should problems occur at the disposal facility in the future. A cost estimate sheet is given in Attachment 1.

2. Enhanced in-situ bio-remediation involves adding micro-organisms and biocatalyst to the sludge while it remains in the tank. Inoculation fees for bacteria range from $15 to $20 per cubic yard. Enclosed in Appendix A is the Alpha West Inc. proposal concerning the cost of treating 2500 cubic yards. The actual sludge volume for three pits is about 1250 cubic yards, and based

on this estimated volume, this method of treatment would cost about $29,900. After in-situ treatment, the waste must either be landfarmed or backfilled, which results in additional cost and is explained further in the next paragraph.

3. Natural biodegradation is the most common method of treatment. After removal of the free water in the tank, the residual sludge would be treated by land farming. The sludge would be sampled for Toxicity Characteristic Leaching Procedures (TCLP) before landfarming operations began. Landfarming involves thorough blending of the top soil at the site with the sludge and added nutrients. Every 30 days the blended soil and sludge would be tilled for aeration. The nutrients are added in calculated quantities during tilling to provide favorable conditions for indigenous bacteria. While biological degradation of hydrocarbon wastes has been used extensively by the petroleum industries, it is a slower process than enhanced bioremediation.

An evaluation assessment of the history, geology and hydrology of the site is required for the implementation of a successful bioremediation design plan. The necessity and amount of nutrients added to subsurface microorganisms for in-situ remediation is dependent upon the site hydrology. Sites with low permeability, such as those with clay, may not allow a successful introduction of nutrients.

A thorough laboratory assessment of the microbiology of the site also provides indicative information as to whether natural bioremediation will be successful. Some components of this laboratory assessment are:

* Evaluate the presence of requisite microorganisms
* Assess potential toxicity to the microorganisms
* Evaluate nutrient requirements to enhance degradation activity
* Evaluate the compatibility of the site geochemistry with the nutrient solution proposed for addition.

Natural biodegradation may be used based on the results of the laboratory assessment.

If the Oil Conservation Division of Santa Fe, New Mexico will not allow land farming, then the sludge can be treated by bio-venting with the use of a bio-cell. The bio-cell would

consist of a layer of one foot thick porous soil, or top soil available at the site, laid over a plastic sheet. It is strongly recommended that drainage pipes be installed for every 20 feet of the bio-cell. For this project, the bio-cell dimensions would be 150 feet by 150 feet. Bio-venting works on the same principles as natural biodegradation, but instead of the sludge being mixed with soil, the sludge is laid out over the bio-cell. The drainage pipes would be used for sludge venting after any water present in the sludge is drained out by gravity.

The Getty/Walker pit can be treated in-situ by adding micro-organisms to enhance the bioremediation and blending of the soil, or the sludge may be moved to the North Pond for treatment. If the sludge is moved from one lease to another, the New Mexico Oil Conservation Division (OCD) has to be notified for approval. Therefore, treatment of the Getty/Walker sludge in-situ might be more favorable. A sample form for the New Mexico OCD is attached at the end of this report.

The natural biodegradation method appears to be the most cost-effective method treatment for the North Pond and South Pond tank sludge. Highlander Services Corp. recommends drainage of any free water from the pits and subsequent injection of the free water into the deep injection wells operated by Greenhill Petroleum.

If you have any further questions involving the investigation or this report, please do not hesitate to call on us at once.

HIGHLANDER ENVIRONMENTAL CORP.

Tim Reed
Vice President, Environmental Services

Vijay Kurki
Hydrologist

SwL SOUTHWESTERN LABORATORIES

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services
1703 West Industrial Avenue • P.O. Box 2150 • Midland, Texas 79702

Report of tests on	Waste	**File No.**	6581000
Client	Highlander Services Corp.	**Report No.**	78575
Delivered by	Tim Reed	**Report Date**	8-18-92
		Date Received	7-29-92

Identification Project No. 294, Greenhill Petroleum, Lovington, Tank Bottoms Sampling, North Pond, Sampled 7-28-92 @ 1145 by Tim Reed.

REPORT OF CHEMICAL ANALYSIS

Parameters	Results	Date Performed	Analyst	Test Method
Chloride, mg/kg (1:1 Water Extract)	284	8-3-92	W. Jaycox	SM 4500-Cl,
pH (1:1)	6.97	8-3-92	W. Jaycox	SW846, 9040
Total Petroleum Hydrocarbons, mg/kg	596000	7-30-92	S. Stovall	EPA 418.1

* Denotes "less than"

Copies: Highlander Services Corp.
Attn: Tim Reed

LLC
Reviewed by

SOUTHWESTERN LABORATORIES

SwL SOUTHWESTERN LABORATORIES

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services
1703 West Industrial Avenue • P.O. Box 2150 • Midland, Texas 79702

Report of tests on	Waste	File No.	6581000
Client	Highlander Services Corp.	Report No.	78575
Delivered by	Tim Reed	Report Date	8-18-92
		Date Received	7-29-92

Identification Project No. 294, Greenhill Petroleum, Lovington, Tank Bottoms Sampling, North Pond, Sampled 7-28-92 @ 1145 by Tim Reed.

REPORT OF TOTAL METALS

Parameters	Results mg/kg	Date Performed	Analyst	Test Method
Arsenic	* 5.0	8-11-92	G. Bunch	SW846, 7061
Barium	* 20	8-17-92	G. Bunch	SW846, 7080
Cadmium	* 2.0	8-17-92	G. Bunch	SW846, 7130
Chromium	* 4.0	8-17-92	G. Bunch	SW846, 7190
Lead	137	8-17-92	G. Bunch	SW846, 7420
Mercury	* 0.40	8-12-92	G. Bunch	SW846, 7470
Selenium	* 1.5	8-11-92	G. Bunch	SW846, 7741
Silver	* 2.5	8-17-92	G. Bunch	SW846, 7760

*Denotes "less than"

Copies: Highlander Services Corp.
Attn: Tim Reed

LLC
Reviewed by

SOUTHWESTERN LABORATORIES

SwL SOUTHWESTERN LABORATORIES

Materials, environmental and geotechnical engineering, nondestructive, metallurgical and analytical services
1703 West Industrial Avenue • P.O. Box 2150 • Midland, Texas 79702

Report of tests on	Waste	File No.	6581000
Client	Highlander Services Corp.	Report No.	78576
Delivered by	Tim Reed	Report Date	8-18-92
		Date Received	7-29-92

Identification Project No. 294, Greenhill Petroleum, Lovington, Tank Bottoms Sampling, South Pond, Sampled 7-28-92 @ 1230 by Tim Reed.

REPORT OF CHEMICAL ANALYSIS

Parameters	Results	Date Performed	Analyst	Test Method
Chloride, mg/kg (1:1 Water Extract)	284	8-3-92	W. Jaycox	SM 4500-Cl,
pH (1:1)	6.69	8-3-92	W. Jaycox	SW846, 9040
Total Petroleum Hydrocarbons, mg/kg	626000	7-30-92	S. Stovall	EPA 418.1

* Denotes "less than"

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Parameters	Results mg/kg	Date Performed	Analyst	Test Method
Arsenic	* 5.0	8-11-92	G. Bunch	SW846, 7061
Barium	* 20	8-17-92	G. Bunch	SW846, 7080
Cadmium	* 2.0	8-17-92	G. Bunch	SW846, 7130
Chromium	* 4.0	8-17-92	G. Bunch	SW846, 7190
Lead	64	8-17-92	G. Bunch	SW846, 7420
Mercury	* 0.40	8-12-92	G. Bunch	SW846, 7470
Selenium	* 1.5	8-11-92	G. Bunch	SW846, 7741
Silver	* 2.5	8-17-92	G. Bunch	SW846, 7760

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REPORT OF CHEMICAL ANALYSIS

Parameters	Results	Date Performed	Analyst	Test Method
Chloride, mg/kg (1:1 Water Extract)	248	8-3-92	W. Jaycox	SM 4500-Cl,
pH (1:1)	6.41	8-3-92	W. Jaycox	SW846, 9040
Total Petroleum Hydrocarbons, mg/kg	334000	7-30-92	S. Stovall	EPA 418.1

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Identification Project No. 294, Greenhill Petroleum, Lovington, Tank Bottoms Sampling, Getty/Walker, Sampled 7-28-92 @ 1430 by Tim Reed.

REPORT OF VOLATILE ORGANICS ANALYSIS

Date of Analysis 7-31-92 **Method** SW846, 5030/8240
Technique Purge and Trap GC/MS **Analyst** R. Wright

Compound		ug/kg
Chloromethane	*	10900
Bromomethane	*	10900
Vinyl Chloride	*	10900
Chloroethane	*	10900
Methylene Chloride	*	5430
1,1-Dichloroethene	*	5430
1,1-Dichloroethane	*	5430
1,2-Dichloroethene (total)	*	5430
trans-1,2-Dichloroethene	*	5430
Chloroform	*	5430
1,2-Dichloroethane	*	5430
1,1,1-Trichloroethane	*	5430
Carbon Tetrachloride	*	5430
Bromodichloromethane	*	5430
1,2-Dichloropropane	*	5430
trans-1,3-Dichloropropene	*	5430
Trichloroethene	*	5430
Dibromochloromethane	*	5430
1,1,2-Trichloroethane	*	5430
Benzene		62000
cis-1,3-Dichloropropene	*	5430
2-Chloroethylvinylether	*	10900
Bromoform	*	5430
Tetrachloroethene	*	5430
1,1,2,2-Tetrachloroethane	*	5430
Toluene		165000
Chlorobenzene	*	5430
Ethylbenzene		126000
Total Xylenes		172000
Acrolein	*	54300
Acrylonitrile	*	54300

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Identification Project No. 294, Greenhill Petroleum, Lovington, Tank Bottoms Sampling, Getty/Walker, Sampled 7-28-92 @ 1145 by Tim Reed.

REPORT OF ORGANICS ANALYSIS

Date of Analysis 8-4-92 **Method** SW846, 3550/8270
Analyst L. Jones

Compound	ug/kg
Phenol	* 280000
bis(2-Chloroethyl)Ether	* 280000
2-Chlorophenol phenol	* 280000
1,3-Dichlorobenzene	* 280000
1,4-Dichlorobenzene	* 280000
Benzyl Alcohol	* 280000
1,2-Dichlorobenzene	* 280000
2-Methylphenol	* 280000
bis(2-Chloroisopropyl)Ether	* 280000
4-Methylphenol	* 280000
N-Nitroso-Di-n-Propylamine	* 280000
Hexachloroethane	* 280000
Nitrobenzene	* 280000
Isophorone	* 280000
2-Nitrophenol	* 280000
2,4-Dimethylphenol	* 280000
Benzoic Acid	*1360000
bis(2-Chloroethoxy)Methane	* 280000
2,4-Dichlorophenol	* 280000
1,2,4-Trichlorobenzene	* 280000
Naphthalene	* 280000
4-Chloroaniline	* 280000
Hexachlorobutadiene	* 280000
4-Chloro-3-Methylphenol	* 280000
2-Methylnaphthalene	* 280000
Hexachlorocyclopentadiene	* 280000
2,4,6-Trichlorophenol	* 280000
2,4,5-Trichlorophenol	* 280000
2-Chloronaphthalene	* 280000
2,Nitroaniline	*1360000

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Identification Project No. 294, Greenhill Petroleum, Lovington, Tank Bottoms Sampling, Getty/Walker, Sampled 7-28-92 @ 1145 by Tim Reed.

REPORT OF ORGANICS ANALYSIS

Compound	ug/kg
Dimethyl Phthalate	* 280000
Acenaphthylene	* 280000
2,6-Dinitrotoluene	* 280000
3-Nitroaniline	*1360000
Acenaphthene	* 280000
2,4-Dinitrophenol	*1360000
4-Nitrophenol	*1360000
Dibenzofuran	* 280000
2,4-Dinitrotoluene	* 280000
Diethyl Phthalate	* 280000
4-Chlorophenyl-phenylether	* 280000
Fluorene	* 280000
4-Nitroaniline	*1360000
4,6-Dinitro-2-Methylphenol	*1360000
N-Nitrosodiphenylamine (1)	* 280000
4-Bromophenyl-phenylether	* 280000
Hexachlorobenzene	* 280000
Pentachlorophenol	*1360000
Phenanthrene	* 280000
Anthracene	* 280000
Di-n-Butylphthalate	* 280000
Fluoranthene	* 280000
Pyrene	* 280000
Butylbenzylphthalate	* 280000
3,3'-Dichlorobenzidine	* 561000
Benzo(a)Anthracene	* 280000
Chrysene	* 280000
bis(2-Ethylhexyl)Phthalate	* 280000

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Attn: Tim Reed

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REPORT OF ORGANICS ANALYSIS

Compound	ug/kg
Di-n-Octyl Phthalate	* 280000
Benzo(b)Fluoranthene	* 280000
Benzo(k)Fluoranthene	* 280000
Benzo(a)Pyrene	* 280000
Indeno(1,2,3-cd)Pyrene	* 280000
Dibenz(a,h)Anthracene	* 280000
Benzo(g,h,i)Perylene	* 280000

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Barium	* 20	8-17-92	G. Bunch	SW846, 7080
Cadmium	* 2.0	8-17-92	G. Bunch	SW846, 7130
Chromium	* 4.0	8-17-92	G. Bunch	SW846, 7190
Lead	32	8-17-92	G. Bunch	SW846, 7420
Mercury	* 0.40	8-12-92	G. Bunch	SW846, 7470
Selenium	* 1.5	8-11-92	G. Bunch	SW846, 7741
Silver	* 2.5	8-17-92	G. Bunch	SW846, 7760

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Attn: Tim Reed

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Reviewed by

SOUTHWESTERN LABORATORIES

Highlander Services Corp.

306 W. Wall • Suite 320 • Midland, TX 79701 • (915)682-4559

Analysis Request and Chain of Custody Record

Page ___ of ___

Project No. 294

Client/Project: Greenhill Petroleum Lovington Tank Bottoms Sampling

Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Type(Liquid Sludge,Ect.)	Preser-vative	ANALYSIS REQUESTED
North Pond 2 kerr	7/29/92 am		X	Sludge	ice	418.1, pH, Total metals, Chloride
South Pond 2 kerr	7/29/92 12:50		X	Sludge	ice	" " " " "
Getty/Walker 3 Jars 1 small kerr	7/29/92 12:50		X	Sludge	ice	418.1, pH, Total metals, Chloride, Volatile Organics, Semi volatiles

Samplers: (Print)
Tim Reed
Vijay Kurki
Tim Reed

Results by: _____

Rush Charges Authorized
Yes ___ No X

Relinquished by: (Signature) Tim Reed — Date: 7/29/92 Time: 10:50

Relinquished by: (Signature) — Date: Time:

Relinquished by: (Signature) — Date: Time:

Delivered To: Southwestern Laboratories Midland

REMARKS: Save additional sample for further testing

Recieved by: (Signature) — Date: Time:

Recieved by: (Signature) [illegible] — Date: 7/29/92 Time: 10:50

Data Results To:
1.
2.

Please Fill out all copies – Deliverer retains White copy for file – Lab retains Yellow copy & Return Pink copy to Highlander Services Corp. at above address

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

June 12, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z 357 870 137

Mr. Ron Lechwar
Titan Resources, Inc.
500 W. Texas
Suite 500
Midland, Tx 79701

Re: Investigation and Remediation of former Greenhill Petroleum Landfarm, Lovington Paddock/San Andres Unit, NE/4 of Section 1, Ts17s-R36e, Lea County, New Mexico.

Dear Mr. Lechwar:

The New Mexico Oil Conservation Division (NMOCD) is in receipt of the Report on Semi-Annual Sampling dated April 27, 1999 for the above captioned site submitted by Highlander Environmental Corp. in which closure is requested. The NMOCD hereby denies your request for closure at this time. In order to further evaluate your request please provide to NMOCD the following information:

1. Please provide a legal surveyed point (to nearest foot) from approximately the center of the landfarm.

2. Please provide another round of sampling from the landfarm area. Samples shall be tested for the constituents of concern i.e. BTEX, TPH, Lead etc. Titan will notify the OCD Santa Fe office and the OCD District office at least 48 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples during OCD's normal business hours.

3. Please provide to NMOCD a linear regression curve showing time vs remaining constituents levels. Please plot existing data and extrapolate into the future.

4. Please provide a copy of the EPA/CERCLA OSWER Dir. 9355.4-02 Sept 7, 1989.

5. Please provide land status ownership.

6. Please provide a plan or rational i.e. model etc. as to how current or future landowners will be protected if they excavate in this area.

Please provide the above information by December 1, 1999, If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155).

Sincerely Yours,

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

cc: OCD Hobbs District Office
Tim M. Reed- Highlander

EPA Washington, DC 20460

OSWER Directive Initiation Request

1. Directive Number: OSWER 9355.4-02

2. Originator Information

Name of Contact Person	Mail Code	Office	Telephone Code
Marlene Berg	OS-240	OERR/HSED	475-9493

3. Title

Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites

4. Summary of Directive (include brief statement of purpose)

The purpose of this memo is to set forth an interim soil cleanup level for total lead, at 500 to 1000 ppm, which OERR and OWPE consider protective for direct contact at residential settings.

5. Keywords: Superfund, CERCLA, SARA

6a. Does This Directive Supersede Previous Directive(s)? [X] No. [ ] Yes What directive (number, title)

b. Does It Supplement Previous Directive(s)? [X] No [ ] Yes What directive (number, title)

7. Draft Level

[ ] A – Signed by AA/DAA [X] B – Signed by Office Director [ ] C – For Review & Comment [ ] D – In Development

8. Document to be distributed to States by Headquarters? [X] Yes [ ] No

This Request Meets OSWER Directives System Format Standards.

9. Signature of Lead Office Directives Coordinator — Date

Betti Van Epps, OERR Publications Coordinator

10. Name and Title of Approving Official — Date

Henry L. Longest II, Director, OERR

EPA Form 1315-17 (Rev. 5-87) Previous editions are obsolete.

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87005 Technical Documents

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 7, 1989

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

OSWER Directive #9355.4-02

MEMORANDUM

SUBJECT: Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites.

FROM: Henry L. Longest II, Director
Office of Emergency and Remedial Response

Bruce Diamond, Director
Office of Waste Programs Enforcement

TO: Directors, Waste Management Division, Regions I, II, IV, V, VII and VIII
Director, Emergency and Remedial Response Division, Region II
Directors, Hazardous Waste Management Division, Regions III and VI
Director, Toxic Waste Management Division, Region IX
Director, Hazardous Waste Division, Region X

PURPOSE

The purpose of this directive is to set forth an interim soil cleanup level for total lead, at 500 to 1000 ppm, which the Office of Emergency and Remedial Response and the Office of Waste Programs Enforcement consider protective for direct contact at residential settings. This range is to be used at both Fund-lead and Enforcement-lead CERCLA sites. Further guidance will be developed after the Agency has developed a verified Cancer Potency Factor and/or a Reference Dose for lead.

BACKGROUND

Lead is commonly found at hazardous waste sites and is a contaminant of concern at approximately one-third of the sites on the National Priorities List (NPL). Applicable or relevant and appropriate requirements (ARARs) are available to provide cleanup levels for lead in air and water but not in soil. The current

National Ambient Air Quality Standard for lead is 1.5 ug/m^3. While the existing Maximum Contaminant Level (MCL) for lead is 50 ppb, the Agency has proposed lowering the MCL for lead to 10 ppb at the tap and to 5 ppb at the treatment plant[1]. A Maximum Contaminant Level Goal (MCLG) for lead of zero was proposed in 1988[2]. At the present time, there are no Agency-verified toxicological values (Reference Dose and Cancer Potency Factor, ie., slope factor), that can be used to perform a risk assessment and to develop protective soil cleanup levels for lead.

Efforts are underway by the Agency to develop a Cancer Potency Factor (CPF) and Reference Dose (RfD), (or similar approach), for lead. Recently, the Science Advisory Board strongly suggested that the Human Health Assessment Group (HHAG) of the Office of Research and Development (ORD) develop a CPF for lead, which was designated by the Agency as a B2 carcinogen in 1988. The HHAG is in the process of selecting studies to derive such a level. The level and documentation package will then be sent to the Agency's Carcinogen Risk Assessment Verification Exercise (CRAVE) workgroup for verification. It is expected that the documentation package will be sent to CRAVE by the end of 1989. The Office of Emergency and Remedial Response, the Office of Waste Programs Enforcement and other Agency programs are working with ORD in conjunction with the Office of Air Quality Planning and Standards (OAQPS) to develop an RfD, (or similar approach), for lead. The Office of Research and Development and OAQPS will develop a level to protect the most sensitive populations, namely young children and pregnant women, and submit a documentation package to the Reference Dose workgroup for verification. It is anticipated that the documentation package will be available for review by the fall of 1989.

IMPLEMENTATION

The following guidance is to be implemented for remedial actions until further guidance can be developed based on an Agency verified Cancer Potency Factor and/or Reference Dose for lead.

Guidance

This guidance adopts the recommendation contained in the 1985 Centers for Disease Control (CDC) statement on childhood lead poisoning[3] and is to be followed when the current or predicted land use is residential. The CDC recommendation states that "...lead in soil and dust appears to be responsible for blood levels in children increasing above background levels when the concentration in the soil or dust exceeds 500 to 1000 ppm". Site-specific conditions may warrant the use of soil cleanup levels below the 500 ppm level or somewhat above the 1000 ppm level. The administrative record should include background documents on the toxicology of lead and information related to site-specific conditions.

The range of 500 to 1000 ppm refers to levels for total lead, as measured by protocols developed by the Superfund Contract Laboratory Program. Issues have been raised concerning the role that the bioavailability of lead in various chemical forms and particle sizes should play in assessing the health risks posed by exposure to lead in soil. At this time, the Agency has not developed a position regarding the bioavailability issue and believes that additional information is needed to develop a position. This guidance may be revised as additional information becomes available regarding the bioavailability of lead in soil.

Blood-lead testing should not be used as the sole criterion for evaluating the need for long-term remedial action at sites that do not already have an extensive, long-term blood-lead data base[1].

EFFECTIVE DATE OF THIS GUIDANCE

This interim guidance shall take effect immediately. The guidance does not require that cleanup levels already entered into Records of Decisions, prior to this date, be revised to conform with this guidance.

---

[1] In one case, a biokinetic uptake model developed by the Office of Air Quality Planning and Standards was used for a site-specific risk assessment. This approach was reviewed and approved by Headquarters for use at the site, based on the adequacy of data (due to continuing CDC studies conducted over many years). These data included all children's blood-lead levels collected over a period of several years, as well as family socio-economic status, dietary conditions, conditions of homes and extensive environmental lead data, also collected over several years. This amount of data allowed the Agency to use the model without a need for extensive default values. Use of the model thus allowed a more precise calculation of the level of cleanup needed to reduce risk to children based on the amount of contamination from all other sources, and the effect of contamination levels on blood-lead levels of children.

REFERENCES

1. 53 FR 31516, August 18, 1988.
2. 53 FR 31521, August 18, 1988.
3. Preventing Lead Poisoning in Young Children, January 1985, U.S. Department of Health and Human Services, Centers for Disease Control, 99-2230.

Table 1
Titan Resources, L.P.
Greenhill Landfarm, Lovington Paddock/ San Andres
Lea County, New Mexico
TPH and Total Lead (mg/kg)

Date	Depth	Area 1		Area 2		Area 3		Area 4		Area 5		Area 6	
	(ft)	TPH	Lead	TPH	Lead	TPH	Lead	TPH	Lead	TPH	Lead	TPH	Lead
3/9/98	0-1'	11,900	7	21,900	13	8,200	15	7,120	7.6	16,900	22	4,240	7.6
	2'	-	-	-	-	-	-	-	-	-	-	-	-
	3'	96.9	5.2	14,100	<5.0	161	<5.0	916	<5.0	121	<5.0	133	<5.0
	5'	38.5	<5.0	-	<5.0	139	<5.0	235	<5.0	12.5	<5.0	<10	<5.0
1/21/99	0-1'	10,200	-	12,900	-	3,200	-	4,900	-	8,910	-	8,150	-
	2.0	-	-	5,790	-	-	-	-	-	-	-	-	-
7/14/99	0-1'	612 / <5	6.8	440 / <5	13	56 / <5	8.4	660 / <5	9.7	<50 / <5	13	651 / <5	15

7/14/99 - Samples collected were analyzed by modified 8015 (TPH shown DRO/GRO)
(-) Not Anaylzed

Table 2
Titan Resources, L.P.
Greenhill Landfarm, Lovington Paddock/ San Andres
Lea County, New Mexico
BTEX Analysis (mg/kg)

Sample ID	Date	Depth (ft)	Benzene	Toluene	Ethylbenzene	Xylene	Total BTEX
Area 1	3/9/98	Surface	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	3	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	5	<0.050	<0.050	<0.050	<0.050	<0.050
Area 2	3/9/98	Surface	<0.050	<0.050	**0.058**	**0.377**	**0.435**
	3/9/98	3	<0.050	<0.050	**0.276**	**1.38**	**1.66**
	3/9/98	5	<0.050	<0.050	<0.050	<0.050	<0.050
Area 3	3/9/98	Surface	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	3	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	5	<0.050	<0.050	<0.050	<0.050	<0.050
Area 4	3/9/98	Surface	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	3	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	5	<0.050	<0.050	<0.050	<0.050	<0.050
Area 5	3/9/98	Surface	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	3	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	5	<0.050	<0.050	<0.050	<0.050	<0.050
Area 6	3/9/98	Surface	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	3	<0.050	<0.050	<0.050	<0.050	<0.050
	3/9/98	5	<0.050	<0.050	<0.050	<0.050	<0.050

TRACE ANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
4725 Ripley Avenue, Suite A El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR
Highlander Environmental Services
Attention Lynn Ward
1910 N. Big Spirng St.
Midland TX 79705

Date: Mar 23, 1998
Date Rec: 3/11/98
Project: 1084
Proj Name: Greenhill Landfarm
Proj Loc: N/A

Lab Receiving # : 9803000189
Sampling Date: 3/9/98
Sample Condition: Intact and Cool
Sample Received By: VW

TA#	Field Code	MATRIX	TRPHC (mg/Kg)
T 93179	Area 1 @ Surface	Soil	11,900
T 93180	Area 1 @ 3'	Soil	96.9
T 93181	Area 1 @ 5'	Soil	38.5
T 93182	Area 2 @ Surface	Soil	21,900
T 93183	Area 2 @ 3'	Soil	14,100
T 93184	Area 2 @ 5'	Soil	139
T 93185	Area 3 @ Surface	Soil	8,200
T 93186	Area 3 @ 3'	Soil	161
T 93187	Area 3 @ 5'	Soil	139
T 93188	Area 4 @ Surface	Soil	7,120
T 93189	Area 4 @ 3'	Soil	916
T 93190	Area 4 @ 5'	Soil	235
T 93191	Area 5 @ Surface	Soil	16,900
T 93192	Area 5 @ 3'	Soil	121
T 93193	Area 5 @ 5'	Soil	12.5
T 93194	Area 6 @ Surface	Soil	4,240
T 93195	Area 6 @ 3'	Soil	133
T 93196	Area 6 @ 5'	Soil	<10.0
Method Blank			<10.0
Reporting Limit			10
QC			99
RPD			15
% Extraction Accuracy			112
% Instrument Accuracy			99

TEST	PREP METHOD	PREP DATE	ANALYSIS METHOD	ANALYSIS COMPLETED	CHEMIST	QC: (mg/L)	SPIKE: (mg/Kg)
TRPHC	EPA 3550	3/18/98	EPA 418.1	3/18/98	MS	100	250

Director, Dr. Blair Leftwich

3-23-98
Date

TRACE ANALYSIS, INC.

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E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR
Highlander Environmental Services
Attention Lynn Ward
1910 N. Big Spirng St.
Midland TX 79705

Lab Receiving # : 9803000189
Sampling Date: 3/9/98
Sample Condition: Intact and Cool
Sample Received By: VW

Date: Mar 19, 1998
Date Rec: 3/11/98
Project: 1084
Proj Name: Greenhill Landfarm
Proj Loc: N/A

TA#	Field Code	MATRIX	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL-BENZENE (mg/Kg)	M,P,O XYLENE (mg/Kg)	TOTAL BTEX mg/Kg)
T 93179	Area 1 @ Surface	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93180	Area 1 @ 3'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93181	Area 1 @ 5'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93182	Area 2 @ Surface	Soil	<0.050	<0.050	0.058	0.377	0.435
T 93183	Area 2 @ 3'	Soil	<0.050	<0.050	0.276	1.38	1.66
T 93184	Area 2 @ 5'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93185	Area 3 @ Surface	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93186	Area 3 @ 3'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93187	Area 3 @ 5'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
Method Blank			<0.050	<0.050	<0.050	<0.050	
Reporting Limit			0.05	0.05	0.05	0.05	
QC			0.093	0.086	0.085	0.260	
RPD			1	2	3	3	
% Extraction Accuracy			102	95	93	97	
% Instrument Accuracy			93	86	85	87	

TEST	PREP METHOD	PREP DATE	ANALYSIS METHOD	ANALYSIS COMPLETED	CHEMIST	QC: (mg/L)	SPIKE: mg/Kg)
BTEX	EPA 5030	3/14/98	EPA 8021B	3/14/98	JG	0.100 ea	5 ea

Review

3-18-98

TRACE ANALYSIS, INC.

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E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR
Highlander Environmental Services
Attention Lynn Ward
1910 N. Big Spirng St.
Midland TX 79705

Lab Receiving # : 9803000189
Sampling Date: 3/9/98
Sample Condition: Intact and Cool
Sample Received By: VW

Date: Mar 19, 1998
Date Rec: 3/11/98
Project: 1084
Proj Name: Greenhill Landfarm
Proj Loc: N/A

TA#	Field Code	MATRIX	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL-BENZENE (mg/Kg)	M,P,O XYLENE (mg/Kg)	TOTAL BTEX mg/Kg)
T 93188	Area 4 @ Surface	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93189	Area 4 @ 3'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93190	Area 4 @ 5'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93191	Area 5 @ Surface	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93192	Area 5 @ 3'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93193	Area 5 @ 5'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93194	Area 6 @ Surface	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93195	Area 6 @ 3'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
T 93196	Area 6 @ 5'	Soil	<0.050	<0.050	<0.050	<0.050	<0.050
Method Blank			<0.050	<0.050	<0.050	<0.050	
Reporting Limit			0.05	0.05	0.05	0.05	
QC			0.093	0.086	0.085	0.260	
RPD			1	2	3	3	
% Extraction Accuracy			102	95	93	97	
% Instrument Accuracy			93	86	85	87	

TEST	PREP METHOD	PREP DATE	ANALYSIS METHOD	ANALYSIS COMPLETED	CHEMIST	QC: (mg/L)	SPIKE: mg/Kg)
BTEX	EPA 5030	3/14/98	EPA 8021B	3/14/98	JG	0.100 ea	5 ea

BR

3-19-98

TRACE ANALYSIS, INC.

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4725 Ripley Avenue, Suite A El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR
HIGHLANDER SERVICES
Attention: Lynn Ward
1910 N. Big Spring St.
Midland, TX 79705

March 20, 1998
Receiving Date: 03/11/98
Sample Type: Soil
Project No: 1084
Project Location: NA

Prep Date: 03/12/98
Analysis Date: 03/13/98
Sampling Date: 03/09/98
Sample Condition: Intact & Cool
Sample Received by: VW
Client Name: Titan
Project Name: Greenhill Landfarm (Bio Cell)

TA#	FIELD CODE	TOTAL Pb (mg/kg)
T93179	Area 1 @ Surface	7.0
T93180	Area 1 @ 3'	5.2
T93181	Area 1 2 5'	<5.0
T93182	Area 2 @ Surface	13
T93183	Area 2 @ 3'	<5.0
T93184	Area 2 @ 5'	<5.0
T93185	Area 3 @ Surface	15
T93186	Area 3 @ 3'	<5.0
T93187	Area 3 @ 5'	<5.0
T93188	Area 4 @ Surface	15
T93189	Area 4 @ 3'	<5.0
T93190	Area 4 @ 5'	<5.0
T93191	Area 5 @ Surface	22
T93192	Area 5 @ 3'	<5.0
T93193	Area 5 @ 5'	<5.0
T93194	Area 6 @ Surface	7.6
T93195	Area 6 @ 3'	<5.0
T93196	Area 6 @ 5'	<5.0
ICV		1.06
CCV		1.03
Reporting Limit		5.0
RPD		3
% Extraction Accuracy		95
% Instrument Accuracy		105

METHODS: EPA SW 846-3051, 6010B.
CHEMIST: RR
TOTAL Pb SPIKE: 200 mg/kg TOTAL Pb.
TOTAL Pb CV: 1.0 mg/L TOTAL Pb.

Director, Dr. Blair Leftwich

3-20-98
DATE

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Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 2

CLIENT NAME: Titan

SITE MANAGER: Lynn Ward

PROJECT NO.: 1084

PROJECT NAME: Greenhill Landfarm (Bio Cell)

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH 418.1	PAH 8270	RCRA Metals Ag As Ba Cd Cr (Pb) Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)
93179	3/9/98		S		X	Area 1 @ surface	1				X		X		X		X												
80	3/9/98		S		X	Area 1 @ 3'	1				X		X		X		X												
81	3/9/98		S		X	Area 1 @ 5'	1				X		X		X		X												
82	3/9/98		S		X	Area 2 @ surface	1				X		X		X		X												
83	3/9/98		S		X	Area 2 @ 3'	1				X		X		X		X												
84	3/9/98		S		X	Area 2 @ 5'	1				X		X		X		X												
85	3/9/98		S		X	Area 3 @ surface	1				X		X		X		X												
86	3/9/98		S		X	Area 3 @ 3'	1				X		X		X		X												
87	3/9/98		S		X	Area 3 @ 5'	1				X		X		X		X												

ANALYSIS REQUEST (Circle or Specify Method No.)

RELINQUISHED BY: (Signature) — Date: 3/10/98 Time: 11:40

RECEIVED BY: (Signature) Helen Shelton — Date: 3/10/98 Time: 11:40AM

SAMPLED BY: (Print & Sign) Lynn Hilton Ward — Date: 3/9/98 Time:

RELINQUISHED BY: (Signature) Helen Shelton — Date: 3/10/98 Time: 6:00 PM

RECEIVED BY: (Signature) — Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS UPS HAND DELIVERED — AIRBILL # 155758 884 — OTHER:

RELINQUISHED BY: (Signature) — Date: Time:

RECEIVED BY: (Signature) — Date: Time:

RECEIVING LABORATORY: Trace Analysis

ADDRESS:

CITY: Lubbock STATE: TX ZIP:

CONTACT: PHONE: 800/378-1296

RECEIVED BY: (Signature) Pat Windham

DATE: 3-11-98 TIME: 9:30 am

HIGHLANDER CONTACT PERSON: Lynn Ward

Results by:

RUSH Charges Authorized: Yes (No)

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water (S-Soil) A-Air SL-Sludge SD-Solid O-Other

REMARKS: Please hold samples for possible TCLP

Please Fill out all required information. Laboratory retains yellow copy. Return original copy to Highlander Environmental Corp. - Project Manager retains pink copy. - Accounting receives Gold copy.

189

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 2 OF: 2

CLIENT NAME: Titan | SITE MANAGER: Lynn Ward

PROJECT NO.: 1084 | PROJECT NAME: Grunhill Landfarm (Bio Cell)

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)
93188	3/9/98		S		X	Area 4 @ Surface	1				X		X		X	X	X												
89	3/9/98		S		X	Area 4 @ 3'	1				X		X		X	X	X												
90	3/9/98		S		X	Area 4 @ 5'	1				X		X		X	X	X												
91	3/9/98		S		X	Area 5 @ Surface	1				X		X		X	X	X												
92	3/9/98		S		X	Area 5 @ 3'	1				X		X		X	X	X												
93	3/9/98		S		X	Area 5 @ 5'	1				X		X		X	X	X												
94	3/9/98		S		X	Area 6 @ Surface	1				X		X		X	X	X												
95	3/9/98		S		X	Area 6 @ 3'	1				X		X		X	X	X												
96	3/9/98		S		X	Area 6 @ 5'	1				X		X		X	X	X												

ANALYSIS REQUEST (Circle or Specify Method No.)

RELINQUISHED BY: (Signature) Lynn Ward — Date: 3/10/98 Time: 11:40
RECEIVED BY: (Signature) Helen Shelton — Date: 3/10/98 Time: 11:40 AM

RELINQUISHED BY: (Signature) Helen Shelton — Date: 3/10/98 Time: 6:00 PM
RECEIVED BY: (Signature) — Date: — Time:

RELINQUISHED BY: (Signature) — Date: — Time:
RECEIVED BY: (Signature) — Date: — Time:

SAMPLED BY: (Print & Sign) Lynn Ward — Date: 3/9/98 Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS UPS HAND DELIVERED — AIRBILL # 155 758884 6 — OTHER:

RECEIVING LABORATORY: Trace Analysis
ADDRESS:
CITY: Lubbock STATE: TX ZIP:
CONTACT: PHONE: 800/378-1296

RECEIVED BY: (Signature) Peggy Windham
DATE: 3-11-98 TIME: 9:30 Am

HIGHLANDER CONTACT PERSON: Lynn Ward

Results by:

RUSH Charges Authorized: Yes (No)

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water A-Air SD-Solid (S-Soil) SL-Sludge O-Other

REMARKS: Please hold samples for possible TCLP

Please Fill out all copies. Laboratory retains yellow copy - Return original copy to Highlander Environmental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

TRACE ANALYSIS, INC.

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E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR
HIGHLANDER SERVICES
Attention: Lynn Ward
1910 N. Big Spring St.
Midland, TX 79705

March 18, 1998
Receiving Date: 03/11/98
Sample Type: Soil
Project No: 1084
Project Location: NA

Prep Date: 03/12/98
Analysis Date: 03/17/98
Sampling Date: 03/09/98
Sample Condition: Intact & Cool
Sample Received by: VW
Client Name: Titan
Project Name: Greenhill Landfarm

TA#	FIELD CODE	TOTAL Pb (mg/kg)
T93164	N. Pit Area @ Surface	4.2
T93165	N. Pit Area @ 3'	<2.0
T93166	N. Pit Area @ 5.0'-5.4'	<2.0
ICV		0.98
CCV		0.99
Reporting Limit		2.0
RPD		1
% Extraction Accuracy		70*
% Instrument Accuracy		98

***NOTE: Extraction Accuracy out of accepted limits of 75-125% because of matrix effects. LCS shows that the test was in range.**

METHODS: EPA SW 846-3051, 6010B.
CHEMIST: RR
TOTAL Pb SPIKE: 200 mg/kg TOTAL Pb.
TOTAL Pb CV: 1.0 mg/L TOTAL Pb.

Director, Dr. Blair Leftwich

3-18-98
DATE

93164-66

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Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705
(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 1

CLIENT NAME: Titan

SITE MANAGER: Lynn Ward

PROJECT NO.: 1084

PROJECT NAME: Greenhill Landfarm

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH	PAH 8270	RCRA Metals Ag As Ba Cd Cr (Pb) Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)
93164	3/9/98	2:45	S		X	N. Pit Area @ surface						X					X												
65	3/9/98	3:30	S		X	N. Pit Area @ 3'						X					X												
66	3/9/98	3:50	S		X	N. Pit Area @ 5.0'-5.4'						X					X												

RELINQUISHED BY: (Signature) Lynn Ward — Date: 3/10/98 Time: 11:46

RECEIVED BY: (Signature) Helen Shelton — Date: 3/10/98 Time: 11:40AM

SAMPLED BY: (Print & Sign) Lynn Ward Lynn Ward — Date: 3/9/98 Time:

RELINQUISHED BY: (Signature) Helen Shelton — Date: 3/10/98 Time: 6:00PM

RECEIVED BY: (Signature) — Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS UPS HAND DELIVERED — AIRBILL # 155758884 4 OTHER:

RELINQUISHED BY: (Signature) — Date: Time:

RECEIVED BY: (Signature) — Date: Time:

RECEIVING LABORATORY:
ADDRESS:
CITY: STATE: ZIP:
CONTACT: PHONE:

RECEIVED BY: (Signature) [signature]
DATE: 3-11-98 TIME: 9:00 AM

HIGHLANDER CONTACT PERSON: Lynn Ward

Results by:

RUSH Charges Authorized: Yes (No)

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water (S-Soil) A-Air SL-Sludge SD-Solid O-Other

REMARKS: c/o 3/11

White - Highlander Environmental Corp. Project Manager retains pink copy - Accounting receives Gold copy

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E-Mail: lab@traceanalysis.com

ANALYTICAL RESULTS FOR
HIGHLANDER ENVIRONMENTAL SERVICES
Attention: Tim Reed
1910 N. Big Spring St.
Midland TX 79705

Date: Apr 15, 1999
Date Rec: 1/22/99
Project: 1084
Proj Name: Greenhill Landfarm
Proj Loc: N/A

Lab Receiving # : 9901000301
Sampling Date: 1/21/99
Sample Condition: Intact and Cool
Sample Received By: VW

TA#	Field Code	MATRIX	TRPHC (mg/L)
117300	Area 1 @ 0-1'	Soil	10,200
117301	Area 2 @ 0-1'	Soil	12,900
117302	Area 2 @ 2'	Soil	5,790
117303	Area 3 @ 0-1'	Soil	3,200
117304	Area 4 @ 0-1'	Soil	4,900
117305	Area 5 @ 0-1'	Soil	8,910
117306	Area 6 @ 0-1'	Soil	8,150
Method			<10.0
Reporting Limit			10
QC			94
RPD			2
% Extraction Accuracy			98
% Instrument Accuracy			94

TEST	PREP METHOD	PREP DATE	ANALYSIS METHOD	ANALYSIS COMPLETED	CHEMIST	QC (mg/L	SPIKE (mg/L)
TRPHC	EPA 3550B	1/25/99	EPA 418.1	1/25/99	MF	100	250

Director, Dr. Blair Leftwich

4-15-99
Date

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Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 1

CLIENT NAME: Titan

SITE MANAGER: Lynn Ward

PROJECT NO.: 1084

PROJECT NAME: Greenhill Landfarm

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH 418.1	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)
117300	1/21/99	10:00	S	X		Area 1 @ 0-1'	1				X				X														
301	1/21/99	10:20	S	X		Area 2 @ 0-1'	1				X				X														
302	1/21/99	12:25	S	X		Area 2 @ 2'	1				X				X														
303	1/21/99	10:50	S	X		Area 3 @ 0-1'	1				X				X														
304	1/21/99	11:30	S	X		Area 4 @ 0-1'	1				X				X														
305	1/21/99	11:55	S	X		Area 5 @ 0-1'	1				X				X														
306	1/21/99	12:05	S	X		Area 6 @ 0-1'	1				X				X														

ANALYSIS REQUEST (Circle or Specify Method No.)

RELINQUISHED BY: (Signature) Lynn Ward — Date: 1/21/99 Time: 3:20 PM

RECEIVED BY: (Signature) Helen Shelton — Date: 1/21/99 Time: 5:20 PM

SAMPLED BY: (Print & Sign) Lynn Ward — Date: 1/21/99 Time: 3:20

RELINQUISHED BY: (Signature) Helen Shelton — Date: 1/21/99 Time: 6:00 PM

RECEIVED BY: (Signature) — Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS UPS — AIRBILL # 159394944 0

HAND DELIVERED — OTHER:

RELINQUISHED BY: (Signature) — Date: Time:

RECEIVED BY: (Signature) — Date: Time:

RECEIVING LABORATORY: Isaac Analysis

ADDRESS:

CITY: Lubbock STATE: TX ZIP:

CONTACT: PHONE:

RECEIVED BY: (Signature) Vicki Wondra

DATE: 1-22-99 TIME: 9:30 40

HIGHLANDER CONTACT PERSON: Tim Reed

Results by: ASAP - please

RUSH Charges Authorized: Yes (No)

SAMPLE CONDITION WHEN RECEIVED: Hightph. (WORD)

MATRIX: W-Water (S-Soil) A-Air SL-Sludge SD-Solid O-Other

REMARKS:

1/26/99

White - Return to Client with Report; Yellow - Laboratory retains yellow copy - Return original copy to Highlander Environmental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
4725 Ripley Avenue, Suite A El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spirng St.
Midland, TX 79705

Report Date: 7/22/99

Project Number: 1084
Project Name: Greenhill Landfarm
Project Location: N/A

Order ID Number: 99071507

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to TraceAnalysis, Inc. for analysis:

Sample Number	Sample Description	Matrix	Date Taken	Time Taken	Date Received
128170	Area 1 (0-1') Comp	Soil	7/14/99	-	7/15/99
128171	Area 2 (0-1') Comp	Soil	7/14/99	-	7/15/99
128172	Area 3 (0-1') Comp	Soil	7/14/99	-	7/15/99
128173	Area 4 (0-1') Comp	Soil	7/14/99	-	7/15/99
128174	Area 5 (0-1') Comp	Soil	7/14/99	-	7/15/99
128175	Area 6 (0-1') Comp	Soil	7/14/99	-	7/15/99

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 4 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director

Analytical Results Report

Sample Number: 128170
Description: Area 1 (0-1') Comp

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
DRO (mg/Kg)		612	1	Mod. 8015B	7/15/99	7/16/99	MF	PB01485	QC01839	50
GRO (mg/Kg)		<5	1	8015B	7/16/99	7/16/99	RC	PB01569	QC01932	0.1

Sample Number: 128171
Description: Area 2 (0-1') Comp

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
DRO (mg/Kg)		440	1	Mod. 8015B	7/15/99	7/16/99	MF	PB01485	QC01839	50
GRO (mg/Kg)		<5	1	8015B	7/16/99	7/16/99	RC	PB01569	QC01932	0.1

Sample Number: 128172
Description: Area 3 (0-1') Comp

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
DRO (mg/Kg)		56	1	Mod. 8015B	7/15/99	7/16/99	MF	PB01485	QC01839	50
GRO (mg/Kg)		<5	1	8015B	7/16/99	7/16/99	RC	PB01569	QC01932	0.1

Sample Number: 128173
Description: Area 4 (0-1') Comp

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
DRO (mg/Kg)		660	1	Mod. 8015B	7/15/99	7/16/99	MF	PB01485	QC01839	50
GRO (mg/Kg)		<5	1	8015B	7/16/99	7/16/99	RC	PB01569	QC01932	0.1

Sample Number: 128174
Description: Area 5 (0-1') Comp

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
DRO (mg/Kg)		<50	1	Mod. 8015B	7/15/99	7/16/99	MF	PB01485	QC01839	50
GRO (mg/Kg)		<5	1	8015B	7/16/99	7/16/99	RC	PB01569	QC01932	0.1

Sample Number: 128175
Description: Area 6 (0-1') Comp

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
DRO (mg/Kg)		651	1	Mod. 8015B	7/15/99	7/16/99	MF	PB01485	QC01839	50
GRO (mg/Kg)		<5	1	8015B	7/16/99	7/16/99	RC	PB01569	QC01932	0.1

TRACE ANALYSIS, INC.

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ANALYTICAL RESULTS FOR
HIGHLANDER ENVIRONMENTAL CORP.
Attention: Ike Tavarez
1910 N. Big Spring St.
Midland, TX 79705

July 21, 1999
Receiving Date: 07/15/99
Sample Type: Soil
Project No: 1084
Project Location: NA
Client Nanme: Titan

Prep Date: 07/19/99
Analysis Date: 07/19/99
Sampling Date: 07/14/99
Sample Condition: Intact & Cool
Sample Received by: VW
Project Name: Titan/Greenhill Landfarm

TA#	FIELD CODE	TOTAL Pb (mg/kg)
T128170	Area 1 (0-1') Comp.	6.8
T128171	Area 2 (0-1') Comp.	13
T128172	Area 3 (0-1') Comp.	8.4
T128173	Area 4 (0-1') Comp.	9.7
T128174	Area 5 (0-1') Comp.	13
T128175	Area 6 (0-1') Comp.	15
ICV		1.0
CCV		1.0
METHOD BLANK		<5.0
REPORTING LIMIT		5.0
RPD		2
% Extraction Accuracy		102
% Instrument Accuracy		102

METHODS: EPA SW 846-3050B, 6010B.
CHEMIST: RR
TOTAL Pb SPIKE: 200 mg/kg TOTAL Pb.
TOTAL Pb CV: 1.0 mg/L TOTAL Pb.

Director, Dr. Blair Leftwich

7-22-99
DATE

Quality Control Report
Method Blanks

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
DRO (mg/Kg)		<50	50	7/16/99	PB01485	QC01839

Param	Flag	Blank Result	Reporting Limit	Date Analyzed	Prep Batch #	QC Batch #
GRO (mg/Kg)		<5	0.1	7/16/99	PB01569	QC01932

Quality Control Report
Matrix Spike and Matrix Duplicate Spike

Standard	Param	Sample Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
MS	DRO (mg/Kg)	651	1	250	811	111		70 - 130	0 - 20	QC01839
MSD	DRO (mg/Kg)	651	1	250	864	104	28	70 - 130	0 - 20	QC01839

Quality Control Report
Lab Control Spikes and Duplicate Spike

	Param	Blank Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
LCS	DRO (mg/Kg)	<50	1	250	217	87		70 - 130	0 - 20	QC01839
LCSD	DRO (mg/Kg)	<50	1	250	212	85	2	70 - 130	0 - 20	QC01839

	Param	Blank Result	Dil.	Spike Amount Added	Matrix Spike Result	% Rec.	RPD	% Rec. Limit	RPD Limit	QC Batch #
LCS	GRO (mg/Kg)	<5	1	1	0.808	81		80 - 120	0 - 20	QC01932
LCSD	GRO (mg/Kg)	<5	1	1	0.812	81	0	80 - 120	0 - 20	QC01932

Quality Control Report
Continuing Calibration Verification Standard

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	DRO (mg/Kg)		250	209	84	70 - 130	7/16/99	QC01839
CCV (1	DRO (mg/Kg)		250	212	85	70 - 130	7/16/99	QC01839
CCV (2	DRO (mg/Kg)		250	218	87	70 - 130	7/16/99	QC01839

Standard	Param	Flag	CCVs TRUE Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	QC Batch #
ICV	GRO (mg/Kg)		1	0.841	86	80 - 120	7/16/99	QC01932
CCV (1	GRO (mg/Kg)		1	0.859	84	80 - 120	7/16/99	QC01932

99071507

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
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PAGE: 1 OF: 1

ANALYSIS REQUEST (Circle or Specify Method No.)

CLIENT NAME: Titan.

SITE MANAGER: Ike Tavarez

PROJECT NO.: 1084

PROJECT NAME: Titan / Greenhill Landfarm. (Biocell)

Analyses listed: BTEX 8020/602; MTBE 8020/602 GRO/DRO; TPH 418.1 (8015 MOD.) TX1005; PAH 8270; RCRA Metals Ag As Ba Cd Cr Pb Hg Se; TCLP Metals Ag As Ba Cd Cr Pd Hg Se; TCLP Volatiles; TCLP Semi Volatiles; RCI; GC.MS Vol. 8240/8260/624; GC.MS Semi. Vol. 8270/625; PCB's 8080/608; Pest. 808/608; BOD, TSS, pH, TDS, Chloride; Gamma Spec.; Alpha Beta (Air); PLM (Asbestos); Total Pb

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	HCL	HNO3	ICE	NONE	TPH 8015 MOD.	Total Pb
128170	7/14/99		S	X		Area 1 (0-1') comp.	1				✓		X	X
171	7/14/99		S	X		Area 2 (0-1') comp.	1				✓		X	X
172	7/14/99		S	X		Area 3 (0-1') comp.	1				✓		X	X
173	7/14/99		S	X		Area 4 (0-1') comp.	1				✓		X	X
174	7/14/99		S	X		Area 5 (0-1') comp.	1				✓		X	X
175	7/14/99		S	X		Area 6 (0-1') comp.	1				✓		X	X

RELINQUISHED BY: (Signature) [signature] Date: 7/14/99 Time: 4:10 PM — RECEIVED BY: (Signature) Helen Shelton Date: 7/14/99 Time: 4:10 PM

RELINQUISHED BY: (Signature) Helen Shelton Date: 7/14/99 Time: 6:30 PM — RECEIVED BY: (Signature) Date: Time:

RELINQUISHED BY: (Signature) Date: Time: — RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY:
ADDRESS:
CITY: STATE: ZIP:
CONTACT: PHONE:

RECEIVED BY: (Signature) Vicki Wrahn
DATE: 7-15-99 TIME: 10:0 Am

SAMPLED BY (Print & Sign) Ike Tavarez Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX (BUS) Greyhound AIRBILL # HAND DELIVERED UPS OTHER:

HIGHLANDER CONTACT PERSON: Ike Tavarez

Results by: 7/22/99 ☆
RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water A-Air SD-Solid (S-Soil) SL-Sludge O-Other

REMARKS: 7/22/99

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Environmental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

F° ... 159-384-5623-R —MS 10 samples —HS