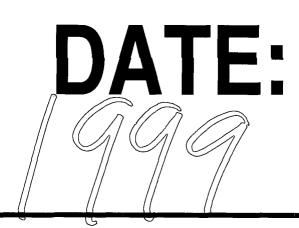


REPORTS





Tipperary Corporation Tatum Pit Closure Project State NBN # 1 Closure Report

RECEIVED

DEC 201999

ENVIRONMENTAL BUREAU OIL CONSERVATION DIVISION



Whole Earth Environmental 19606 San Gabriel Houston, Tx. 77084





633 Seventeenth Street Suite 1550 Denver, Colorado 80202

November 2, 1999

CERTIFIED MAIL

Mr. William C. Olson New Mexico Oil Conservation Division 2040 South Pacheco Santa Fe, NM 87505

RE: Request for Final Closure of Pit State NBN #1 Sec 16N-T11N-R33E Tatum Pit Closure Project Lea County, NM

Dear Mr. Olson:

Please find enclosed additional data requested in your letter of August 6, 1999 which should allow you to complete your review of our request for final closure of the subject pit. The data included in the attached report is summarized below:

- Summary of pit closure including the OCD Pit Remediation Report, topographic base map, well site map with surveyed locations of pit and wells, water table elevations including a calculation of hydraulic gradient.
- Before and after photographs of pit closure.
- Pit closure protocol and procedures used.
- Results of all soil and water samples taken.
- Boring log of monitor well.
- Disposal manifests of all waste products.
- Vadsat modeling results.
- Liner material information.

We respectfully request final closure of the subject pit project. If you have any questions, please call me at (303) 293-9379.

Very truly yours,

Jany 6 Doguno

Larry G. Sugano Vice President - Engineering

cc: NMOCD Hobbs Office Enclosures



State NBN # 1

Legal Description

State Lease K2654 - Unit "N", (Oil & Gas # E2654) T11S-R33E-Sec.16 660' FSL - 1,982.5' FWL

Pit Description

State NBN # 1 is described as an unlined emergency upset pit that was used in conjunction with on-site separation and storage. The pit was situated approximately 50 feet north of the separator and contained a raised berm approximately 2' in height. The actual pit dimensions were 50' X 60' x 3' in depth. The pit was covered in bird netting and surrounded by a four strand barbed wire fence.

There was a minor amount of free product within the pit consisting of heavily weathered asphaltic fractions however there was no evidence of surface staining surrounding the berm. There are no signs of stressed vegetation surrounding the pit. (See attached photograph.)

Pit History

State NBN # 1 was logged in March 1965 and completed shortly thereafter. Burro Pipeline was permitted in October of 1967 and was connected to the wellsite prior to 1970. All emergency discharges to the pit were discontinued prior to 1970.

Distance to Surface & Ground Waters

The attached plat map demonstrates that the pit is more than 1,000 ft. from a surface water body or private domestic water source. The vertical distance to ground water is 63' as determined on January 8, 1997. (See attached 7.5', hydro-geological plat maps and boring logs.)

Closure Standards

In accordance with the Oil Conservation Division <u>Unlined Surface Impoundment Closure</u> <u>Guidelines</u> (Feb. '93) the pit has a total ranking score of >19 and thus must be closed to a TPH concentration of less than 100 ppm.

Sampling Results

On January 10, 1997, Whole Earth supervised the coring of the pit and found hydrocarbon concentrations of less than 10,000 ppm TPH at a depth of between 10-15'. Due to the presence of free product within the pit, the coring was performed at the southeast corner, mid-way up the berm. (See attached field sampling report and plat map.) The field tests were conducted using EPA Method 418.1 (modified) in accordance with Whole Earth Quality Procedures QP-6 and QP-25 (enclosed).

Core samples obtained from the upper vadose zone of the aquifer revealed no detectable concentrations of volatile or semi-volatile compounds. (See attached Environmental Labs of Texas analytical reports.)

Closure Protocol

The pit was closed in accordance with the attached Protocol QP-42. Approximately 106 cubic yards of the most highly contaminated soils were excavated and transported to a licensed landfarm. The remaining soils were excavated to a total depth of approximately 15' below ground level and remediated by means of aeration and dilution with substrait materials immediately adjacent to the excavation. The side-walls and bottom of the excavation were sampled in accordance with WEQP-77 (enclosed). A 20 mil liner was laid atop the excavation and filled with soils remediated to an average TPH and BTEX concentration of >10,000 ppm TPH and >10 ppm benzene concentration.

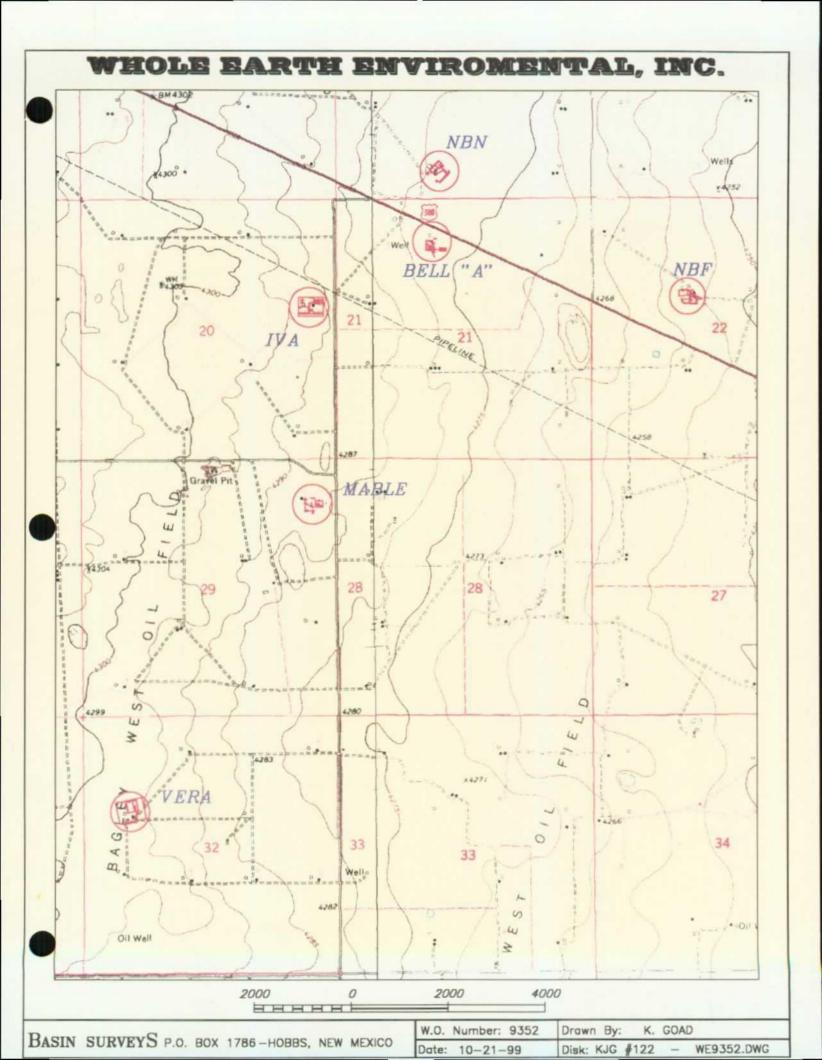
A monitor well was drilled at the southeast corner of the pit and initially sampled for RCRA 8 metals, volatile and semi-volatile compounds and BTEX. The pit was modeled by means of VADSAT and found to pose no calculated risk to the water table. Six subsequent quarterly BTEX samplings found no criteria contaminant concentration to be in excess of NMWQCC standards.

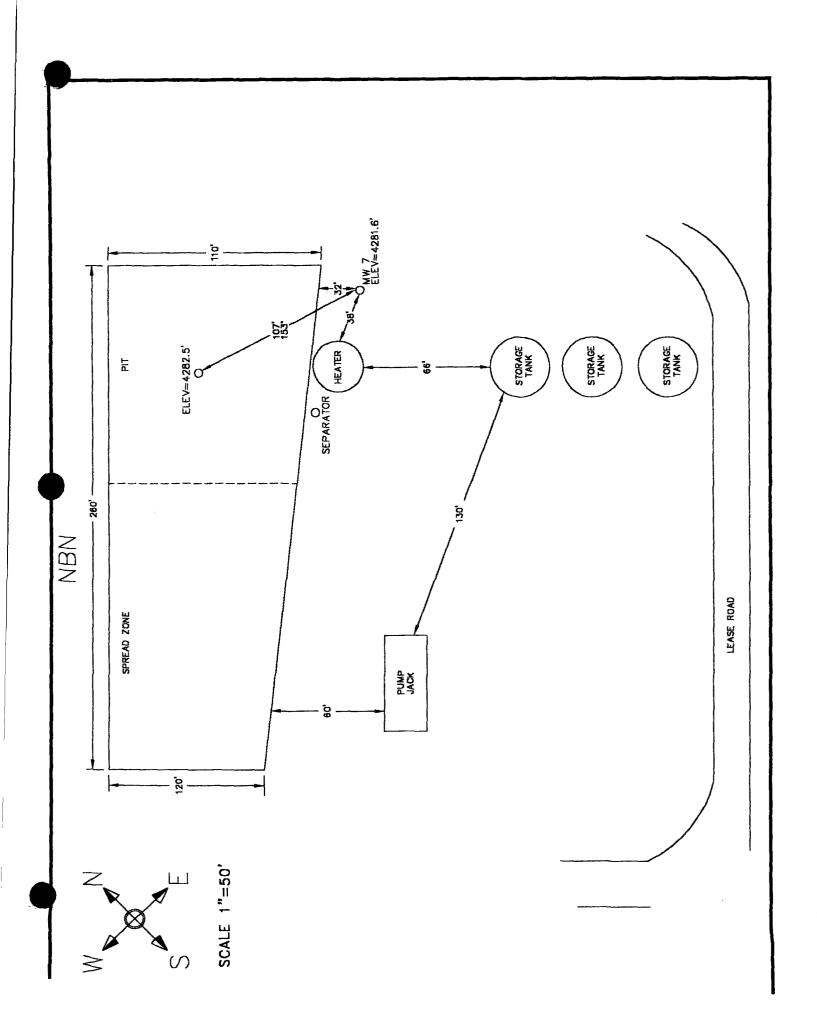
Page 2

Pit Remediation and Closure Report

Operator:	Telephone: <u>(303) 293-9379</u>
Address:633 Seventeenth St, Denver,	CO 80202
Facility or <u>State NBN # 1</u> Well Name	
Location: Unit or Qtr / Qtr Sec.: Sec <u>E</u>	TT TR CountyLea
Pit Type: Separator <u>X</u> Dehydrator	Other
Land Type: BLM <u>X</u> , State	, Fee Other
Pit Location: Pit Dimensions: length	<u>50'</u> width <u>60'</u> depth <u>15'</u>
Reference: wellhead	other <u>(See Attached Plat Map</u>
Footage from reference :	
Direction from reference:	Degrees East North
	West South
Depth to Ground Water:	Less than 50 feet (20 points) 50 feet to 99 feet (10 points) Greater than 100 feet (0 points)
Wellhead Protection Area:	Yes (20 points) No (0 points)
Wellhead Protection Area: Distance to Surface Water:	
	No (0 points) Less than 200 feet (20 Points) 200 feet to 1000 feet (10 points)

Date Remediation Started: 8-10-97 Date Completed: 8-20-97
Remediation Method: <u>Excavation</u> Approx. cubic yards <u>1,460</u>
Landfarmed X Insitu Bioremediation
Other
Remediation Location: Onsite X Offsite
General Description of Remedial Action: (See Attached)
Ground Water Encountered: No X Yes Depth
Final Pit Closure Sampling: Sample Location (See attached)
Sample Depth
Sample Date Sample Time
Sample Results
Benzene (ppm)
Total BTEX (ppm)
Field Headspace (ppm)
TPH
Ground Water Sample: Yes X No
I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE OR BELIEF
Date10/17/99 Printed Name
Signature Title







1

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Tipperary Corporation Tatum Pit Closure Project Monitor Well Water Elevation Table

C Drill Date E levalion C Bañas C Brãas C 1021/33 Aug. / Cot. 195 Aug. / Cot. 195 52.0 4.23650 43.83 4.24327 61.50 4.24035 2.92 52.0 4.23650 48.83 4.24327 61.50 4.24035 2.92 52.0 4.23650 48.83 4.24327 61.0 4.24035 2.92 52.0 4.23650 61.50 4.23634 51.75 4.23671 3.17 52.0 4.2365 48.83 4.2365 61.0 4.23671 3.17 61.0 4.2365 43.50 4.2365 4.361 2.337 3.76 61.0 4.2326 43.50 4.2365 4.360 4.237 3.76 2.337 61.0 4.2326 4.360 4.2366 3.76 4.2367 0.00 61.0 4.2367 4.360 4.237 4.360 4.237 4.360 4.237 61.0 4.23616 0.30 4.366 4.2366 0.00<	Well	Monitor	Surface	Date Well	Water Depth	Water	Water Depth	Water Elev.	Water Depth	Water Elev.	Depth Change	Distance to	Gradient	Gradlent
Theorem Table <	Name	Well No.	Elevation	Drilled	C Drill Date	Elevation	68/8/8	6 8/8/8 D	@ 10/21/99	@ 10/21/99	Aug. / Oct. '99	Pit Center (ft)	(Ft. / Pt.)	(Ft. /100 Ft.)
1 4.281:3 Auger 546 4.232.3 64.17 4.247.7 51.7 4.246.3 2.29 11.0 0.068004 7 7 4.271.5 Auger 50.0 4.238.5 45.17 4.277.5 10.0 0.06800 7 7 4.277.5 Auger 52.0 4.238.5 45.17 4.237.4 10.0 0.06800 7 4.277.6 4.278.5 4.78.6 4.36.7 3.17 116 0.017333 7 4.230.0 61.0 4.278.6 4.36 4.238.6 4.36 4.238.6 4.36 4.238.6 4.36 4.238.6 4.30 1.36 0.017333 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044723 10 0.044773 10 0.044723	Iva	Recovery Well	4,298.42		52.0	4,246.42								
2 2 4.201 50.0 4.2435 64.1 4.2475 51.60 4.24043 2.33 14.6 0.03500 3 3 4.375 4.4971 50.0 4.2335 64.17 4.2347 14.6 0.03500 7 4.375 4.4971 50.0 4.2336 64.37 4.2347 7.35 14.6 0.03500 Precimit 4.3750 4.4971 50.0 4.2350 6.33 4.237.16 7.35 7.14 0.03500 Precimit 4.3800 4.999 50.0 4.2364 4.301 4.237.16 0.01311 119 0.01311 11 4.2060 6.991 4.30 4.2364 4.301 4.2364 4.301 4.2364 4.301 <		-	4,292.10		54.9	4,237.20	48.83		51.75					8.02
Recordy wile 4.305.3 Auge? 22.0 4.333.5 4.307.5 Auge? 22.0 4.333.6 4.33 4.35.71 3.17 160 0.13313 1 4.207.51 Auge? 22.0 4.233.66 4.35 4.35.71 3.17 160 0.13133 PLC 4.231.30 Auge? 150 4.236.60 61.0 4.236.71 3.17 160 0.13133 PLC 4.231.00 Auge? 16 4.236.60 61.0 4.236.71 3.17 160 0.01313 PLC 4.231.00 Auge? 16 4.236.60 61.0 4.236.60 61.0 4.236.60 61.0 61.001 61.00 61.001 61.00 61.001 61.001 61.001 61.001 <th></th> <th>2</th> <th>4,291.93</th> <th></th> <th></th> <th>4,238.93</th> <th>49.17</th> <th>4,242.76</th> <th>51.50</th> <th></th> <th>2.33</th> <th></th> <th></th> <th>5.35</th>		2	4,291.93			4,238.93	49.17	4,242.76	51.50		2.33			5.35
3 4.37/2 A.47/2 C.429/1 S2.00 4.233.42 4.49/2 S2.00 4.233.41 S1.75 4.735.71 3.75 1.46 0.022600 PLCumin 4.237.50 Auge7 S2.0 4.233.61 Auge7 S2.0 4.237.61 Auge7	Mable	Recovery Well	4,290.55	Aug-97.		4,238.55								
Precurer 4/20/46 Mag/27 5/20 4/20/26 6/20 4/20/26 6/20/20 6/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 4/20/20 6/10 6/		3	4,287.22	Aug-97		4,235.22	48.75		52.50		3.75			2.25
Pf Canter 1 232.36 2 239.36 5 249.60 5 10 2 23.94 5 10 5		4	4,287.46	Aug-97	52.0	4,235.46	48.58	4,238.88	51.75		3.17		0.019313	1.93
Presentation 4,236.00 Auge? 61.0 4,237.40 61.00 4,237.40 61.00 4,237.30 61.0	Vera	Pit Center	4,292.98			4,289.50								
Prediate 4.238.10 Mark 4.278.00 4.238.11 0.01 4.238.11 0.01 4.238.11 0.01 4.238.11 0.01 4.23 0.01 4.24 0.01		5	4,298.90	Aug-97	63.0	4,235.90	61.50	4,237.40				159	-0.037233	-3.72
1 4,261:1 Auge? 91.0 4,230.12 4,21 2,30.12 6,10 6,10.13 1 4,280.00 Coe87 4,12 4,23.01 4,23.01 6,10 6,10.01 6,10 6,10.01 1 4,280.00 Coe87 4,3 4,22.06 4,30.0 4,23.00 6,0.01 6,10 0,0001 6,10 0,0001 7 4,280.00 Coe87 4,3 4,23.06 4,30.0 4,30.0 6,001 6,10 0,0001 6,10 0,0001 6,10 0,0001 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 6,10 0,0010 0,0010 0,0010 0,010 0,010 <th< th=""><th>Bell</th><th>Pit Center</th><th>4,283.09</th><th></th><th></th><th>4,279.60</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>	Bell	Pit Center	4,283.09			4,279.60								
13 4,200,0 0<+37		9	4,281.12	Aug-97	51.0	4,230.12	42.13	4,238.99	43.01	4,238.11	0.88			2.12
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8 1,29641 Auge7 48.0 4,21161 35.75 4,223.66 0.00 166 0.046152 16 4,29640 Cere)7 4/1 4,21169 36.05 4,223.66 36.10 4,223.66 0.10 241 0.001579 17 4,21960 Oce97 4/1 4,21169 36.00 4,223.61 36.10 4,223.66 0.10 241 0.001579 17 4,233.51 Oce97 4/1 4,233.51 44.60 4,236.51 36.10 4,236.51 0.40 110 0.01673 17 4,233.51 Oce97 4/2 4/2 4/2 4/2 37.61 2.36.60 4.236.51 36.10 4.236.51 36.10 4.236.51 36.10 0.105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 27.1 0.0105 <	NBF	Pit Center	4,266.86			4,266.86								
		8	4,259.41	Aug-97	48.0	4,211.41	35.75	4,223.66	35.75	4,223.66	00.0		0.045152	4.52
16 4,256.06 Oct97 4/1 4,211.96 36.00 4,223.69 36.10 4,223.69 0.10 247 0.03575 PII Center 4,236.45 4,30 4,204.03 34.76 4,233.63 4,450 4,233.64 0.10 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.016 247 0.0166558 0.0106558 0.01066558 0.0106558		15	4,259.68	Oct-97	47.0	4,212.68	34.75	4,224.93	37.00	4,222.68	2.25			3.63
26 4,266,4 Mar-89 4,30 4,215,45 3,475 4,223,31 0,16 387 0,022751 10 4,283,33 Mg-97 50.0 4,283,43 44.50 4,239,13 0,40 110 0,165273 17 4,283,31 0,583 4,450 4,239,31 44.50 4,239,43 0,40 110 0,16573 17 4,283,31 0,583 4,450 4,239,41 4,10 4,239,43 0,40 116 0,16573 28 4,283,51 Mar-99 45,3 4,234,69 45,3 4,234,69 45,3 4,236,62 55,1 0,400 116 0,16573 28 4,284,51 4,19 4,230,45 36,60 4,247,30 0,40 116 0,06528 30 4,284,51 4,87 4,234,63 38,50 4,247,30 0,127 126,10 0,06528 11 4,286,51 56,91 4,217,30 0,25 265 116,1 0,05536 11		16	4,259.06	Oct-97	47.1	4,211.96	36.00	4,223.06	36.10	4,222.96	0.10		0.031579	3.16
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	Sohlo # 1	Pit Center	4,285.42			4,285.42								
		10	4,283.63	Aug-97	50.0	4,233.63	44.50	4,239.13	44.90	4,238.73	0.40	110		1.63
18 4.283.59 Octe37 4.86 4.324.59 4.375 4.328.54 4.310 4.328.46 0.35 176 0.00308 28 4.281.31 Mag-99 45.3 4.236.592 45.31 4.236.592 45.31 4.236.506 9.15 17 60.00404 30 4.286.51 Mag-99 45.3 4.236.53 45.31 4.236.53 44.10 4.373 0.15 17.6 0.00548 11 4.286.54 Aug 4.256.51 4.247.53 36.6 4.247.36 0.55 116 0.00548 20 4.286.56 Aug 4.266.63 38.25 4.247.56 38.20 4.247.36 157 164 0.05528 20 4.286.51 Aug 4.246.09 37.45 38.20 4.247.41 1.37 264 0.05528 20 4.286.51 Mar-99 4.00 4.266.03 37.46 1.37 264 0.05528 161 0.05528 20 4.2856.1 Mar-99 <th></th> <th>17</th> <th>4,283.31</th> <th>Oct-97</th> <th>49.4</th> <th>4,233.91</th> <th>44.00</th> <th>4,239.31</th> <th>44.50</th> <th>4,238.81</th> <th>0.50</th> <th></th> <th>0.008053</th> <th>0.81</th>		17	4,283.31	Oct-97	49.4	4,233.91	44.00	4,239.31	44.50	4,238.81	0.50		0.008053	0.81
28 4,283,21 Mar-99 46.3 4,236,56 35.00 4,246,52 44.15 4,230,06 9.15 55.2 0.004004 30 4,281,13 Aug-97 30.0 4,236,82 45.31 4,236,82 45.31 4,236,82 45.31 4,236,82 45.31 4,236,82 45.31 7.76 0.065738 716 1 4,285,81 38.25 4,247,53 35.15 4,247,38 0.25 115 0.005328 19 4,285,91 58-97 48.7 4,237,37 33.50 4,247,38 0.25 115 0.005328 20 4,285,91 58-97 48.7 4,247,56 38.50 4,247,31 1,37 26 0.005328 20 4,285,51 38.00 4,248,79 38.60 4,247,41 1,45 56.4 0.005528 20 4,307.00 58-97 48.0 4,248,79 38.90 4,247,41 1,45 56.4 0.005528 21 4,307.00 58-97 <t< th=""><th></th><th>18</th><th>4,283.59</th><th>Oct-97</th><th>48.6</th><th>4,234.99</th><th>43.75</th><th>4,239.84</th><th>44.10</th><th>4,239.49</th><th>0.35</th><th></th><th>0.010398</th><th>1.04</th></t<>		18	4,283.59	Oct-97	48.6	4,234.99	43.75	4,239.84	44.10	4,239.49	0.35		0.010398	1.04
		28	4,283.21	Mar-99	46.3	4,236.96	35.00	4,248.21	44.15	4,239.06	9.15			0.40
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		24	4,208.64	Oct-97	28.9	4,179.74	26.08	4,182.56	26.45	4,182.19	0.37	150	0.019000	1.90

Note: Vera, Bell and Sabilite 4 had significant subsidance within the pit area. The red elevations include an added 3.49' (Ave. of seven other sites) Correct elevations noted in column 6. ----

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3-18-99

COORDINATE FILE : TIPARARY.CRD

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JIST COORDINATES

SOHIO A STATE 1 MW11 254 869981.125 760134.902 4 SOHIO A STATE 1 MW19 255 869974.033 760205.397 4 SOHIO A STATE 1 MW28 256 869892.771 760255.240 4 SOHIO A STATE 1 MW31 257 869667.200 760452.460 4 SOHIO STATE 1 PIT 258 870105.632 761381.498 4	ELEV 4286.84 4285.88 4285.97 4285.61 4285.42 4283.63 4283.31 4283.59 4283.21 4283.21 4283.21 4281.13 4289.49
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SOHIO STATE 1 MW3C 263 869677.360 761728.469 4	
	4298.90
STATE NBF 1 PIT 266- 856893.939 764024.682 4	4266.86
STATE NBF 1 MW8 267 856806.388 764165.403 4	4259.41
STATE NBF 1 MW15 268 856747.667 764157.788 4	4259.68
STATE NBF 1 MW16 269 856774.041 764241.604 4	4259.06
STATE NBF 1 MW26 270 856658.728 764331.675 4	4258.04
BELL A 1 PII 271 857796.692 758625.535 4	4279.64
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HORIZONTAL DATUM NAD 83 VERTICAL DATUM NAVD 88



Photographs

This section contains the following photographs:

1. The site prior to excavation

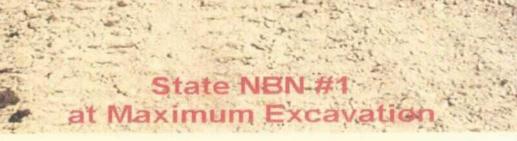
2. The pit at the point of maximum excavation

3. Detail of the liner installation

4. The site after final contouring and closure















Protocol

This section contains the approved remediation protocol used at this site.



Pit Remediation Protocol Pits Requiring Modeling

1.0 Purpose

This protocol is to provide a detailed outline of the steps to be employed in the remediation and final closure for pits requiring risk assessment modeling.

2.0 Scope

This protocol is not site specific.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

- 3.1.1 Whole Earth shall meet with cognizant personnel within Client to review this protocol and make any requested modifications or alterations prior to submittal to the State of New Mexico Oil Conservation Division.
- 3.1.2 Changes to this protocol will be documented and submitted for final review by Client prior to submittal to the Oil Conservation Division.

3.2 Oil Conservation Division Review

3.2.1 Upon client approval, this protocol and associated modeling results will be submitted to the New Mexico Oil Conservation Division for review and comment. Recommended changes will be reviewed by the client prior to implementation.

3.2.2 Any recommended changes effecting costs will require a revised quotation to be issued to the client for approval prior to the commencement of any on-site remediation activity.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Client personnel, sub-contractors and exchange phone numbers.

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4.2 A tailgate safety meeting shall be held and documented each day. All subcontractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel-toed boots, and long pants. Each vehicle must be equipped with two-way communication capabilities.

4.4 Prior to any excavation, the area shall be surveyed with a line finder. If lines are discovered within the area to be excavated, they shall be marked with pin flags on either side of the line at maximum five-foot intervals.

5.0 Fluid Removal

Prior to any excavation, the pit fluids shall be removed by vacuum truck and transported to a licensed disposal facility. A shipping manifest and O.C.D. Form C-117-A shall be prepared for each load and included within the final closure report.

6.0 Excavation & Remediation

- 6.1 The site shall be excavated to a minimum depth of 10'. All excavated materials will be deposited immediately adjacent to the pit site.
- 6.2 The bottom of the pit and all four side walls will be tested for TPH and BTEX concentrations using WEQP-06 and WEQP-19. Excavation will continue until such concentrations are <10,000 ppm TPH, <10 ppm benzene and <50 ppm total BTEX.
- 6.3 Upon reaching the required depth and side wall dimensions, the bottom of the pit will be made as smooth as possible with excavation equipment. Sand will be deposited in the bottom of the pit in a minimum thickness of 6".
- 6.4 A polyethylene liner of a minimum thickness of 20 mils will be spread atop the sand to the pit edge and an additional 6" of sand deposited above it.

- 6.5 The excavated materials will be mixed and blended with additional topsoils obtained from the area immediately adjacent to the pit until the hydrocarbon concentrations fall below the maximum limits as described in Paragraph 6.2 of this protocol. The remediated materials will then be replaced into the excavated area, compacted and the surface contoured to provide for positive drainage.
- 6.6 The top two feet of the excavation shall be covered in remediated materials having a maximum TPH concentration of <100 ppm and benzene concentrations of <2 ppm.

7.0 Documentation & Reporting

- 7.1 At the conclusion of the pit remediation project, Whole Earth will prepare a closure report to include the following information:
 - A plat map of the location showing the exact location of the pit, the dimensions prior to excavation and the actual excavated dimensions.
 - Photographs of the pit prior to excavation, at the point of maximum excavation and after final closure
 - Field Sampling Report to include the side wall and pit bottom TPH and BTEX concentrations after excavation.
 - Field Sampling Report to include TPH and BTEX concentrations of all remediated materials deposited into the pit.
 - Daily calibration records of each testing instrument
 - Shipping manifests and OCD Form C-117-A
 - Risk assessment model and supporting documentation
 - M.S.D.S. and permeability certification of liner materials



Procedures

This section contains copies of the detailed sample collection, testing, instrument calibration and bailing procedures employed on this project.

QP-06 Rev. C

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Conducting Field TPH Analysis

Completed By:	Approved By:	Effective Date:	02/15/97

1.0 Purpose

To define the procedure to be used in conducting total percentage hydrocarbon testing in accordance with EPA Method 418.1 (modified) using the "MEGA" TPH Analyzer.

2.0 Scope

This procedure is to be used for field testing and on site remediation information.

3.0 Procedure

- 3.1 The G.A.C. "MEGA" TPH analyzer is an instrument that measures concentrations of aliphatic hydrocarbons by means of infra-red spectrometry. It is manufactured to our specifications and can accurately measure concentrations from two parts per million through 100,000 parts per million. The unit is factory calibrated however minor calibration adjustments may be made in the field. Quality Procedure 25 defines the field calibration methods to be employed.
- 3.2 Prior to taking the machine into the field, insert a 500 ppm and 5,000 ppm calibration standard into the sample port of the machine. Zero out the Range dial until the instrument records the exact standard reading.
- 3.3 Once in the field, insert a large and small cuvette filled with clean Freon 113 into the sample port of the machine. Use the range dial to zero in the reading. If the machine does not zero, do not attempt to adjust the span dial. Immediately implement Quality Procedure 25.

- 3.4 Place a 100 g. weight standard on the field scale to insure accuracy. Zero out the scale as necessary.
- 3.5 Tare a clean 100 ml. sample vial with the Teflon cap removed. Add 10 g. (+/- .01 g), of sample soil into the vial taking care to remove rocks or vegetable matter from the sample to be tested. If the sample is wet, add up to 5 g. silica gel or anhydrous sodium sulfate to the sample after weighing.
- 3.6 Dispense 10 ml. Freon 113 into the sample vial.
- 3.7 Cap the vial and shake for five minutes.
- 3.8 Carefully decant the liquid contents of the vial into a filter/desiccant cartridge and affix the cartridge cap. Recap the sample vial and set aside.
- 3.9 Insert the metal tip of the pressure syringe into the cap opening and slowly pressurize. WARNING: APPLY ONLY ENOUGH PRESSURE ON THE SYRINGE TO EFFECT FLOW THROUGH THE FILTERS. TOO MUCH PRESSURE MAY CAUSE THE CAP TO SEPARATE FROM THE BODY OF THE CARTRIDGE. Once flow is established through the cartridge direct the flow into the 5 cm. cuvette until the cuvette is full. Reverse the pressure on the syringe and remove the syringe tip from the cartridge cap. Set the cartridge aside in vertical position.
- 3.10 The cuvette has two clear and two frosted sides. Hold the cuvette by the frosted sides and carefully insert into the sample port of the machine. Read the right hand digital read-out of the instrument. If the reading is less than 1,000 ppm. the results shall be recorded in the field Soil Analysis Report. If the result is higher than 1,000 ppm, continue with the dilution procedure.

4.0 Dilution Procedure

4.1 When initial readings are greater than 1,000 ppm using the 5 cm. cuvette, pour the contents of the 5 cm. cuvette into a 1 cm. cuvette. Insert the 1. cm cuvette into the metal holder and insert into the test port of the instrument.

- 4.1 Read the left hand digital read-out of the machine. If the results are less than 10,000 ppm, record the results into the field Soil Analysis Report. If greater than 10,000 ppm, continue the dilution process. Concentrations >10,000 ppm are to be used for field screen purposes only.
- 4.2 Pour the contents of the small cuvette into a graduated glass pipette. Add 10 ml. pure Freon 113 into the pipette. Shake the contents and pour into the 1cm. cuvette. Repeat step 4.2. adding two zeros to the end of the displayed number. If the reported result is greater than 100,000 ppm. the accuracy of further readings through additional dilutions is extremely questionable. Do not use for reporting purposes.
- 4.4 Pour all sample Freon into the recycling container.

5.0 Split Samples

5.1 Each tenth test sample shall be a split sample. Decant approximately one half of the extraction solvent through a filter cartridge and insert into the instrument to obtain a concentration reading. Clean and rinse the cuvette and decant the remainder of the fluid to obtain a second concentration reading from the same sample. If the second reading varies by more than 1% from the original, it will be necessary to completely recalibrate the instrument.



QP-25

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Instrument Calibration and Quality Assurance Analysis for General Analysis "MEGA" TPH Analyzer

Completed By:	Approved By:	Effective Date:	1	/

1.0 Purpose

This procedure outlines the methods to be employed in calibrating the GAC MEGA TPH analyzer and for determining and reporting of accuracy curves.

2.0 Scope

This procedure shall be followed each day that the instrument is used.

3.0 Procedure

3.1 Turn the instrument on and allow to warm up with no cuvette in the receptacle. The instrument will take between five and ten minutes to come to equilibrium as can be determined by the concentration display readings moving a maximum of 5 ppm on the low scale. If the instrument continues to display erratic readings greater than 5 ppm, remove the cover and check both the mirrors and chopper to insure cleanliness.

3.2 All TPH standards shall be purchased form Environmental Resources Corporation and as a condition of their manufacture subject to independent certification by third party laboratories. Each standard is received with a calibration certificate.

3.3 Insert the low range (100 ppm) calibration standard into the receiving port and note the result on the right hand digital display. If the displayed reading is less than 98 ppm or greater than 102 ppm, remove the circuit board cover panel and zero out the instrument in accordance with QP-26. 3.4 Repeat the process with the mid range (500 ppm) calibration standard. If the displayed reading is less than 490 ppm or greater than 510 ppm zero out the span as described in QP-26.

3.5 Repeat the process again with the 1,000 and 5,000 ppm calibration standards.

3.6 Pour clean Freon 113 into a filter cartridge and extract into 10 ml cuvette. Insert the cuvette into the receiving port and zero out the instrument reading using the far right adjustment knob on the instrument. Repeat using the 1 ml cuvette and the left hand zero dial.

4.0 Determining & Reporting Instrument Accuracy

4.1 After making the fine adjustment with the zero dials reinsert each calibration standard into the instrument and note the concentration values. If <u>any concentration value exceeds 2% of the standard set point, repeat all</u> steps in section 3.0 of this Procedure. Note the actual concentration values displayed by the instrument after each calibration standard.

4.2 The four calibration standards shall be used in reporting span deviation as follows:

	Standards Range		
100 ppm	500 ррт	1,000 ppm	5,000 ррт
0-250 ppm	251-750 ppm	751-2,500 ppm	2,501-10,000 ppm

4.3 Divide the actual instrument reading value of each calibration sample by the concentration shown on the standard (e.g., 501 ppm instrument reading / 500 ppm standard = 1.002%). These readings shall be reported for each test performed.

5.0 Re-calibration

5.1 If any sample exceeds the concentration of 1,000 ppm on the 10 ml cuvette or 10,000 ppm on the 1 ml cuvette, the cuvette must be thoroughly rinsed with clean Freon and the instrument re-zeroed in accordance with 3.6 of this procedure.



QP-28

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Developing Cased Water Monitoring Wells

The second	Completed By:	Approved By:	Effective Date:	1	/
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1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe or a steel engineer's tape and water sensitive paste.

3.2 All measurements will be recorded within a field log notebook and subsequently reported within the driller's boring log report.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Alconox, a phosphate free laboratory detergent, and water to reduce the possibility of crosscontamination. The volume of water in each well casing will be calculated.

4.0 Purging

4.1 Wells will be purged by removing a minimum of three well casing volumes by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer.

4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with an Alconox-water mixture, pumping an Alconox-water mixture through the pump, and a final flush with fresh water.

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5.0 Water Disposal

5.1 All purge and decontamination water will be temporarily stored within a 60 gallon portable tank and then pumped into a permanent storage tank to be later disposed of in an appropriate manner.



Pit Remediation Protocol Pits Requiring Modeling

1.0 Purpose

This protocol is to provide a detailed outline of the steps to be employed in the remediation and final closure for pits requiring risk assessment modeling.

2.0 Scope

This protocol is not site specific.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

- 3.1.1 Whole Earth shall meet with cognizant personnel within Client to review this protocol and make any requested modifications or alterations prior to submittal to the State of New Mexico Oil Conservation Division.
- 3.1.2 Changes to this protocol will be documented and submitted for final review by Client prior to submittal to the Oil Conservation Division.

3.2 Oil Conservation Division Review

3.2.1 Upon client approval, this protocol and associated modeling results will be submitted to the New Mexico Oil Conservation Division for review and comment. Recommended changes will be reviewed by the client prior to implementation.

3.2.2 Any recommended changes effecting costs will require a revised quotation to be issued to the client for approval prior to the commencement of any on-site remediation activity.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Client personnel, sub-contractors and exchange phone numbers.

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Page 2

4.2 A tailgate safety meeting shall be held and documented each day. All subcontractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel-toed boots, and long pants. Each vehicle must be equipped with two-way communication capabilities.

4.4 Prior to any excavation, the area shall be surveyed with a line finder. If lines are discovered within the area to be excavated, they shall be marked with pin flags on either side of the line at maximum five-foot intervals.

5.0 Fluid Removal

Prior to any excavation, the pit fluids shall be removed by vacuum truck and transported to a licensed disposal facility. A shipping manifest and O.C.D. Form C-117-A shall be prepared for each load and included within the final closure report.

6.0 Excavation & Remediation

- 6.1 The site shall be excavated to a minimum depth of 10'. All excavated materials will be deposited immediately adjacent to the pit site.
- 6.2 The bottom of the pit and all four side walls will be tested for TPH and BTEX concentrations using WEQP-06 and WEQP-19. Excavation will continue until such concentrations are <10,000 ppm TPH, <10 ppm benzene and <50 ppm total BTEX.
- **6.3** Upon reaching the required depth and side wall dimensions, the bottom of the pit will be made as smooth as possible with excavation equipment. Sand will be deposited in the bottom of the pit in a minimum thickness of 6".
- 6.4 A polyethylene liner of a minimum thickness of 20 mils will be spread atop the sand to the pit edge and an additional 6" of sand deposited above it.



- 6.5 The excavated materials will be mixed and blended with additional topsoils obtained from the area immediately adjacent to the pit until the hydrocarbon concentrations fall below the maximum limits as described in Paragraph 6.2 of this protocol. The remediated materials will then be replaced into the excavated area, compacted and the surface contoured to provide for positive drainage.
- 6.6 The top two feet of the excavation shall be covered in remediated materials having a maximum TPH concentration of <100 ppm and benzene concentrations of <2 ppm.

7.0 Documentation & Reporting

- 7.1 At the conclusion of the pit remediation project, Whole Earth will prepare a closure report to include the following information:
 - A plat map of the location showing the exact location of the pit, the dimensions prior to excavation and the actual excavated dimensions.
 - Photographs of the pit prior to excavation, at the point of maximum excavation and after final closure.
 - Field Sampling Report to include the side wall and pit bottom TPH and BTEX concentrations after excavation.
 - Field Sampling Report to include TPH and BTEX concentrations of all remediated materials deposited into the pit.
 - Daily calibration records of each testing instrument
 - Shipping manifests and OCD Form C-117-A
 - Risk assessment model and supporting documentation
 - M.S.D.S. and permeability certification of liner materials



QP-76 (Rev. A)

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Obtaining Water Samples (Cased Wells) Using One Liter Bailer

	· · ·		
Completed By:	Approved By:	Effective Date:	/ /
1 5	•• •		

1.0 Purpose

This procedure outlines the methods to be employed in obtaining water samples from cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

- 3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the water. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.
- 3.2 The following table shall be used to select the appropriate sampling container, preservative method and holding times for the various elements and compounds to be analyzed.

Compound to be Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	40 ml.	VOA Container	Teflon Lined	HCI	7 days
ТРН	1 liter	clear glass	Teflon Lined	HCI	28 days
PAH	1 liter	clear glass	Teflon Lined	lce	7 days
Cation / Anion	1 liter	clear glass	Teflon Lined	None	48 Hrs.
Metals	1 liter	HD polyethylene	Any Plastic	Ice / HNO ₃	28 Days
TDS	300 ml.	clear glass	Any Plastic	lce	7 Days

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4.0 Chain of Custody

- 4.1 Prepare a Sample Plan. The plan will list the well identification and the individual tests to be performed at that location. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.
- 4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.
- 4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Bailing Procedure

- 5.1 Identify the well from the site schematics. Place pre-labeled jar(s) next to the well. Remove the bolts from the well cover and place the cover with the bolts nearby. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.
- 5.2 The well may be equipped with an individual 1 liter bailing tube. If so, use the tube to bail a volume of water from the well bore equal to 10 liters
- for each 5' of well bore in the water table. (This assumes a 2" dia. Well bore).

5.3 Take care to insure that the bailing device and string do not become crosscontaminated. A clean pair of rubber gloves should be used when handling either the retrieval string or bailer. The retrieval string should not be allowed to come into contact with the ground.

6.0 Sampling Procedure

- 6.1 Once the well has been bailed in accordance with 5.2 of this procedure, a sample may be decanted into the appropriate sample collection jar directly
- from the bailer. The collection jar should be filled to the brim. Once the jar is sealed, turn the jar over to detect any bubbles that may be present. Add additional water to remove all bubbles from the sample container.
- 6.2 Note the time of collection on the sample collection jar with a fine Sharpie.

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- 6.3 Place the sample directly on ice for transport to the laboratory. The preceding table shows the maximum hold times between collection and testing for the various analyses.
- 6.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

7.0 Documentation

- 7.1 The testing laboratory shall provide the following minimum information:
 - A. Client, Project and sample name.
 - B. Signed copy of the original Chain of Custody Form including data on the time the sample was received by the lab.
 - C. Results of the requested analyses
 - D. Test Methods employed
 - E. Quality Control methods and results

Page 3



QP-77

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Obtaining Soil Samples for Transportation to a Laboratory

Completed By:	Approved By:	Effective Date:	/ /

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

- 3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.
- 3.2 If collecting TPH, BTEX, RCRA 8 metals, cation / anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container with Teflon lid.

4.0 Chain of Custody

- 4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.
- 4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

QP-77

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Sampling Procedure

- 5.1 Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil. Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.
- 5.2 Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.
- 5.3 Place the sample directly on ice for transport to the laboratory.
- 5.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

- 6.1 The testing laboratory shall provide the following minimum information:
 - A. Client, Project and sample name.
 - B. Signed copy of the original Chain of Custody Form including data on the time the sample was received by the lab.
 - C. Results of the requested analyses
 - D. Test Methods employed
 - E. Quality Control methods and results



Laboratory Analytical Reports

This section contains the following laboratory analytical results and associated chains of custody:

1. Side wall and bottom hole TPH and BTEX results (ELT Nos. 12239-12243) sampled 8/20/97.

2. Composite composite analysis of final top cover material (ELT No. 12425) sampled 8/29/97.

3. Volatile and semi-volatile compound analysis of monitor well (ELT No. 9911) sampled 1/9/97.

4. Quarterly BTEX sampling results of monitor well (ELT Nos. 12482, 3174, 14063, 14662, 15994, 16601) sampled 9/5/97, 12/3/97, 3/23/97, 6/25/98, 10/1/98 and 1/6/99 respectively.

5. Analysis of RCRA 8 metals from the monitoring well (ELT No. 12482) sampled 9/6/97.

6. Spreadsheet summary of BTEX analyses conducted at Vera Monitoring Well # 5.

ENVIRONMENTAL LAB OF , INC.

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WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 1-281-646-8996

Receiving Date: 08/21/97 Sample Type: SOIL Project : TIPPERARY Project Location: NONE GIVEN Analysis Date: 08/21/97 Sampling Date: 08/20/97 Sample Condition: Intact/Iced

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ELT#		BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg	DRO (C10-C28) mg/kg
12239 12240 12241 12242 12243 12244 12245 12245 12246 12247 12248	NBN NORTH NBN SOUTH NBN EAST NBN WEST NBN BTM IVA BOTTOM (RE-TEST) NBF NORTH NBF SOUTH NBF SOUTH NBF EAST NBF WEST	<.100 <.100 <.100 <.100 <.100 <.100 <.100 <.100 <.100 <.100 <.100	<.100 <.100 0.571 <.100 0.149 <.100 0.125 0.107 <.100 0.103	<.100 <.100 0.409 <.100 0.14 <.100 <.100 0.201 <.100 <.100	0.168 <.100 2.547 0.144 0.303 <.100 0.377 0.694 <.100 0.327	<.100 <.100 0.85 <.100 0.151 <.100 0.245 0.898 <.100 0.254	<10 <10 1,222 21 1,965 1,577 1,063 8,389 <10 4,699
	% IA % EA BLANK	106 109 <0.001	97 102 <0.001	95 99 <0.001	93 97 <0.001	97 100 <0.001	94 98 <10

METHODS: SW 846-8020,5030,8015m DRO

Michael R. Fowler

18-28 Date

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WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 1-281-646-8996

Receiving Date: 09/01/97 Sample Type: SOIL Project : TIPPERARY Project Location: TATUM,N.M. Analysis Date: 09/02/97 Sampling Date: 08/29/97 Sample Condition: Intact/Iced

ELT#	FIELD CODE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg	DRO (C10-C28) mg/kg
12421	IVA FINAL	<.100	<.100	<.100	0.105	<.100	<10
12422	MABLE FINAL	<.100	0.165	0.129	0.255	<.100	11
12423	VERA FINAL	<.100	0.126	<.100	0.192	<.100	10
12424	BELL FINAL	<.100	<.100	<.100	<.100	<.100	24
12425	NBN FINAL	<.100	<.100	<.100	<.100	<.100	103
12426	NBF FINAL	<.100	<.100	<.100	<.100	<.100	<10
12427	SOHIO A FINAL	0.186	0.312	0.232	0.737	0.580	6,702
12428	SOHIO 1 FINAL	<.100	0.373	0.142	0.463	0.342	15,016
12429	G.S. FINAL	<.100	<.100	<.100	<.100	<.100	15
12430	SAT. 4 FINAL	*	*	*	*	*	*
12431	G.S. BOTTOM (RE TEST)	<.100	<.100	<.100	0.217	0.166	2,963
	% IA	98	95	96	95	99	107
	% EA	93	85	81	78	80	93
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001	<10

* NOTE SAMPLE CONTAINER WAS EMPTY.

METHODS: SW 846-8020,5030,8015m DRO

Michael R. Fowler

Date

	I Lab of Texas, Inc. 1260 Weet 20 Ener Odene, Tene 19763 PISSES 1713 CLAIR OF CLAIR PISSES 1713 CLAIR OF CLEADER RECORD AND AVALYSIS 2000EST	React AULYSIS REQUEST		8 84		Be Ci	S A C S CHURCH S CHURCH S C C C		Vebune No								CRe test)	Pue Pue Pue Received by Reversed by Reversed by Sut. 4 - Simple Centainer Empty 9:30 6:11 A.M.	9-1-87 0930 Relact LSA.	
	Environmental Lab of Texas,]		· .			rs1 .	ен	PEL CODE	-	Finel	 •	r (Pro	 ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	11	, , , , , , , , , , , , , , , , , , ,	Rotton CRE test)		1	Γ

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WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 800-854-4358

Receiving Date: 01/10/97 Sample Type: SOIL Project : TATUM PIT SAMPLING Project Location: WEST OF TATUM, NM Field Code: STATE NBN #1 FLT# 0011 Analysis Date: 01/19/97 Sampling Date: 01/08/97 Sample Condition: Intact/Iced

ELT# 9911	REPORTING	SAMPLE Concentration				
8270 COMPOUNDS	LIMIT	ppm	QC	RPD	%EA	96 IA
N-Nitrosodimethylamine	0.01	ND				
2-Picoline	0.01	ND				
Methyl methanesulfonate	0.01	ND				
Ethyl methanesulfonate	0.01	ND				
Phenol	0.01	ND	91	11	84	95
Aniline	0.05	ND				
bis(2-Chloroethyl)ether	0.05	ND				
2-Chlorophenol	0.05	ND		8	74	
1,3-Dichlorobenzene	0.01	ND				
1.4-Dichlorobenzene	0.01	ND	94	10	73	93
Benzyl alchohol	0.05	ND				
1.2-Dichlorobenzene	0.01	ND				
2-Methylphenoi	0.01	ND				
bis(2-Chloroisopropyl)ether	0.05	ND				
4-Methylphenol/3-Methylphenol	0.01	ND				
Acetophenone	0.05	ND				
n-Nitrosodi-n-propylamine	0.01	ND		5	79	
Hexachloroethane	0.01	ND				
Nitrobenzene	0.01	ND				
N-Nitrosopiperidine	0.05	ND				
Isophorone	0.05	ND				
2-Nitrophenol	0.05	ND	93			94
2,4-Dimethylphenol	0.05	ND				
bis(2-Chloroethoxy)methane	0.01	ND				
Benzoic acid	0.1	ND				
2.4-Dichlorophenol	0.05	ND	87			96
1,2,4-Trichlorobenzene	0.01	ND		9	79	
a,a Dimethylphenethylamine	0.1	ND				
Naphthalene	0.01	ND				
4-Chloroaniline	0.05	ND				
2.6-Dichlorophenol	0.05	ND				
Hexachlorobutadiene	0.01	ND	95			97
N-Nitroso-di-n-butylamine	0.05	ND				
4-Chloro-3-methylphenol	0.05	ND	97	12	81	93





C) T# 0011					Page 2 of 3	
ELT# 9911	Reporting	SAMPLE Concentration		r	······	
8270 COMPOUNDS	Limits	1	QC	RPD	%EA	%\/
2-Methylnaphthalene	0.01	ppm ND	<u> </u>		/OEA	761/
1,2,4,5-Tetrachlorobenzene	0.01	ND				
Hexachlorocyclopentadiene	0.01	ND				
2,4,6-Trichlorophenol	0.01	ND	86			94
2,4,5-Trichlorophenol	0.05	ND	00			94
2.4.5 memorophenor 2-Chioronaphthalene	0.05	ND				
1,-Chloronaphthalene	0.01	ND				
2-Nitroaniline	0.01	ND				
	0.05	ND				
Dimethylphthalate						
Acenaphthylene	0.01	ND				
2,6-Dinitrotoluene	0.01	ND				
3-Nitroaniline	0.05	ND	07	~	64	~~
Acenaphthene	0.01	ND	97	3	81	92
2,4-Dinitrophenol	0.05	ND				
Dibenzofuran	0.05	ND				
Pentachlorobenzene	0.01	ND		-		
4-Nitrophenol	0.05	ND		4	80	
1-Napthylamine	0.05	ND		-	_	
2,4-Dinitrotoluene	0.01	ND		6	79	
2-Napthylamine	0.05	ND				
2.3.4.6-Tetrachlorophenol	0.05	ND				
Fluorene	0.01	ND				
Diethylphthalate	0.01	ND				
4-Chlorophenyl-phenylether	0.01	ND				
4-Nitroaniline	0.05	ND				
4,6-Dinitro-2-methylphenol	0.01	ND				
n-Nitrosodipenlamine & Diphenylar		ND	93			90
Diphenylhydrazine	0.05	ND				
4-Bromophenyi-phenylether	0.01	ND				
Phenacetin	0.05	ND				
Hexachlorobenzene	0.01	ND				
4-Aminobiphenyl	0.05	ND				
Pentachlorophenol	0.05	ND	89	6	79	95
Pentachloronitrobenzene	0.05	ND				
Pronamide	0.01	ND				
Phenanthrene	0.01	ND				
Anthracene	0.01	ND				
Di-n-butylphthalate	0.01	ND				
Fluoranthene	0.01	ND	92			95
Benzidine	0.1	ND				
Pyrene	0.01	ND		6	88	
p-Dimethylaminoazobenzene	0.01	ND				
Butylbenzylphthalate	0.01	ND				
Benzo [a]anthracene	0.01	ND				
3,3-Dichlorobenzidine	0.01	ND				
Chrysene	0.01	ND				
bis (2-Ethylhexyl)phthalate	0.05	ND				

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ELT# 9911		SAMPLE				
	Reporting			T	T	
8270 COMPOUNDS	Limits	ppm	QC	RPD	%EA	% A
Di-n- octiphthalate	0.01	ND	89			92
Benzo[b]fluoranthene	0.01	ND				
7,12-Dimethylbenz(a)anthracene	0.01	ND				
Benzo[k]fluoranthene	0.01	ND				
Benzo [a] pyrene	0.01	ND	96			91
3-Methylcholanthrene	0.01	ND				
Dibenzo (a,j) acridine	0.01	ND				
Indeno [1,2,3-cd] pyrene	0.01	ND				
Dibenz [a,h] anthracene	0.01	ND				
Benzo [g.h.i] perylene	0.01	ND				

METHOD: EPA SW 846-8270, 3551 SURROGATES

%	RECOVERY	

2-Fluorophenol SURR	89
Phenol-d6 SURR	83
Nitrobenzene-d5 SURR	96
2-Fluorobiphenyl SURR	9 5
2,4,6-Tribromophenol SURR	84
Terphenyl-d14 SURR	97

DR. Jearle Mula

Michael R. Fowler

1-2797 Date

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ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 800-854-4358

Receiving Date: 01/10/97 Reporting Date: 01/23/97 Project Name: TATUM PIT SAMPLING Project Location: WEST OF TATUM, NM Field Code: STATE NBN #1 Analysis Date: 01/22/97 Sampling Date: 01/09/97 Sample Type: SOIL Sample Condition: C&I

Chloromethane ND 0.1 110 ND Vinyl chloride ND 0.1 101 ND Bromomethane ND 0.1 100 ND Chloroethane ND 0.1 100 ND Trichlorofluoromethane ND 0.1 102 ND Acetone ND 0.1 100 ND 1.1-Dichloroethane ND 0.1 95 ND 69 Iodomethane ND 1.0 92 ND 92 ND Vinyl Acetate ND 1.0 107 ND 69 Iodomethane ND 0.1 100 ND Carbon Disulfide ND 0.1 100 ND 10 100 ND 11-Dichloroethane ND 0.1 102 ND 2-Butanone ND 0.1 102 ND 2-Butanone ND 0.1 94 ND 0.1 1.1-Dichloroethane ND 0.1 96 ND	Volatiles EPA SW 846-8240. (ppm) Compounds	ELT# 9911	PQL	% IA	Method Blank	% EA
Vinyl chloride ND 0.1 101 ND Bromomethane ND 0.1 100 ND Chloroethane ND 0.1 102 ND Acetone ND 0.1 102 ND Acetone ND 0.1 100 ND 1.1-Dichloroethane ND 0.1 95 ND 69 Iodomethane ND 1.0 92 ND 69 Vinyl Acetate ND 1.0 107 ND Carbon Disulfide ND 0.1 100 ND Methylene Chloride ND 0.1 100 ND 2-Butanone ND 0.1 102 ND 2-Butanone ND 0.1 94 ND Carbon Tetrachloride ND 0.1 94 ND Carbon Tetrachloride ND 0.1 97 ND 1.2 Dichloroethane ND 0.1 97 ND <t< td=""><td>Chloromethane</td><td>ND</td><td>01</td><td>110</td><td>ND</td><td></td></t<>	Chloromethane	ND	01	110	ND	
Bromomethane ND 0.1 100 ND Chloroethane ND 0.1 105 ND Trichlorofluoromethane ND 0.1 102 ND Acetone ND 0.1 102 ND Acetone ND 0.1 95 ND 69 Iodomethane ND 1.0 92 ND 10 Vinyl Acetate ND 1.0 107 ND 69 Iodomethane ND 1.0 107 ND 107 ND Carbon Disulfide ND 0.1 100 ND 100 ND trans-1,2-Dichloroethane ND 0.1 98 ND 11 102 ND 2-Butanone ND 0.1 98 ND 10.1 108 ND Carbor Tetrachloride ND 0.1 91 ND 110 1.2 ND 110 1.2 110 12 110 12 ND						
Chloroethane ND 0.1 105 ND Trichlorofluoromethane ND 0.1 102 ND Acetone ND 0.1 100 ND 1.1-Dichloroethane ND 0.1 95 ND 69 Iodomethane ND 1.0 92 ND 69 Iodomethane ND 1.0 107 ND 69 Iodomethane ND 1.0 107 ND 69 Iodomethane ND 0.1 100 ND 69 Iodomethane ND 0.1 100 ND 69 Carbon Disulfide ND 0.1 100 ND 10 ND Carbon Cethane ND 0.1 98 ND 0.1 100 ND 2-Butanone ND 0.1 98 ND 0.1 110 1.1.1-Trichloroethane ND 0.1 94 ND 0.1 110 1.2 100	-					
Trichlorofluoromethane ND 0.1 102 ND Acetone ND 0.1 100 ND 1.1-Dichloroethane ND 0.1 95 ND 69 lodomethane ND 1.0 92 ND 69 lodomethane ND 1.0 92 ND 69 Vinyl Acetate ND 0.1 100 ND 69 Carbon Disulfide ND 0.1 100 ND 0 Methylene Chloride ND 0.1 100 ND 1 trans-1.2-Dichloroethane ND 0.1 98 ND 1 trans-1.2-Dichloroethane ND 0.1 108 ND 2 Z-Butanone ND 0.1 108 ND 110 110 2-Butanone ND 0.1 94 ND 110 12 110 12 110 12 110 12 110 12 110 12						
Acetone ND 0.1 100 ND 1.1-Dichloroethane ND 0.1 95 ND 69 Iodomethane ND 1.0 92 ND Vinyl Acetate ND 1.0 107 ND Carbon Disulfide ND 0.1 100 ND Methylene Chloride ND 0.1 100 ND trans-1,2-Dichloroethene ND 0.1 102 ND 1.1-Dichloroethane ND 0.1 102 ND 2-Butanone ND 0.1 108 ND 1.1-Trichloroethane ND 0.1 94 ND Carbon Tetrachloride ND 0.1 94 ND Benzene ND 0.1 97 ND Trichloroethane ND 0.1 97 ND 1.2 Dichloroethane ND 0.1 95 ND Dibromomethane ND 0.1 95 ND <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
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4-Methyl 2-PentanoneND1.0120NDcis 1,3 DichloropropeneND0.1105NDTolueneND0.196ND119trans 1,3-DichloropropeneND0.189ND1,1,2-TrichloroethaneND0.198NDDibromochloromethaneND0.1105NDTetrachloroetheneND0.1107ND	Bromochloromethane	ND	0.1	124	ND	
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1,1,2-TrichloroethaneND0.198NDDibromochloromethaneND0.1105NDTetrachloroetheneND0.1107ND	Toluene	ND	0.1	96	ND	119
DibromochloromethaneND0.1105NDTetrachloroetheneND0.1107ND	trans 1.3-Dichloropropene	ND	0.1	89	ND	
Tetrachloroethene ND 0.1 107 ND	1,1,2-Trichloroethane	ND	0.1	98	ND	
	Dibromochloromethane	ND	0.1	105	ND	
Chlorobenzene ND 0.1 98 ND 107	Tetrachloroethene	ND	0.1	107	ND	
	Chlorobenzene	ND	0.1	98	ND	107

WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 800-854-4358

Receiving Date: 01/10/97 Reporting Date: 01/23/97 Project Name: TATUM PIT SAMPLING Project Location: WEST OF TATUM, NM Field Code: STATE NBN #1 Analysis Date: 01/22/97 Sampling Date: 01/09/97 Sample Type: SOIL Sample Condition: C&I

Volatiles EPA SW 846-8240, (ppm) Compounds	ELT# 9911	PQL	% iA	Method Blank	% EA
Ethylbenze ne	ND	0.1	89	ND	
m&p Xylene	ND	0.1	87	ND	
o-Xylene	ND	0.1	90	ND	
Styrene	ND	0.1	95	ND	
Bromoform	ND	0.1	113	ND	
1,1,2,2-Tetrachloroethane	ND	0.1	87	ND	
1,2,3-Trichloropropane	ND	0.1	108	ND	

SYSTEM MONITORING COMPOUNDS

Dibromofluoromethane Toluene-d8 4-Bromofluorobenzene 98 115

% RECOVERY

85

ND=<PQL

chael R. Fowler

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Environmen	Environmental Lab of Texas, I	las, I	DC. 1	DC. 12600 Werl-20 East Odesca, Texas 79763 (915) 563-1800 FAX (915) 563-1713	1 West 1-20 East (915) 563-1800	r Odes FAX	ы, Тех (915) 5	Odessa, Texas 79763 FAX (915) 563-1713		CHAIN-OF-L- T-DDY RECORD AND ANALYSIS REQUEST	Kac	ଧ୍ୟୁ	NY CX	DANU	I SISA	reque	ג
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WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 281-646-8996

Receiving Date: 09/08/97 Sample Type: WATER Project Location: TATUM, NM Project Name: TIPPERARY Analysis Date: 10/01/97 Sampling Date: 09/06/97 Sample Condition: Intact/Cool

Field Code: NBN #7

EPA SW846 8270 (mg/L)	REPORT LIMIT	ELT# 12482	% D	%IA
				AF
Naphthalene	0.02	ND	5	95
Acenaphthylene	0.02	ND	4	96
Acenaphthene	0.02	ND	5	.95
Fluorene	0.02	ND	6	93
Phenanthrene	0.02	ND	6	94
Anthracene	0.02	ND	4	95
Fluoranthene	0.02	ND	14	86
Pyrene	0.02	ND	0	100
Benzo[a]anthracene	0.02	ND	2	98
Chrysene	0.02	ND	1	100
Benzo[b]fluoranthene	0.02	ND	2	98
Benzo[k]fluoranthene	0.02	ND	19	119
Benzo [a]pyrene	0.02	ND	2	98
Indeno[1,2,3-cd]pyrene	0.02	ND	3	102
Dibenz[a,h]anthracene	0.02	ND	6	106
Benzo(g,h,i]perylene	0.02	ND	4	104
		% RECOVERY		

63 54

80

Nitrobenzene-dr SURR 2-Fluorobiphenyl SURR Terphenyl-d14 SURR

ND= NOT DETECTED

Method: EPA SW 846 8270, 3550

Michael R. Fowler

10-1497

Date

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ENVIRONMENTAL LAB OF , INC.

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TIPPERARY ATTN: MR. VICTOR A. VICE P.O. BOX 857 TATUM. NM 88267 FAX: 800-854-4358

Receiving Date: 12/03/97 Sample Type: WATERS Project : TATUM, NM Project Location: TATUM, NM

Analysis Date: 12/03/97 Sampling Date: 12/03/97 Sample Condition: IntacViced

<u>ELT#</u>	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/i)	ETHYLBENZENE (mg/l)	m,p-XYLENE	o-XYLENE (mg/i)
				_		
13174	NBN MW-7	0.017	0.002	<0.001	0.001	0.002
13175	NBF MW-8	0.051	0.007	0.012	0.047	0.009
13176	NBF MW-16	0.234	0.003	0.004	0.012	0.003
13177	MABLE COM. MW-3	1.093	0.024	0.097	0.153	0.020
13178	MABLE COM. MW-4	1.465	0.007	0.017	0.010	0.002
13179	BELL A MW-G	0.029	0.004	0.002	0.030	0,003
13180	BELLA MW-13	0.002	0.001	<0.001	0.005	0.001
13181	BELL A MW-14	1.147	0.007	0.017	0.010	0.002
13182	IVA COM, MW-1	0.004	0.003	0.001	0.009	0.008
13183	IVA COM. MW-2	0.002	0.002	0.001	0.006	0.002
	07.14					
	% IA	83	93	83	92	95
	% EA	101	101	103	102	104
	BLANK	<0.001	<0,001	<0.001	<0.001	<0,001

METHODS: SW 846-8020,5030

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Michael R. Fowler

12-5-47 Date

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CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST	AVALYSIS REQUEST				0 10 10	68 V By / 69 1 C(15/	BTEX 81121 TCLP Volalia TCLP VOLA TCLP VOLA TCLP VOLA TCLP VOLA TCLP VOLALIA TCLP VOLA TCLP VOLA										REMARKS	hours	rolong	2)
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"Don't Treat Your Soil Like Dirt!"

TIPPERARY ATTN: MR. VICTOR A. VICE P.O. BOX 857 TATUM, NM 88267 FAX: 281-646-8996

Receiving Date: 03/24/98 Sample Type: WATER Project : TATUM, NM Project Location: TATUM, NM Analysis Date: 3/24/98 Sampling Date: 3/23/98 Sample Condition: Intact/Iced P.11

ELT#	FIELD CODE	BENZENE	TOLUENE (mg/i)	ETHYLBENZENE (mg/l)	m.p-XYLENE (mo/)	o-XYLENE (mg/l)
14045	Satelite #4 MW #23	0.071	0.004	0.012	0.017	0.002
14046	Satelite #4 MW #24	0.001	<0.001	<0.001	0.003	0.001
14047	Bell "A" MW #13	0.011	0.007	0.004	0.011	0.004
14048	Bell "A" MW #14	0.904	0.002	0.004	0.006	0.002
14049	NBF MW #15	1.470	1.230	0.364	1.058	0.466
14050	NBF MW #16	1.029	0.086	0.084	0.173	0.047
14051	Sohio State #1 MW #17	1.101	0.108	0.130	0.376	0.148
14052	Sohio State #1 MW #18	1.396	0.269	0.159	0.823	0.366
14053	Sohio State A MW #19	0.042	0.017	0.010	0.034	0.017
14054	Sohio State A MW #20	0.539	0.016	0.014	0.075	0.014
14055	G.S. State #1 MW #21	0.233	0.019	0.067	0.221	0.014
14056	G.S. State #1 MW #22	0.050	0.017	0.016	0.086	0.026
14057	Iva Com MW #1	0.003	0.003	0.001	0.007	0.008
14058	Iva Com MW #2	0.002	0.001	<0.001	0.005	0.002
14059	Mable Com MW #3	0.006	0.006	0.007	0.029	0.006
14060	Mable Com MW #4	0.019	0.004	0.002	0.019	0.003
14061	Vera MW #5	0.003	0.001	<0.001	0.004	0.002
14062	Bell "A" MW #6	0.236	0.002	0.019	0.016	0.008
14063	NBN MW #7	0.009	0.001	0,001	0.004	0.002
14064	NBN MW #8	0.046	0.036	0.013	0.038	0.011
	% IA	98	92	90	90	92
	% EA	110	104	101	103	103
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Michael R owiei

Date

12600 West 520 East • Odessa, Texas 79765 • (915) 563-1800 • Fax (915) 563-1713

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ENVIRONMENTAL LAB OF , Inc.

"Don't Treat Your Soil Like Dirti"

TIPPERARY ATTN: MR. VICTOR A. VICE P.O. BOX 857 TATUM, NM 86267 FAX: 1-281-646-8996

Receiving Date: 06/26/98 Sample Type: WATER Project: TATUM. NM Project Location: TATUM, NM Analysis Date: 06/26/98 Sampling Date: 06/25/98 Sample Condition: Intact/load

ELT#	FIELD CODE	BENZENE (mg/i)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m.p-XVLENE (mg/l)	c-XYLENE
14657	IVA COM M/W #1	0,006	0.005	0.002	0.008	0.009 -
	MABLE COM MW #3	0.009	0.003	0.002	0.033	0.009
14658 14659	MABLE COM M/W #3	0.020	0.006	0.003	0.015	0.005
14660	VERA MW #5	0.020	0.006	0.005	0.013	0.008
	-	0.203	0.00B	0.015	0.017	0.006
14661	BELLAMW #6	0.009	0.008	0.007	0.016	0.009 /
14662	NBN M/W #7	0.034	0.007	0.007	0.011	0.003
14663	NBF M/W #B		0.003	0.010	0.011	0.002 /
14664	SATELITE #4 M/W #9	0.055		-	0.611	0.180
14665	Sohio State #1 M/W #10	1.313	0.113	0.206		0.014 /
14666	SOHIO STATE A M/W #11	0.093	0.009	0.005	0.020	
14667	BELLA M/W #13	0.016	0.014	0.005	0.015	0.006
14668	BELL A M/W #14	0.735	0.009	0.005	0.011	0,004
14669	NBF M/W #15	1.415 <	1.165	0.270	0.927	0.412
14670	NBF M/W #18	1.05 <b>8</b> ×	0,113	0.070	0.145	0.060
14671	SOHIO STATE #1 M/W #17	1.111	0.138	0.118	0.379	0.174
14672	SOHIO STATE #1 M/W #18	<b>1.357</b> : .	0.272	0.131	0.589 ->	0.252
14673	SOHIO STATE A #1 MAW #19	0.029 🔇	0.010	0.007	0.022	0.011
14674	SOHIO STATE A #1 MW/ #20	0.517	0.009	0.008	0.051	0.009
14675	G9 STATE #1 M/W #21	0.047	0.009	0.019	0.086	0.038
14676	GS STATE #1 M/W #22	0.183 🔪	0.012	0.062	0.077	0.010
14677	SATELITE #4 MAV #23	0.002	<.001	0.001	0.003	0.001
14678	SATELITE NA MW #24	0.003	0.003	0.002	0.006	0.003
14679	IVA COM WINDMILL SW #1	1.174 .	1.290	0.265	1.262	1.241
,	% IA	<del>9</del> 9	95	92	90	94
	% EA	98	95	94	92	95
	BLANK	<0.001	<0.001	<0.001	<0.001	<0,001

METHODS: SW 846-8020,5030

Michael R. Fowler

6-29-93 Date

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# ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY ATTN: MR. VICTOR A. VICE P.O. BOX 857 TATUM. NM 88267 FAX: 505-398-6510 FAX: 281-646-8996

Receiving Date: 09/30/98 Sample Type: Water Project : None Given Project Location: Tatum, New Mexico

Analysis Date: 9/30 & 10/01/98 Sampling Date: 09/29/98 Sample Condition: Intact/Iced

ELTH	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m.p-XYLENE (mg/l)	o-XYLENE (mg/l)
15590	Na Com M/W #1	0.004	0.004	0.002	0.006	0.007
15591	Mable Com M/W #3	0.010	0.015	0.010	0.041	0.017
15592	Vera M/W #5	0.003	0.003	0.001	0.004	0.004
15 <b>593</b>	Bell A M/W #6	0.130	0.002	0.003	0.004	0.002
15594	NBN M/W #7	0.006	0.007	0.001	0.006	0.003
15595	NBF M/W #8	0.005	0.004	0.001	0.004	0.004
15598	Seleite #4 M/W #9	0.036	0.002	0.006	0.003	0.001
15597	Sohio SI. #1 M/W #10	2.541	0.106	0.182	0.167	0,098
15598	Schio St. "A" MW #11	0.070	0.010	0.003	0.014	0.011
155 <b>99</b>	Bell A M/W #13	0.003	0.002	0.002	0.004	0.002
15600	NBF M/W #15	3.027	1.630	0.225	0.811	0.393
15601	Sohio St. #1 M/W #17	0.872	0.105	0.071	0.242	0.129
15602	Sohio St. "A" MW #19	0.033	0.015	0.005	0.018	0.011
15603	G.S. State M/W #21	0.128	0.005	0.069	0.030	0.006
15604	Salelhe #4 M/W #23	0.048	0.023	0.001	0.004	0.002
15605	Na Com M/W #2	0.003	0.002	<0.001	0.003	0.001
15606	Mable Com M/W #4	0.007	0.002	<0.001	0.002	0.001
15607	Bell A M/W #14	0.175	0.002	0.001	0.002	0.001
15608	NBF M/W #16	1.046	0.065	0.037	0.100	0.039
15609	Sobio St. #1 M/W #18	0.542	0.072	0.025	0.093	0.054
15610	Sohio 81. "A" M/W #20	0.464	0.011	0.008	0.045	0.011
15611	G.S. Slate M/W #22	0.049	0.011	0.028	0.040	0.018
15612	Satelite #4 M/W #24	0.002	0.001	<0.001	0.002	<0.001
	% IA	100	94	<b>9</b> 1	90	95
	% EA	98	97	93	91	93
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

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12600 West I-20 East • Odesso, Texas 79765 • (915) 553-1800 • Fax (915) 563-1713

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"Don't Treat Your Soil Like Dirt!"

TIPPERARY ATTN: MR. VICTOR A. VICE P.O. BOX 857 TATUM, NM 88267 FAX: 505-398-6510 FAX: 281-646-8996

Receiving Date: 01/08/99 Sample Type: Water Project : None Given Project Location: Tatum, New Mexico 88237

Analysis Date: 01/08/99 Sampling Date: 01/06 & 01/07/99 Sample Condition: Intact/loed/HOL

ELT#	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m.p-XYLENE (mg/l)	o-XYLENE (mg/l)
16587	Sohio SI, #1 - #17	0.876	0.136	0.094	0.339	0.163
16588	Sohia St. #1 - #18	1.10	0.247	0.107	0,415	0.203
16589	Sohio Sta. M/W #19	0.040	0.014	0.006	0.021	0.013
16590	Sohio Sal. M/W #20	0.341	0,010	0.005	0.026	0.008
16591	GS State M/W #21	0.133	0.010	0.054	0.056	0.006
16592	<b>GS State M/W #22</b>	0.039	0.010	0.020	0.048	0.017
16593	Sat. #4 M/W #23	0.004	0.003	0.001	0.004	0,002
16594	Sal. #4 M/W #24	0.004	0.003	<0.001	0.002	<0.001
16595	Na Com. M/W #1	0.003	0.001	<0.001	0.002	0.004
16596	tva Com. M/W #2	0.004	0.001	<0.001	0.003	0.001
16597	Mable Com. M/W #3	<0.001	0.002	0.012	0.042	0.016
16598	Mable Com. MW #4	0.007	0.002	0.002	0.006	0.002
16599	Vera M/W #5	0.002	0.002	0.001	0.004	0.002
16600	Bell A M/W #8	0.127	0.001	0.003	0.005	0.001
16601	NBN M/W #7	0.003	<0.001	<0.001	0.002	<0.001
16602	NDF M/W #8	0.026	0.001	0.003	0.003	<0.001
16603	Sal. 4 M/W #9	0.034	0,003	0.006	0.005	0.001
16604	Sohio 81. #1 M/W #10	1.00	0.067	0,156	0.214	0.095
16605	Sohio Sta. M/W #11	0.061	0.011	0.005	0.016	0.012
16606	Bell A M/W #13	0.001	<0.001	<0.001	0.003	0.001
16607	Bell A M/W #14	0.154	<0.001	0.002	0.003	0.001
16608	NBF M/W #15	1.63	1.49	0.182	0.728	0.350
16609	NBF M/W #16	1.47	0.122	0.047	0.144	0.062
	% IA	86	85	87	85	87
	% EA	90	90	89	88	90
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Caland K first Raland K. Tuttle

1-11-99 Date

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"Don't Treat Your Soil Like Dirt!"

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WHOLE EARTH ENVIRONMENTAL ATTN: MR. MIKE GRIFFIN 19606 SAN GABRIEL HOUSTON, TEXAS 77084 FAX: 281-646-8996

Receiving Date: 09/08/97 Sample Type: WATER Project : TIPPERARY Project Location: NONE GIVEN Analysis Date: 09/15-09/17/97 Sampling Date: 09/05-09/06/97 Sample Condition: Intact/Iced

	TOTAL METALS (ppm)								
ELT#	Field Code	Ăg	As	Ba	~~ Cd	à	Hg	Pb	Se
12477	IVA COM SW	<0.01	<0.002	<0.10	0.011	<0.03	<0.001	<0.10	<0.002
12478	GS #12	<0.01	<0.002	<0.10	<0.005	<0.03	<0.001	<0.10	<0.002
12481	BELL#6	<0.01	<0.002	<0.10	<0.005	<0.03	<0.001	<0.10	<0.002
12482	NBN # 7	0.01	<0.002	<0.10	<0.005	<0.03	<0.001	<0.10	0.004
12483	SOHIO 1 #10	0.01	<0.002	<0.10	0.009	0.37	<0.001	<0.10	<0.002
12484	SOHIO A #11	0.04	<0.002	<0.10	0.034	0.07	<0.001	0.19	<0.002
12485	SAT. 4 #9	0.04	<0.002	<0.10	<0.005	<0.03	<0.001	<0.10	<0.002
12486	NBF # 8	<0.01	<0.002	<0.10	<0.005	<0.03	0.001	<0.10	0.002
12487	<b>VERA # 5</b>	<0.01	<0.002	<0.10	<0.005	<0.03	<0.001	<0.10	<0.002
	Minimum Detection Limit (MDL)	0.01	0.002	0.10	0.002	0.03	0.001	0.1	0.002
	% IA	103	94	98	104	103	100	96	112
	% EA	109	106	94	108	102	88	103	105

METHODS: EPA SW 846-3005, 7760, 7062, 7080, 7130, 7190, 7470, 7420, 7742

R. Jaule

Michael R. Fowler

10-14-97



# Monitor Well # 7

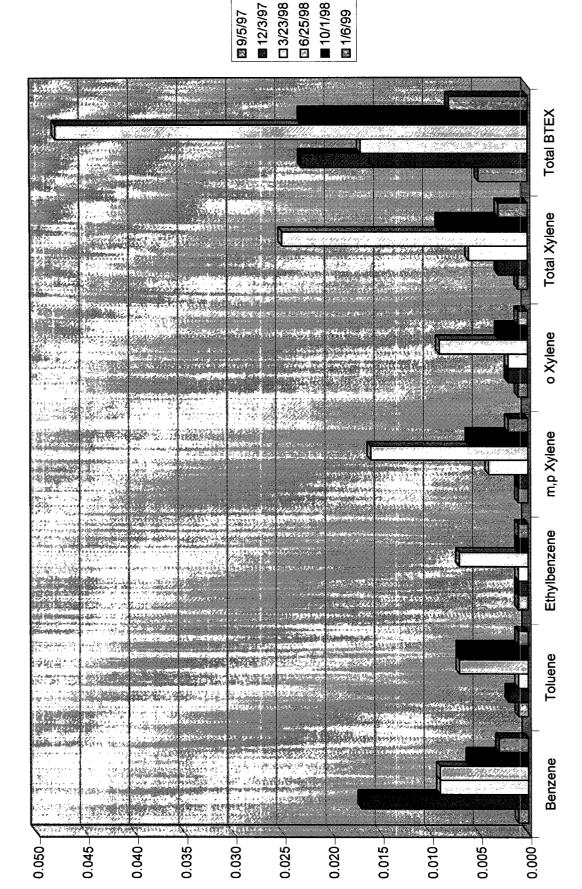
-

# State NBN # 1

# **Sampling Results**

an a						_	<b></b>
16601	0.003	0.001	0.001	0.002	0.001	0.003	0.008
15594	0.006	0.007	0.001	0.006	0.003	0.009	0.023
14662 6/25/98	0.009	0.007	0.007	0.016	0.009	0.025	0.048
14063 3/23/98-	0.009	0.001	0.001	0.004	0.002	0.006	0.017
13174	0.017	0.002	0.001	0.001	0.002	0.003	0.023
12482 - 9/5/97	0.001	0.001	0.001	0.001	0.001	0.001	0.005
Lab.# Sample Date	Benzene	Toluene	Ethylbenzene	m,p Xylene	o Xylene	Total Xylene	Total BTEX

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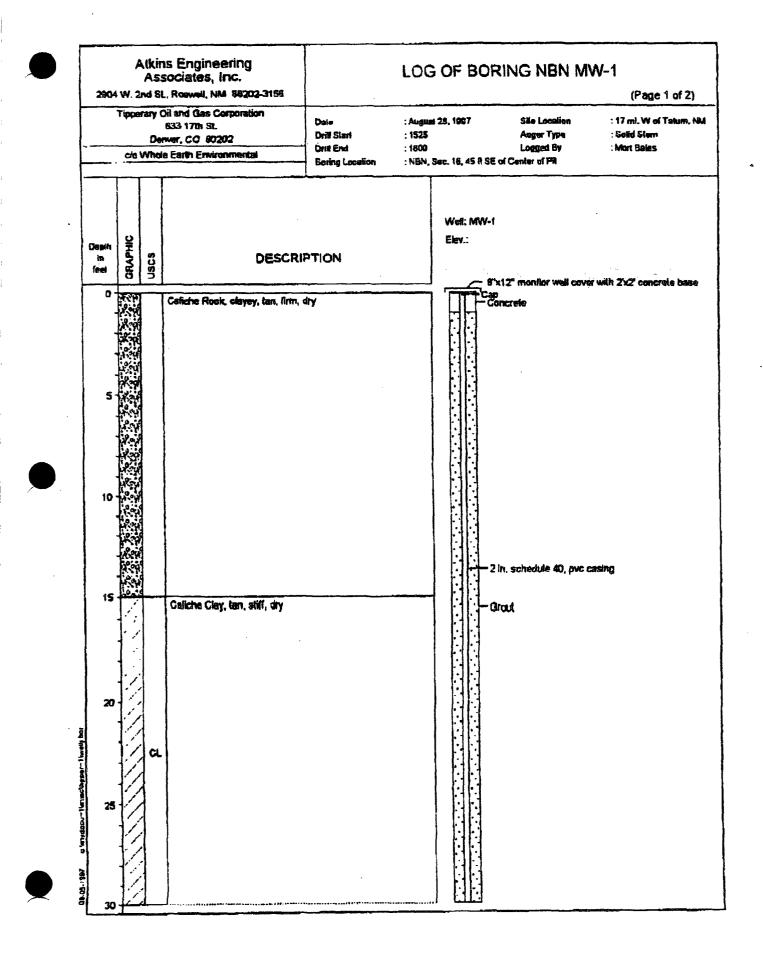
Monitor Well # 7



# Boring Log

This section contains the boring log for the monitor well at this site.

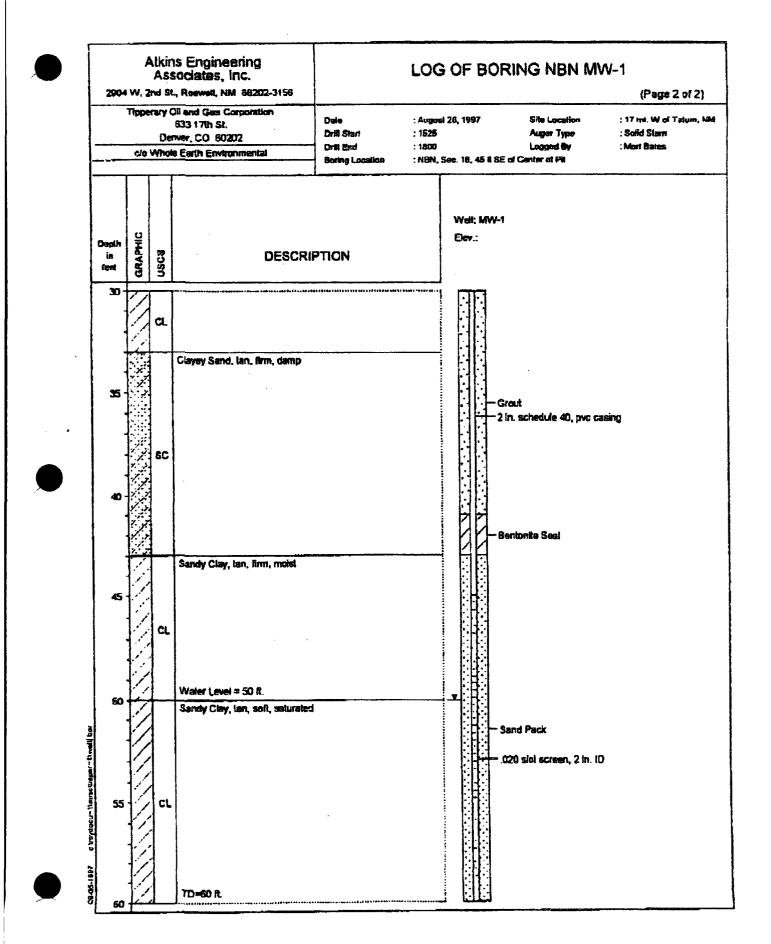
Atkins Eng Assoc



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09/10/97 11:43 FAX 505 624 2421

Atkins Eng Assoc



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# **Disposal Manifests**

This section contains the treatment cell locations and disposal manifests of all wastes removed from this site.

GANDY MARLEY, INC. P. O. BOX 827 TATUM, NEW MEXICO 88267 TATUM, NEW MEXICO ROSWELL, NEW MEXICO

### CERTIFICATE OF WASTE STATUS

### OILFIELD EXEMPT WASTE MATERIAL

Originating Location: _____ State NBN #1_____

Source: Overflow Pit

Disposal Location: ____ Gandy-Marley, Inc.

"As a condition of acceptance for disposal, I hereby certify that this waste is an exempt waste as defined by the Environmental Protection Agency's (EPA) July 1988 Regulatory Determination. To my knowledge, this waste will be analyzed persuant to the provisions of 40 CFR Part 261 to verify the nature as non-hazardous. I further certify that to my knowledge no "hazardous or listed waste" pursuant to the provisions of 40 CFR, Part 261, Subparts C and D, has been added or mixed with the waste so as to make the resultant mixture a "hazardous waste" pursuant to the provisions of 40 CFR, Section 261.3 (b)."

I, the undersigned as the agent for <u>Tipperary Corporation</u> concur with the status of the waste from the subject site.

Name	Vic Vice
Title/Agenc	Y Production Foreman
$-(\iota$	) A Due
Address	P. O. Box 857
	Tatum, NM 88267
	D.A. Ose a
Signature_	Citt Cae e
Date	8-22-97

	Contaminated Soils Shipment	Manifest	1	Manifest I			9	7	² .Page _	0
ŀ	3. Generator's Name and Mailing Address			A	<b>6</b>	4. G	encrator	Phone N	lo.	
	Tipperary Oil & Gas - P.O.Box 857 Tatum N.M. 88267-0857		ζ.			5. G	enerator	Contact	-6509 Vice	9
f	6. Transporter 1 Company Name					7. 10	No.			
	Gandy Corp					s.	c.¢.	14	225	
	8. Transporter 2 Company Name					9. II	No.			
ţ	10. Designated Disposal Facility Name and Site Address					11. F	acility P	ermit No	umber	
	Gandy Marley, Inc. Contamin		dfarm			NI NI	10CD	(NM	-711-	1-00
	7200 East Second PO Box 165					12. F	acility P	hone No	),	
	Roswell, NM 8						(5	05) 398	8 - 4960	
ł	13. Description of Waste				14. Cor	tainers	15. 1		15.	Unit
$\left  \right $					No.	Туре	Qu	antity		Wt/Vol
	^{a.} contaminated soils & b.	s. from c	old p	pit		DT	10	)6	yd	S
	on State NBN #1		-			1		] ] ]		
┞	b.				┨┈┥╌┤╴	-1	[l			
	υ.									
ŀ	¢.				┠━┴━┸╸	┨╼╍┹╼╾╸		1 <u></u> 11		
ľ	17. Special Handling Instructions and Additional Information		<u></u>		&	4	4	h		
	nla									
	18. Generator's Certification: I hereby declare that the care classified, packed, ma to applicable federal, state FURTHER, I represent an Conservation and Recover	irked, and labeled, e, and international d warrant that the v	and are 1 laws. waste ma	in all respe verial as de	cis in proj scribed o	per condi n this mar	ion for t ufest is e	ransport	by highw	ay accord
ŀ	laboratory analysis done i									
	Printed/Typed Name Vic Vice	Signature,	<u>n (</u>	Jue				Date	2 0 1	8 197
┢	19. Transporter 1 Acknowledgement of Receipt of Materials	1		<u> </u>						
Г	Printed/Typed Name	Signature	_	randy	·			Date OS	<u>ן בן י</u>	4
	Larry Gandy	1	A	۸						
		Signature	4	0	<b>)</b>			Date		

Contraction of motion of materials described on this manifest except as noted in item 21.

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Tipperary Oil & Gas P.O. Box 857 Tatum, NM 88267

### 9/22/97

Detailed Report of material received between 8-1-97 and 8-31-97

P.O. Box 1658 Roswell, NM 88202 Phone 505-625-9206 Fax 505-625-9706

### EXEMPT OCD

	SATALLITE #					
Date:	Ticket No:	Discripition:	Transporter:	Cell:	Units	Unit Type
8/18/97	1897	OCD EXEMPT SLUDGES	Gandy Inc.	7	185	BBLS
8/19 <b>/</b> 97	1942	OCD EXEMPT SLUDGES	Gandy Inc.	7	360	BBLS
		SATALLIT	E #4 Total Units.		545 BE	BLS
		E	XEMPT OCD Total BB	LS.	545 BI	BLS
Origin: E	BELL STATE	Α				
Date:	Ticket No:	Discripition:	Transporter:	Cell:	Units	Unit Type
8/16/97	1890	OCD EXEMPT SOILS	Gandy Inc.	7	160	Yards
8/18 <b>/</b> 97	189?	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards
8/18/97	1893	OCD EXEMPT SOILS	Gandy Inc.	7	14	Yards
8/18/97	1895	OCD EXEMPT SOILS	Gandy Inc.	7	60	Yards
		BELL STA	TEA Total Units.		262 Ya	ards
Origin: 0	GULF STAT	ON #1				
Date:	Ticket No:	Discripition:	Transporter:	Cell	Units	Unit Typ
8/30/97	1941		Gandy Inc. 7A7 <i>2</i>	7	120	Yards
	NBN	GULF ST	ATION #1 Total Units.		120 Ya	ards
Date:	Ticket No:	Discripition:	Transporter:	Cell:	Units	Unit Typ
8/22/97	1926	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards
8/22/97	1928	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards
8/22/97	1929	OCD EXEMPT SOILS	Gandy Inc.	7	22	Yards
8/22/97	1931	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards
		NMB Tot	al Units.		106 Y	ards
Origin: 4	ØVERA					
Date:	Ticket No:	Discripition:	Transporter:	Cell:	Units	Unit Typ
8/21/97	1915	OCD EXEMPT SOILS	Gandy Inc.	7	42	Yards
8/21/97	1916	OCD EXEMPT SOILS	Gandy Inc.	7	42	Yards
8/21/97	1917	OCD EXEMPT SOILS	Gandy Inc.	7	42	Yards
8/21/97	1919	OCD EXEMPT SOILS	Gandy Inc.	7	40	Yards
8/22/97	1918	OCD EXEMPT SOILS	Gandy Inc.	7	246	Yards
8/22/97	1920	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards
8/22/97	1921	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards
8/22/97	1922	OCD EXEMPT SOILS	Gandy Inc.	7	28	Yards



# VADSAT Modeling

This section contains the original contaminant migration model used in the preparation of the remediation protocol for this site.

# Modeling Data Entry State NBN # 1

Control Data	Entry	U/M
Deterministic	Yes	
Monte Carlo	No	
Evaporation	No	
Biodecay	No	
Low Permeability Layer Below Contamination	No	

Source Data		
Waste Zone Thickness	48	ft.
Waste Zone Area	3,000	sq. ft.
Ratio of Length to Width	0.75	
Soil Thickness above Waste Zone	15	ft.
Contaminant Concentration in Soil / Waste Zone	10	ppm
Hydrocarbon Concentration in Soil / Waste Zone	10,000	ppm

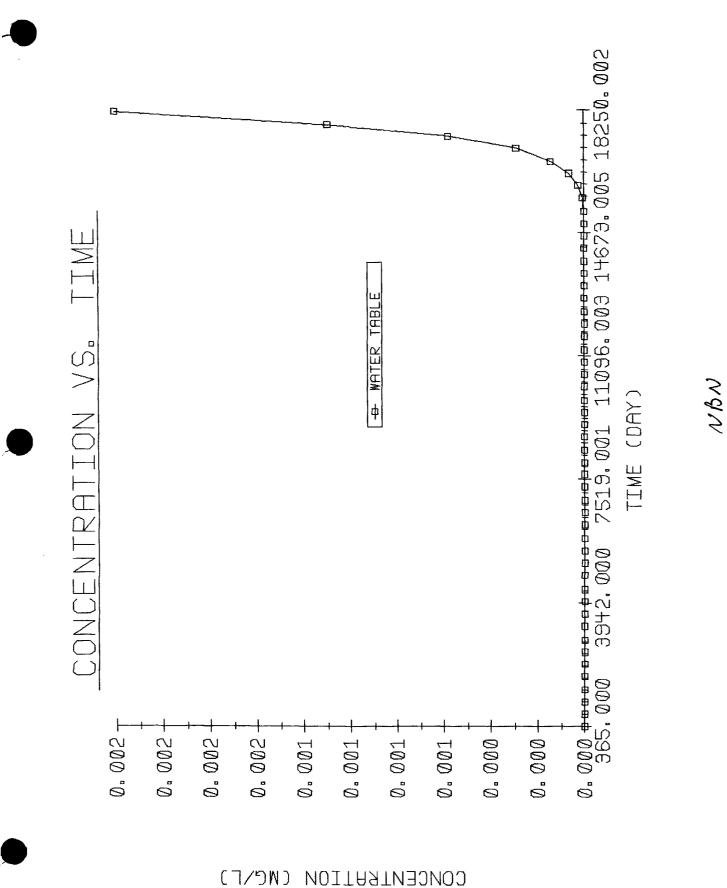


Chen	al Data
Benzene	Yes

Unsaturated Zone	
Biodecay Cooefficient	Ó
Organic Carbon Fraction	0
Soil Database	Clay
Hydrological Database	Sedimentary
Unsaturated Zone Thickness	1 meter
Soil Database	Clay
van Genuchten n	1.09 (Default)
Residual Water Content	0.01001
Unsaturated Zone Dispersivity	0 internall

Saturated Zone		
Biodecay Cooefficient	0	
Aquifer Porosity	0.2	(Default)
Organic Carbon Fraction	0	
Longitudinal Dispersivity	0	Internally
Ratio of Long. / Trans. Dispersivities	3	
Ratio of Trans. / Vert. Dispersivities	3	
Hydrological Database	Sedimentary	
Aquifer Thickness	60	ft.
Aquifer Gradient	0.00357	
Saturated Hydraulic Conductivity	0.0986	ft / day

Net Inditention Dete	
INet Infiltration Rate	0.00001 ft / day



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# Liner Detail

This section contains the MSDS and technical description of the liner material used on this project.

# 10/18/99 MON 15:26 FAX 915 366 2999

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FALCON ENVIRON

### P.O. Box 4396 Odessa, Texas 79760 5200 Johnson Rd. 79764

Phone: (915) 366-2611

Environmental Lining Systems, Inc.

1-800-842-0945 FAX: (915) 366-2999

# TECHNICAL SPECIFICATION SHEET 20 MIL BLACK POLYETHYLENE

PROPERTIES	TEST METHOD	VALUE
Thickness mils	ASTM D 1593	20
Density Ib/cm3	ASTM 0792	57.7 lbs.
Tensile Strength at Yeild	ASTM D638	40 lbs.
Tensile Strength at Break	ASTM D638	88 lbs.
Elongation at Break	ASTM D638	700 %
Hydrostatic Resistance	ASTM D751	122
Puncture Resistance	FTMS 101 C	36
Tear Resistance	ASTM D1004	13
Volatile Loss	ASTM 1203	<1%
Resistance to Soil Burial	ASTM G22	-4%
Low Temp, Failure	ASTM D746	<-94
Dimensional Stability %Change	ASTM D1204	<2
Environmental Stress Crack Resistance Hours to failure	ASTM D5397 Method A	>400
Carbon Black %	ASTM D1603	2.75
WVTR GH2O/100 in 2/24 hrs (g H2O/m2/24 hrs.	ASTM E96 Method A73 F, 50% RH	.020 (.022)



# 10/18/99 MON 15:26 FAX 915 366 2999

FALCON ENVIRON

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ection 4 - PHY	SICAL HAZ	LARDS			•• ••		
biliry Unstable	1	Conditions	Tamperatur	es over 570 F wil	I release com	oustible gases	
Stable	X	to Avoid	•				
compatibility		None					
Asterials to Avoid)							
82100005		The following con	bustion proc	iucts may be gene	aated: Carb	on dioxide, c	arbon
composition Prod		monoxide, water v	•				
Randous	May Octor :		Conditions	N/A			
dymerization	Will not Occ	X	to Avoid	·			
ection 5 - HEA	LTH HAZA	RDS					
breshold	N/A						
imir Value							
igns and Symptom	raf Exposure						
Acide	Not Dete	mined		2. Chronic	Not Determ	nined.	
Overagion	9			Overesposure	_		
ledical Conditions	Generally	There are no know	n medical co	nditions aggrava	ted by exposu	re to this pro	tuct.
geravated by Erec	STILLE						
		National Toxicology	Not	LARC	Not	OSHA:	Not
r Potential Carcino		Program		Monographs	Listed		Listed
SHA Parmissible		ACODE Direstold	Nonc		Other Exposus	None	
iposure Limit	• • • • • • • •	Limir Value			Limit Used		
IDEPRESETY and		eurs will result from					
ust Ani Procedure:	-						
Inhalation		ly remove victim fi		and alm Easter	2 1 4 2 2		
		IA ISUIDAČ AIRIITI U	rom area to t	icso bit. Sock inc	ancal allendo		
		•					
	If contacte	by molten materi	al, unmediat	ely flush eyes wit	h plenty of co	ol water for a	it least 15
Eyes ML	If contacter minutes. I	by molten materi	al, unmediat n to rub eyes	ely flush eyes with the second s	h plenty of co	ol water for a tention.	
Eyes AL	If contacter minutes. I If contact b	by molten materi to not permit victi by molten material,	al, unmediat n to rub eyes , cool unmed	cly flush eyes with Immediately se intely with cool w	h plenty of co rek medical at varcr. Do nor	ol water for a tention.	
Skin (	If contactes minutes. I If contact b any solidifi	by molten materi to not permit victin by molten material, ied material. Imma	al, unmediat n to rab eyes cool unmed diately seek I	ely flush eyes with Immediately se intely with cool with	h plenty of co ck medical at varcr. Do not	ol water for a tention. attempt to rea	ROVE
Skin (	If contacter minutes. I If contact b any solidifi If material	by molten material to not permit victin by molten material, ied material. Immu- is ingested, contac	al, unmediat n to rub eyes cool unmed diately seek i t a physician	ely flush eyes with Immediately se intely with cool with	h plenty of co ck medical at varcr. Do not	ol water for a tention. attempt to rea	ROVE
Eyes http://www.seconder.com	If contacted minutes. If If contact b any solidifi If material any foreign	d by molten materi to not permit victin by molten material, ied material. Imma is ingested, confac t object is swallow	al, unmediat n to rub eyes , cool unmed diately seek I t a physician ed.	ely flush eyes with Immediately so jately with cool w nedical attention or Poison Contro	h plenty of co ek medical at vater. Do not l Center as ap	ol water for a tention. attempt to rea	ROVE
Eyes have a special strain of the special st	If contacted minutes. If if contact h any solidifi if material any foreign CIAL PROP	by molten material to not permit victin by molten material, ied material. Immu- is ingested, contac	al, unmediat n to rub eyes , cool unmed diately seek I t a physician ed.	ely flush eyes with Immediately so jately with cool w nedical attention or Poison Contro	h plenty of co ek medical at vater. Do not l Center as ap	ol water for a tention. attempt to rea	ROVE
Eyes Sem Ingestion Section 6 - SPE Respiratory Protecti	If contacted minutes. If if contact h any solidifi if material any foreign CIAL PROP	d by molten materi to not permit victin by molten material, ied material. Imma is ingested, confac t object is swallow	al, unmediat n to rub eyes , cool unmed diately seek I t a physician ed.	ely flush eyes with Immediately so jately with cool w nedical attention or Poison Contro	h plenty of co ek medical at vater. Do not l Center as ap	ol water for a tention. attempt to rea	ROVE
Eyes Skin Schort 6 - SPE Inspiratory Protecti Specify Type) (equilation	If contacter minutes. I If contact b any solidifi If material any foreigr CIAL PROF	d by molten materi to not permit victin by molten material. is material. Imma is ingested, confact tobject is swallow <b>ECTION ENFOR</b> N/A	al, unmediat n to rub eyes cool immed diately seek n t a physician ed. <b>IMATION</b>	ely flush eyes wit , Immediately se iately with cool w nedical attention or Poison Contro	h plenty of co ck medical at varer. Do not D Center as ap	nol water for a tention. attempt to rea opropriate wh	ROVC enever
Eyes Skin Schon 6 - SPE (contractory Protection Specify Type) (contractory Type) (contractory N/A	If contacter minutes. I If contact b any solidifi If material any foreigr CIAL PROP on Local Potensis N/A	d by molten materi to not permit victin by molten material, is ingested, contac to object is swallow ECTION INFOR N/A	al, unmediat n to rub eyes cool unmed hiately seek n t a physician ed <b>IMATION</b> Mechanical (( N/A	ely flush eyes wit s. Immediately se iately with cool w nedical attention or Poison Contro General).	h plenty of co ek medical at vater. Do not I Center as ap	al water for a tention. attempt to res opropriate who Special N/A	nove enever Döter N/A
Eyes Skin Section 6 SPE Respiratory Protecti Specify Type) (entilation N/A Toperrive	If contacter minutes. I If contact b any solidifi If material any foreigr CIAL PROP CIAL PROP Local Extravis N/A Wear prote	d by molten materi to not permit victin by molten material, is ingested, contact tobject is swallow ECTION INFOR N/A t	al, unmediat n to rub eyes cool unmed hiately seek n t a physician ed <b>IMATION</b> Mechanical (( N/A	ely flush eyes wit s. Immediately se iately with cool w nedical attention or Poison Contro General).	h plenty of co ek medical at vater. Do not d Center as ap Wear eye pro	ol water for a tention. attempt to rea opropriate wh Spectal	nove enever Döter N/A
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Salarg       Not Applicable (Notes)         Similar       0         Wohmen (%)       Description         Salar       Insoluable in Water         Sanz       Black, odorless plastic film         Salar       Black, odorless plastic film         Salar       N/A         Flammability Limits         Salar       Use water spray, dry chemi         Special Fire Fighting         Freedoms       Fire fighters should wear a         Xposure to smoke, fumes or hazardous decomi         Stom a fogging nozzle since this material is a since the material is a since the smaterial is a since since the smaterial i	<ul> <li>(A) Specific Quanting Quan</li></ul>	ppet number of the second seco	0.93 N/A Not React no Ignition neptorature	Vapor Pressure, manHg ive in Water > 650 F (es Pre is a possibili	N/A timated)
Salarg       Not Applicable (Notes)         Similar       0         Wohmen (%)       Description         Salar       Insoluable in Water         Sanz       Black, odorless plastic film         Salar       Black, odorless plastic film         Salar       N/A         Flammability Limits         Salar       Use water spray, dry chemi         Special Fire Fighting         Freedoms       Fire fighters should wear a         Xposure to smoke, fumes or hazardous decomi         Stom a fogging nozzle since this material is a since the material is a since the smaterial is a since since the smaterial i	<ul> <li>(A) Specific Quanting Quan</li></ul>	ppet number of the second seco	0.93 N/A Not React no Ignition neptorature	Vapor Pressure, manHg ive in Water > 650 F (es Pre is a possibili	N/A timated)
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