AP - 32

STAGE 1 & 2 REPORTS

DATE: June 28, 2002

Tipperary
CORPORATION

633 Seventeenth Street
Suite 1550
Denver, Colorado 80202

June 28, 2002

VIA OVERNIGHT MAIL

Mr. Roger C. Anderson
New Mexico Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87505

RE: Abatement Plan
Collier #1 Pit
Section 9F-T11S-R33E
Lea County, NM

Dear Mr. Anderson:

As a follow up to your correspondence of April 29, 2002, please find enclosed our Stage 1 investigation proposal for the subject site. We have included the investigation work conducted to date.

Please advise if this proposal is acceptable, and we will proceed accordingly. If you have any questions, please call me at (303) 293-9379.

Very truly yours,

Larry G. Sugano
Vice President - Engineering

Enclosure

cc: NMOCD Hobbs Office
Whole Earth Environmental

Tipperary Corporation
Stage I Investigation Proposal
Collier # 1 Pit Site
Section 9F-T11S-R33E
Lea County, New Mexico

Site History

Drilling of the Tipperary Portion of the Bagley Field began in the early 1960's and was substantially completed by 1969. During the early days of production within the field, small, unlined impoundments were erected near the wells to serve as emergency overflow pits, and general catchments for workover operations. The method of construction was to excavate an area approximately 30' X 30' X 5' deep and to then use the excavated soils to construct containment berms surrounding the perimeter.

These impoundments were no longer in use by the early to mid-seventies with the advent of the Burro Pipeline System. The closure method for these locations was to first remove all free product and liquids within the containment and then push the berms over the surface depression. Over time, normal precipitation and capillary migration allowed many of the lighter-end hydrocarbons previously trapped beneath the overlying soils to migrate to the surface. Once exposed to sunlight and the elements, these lighter fractions evaporated and naturally biodegraded into heavier-end paraffinic or asphaltine fractions.

In December of 1999, during a routine inspection of the Bagley Field, Mr. Billy Prichart of the NMOCD noticed what appeared to be a possible unlined pit at the Collier No. 1 location. Tipperary Corporation was notified of the potential problem on December 9th. A work plan for the investigation and closure of the site was approved by the NMOCD on November 22nd, 2000. Work began on the pit closure on November 27th, 2000 and extended through December 8th.

In accordance with the approved plan, the pit was excavated to a depth of approximately 40' below ground surface. The contaminant concentrations on each sidewall were tested and found to be within OCD standards. The pit excavation was draped with a 20 mil high density polyethylene liner and the previously excavated materials replaced within the encapsulation barrier. A second polyethylene sheet was placed over the excavation at an average depth of 5' below ground surface to eliminate any potential for the vertical migration of contaminants in the future.

The surface of the work site was then contoured and re-seeded. A 4" diameter monitor / recovery well was drilled, cased and developed at the southeast corner of the site. Three additional monitor wells extending in a line approximately 920' from the recovery well were similarly drilled, cased developed and tested for the presence of criteria contaminants. The results of the investigation and closure activities were submitted to the NMOCD on December 21st, 2000.

Investigative Results

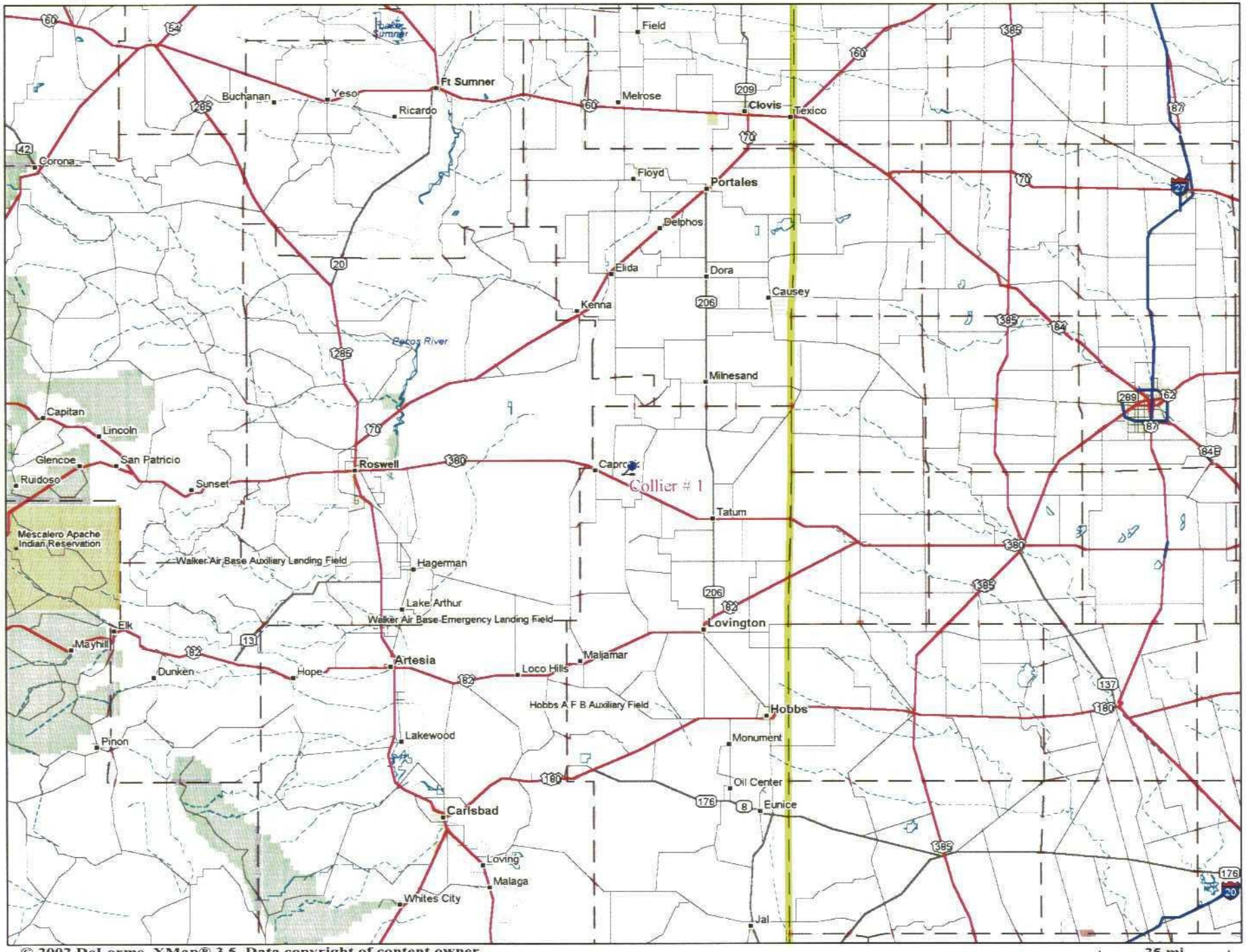
Excavation of the site revealed that both hydrocarbon and chloride contamination extended to the top of the water table. This table is found at a depth approximately 43' below ground surface at the southeastern corner of the old pit site. The three lateral delineation wells already present at the site show a contaminant plume extends a minimum distance of 600' down-gradient from the recovery well but less than 920'.

Site Investigation Work Plan

Within thirty days of the approval of this plan, we will drill, case, develop and test two additional monitor wells. One well will be situated approximately 900' east of the existing recovery well and the second, approximately 600' due south of the recovery well. The purpose of these additional wells is to confirm the width and potentially the source of the plume. A third well will be advanced to the redbed clay layer situated below the Ogallala Aquifer. This well will be located near the recovery well and will be used to determine the vertical extent of the plume. Initially, each new well will be tested for the presence and concentrations of BTEX, chlorides, TDS and major cations / anions. Each well (including the four already present) will be tested on a quarterly basis for the presence and concentration of BTEX. Depending on the results of the initial sampling, chlorides may be included within the quarterly testing criteria for selected wells within the pattern.

Based on the test results of the new delineation wells, and Abatement Plan will be designed for the location. The Abatement Plan will define the site geology and hydrology, the vertical and horizontal extent and magnitude of vadose zone and ground-water contamination, subsurface hydraulic conductivity, transmissivity, storativity, and rate and direction of contaminant migration, inventory of water wells within a one-mile radius of the plume and the location and number of such wells actually or potentially affected by the pollution.

Exhibit Index



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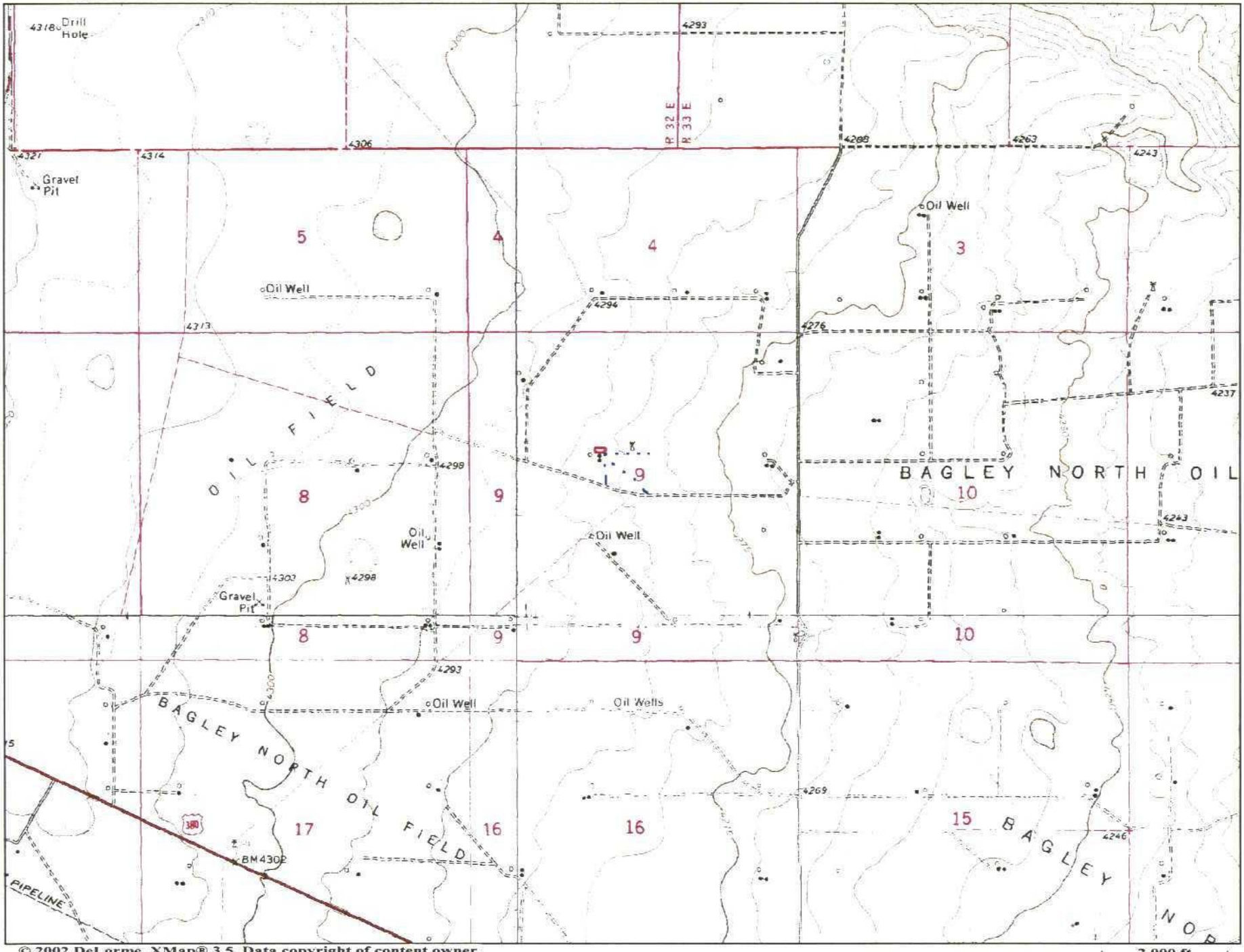
25 mi



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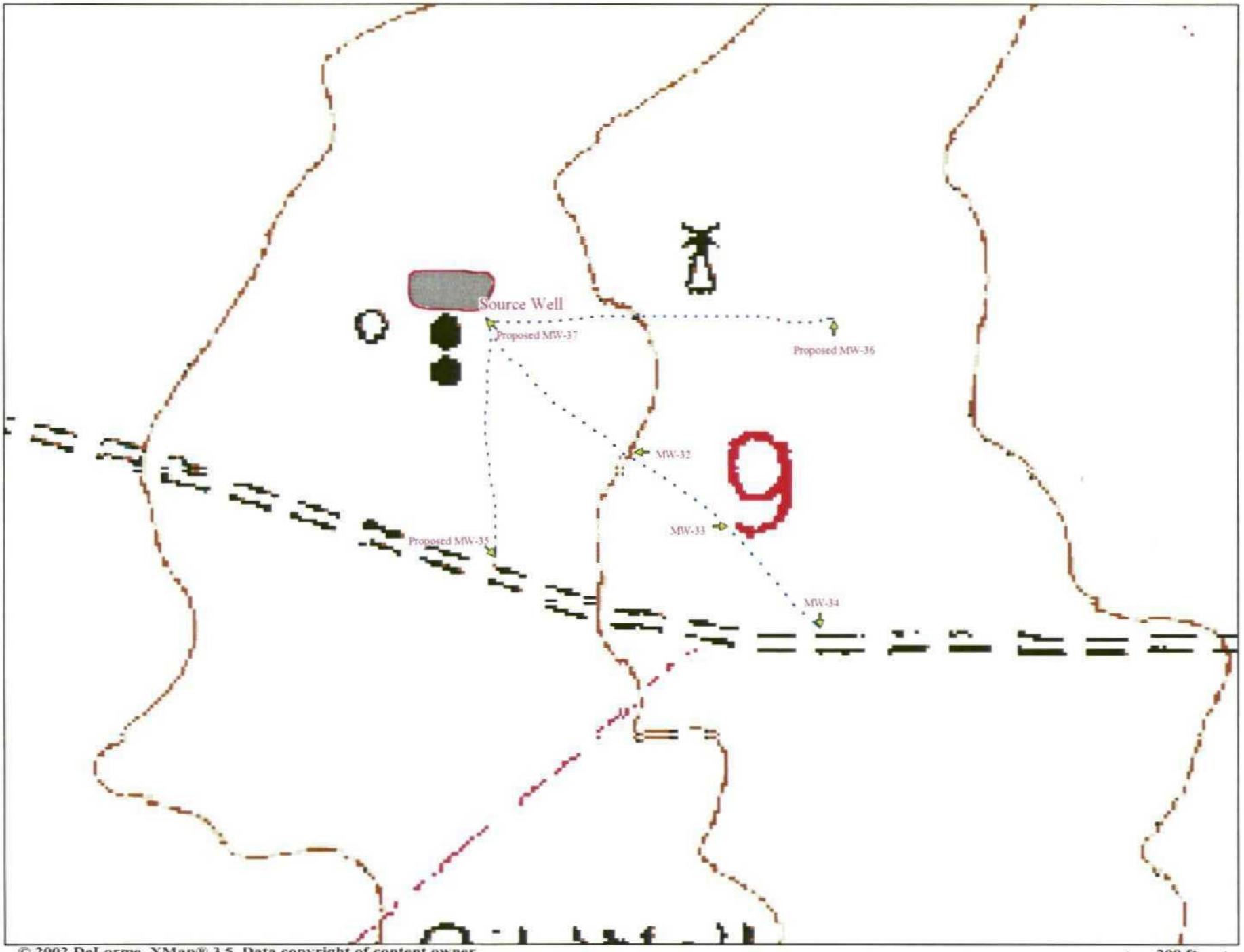
2,000 ft



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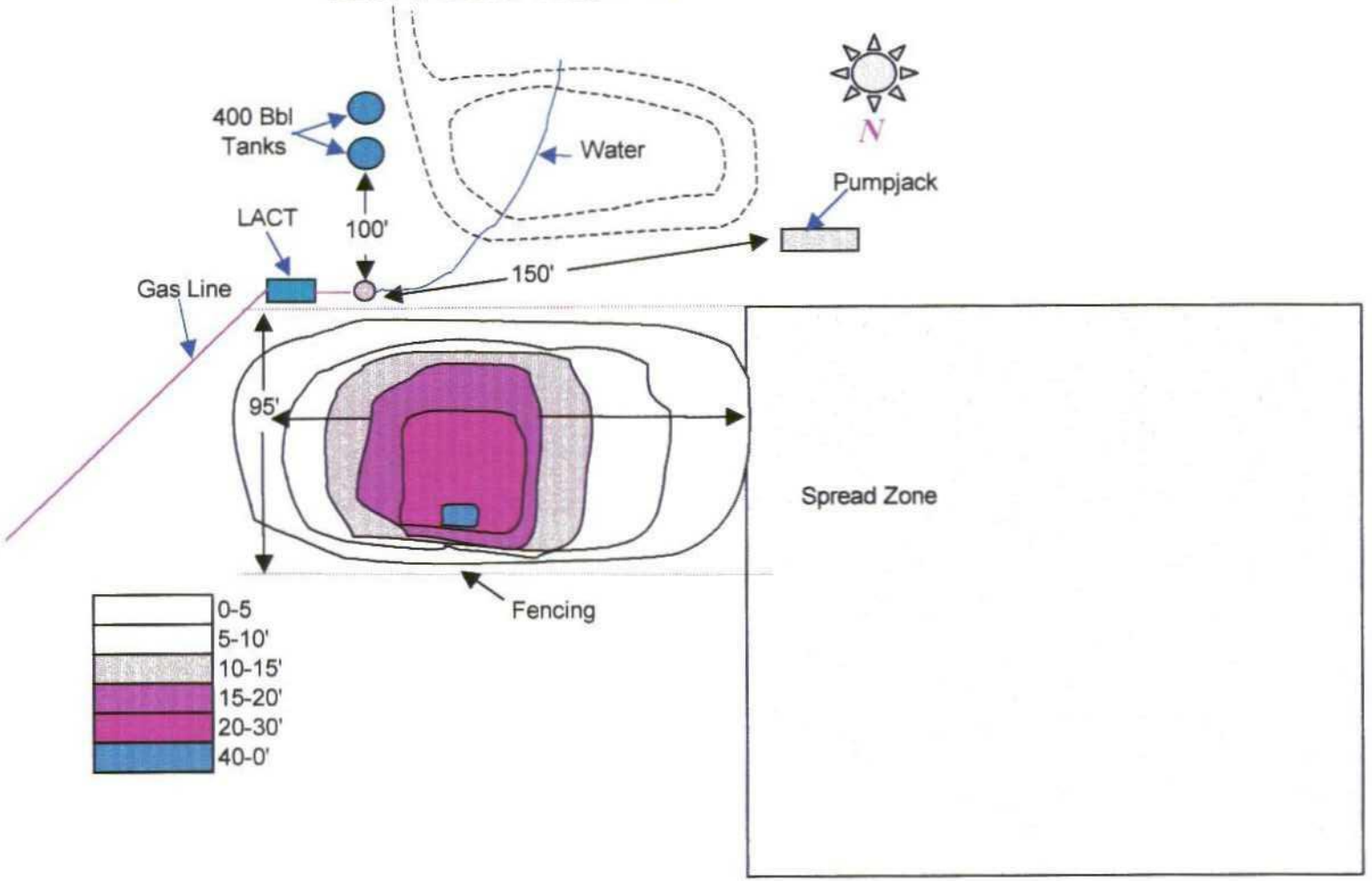
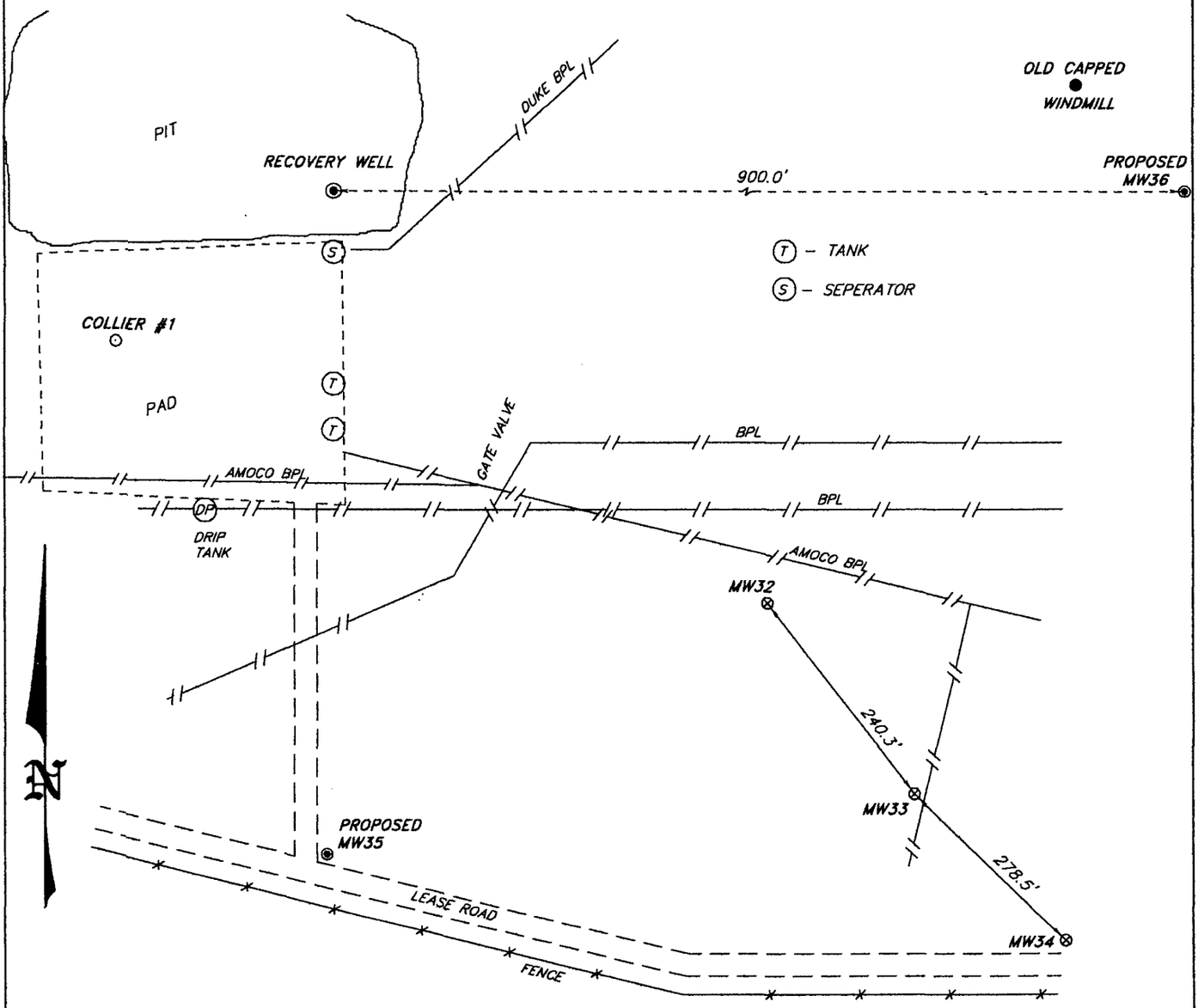
200 ft

Tipperary

Collier # 1
SE/NW Sec. 9 T11S R33E



SECTION 9, TOWNSHIP 11 SOUTH, RANGE 33 EAST, N.M.P.M.,
LEA COUNTY, **NEW MEXICO.**



NAME	GRND ELEV.	NORTHING	EASTING	LATITUDE	LONGITUDE
MW #32	4284.0'	N867126.912	E759044.543	N33°22'53.8"	W103°37'12.5"
MW #33	4281.2'	N866936.756	E759191.429	N33°22'51.9"	W103°37'10.8"
MW #34	4284.0'	N867126.912	E759044.543	N33°22'53.8"	W103°37'12.5"
MW #35(PROP)		N867040.545	E758751.082	N33°22'53.0"	W103°37'15.9"
MW #36(PROP)		N867399.618	E759655.059	N33°22'56.5"	W103°37'05.3"
RECOVERY WELL	4292.1'	N867399.618	E758755.059	N33°22'56.5"	W103°37'15.9"
COLLIER #1	4290.7'	N867299.109	E758610.947	N33°22'55.5"	W103°37'17.6"
WINDMILL	4286.2'	N867507.191	E759256.868	N33°22'57.6"	W103°37'09.9"

ALL COORDINATES ARE BASED ON NMSPCE (NAD83)

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES
NEW MEXICO No. 7977
TEXAS No. 5074

GARY L. JONES
7977
REGISTERED PROFESSIONAL LAND SURVEYOR

100 0 100 100

BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO

W.O. Number: COLLIER | Drawn By: K. GOAD

WHOLE EARTH ENVIROMENTAL, INC.

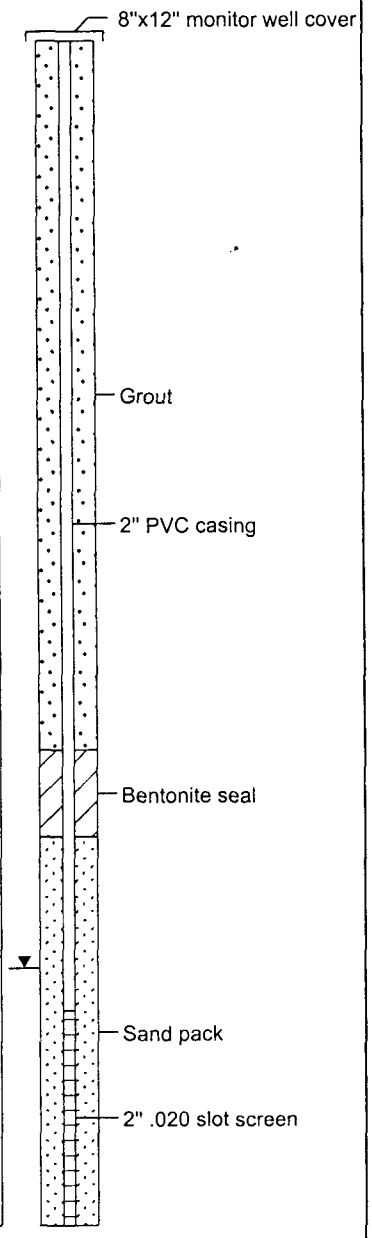
REF: MONITOR WELLS

MONITOR WELLS LOCATED IN
SECTION 9, TOWNSHIP 11 SOUTH, RANGE 33 EAST,
N.M.P.M., LEA COUNTY, NEW MEXICO.

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Callier #1, MW-2 (Page 1 of 1)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084	Date : 07-02-01 Drill Start : 1400 Drill End : 1800 Boring Location : 200'SE of MW-1	Site Location	: Caprock, NM : Sec. 9, T11S, R33E : Hollow Stem : Mort Bates
Contact: Mike Griffin		Auger Type	
Job#: WHOLETH.MWD.01		Logged By	

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab mg/kg	PID ppm-v
0		CL		Clay w/ caliche rock, tan, firm, dry		
				Caliche, white, firm, dry		
5						
10						
15		SM		Silty sand w/ caliche, pink, firm, dry		
20						
25		SM		Silty sand, tan, loose, dry		
30						
35						
40		SS		*Sandstone w/ sand, tan, firm, damp*		
		SP		Sand, tan, tight, damp		
45						
50		SP		Sand, tan, soft, wet		
55				Total depth 55' Water level 43'		
60						



07-05-2001 C:\MTECH46\WHOLETH\MWD01\mw-2.bor

Tipperary
CORPORATION

633 Seventeenth Street
Suite 1550
Denver, Colorado 80202

December 21, 2001

VIA OVERNIGHT MAIL

Mr. William C. Olson
New Mexico Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87505

RE: Collier #1 Pit Closure
Section 9F-T11S-R33E
Lea County, NM

Dear Mr. Olson:

As a follow up to your letter of June 5, 2001, please find enclosed the results of our investigation of the previously closed unlined production pit and our proposed abatement plan. Four delineation wells were installed during July and August. Mike Griffin's email to you on August 8, 2001 advised you that we were continuing our investigation and that we would forward the results to you.

We propose to monitor the area for one year taking samples quarterly to determine if dilution is the most effective remediation method.

If you have any questions, please call me at (303) 293-9379 or Mike Griffin at (800) 854-4358.

Very truly yours,

Larry G. Sugano
Vice President - Engineering

Enclosure

cc: NMOCD Hobbs Office

Executive Summary

Location

The spill area is located within Section 9, T11S, Range 33E west of Tatum, New Mexico on fee land owned by Mr. Ricky Pearce. The primary land use is that of grazing cattle. Significant oilfield development is present within the area and several oil wells, storage tanks, flow lines and ancillary structures are present on and under the landholdings. A 7.5' map is enclosed within this section to define the location (Exhibits 1 & 2).

The topography is unremarkable. There are no surface streams within one mile of the site. A capped windmill and ancillary catchment is situated approximately 600' east northeast of the wellhead.

Discovery & Notification

On December 9th, 1999 Tipperary Corporation was notified of the presence of an old, unlined pit on the site. Tipperary Corporation responded on January 31st 2000 that they were of the belief that the pit was closed some thirty years previously under Order 3221 (6). The NMOCD had no record of the response and subsequently sent a second request to Tipperary on September 22nd, 2000 that they demonstrate "that contaminants have not and will not migrate vertically so as to cause groundwater to exceed standards." On November 17th, Whole Earth Environmental sent a remediation protocol PR-56 covering the site to the NMOCD for approval. It was approved the same day.

Excavation of the site began on November 27th and continued through December 11th. Due to mechanical and safety limitations, the excavation was not able to adequately determine the depth of contamination at the site. The pit closure proceeded in accordance with the approved protocol and was completed on December 20th.

Containment

The main plume source was encapsulated in accordance with the approved protocol.

Testing

Water Testing

On July 2nd 2001, Atkins Engineering drilled and completed two water monitoring wells. Water samples were collected in accordance with the conditions specified within the protocol approval and Whole Earth Quality procedure QP-76. Field testing revealed that the chloride concentrations within the outer delineation well exceed NMWQCC standards. Resultantly, two additional delineation wells were drilled on August 9th. The location of each of these wells is described within the attached Exhibit 10.

Site Geology

The boring logs from the monitor well borings reveal seven sedimentary soil morphologies, generally consisting of calichi, sandstone and unconsolidated sands.

Hydrology

The U.S.G.S. survey maps indicate a general decline in elevation of the site and surrounding area to the southeast. The civil survey shows the elevation of MW-1 to be 4,292' at the top of the cement pad. The distance to ground water from the top of the pad is 42.8'. The distance to groundwater averages 43'. The gradient between the two water depths is described in Exhibit 12 of this report.

Abatement Plan

Current Site Status

The production pit has been excavated to a depth of 30' bgl with a test hole extending to a depth of approximately 40'. The excavation was encapsulated with a 20-mil high-density polyethylene liner and the surface fenced and re-seeded. A 4" diameter monitor / recovery well has been drilled, cased and developed at the southeast corner of the pit area. A series of three monitor wells extending to a distance of approximately 920' from the southeast corner of the pit have similarly been drilled, cased, developed and tested.

Abatement Options (Soil)

The site has no significant soil contamination remaining.

Abatement Option (Water)

Exhibit 11 indicates that the chloride plume concentrations appear to be in the shape of a toroidal arc extending to the southeast. The BTEX concentrations are greatest at the plume source and diminish with distance from the source. This is a result of both dilution and natural attenuation.

The only attenuation mechanism for chlorides is adsorption to soil particles. In water sands, this adsorption rate is very low as there are few anionic receptor sites available. Once filled, they are no longer able to capture additional sodium chloride anions; new sodium chloride ions within the water table simply pass them by.

With dilution being the only significant mechanism for reducing these chloride concentrations, we would expect the test results within the satellite delineation wells to be very linear, that is, steadily decreasing as you go further from the source. However, we find in fact that the chloride concentrations at the southeast corner of the pit are 7,800 ppm yet are 15,100 ppm at a distance of 400' from the source. This demonstrates that the remediation of the plume source (the pit) has significantly diminished the replenishment rate of the contaminant plume upon the water and may in fact be sufficient to affect eventual clean-up.

Rather than employing a plume model hypothesis on the basis of a single groundwater sampling round, Tipperary proposes to monitor the site for a period of one year during which we will perform a minimum of four quarterly samplings for BTEX and chlorides. If we find that the chloride slug passes Monitor Wells 3 & 4 and that the chloride and BTEX concentrations within the source well and the first monitor well show consistent reductions, simple dilution will be the most appropriate remediation method for the location.

Exhibit Index

Exhibit 1. Large view U.S.G.S. map showing location of site to general area.

Exhibit 2. Detailed view U.S.G.S. map showing local topography and access.

Exhibit 3. Photograph detailing the extent of lateral excavation of the pit.

Exhibit 4. Photograph detailing the extent of vertical excavation of the pit.

Exhibit 5. Boring Log of the source well

Exhibit 6. Boring Log of Monitor Well # 1

Exhibit 7. Boring Log of Monitor Well # 2

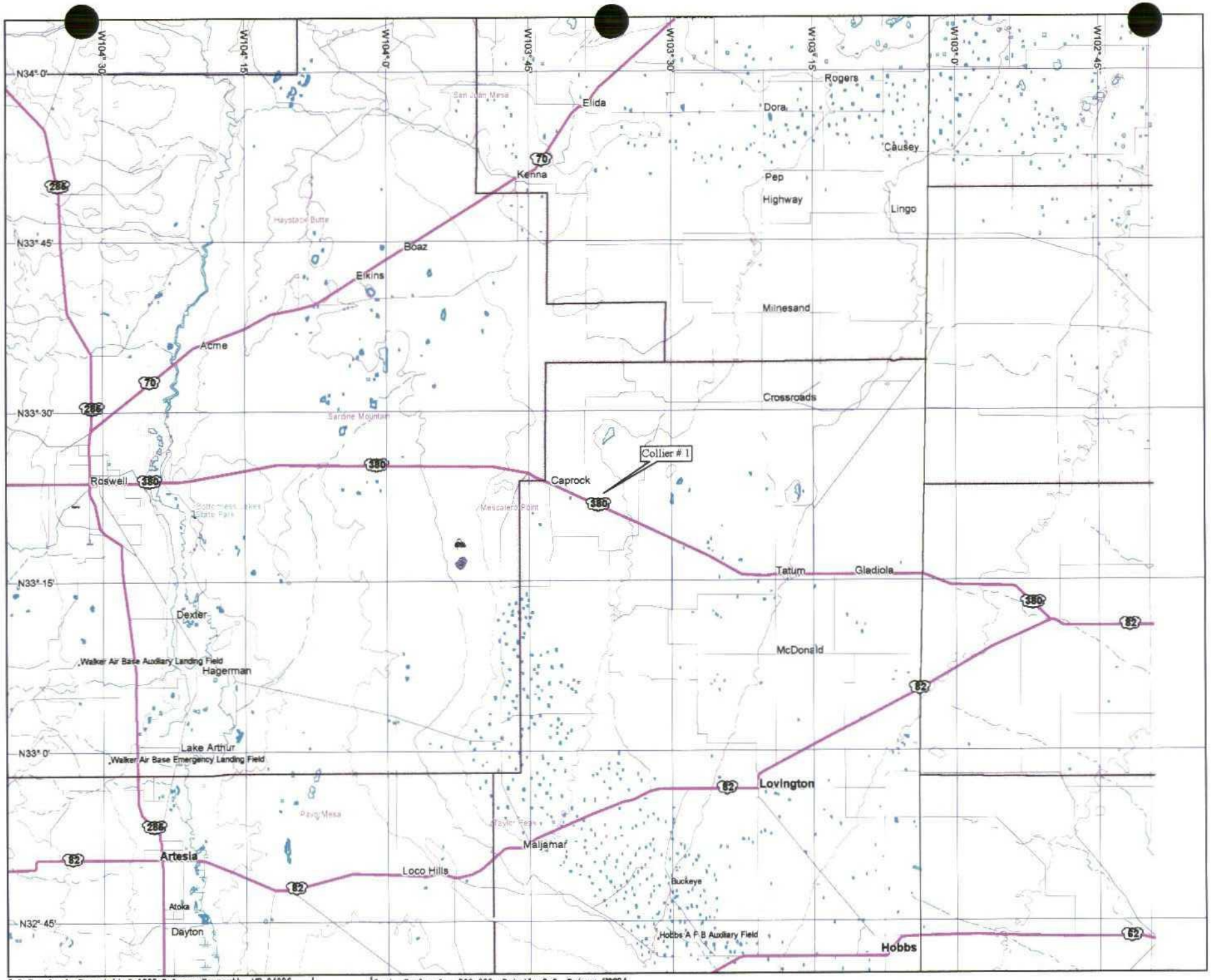
Exhibit 8. Boring Log of Monitor Well # 3

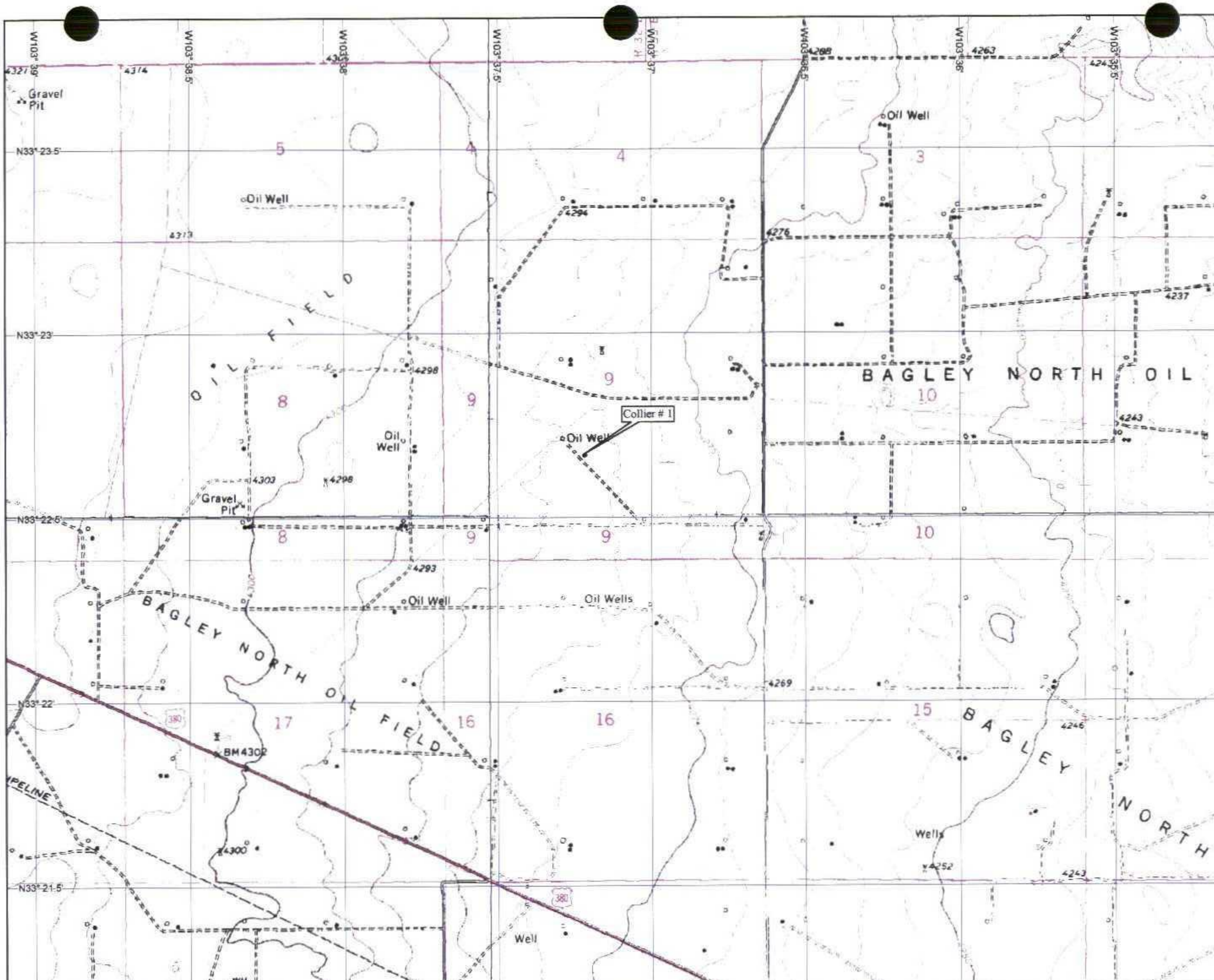
Exhibit 9. Boring Log of Monitor Well # 4

Exhibit 10. Basin Survey plat map showing the locations of all significant surface features

Exhibit 11. Copy of Basin Survey showing chloride & BTEX concentrations within the well bores

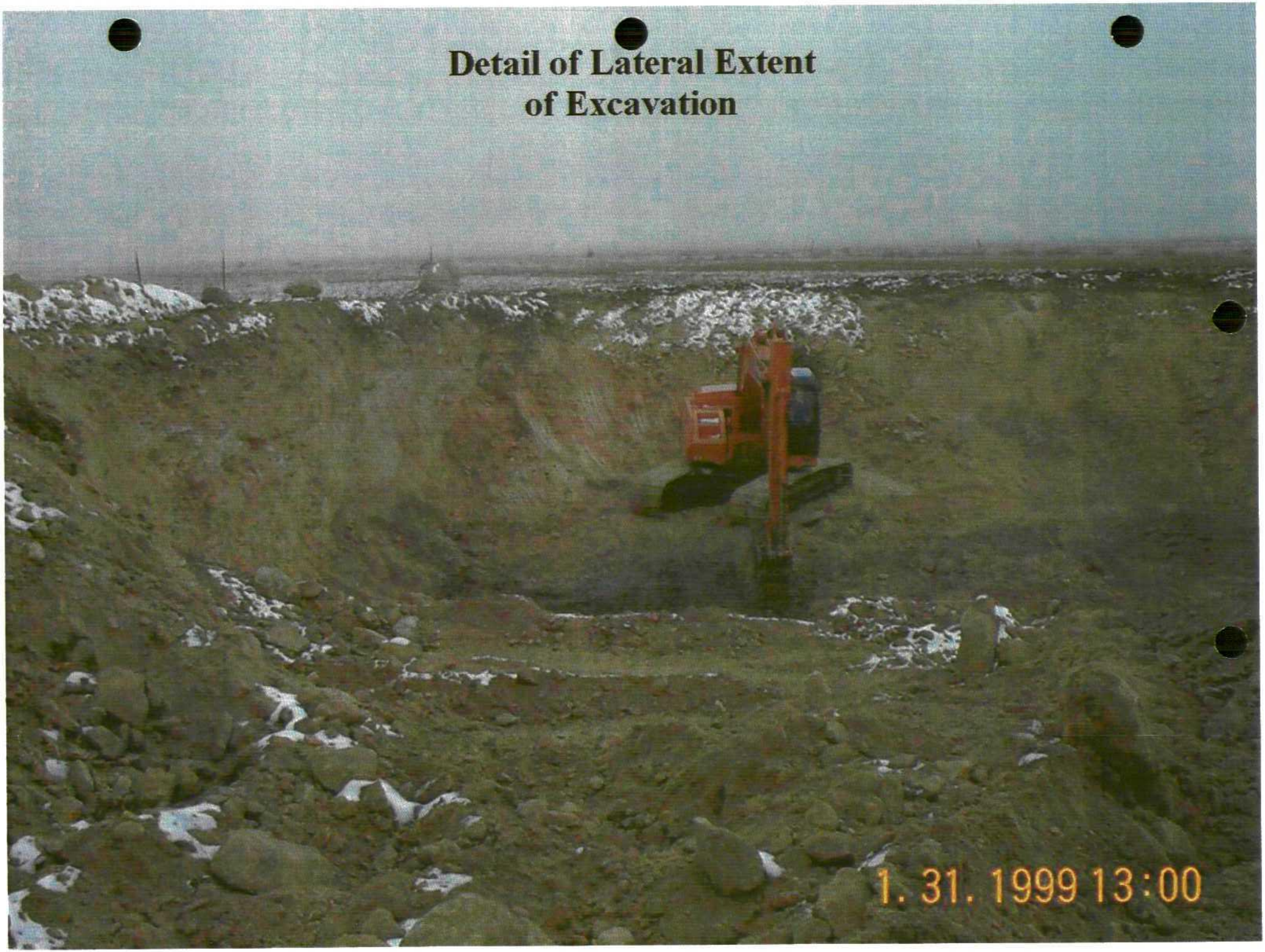
Exhibit 12. Collier # 1 Well Gradient Calculations Worksheet

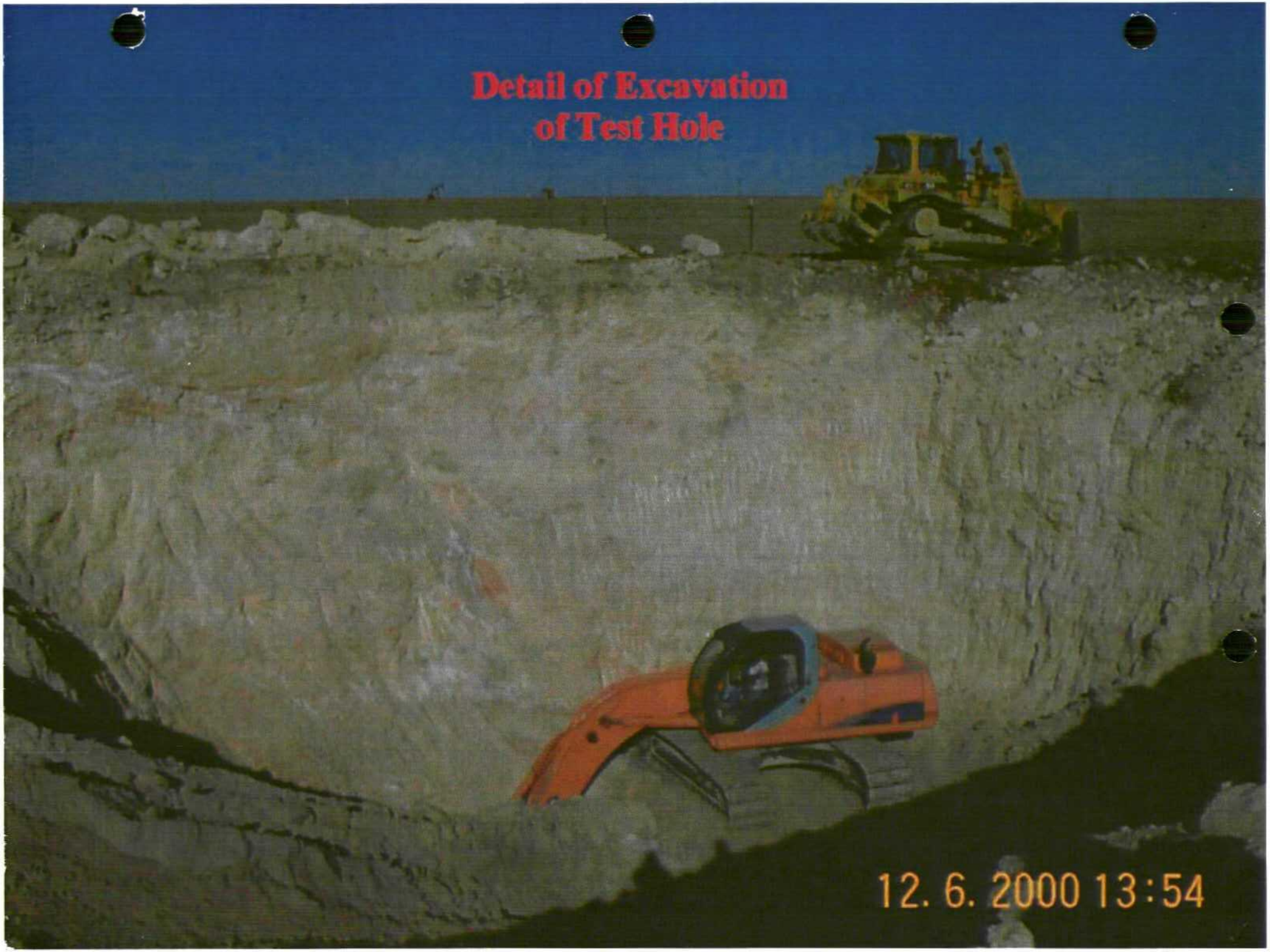

W104° 30'
W104° 15'
W104° 0'
W103° 45'
W103° 30'
W103° 15'
W103° 0'
W102° 45'
N34° 0'
N33° 45'
N33° 30'
N33° 15'
N33° 0'
N32° 45'
San Juan Mesa
Haystack Butte
Sardine Mountain
Mescalero Point
Paving Mesa
Taylor Peak
Elida
Kenna
Rogers
Dora
Causey
Pep
Highway
Lingo
Boaz
Elkins
Milnesand
Acme
Crossroads
Collier # 1
Caprock
Roswell
Bottomless Lakes State Park
Tatum
Gladiola
Dexter
McDonald
Walker Air Base Auxiliary Landing Field
Hagerman
Lake Arthur
Walker Air Base Emergency Landing Field
Lovington
Maljamar
Artesia
Loco Hills
Buckeye
Atoka
Dayton
Hobbs A F B Auxiliary Field
Hobbs
70
285
380
82
62
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096
6 mi
Scale: 1 : 800,000 Detail: 8-0 Datum: WGS84



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 1000 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84

Detail of Lateral Extent of Excavation




Detail of Excavation
of Test Hole
12. 6. 2000 13:54

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Callier #1, MW-1 (Page 1 of 2)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084	Date	: 07-02-01	Site Location : Caprock, NM : Sec. 9, T11S, R33E
	Drill Start	: 0800	
	Drill End	: 1330	Auger Type : Hollow Stem
Contact: Mike Griffin	Boring Location	: SE of old pit	Logged By : Mort Bates
Job#: WHOLETH.MWD.01			

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab mg/kg	PID ppm-v	Well: MW-1
0				Caliche w/ rock, tan & white, loose, dry			Grout
5							Bentonite seal
10							
15							4" PVC Casing
20							
25				Caliche w/ sand, tan, firm, dry			Silica sand pack
30				Silty sand, tan, loose, dry			
35		SM					
40							4" .020 slot screen
45		SS		Sandstone w/ sand, tan, firm, dry			
50							

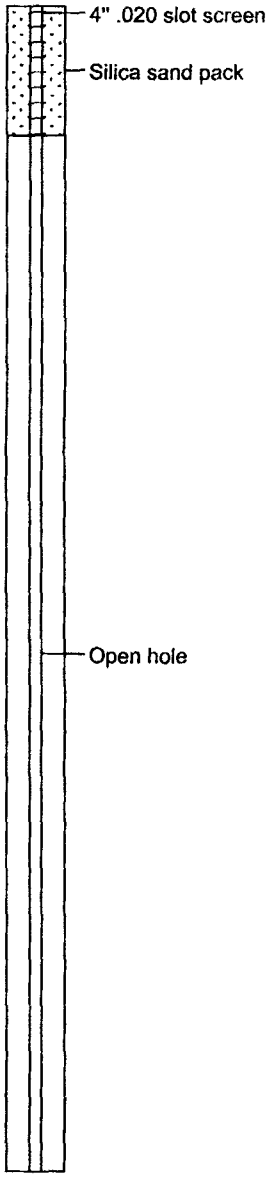
07-05-2001 ...\TECH46\WHOLETH\MWD01\mw-1.bor

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Callier #1, MW-1 (Page 2 of 2)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084	Date	: 07-02-01	Site Location	: Caprock, NM
	Drill Start	: 0800		: Sec. 9, T11S, R33E
	Drill End	: 1330	Auger Type	: Hollow Stem
Contact: Mike Griffin	Boring Location	: SE of old pit	Logged By	: Mort Bates
Job#: WHOLETH.MWD.01				

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab mg/kg	PID ppm-v
50		SS				
				Clayey sand, ted, tight, damp		
55						
60		SC				
65						
70						
75		CL		Sandy clay, tan, soft, wet		
80				Clayey sand, tan, soft, wet		
85		SC				
90						
95				Total depth 95' Water level 44.0'		
100						

Well: MW-1



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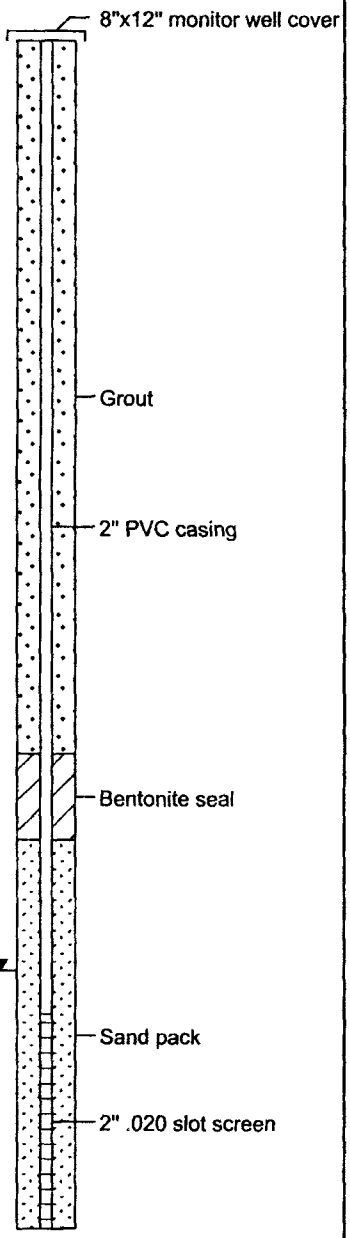
Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Callier #1, MW-2 (Page 1 of 1)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084	Date	: 07-02-01	Site Location : Caprock, NM : Sec. 9, T11S, R33E
Contact: Mike Griffin	Drill Start	: 1400	
Job#: WHOLETH.MWD.01	Drill End	: 1800	Auger Type : Hollow Stem
	Boring Location	: 200'SE of MW-1	Logged By : Mort Bates

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab mg/kg	PID ppm-v
0		CL		Clay w/ caliche rock, tan, firm, dry		
5				Caliche, white, firm, dry		
10						
15		SM		Silty sand w/ caliche, pink, firm, dry		
20						
25		SM		Silty sand, tan, loose, dry		
30						
35						
40		SS		Sandstone w/ sand, tan, firm, damp		
45		SP		Sand, tan, tight, damp		
50		SP		Sand, tan, soft, wet		
55				Total depth 55' Water level 43'		
60						

Well: MW-2



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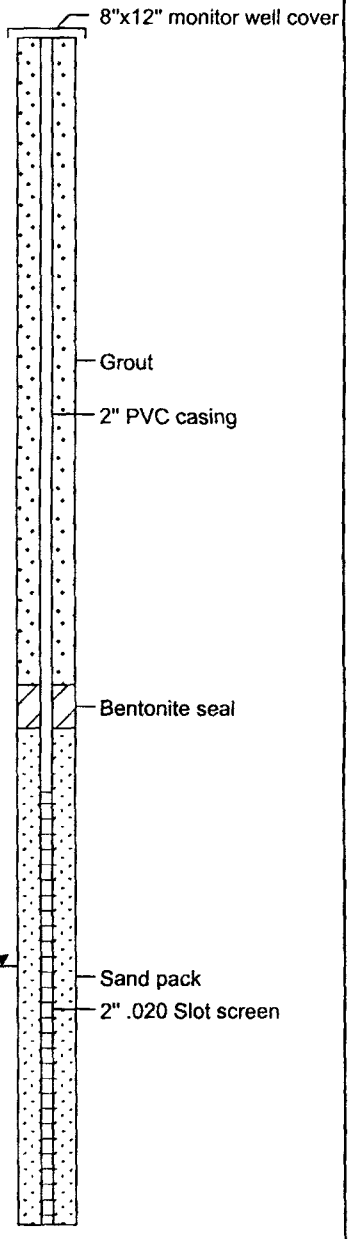
Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Callier#1 MW-3 (Page 1 of 1)

Whole Earth 19606 San Gabriel Houston, TX 77084	Date	: 08-09-01	Site Location : Caprock, NM
	Drill Start	: 0800	: T11S, R33E, Sec. 9
	Drill End	: 1030	Auger Type : Hollow Stem
Contact: Mike Griffin	Boring Location	: 254'SE of MW-2	Logged By : Mort Bates
Job#: WHOLETH.MWE!01			

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v
0		CL		Clay w/ caliche rock, brown, loose, damp		
5				Silty sand w/ caliche, tan, firm, dry		
10						
15		SM				
20						
25						
30		SP		Poorly graded sand, tan, loose, dry		
35		SP		Sand w/ sandstone, tan, loose, dry		
40		SS		Sandstone w/ sand, tan, firm, dry		
		SP		Sand, tan, loose, damp		
45				Sand, tan, loose, moist		
50		SP				
55				Total depth 55' Water level 43.00'		
60						

Well: MW-3



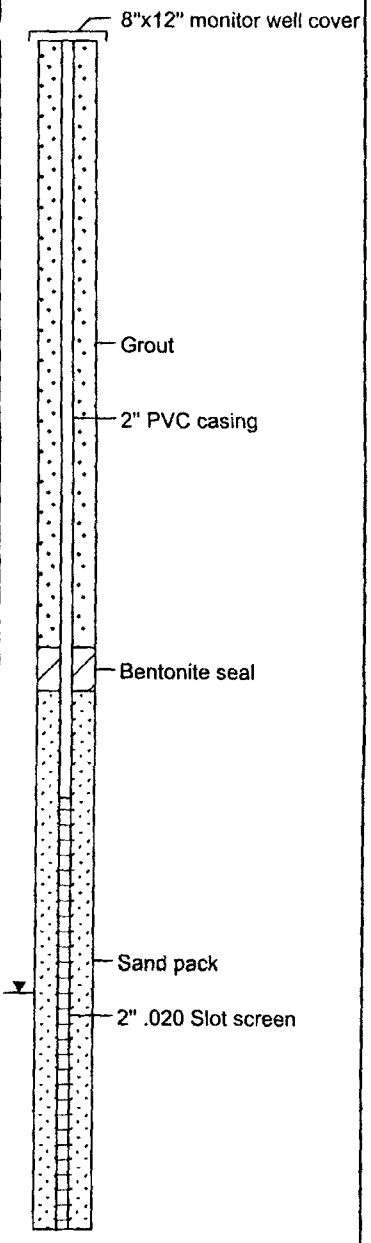
08-10-2001 C:\MTECH46\WEMWE01\mw-3.bor

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Callier#1 MW-4 (Page 1 of 1)

Whole Earth 19606 San Gabriel Houston, TX 77084	Date	: 08-09-01	Site Location : Caprock, NM
	Drill Start	: 1100	: T11S, R33E, Sec. 9
	Drill End	: 1500	Auger Type : Hollow Stem
Contact: Mike Griffin	Boring Location	: 250'SE of MW-3	Logged By : Mort Bates
Job#: WHOLETH.MWE.01			

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v
0		CL		Clay w/ caliche rock, brown, loose, dry		
				Caliche rock, tan, hard, dry		
5				Silty sand w/ caliche, tan, firm, dry		
10		SM				
15						
20						
				Poorly graded, sand, tan, loose, dry		
25		SP				
30						
				Sand w/ sandstone, tan, loose, dry		
35		SP				
40		SS		Cemented sandstone, tan, firm, dry		
				Sand, tan, loose, moist		
45		SP				
50						
55				Total depth 55' Water level 44.0'		
60						

Well: MW-4



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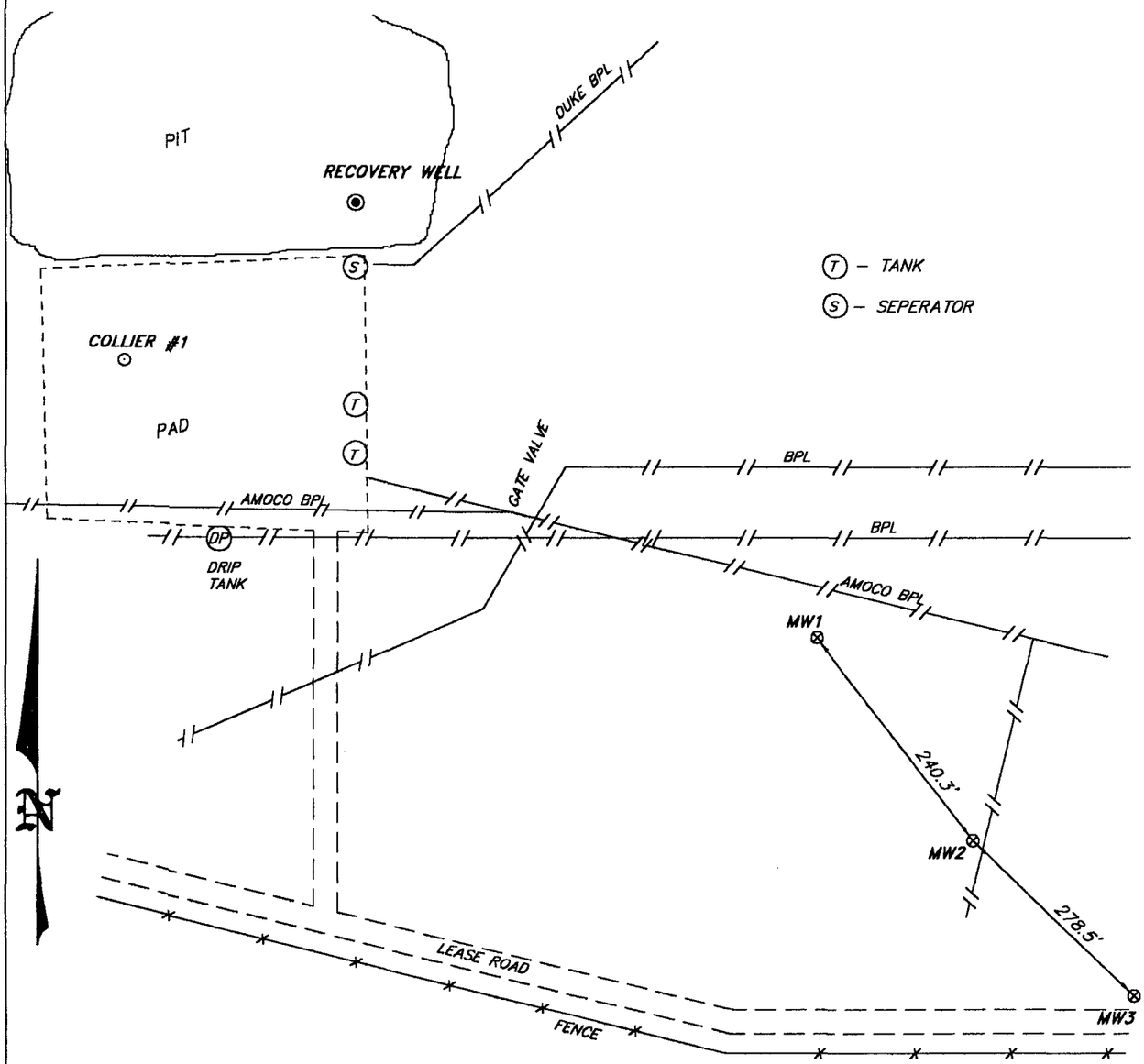
SECTION 9, TOWNSHIP 11 SOUTH, RANGE 33 EAST, N.M.P.M.,
LEA COUNTY, **NEW MEXICO.**



NAME	GRND ELEV.	NORTHING	EASTING	LATITUDE	LONGITUDE
MW #1	4284.0'	N867126.912	E759044.543	N33°22'53.8"	W103°37'12.5"
MW #2	4281.2'	N866936.756	E759191.429	N33°22'51.9"	W103°37'10.8"
MW #3	4280.8'	N866743.131	E759391.582	N33°22'50.0"	W103°37'08.4"
RECOVERY WELL	4292.1'	N867399.618	E758755.059	N33°22'56.5"	W103°37'15.9"
COLLIER #1	4290.7'	N867299.109	E758610.947	N33°22'55.5"	W103°37'17.6"

ALL COORDINATES ARE BASED ON NMSPCE (NAD83)

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES
NEW MEXICO 7977
REGISTERED PROFESSIONAL LAND SURVEYOR

GARY L. JONES N.M. P.S. No. 7977
TEXAS R.P.L.S. No. 5074

100 0 100 100

BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO

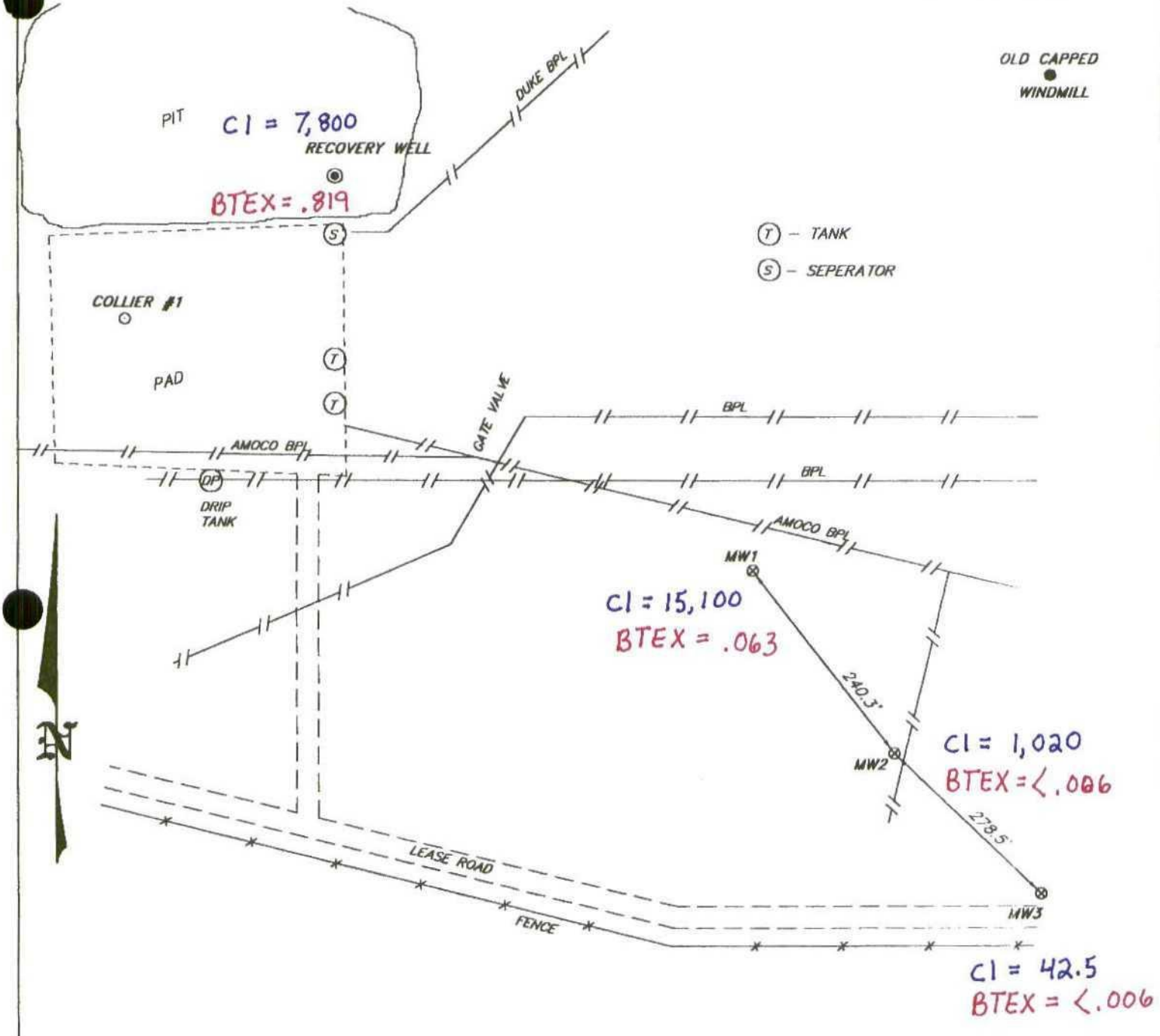
WHOLE EARTH ENVIROMENTAL, INC.

REF: MONITOR WELLS

MONITOR WELLS LOCATED IN
SECTION 9, TOWNSHIP 11 SOUTH, RANGE 33 EAST,
N.M.P.M., LEA COUNTY, NEW MEXICO.

W.O. Number: COLLIER	Drawn By: K. GOAD		
Date: 08-09-2001	Disk: KJG CD#4 – COLLIER.DWG	Survey Date: 08-02-2001	Sheet 1 of 3 Sheets

SECTION 9, TOWNSHIP 11 SOUTH, RANGE 33 EAST, N.M.P.M.,
LEA COUNTY, **NEW MEXICO.**



NAME	GRND ELEV.	NORTHING	EASTING	LATITUDE	LONGITUDE
MW #1	4284.0'	N867126.912	E759044.543	N33°22'53.8"	W103°37'12.5"
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MW #3	4280.8'	N866743.131	E759391.582	N33°22'50.0"	W103°37'08.4"
RECOVERY WELL	4292.1'	N867399.618	E758755.059	N33°22'56.5"	W103°37'15.9"
COLLIER #1	4290.7'	N867299.109	E758610.947	N33°22'55.5"	W103°37'17.6"
WINDMILL	4286.2'	N867507.191	E759256.868	N33°22'57.6"	W103°37'09.9"

ALL COORDINATES ARE BASED ON NMSPCE (NAD83)

Tipperary Corporation
Collier # 1
Well Gradient
Calculation Worksheet

Well Number	Surface Elevation	Depth to Water	Distance From Source	Gradient (ft / ft)
Collier Source	4,292.1	42.8		
MW 1	4,284.0	43.4	400.0	0.0188
MW 2	4,281.2	43.0	240.3	0.0167
MW 3	4,280.8	44.0	278.5	0.0110

ıviron[illegible]ental Lab of Texas, Inc.

0 West I-20 E[illegible]
sa, Texas 79763

Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: ____________________

Company Name Whole Earth Environmental, Inc.

Company Address: 19606 San Gabriel

City/State/Zip: Houston, Tx. 77084

Telephone No: 800.854.4358

Fax No: 281.646.8996

Sampler Signature: M. Griffin (signature)

Project Name: Collier # 1

Project #: ____________________

Project Loc: Tatum, NM

PO #: ____________________

Preservative: HCl column annotated by hand "as per Mike Griffin"; the H_2SO_4 column is struck through.

Analyze For: TCLP: / TOTAL:

Lab # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	Preservative: HNO_3	Preservative: HCl	Preservative: NaOH	Preservative: H_2SO_4	Preservative: None	Preservative: Other (Specify)	Matrix: Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify):	TDS / CL / SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	Chlorides	RUSH TAT (Pre-Schedule)	Standard TAT
[illegible]	3	8/11/01	10:30	2	X		X		X			X											X			
[illegible]	3	8/11/01	10:30	1	X							X												X		
[illegible]	4	8/11/01	11:45	2	X		X		X			X											X			
[illegible]	4	8/11/01	11:45	1	X							X												X		

Instructions:

Relinquished by	Date	Time	Received by	Date	Time
ıshed by: . Griffin (signature)	8/12/01	8:30 AM	Received by:		
ıshed by:	Date	Time	Received by ELOT: (signature)	8-[illegible]	[illegible]

Sample Containers Intact? [illegible]
Temperature Upon Receipt: [illegible]
Laboratory Comments: [illegible]

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

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

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl/ 3.5 deg C
Project #: None Given
Project Name: Collier #1
Project Location: Tatum, NM

Sampling Date: 08/11/01
Receiving Date: 08/12/01
Analysis Date: 08/14/01

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
0101331-01	3	<0.001	<0.001	<0.001	<0.001	<0.001
0101331-02	4	<0.001	<0.001	<0.001	<0.001	<0.001

QUALITY CONTROL	0.105	0.109	0.111	0.226	0.112
TRUE VALUE	0.100	0.100	0.100	0.200	0.100
% INSTRUMENT ACCURACY	105	109	111	113	112
SPIKED AMOUNT	0.100	0.100	0.100	0.200	0.100
ORIGINAL SAMPLE	<0.001	<0.001	<0.001	<0.001	<0.001
SPIKE	0.097	0.101	0.102	0.209	0.104
SPIKE DUP	0.092	0.093	0.092	0.183	0.094
% EXTRACTION ACCURACY	97	101	102	105	104
BLANK	<0.001	<0.001	<0.001	<0.001	<0.001
RPD	5	8	10	13	10

METHODS: EPA SW 846-8021B ,5030

Raland K. Tuttle

8-16-01
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

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

Sample Type: Water
Sample Condition: Intact/ Iced/ 3.5 deg C
Project #: None Given
Project Name: Collier #1
Project Location: Tatum, NM

Sampling Date: 08/11/01
Receiving Date: 08/12/01
Analysis Date: 08/13/01

ELT#	FIELD CODE	Chloride mg/L
0101331-01	3	1060
0101331-02	4	42.5

QUALITY CONTROL	5140
TRUE VALUE	5000
% INSTRUMENT ACCURACY	103
SPIKED AMOUNT	500
ORIGINAL SAMPLE	1060
SPIKE	1550
SPIKE DUP	1570
% EXTRACTION ACCURACY	98
BLANK	<5.00
RPD	1.28

METHODS: EPA SW 846-9253

Raland K. Tuttle

8-16-01
Date

'ironmental Lab of Texas, Inc.

est I-20 East
Texas 79763

Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager:

Company Name: Whole Earth Environmental, Inc.

Company Address: 19606 San Gabriel

City/State/Zip: Houston, Tx. 77084

Telephone No: (800) 854-4358

Fax No: (281) 646-8996

Sampler Signature: [signature]

Project Name: Quarterly Sampling

Project #:

Project Loc: Tatum, New Mexico

PO #:

				Preservative							Matrix				Analyze For: (TCLP: / TOTAL:)																
FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Ice	HNO_3	HCl	NaOH	H_2SO_4	None	Other (Specify)	Water	Sludge	Soil	Other (specify):	TDS / CL / SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	Cations / Anions							RUSH TAT (Pre-Schedule)	Standard TAT
Satellite # 4 MW 23	6/6/01		2	X		X					X											X									
Satellite # 4 MW24	6/6/01		2	X		X					X											X									
Collier MW 32	6/6/01		4	X		X					X				X							X	X								
CollierMW 33	6/6/01		4	X		X					X				X							X	X								

al Instructions:

uished by:	Date	Time	Received by:	Date	Time
[signature]	7-7-01	11:30			
uished by:	Date	Time	Received by ELOT: [signature]	Date 7-7-01	Time 11:30

Sample Containers Intact? Temperature Upon Receipt: Laboratory Comments:

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: 281-646-8996
FAX: 505-397-3591 (motel)

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl 2 deg C
Project #: None Given
Project Name: Quarterly Sampling
Project Location: Tatum, N.M.

Sampling Date: 07/06/01
Receiving Date: 07/07/01
Analysis Date: 07/09/01

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
0101098-18	Sohio #1 MW 28	0.009	0.002	0.006	0.025	0.007
0101098-19	Sohio #1 MW 30	0.005	0.001	0.004	0.017	0.005
0101098-20	Sohio "A" MW 11	0.035	0.002	0.005	0.018	0.007
0101098-21	Sohio "A" MW 19	0.307	0.001	0.004	0.017	0.005
0101098-22	Sohio "A" MW 20	0.005	<0.001	0.004	0.014	0.004
0101098-23	Sohio "A" MW 27	0.073	<0.001	0.004	0.012	0.004
0101098-24	Sohio "A" MW 31	0.275	0.003	0.007	0.039	0.014
0101098-25	GS Source Well	0.318	0.180	0.133	0.722	0.368
0101098-26	GS MW 12	0.350	0.026	0.150	0.483	0.150
0101098-27	GS MW 21	0.009	0.002	0.007	0.004	0.002
0101098-28	GS MW 22	0.062	0.020	0.046	0.047	0.069
0101098-29	GS MW 29	0.005	0.002	0.004	0.005	0.004
0101098-30	Sat. 4 MW 9	<0.001	<0.001	0.001	0.003	<0.001
0101098-31	Satellite #4 MW 23	<0.001	<0.001	<0.001	<0.001	<0.001
0101098-32	Satellite #4 MW 24	<0.001	<0.001	<0.001	<0.001	<0.001
0101098-33	Collier MW 32	0.537	0.054	0.073	0.077	0.078
0101098-34	Collier MW 33	0.043	0.003	0.005	0.007	0.005
	QUALITY CONTROL	0.092	0.098	0.095	0.186	0.097
	TRUE VALUE	0.100	0.100	0.100	0.200	0.100
	% INSTRUMENT ACCURACY	92	90	95	93	97
	SPIKED AMOUNT	0.100	0.100	0.100	0.200	0.100
	ORIGINAL SAMPLE	0.005	0.001	0.004	0.017	0.005
	SPIKE	0.097	0.090	0.098	0.202	0.101
	SPIKE DUP	0.097	0.091	0.090	0.185	0.090
	% EXTRACTION ACCURACY	92	89	94	93	96
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001
	RPD	0	1	8	9	11

METHODS: EPA SW 846-8021B ,5030

Raland K. Tuttle

7-13-01
Date

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: 281-646-8996
FAX: 505-397-3591 (motel)

Sample Type: Water
Sample Condition: Intact/ 2 deg. C
Project #: None Given
Project Name: Quarterly Sampling
Project Location: Tatum, N.M.

Sampling Date: 07/05/01
Receiving Date: 07/07/01
Analysis Date: See Below

ELT#	FIELD CODE	TDS mg/L	Conductivity uS/cm	Chloride mg/L	Sulfate mg/L	Carbonate mg/l	Bicarbonate mg/l
0101098-33	Collier MW 32	13300	18400	7800	104	<0.10	340
0101098-34	Collier MW 33	25000	29200	15100	176	<0.10	144
	REPORTING LIMIT	10.0	N/A	10.0	0.5	0.10	2.00
	QUALITY CONTROL	N/A	1439	5140	41.8	0.0205	0.0205
	TRUE VALUE	N/A	1413	5000	50.0	0.0200	0.0200
	% IA	N/A	102	103	84	103	103
	RPD	1.32	1.1	0.0	13.6	0.57	0.57
	BLANK	<10.0	8.0	<10.0	<0.5	<0.10	<2.00
	ANALYSIS DATE	7/10/01	7/07/01	7/09/01	7/11/01	7/10/01	7/10/01

METHODS: EPA 375.4, 310.0, 160.1, 120.1, SW846-9253,

Raland K. Tuttle

7-13-01
Date

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: 281-646-8996
FAX: 505-397-3591 (motel)

Sample Type: Water
Sample Condition: Intact/ 2 deg C
Project #: None Given
Project Name: Quarterly Sampling
Project Location: Tatum, N.M.

Sampling Date: 07/05/01
Receiving Date: 07/07/01
Analysis Date: 07/13/01

ELT#	FIELD CODE	Ca mg/L	K mg/L	Mg mg/L	Na mg/L
0101098-33	Collier MW 32	382	33.9	82.9	3650
0101098-34	Collier MW 33	3350	49.0	462	4620
	REPORT LIMIT	0.01	0.05	0.001	0.01
	QUALITY CONTROL	5.00	4.95	5.01	5.00
	TRUE VALUE	5.00	5.00	5.00	5.00
	% INSTRUMENT ACCURACY	100	99	100	100
	SPIKED AMOUNT	2.00	2.00	2.00	2.00
	ORIGINAL SAMPLE	<0.01	<0.05	<0.001	<0.01
	SPIKE	2.00	1.76	2.10	2.02
	SPIKE DUP	1.98	1.76	2.09	1.98
	% EXTRACTION ACCURACY	100	88	105	101
	BLANK	<0.01	<0.05	<0.001	<0.01
	RPD	1.00	0.00	0.96	2.00

METHODS: SW846-6010B

Raland K. Tuttle

Raland K. Tuttle

7-13-01
Date