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REPORTS

DATE:

2001

Tipperary
CORPORATION

Tipperary Corporation
Tatum Pit Closure Project
Annual Sampling Summary

RECEIVED
APR 3 0 2001
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Whole Earth Environmental
19606 San Gabriel
Houston, Tx. 77084

Tipperary
CORPORATION

633 Seventeenth Street
Suite 1550
Denver, Colorado 80202

November 29, 1999

CERTIFIED MAIL

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

RE: July 1999 Progress Report
October 1999 Progress Report
Tatum Pit Closure Project
Lea County, NM

Dear Mr. Olson:

Please find enclosed additional monitor well results from the subject project area. This data represents results from our eighth and ninth quarters of monitoring. We would like to request permission to submit our monitoring results annually to your office. Of course, we will continue to sample and monitor the project quarterly.

We have also addressed the requests and issues in your letter of August 6, 1999 correspondence (copy attached). Our responses are found in the Executive Summary section. Additional data included in the Executive Summary section is summarized below:

- Surveyed locations of each pit center and all recovery and monitor wells including surface elevations. The above information is plotted on a topographic base map. Individual site plat maps are included within each well/pit section.
- A table of monitor well water elevations. This table includes a calculation of the hydraulic gradient for each well/pit site.
- A graph of the depths to water in each monitor well. The data covers the last two sampling quarters and the depth of water when the monitor wells were drilled.
- A graph of the monthly rainfall totals as measured in Lovington, NM. Also included is a table of weather data recorded by Lea County Electric Co-Op.
- A graph comparing the average BTEX concentrations measured each quarter with the quarterly rainfall to establish a direct relationship with the amount of precipitation.
- A summary table of results from BTEX sampling with a plot of results.
- Copies of the BTEX analyses from Environmental Lab of Texas, Inc.
- A procedure for developing cased water monitoring wells.

Data for each well/pit is summarized in its own section. The following data is included under each well/pit section.

- A summary of monitoring activity for each monitor well.
- A summary of BTEX results for each recovery and monitor well. A bar graph of this data is presented.
- A topographic map for each well/pit.
- A site map with the location of the pit and monitor wells including the surface elevations.
- A table of water elevations from the monitor wells along with a calculation of the hydraulic gradient for each well/pit.

We have also submitted formal closure reports for the Vera #1 and State NBN #1 sites under separate cover. If you have any questions, please call me at (303) 293-9379.

Very truly yours,

Larry G. Sugano

Larry G. Sugano
Vice President - Engineering

cc: NMOCD Hobbs Office
Enclosures

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

August 6, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z-274-520-689

Mr. Larry G. Sugano
Tipperary Corporation
633 Seventeenth St., Suite 1550
Denver, Colorado 80202

RE: TATUM PIT CLOSURES

Dear Mr. Sugano:

The New Mexico Oil Conservation Division (OCD) has reviewed Tipperary Corporation's (TC) April 27, 1999 "APRIL 1999 PROGRESS REPORT, TATUM PIT CLOSURE PROJECT, LEA COUNTY, NEW MEXICO". This document contains the results of TC's monitoring of ground water contamination related to the closure of 10 unlined pits west of Tatum, New Mexico. The document also requests final closure of the remedial actions related to unlined pits at the State NBN #1 and Vera #1 sites and proposes modifications to the ground water sampling program.

In order to complete a review of the above referenced closure requests and sampling modifications, the OCD requires that TC submit the following information, with all maps, tables and data segregated into separate case files for each site:

1. A water table potentiometric map for each site which shows the location of the pit and excavated areas, the surveyed locations of all monitor wells and recovery wells and any other pertinent site features as well as the direction and magnitude of the hydraulic gradient created using the water table elevation in each monitor well On March 29, 1999, the OCD required that TC submit this information. The above referenced document states that TC was preparing the maps. To date the OCD has not received this required information.

2. Tables of water table elevations in each monitor well during each sampling event. The document discusses seasonal fluctuations in the water table as responsible for increases in contaminant concentrations in ground water. However, the supporting water table elevation vs. time data for each monitor well is not provided.

3. Tables of all past and present water quality sampling results for each ground water monitoring and recovery well as required in the OCD's January 15, 1999 conditions of approval. The document only contains analytical data for ground water monitoring wells that are currently being sampled.

4. An explanation of the use of drill cuttings as backfill in the annular space above the bentonite plug in each newly constructed monitor well . This is a direct violation of the OCD's January 15, 1999 conditions of approval which required that the remainder of the annular space be grouted to the surface with cement containing 3-5% bentonite. As a result the monitor wells as constructed by TC are potentially direct conduits to ground water.

5. The monitor well development procedures and volumes for each monitor well.

6. The volume of ground water and product recovered to date at all sites with fluid recovery as required in the OCD's January 15, 1999 conditions of approval.

7. A completed OCD pit closure and remediation report form for each site requested for closure. Each form will contain a discussion and the results of all soil and ground water site closure activities including all soil analytical data from the excavations and the backfilled materials as well as figures showing all sample locations.

The above required information shall be submitted to the OCD Santa Fe Office by October 4, 1999 with a copy provided to the OCD Hobbs District Office. Submission of this information will allow the OCD to complete a review of TC's closure requests and proposed ground water sampling plan modifications.

If you have any questions or comments, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Office
Mike Matush, NM State Land Office
Mike Griffin, Whole Earth Environmental, Inc.

OCD 8/6/99 Request for Additional Data

Scope
This report addresses the August 6th request from Mr. Olson (enclosed) requesting additional information.

Request # 1
A water table potentiometric map for each site which shows the location of the pit and excavated areas, the surveyed locations of all monitoring wells and recovery wells and any other pertinent features as well as the direction and magnitude of the hydraulic gradient created using the water table elevation in each monitoring well.

Response
The locations of each pit center, and of all recovery and monitor wells was surveyed by Adkins Engineering on August 18, 1999 (see *Coordinate File: Tipperary.CRD* within this section). The data was incorporated into previously rendered plat AutoCad maps and overlaid atop USGS 7.5' maps by Basin Surveying. A copy of each site's plat map is enclosed within the appropriate section of this report. Similar maps are included within a final closure report for Vera and State NBN submitted under separate cover.

Request # 2
Tables of water table elevations in each monitor well during each sampling event. The document discusses seasonal fluctuations in the water table as responsible for increases in contaminant concentrations in ground water. However the supporting water table elevation vs. time data for each monitor well is not provided.

Response
We've only three data points for the water table elevations within the monitoring wells. The first is from the original drilling report when the well was first installed; the second, was measured on 8/9/99; the third, on 10/21/99. In the future, the elevations for each monitor well will be measured at the time of sampling and included within the annual report.

Included within this Executive Summary section are the following charts and graphs:

A. Chart titled *"Tipperary Corporation Tatum Pit Closure Project Monitor Well Water Elevation Table"*. This table summarizes the results of the original drillers log and the two sampling events. the chart also provides the calculated gradient for each monitor well.

B. Line Graph titled *"Tipperary Corporation Monitor Well Depths"*. This graph compares the depth to water during each sampling event.

C. Chart titled *"Lea County Electrical Coop Weather Report 1998, 1999"*. These are detailed daily measurements of the precipitation received at the LEACO Lovington, New Mexico plant located approximately twenty-five miles southeast of the Tatum Field.

D. Line Graph titled *"Monthly Rainfall Totals"*. This graph takes the detailed monthly total rainfall figures from the LEACO chart and plots the information into line form for comparison purposes. Included within the map is a line showing the average monthly rainfall for the Tatum area. This number was calculated by taking the average annual rainfall for Tatum and dividing by 12.

Request # 3
Tables of all past and present water quality sampling results for each ground water monitoring and recovery well as required in the OCD's January 15, 1999 conditions of approval.

Response
Each monitor well was generally sampled each quarter and the results of each test are summarized within the Sampling Results charts and graphs for each well. The only exceptions to this are Monitor Well #1 in which we had five consecutive quarters of acceptable concentrations, Monitor Well # 3 in which we encountered mechanical problems in removing a bailer, NBN and Vera in which we've requested final closure and the three recovery wells.

Each recovery and monitor well will be sampled each quarter and the results provided to the OCD on an annual basis.

Request # 4
An explanation of the use of drill cuttings in the annular space above the bentonite plug in each newly constructed monitor well.

Response
The error is a result of a lack of oversight of the completion of the wells by Whole Earth Environmental. We believed that the instructions were correctly conveyed to the driller. We did not directly supervise the final completion of the wells.

Request # 5
The monitor well development procedures and volumes for each monitoring well.

Response
Enclosed within this Executive Summary section is *"WEQP-28, Procedure for Developing Cased Water Monitoring Wells"*. The procedure calls for the removal of three well casing volumes. The formula for determining casing volume is attached as a supplement to WEQP-28 and shows that with a water column height of 15', a total of 7.344 gallons of water must be bailed to achieve the minimum volume. In fact at least fifteen gallons of fluid were removed from each well in order to minimize turbidity. Neither Whole Earth nor Adkins Engineering maintained a log of the volumes of water removed however the procedure has been amended to insure that such information will be recorded and transmitted to the OCD in the future.

Request # 6
The volume of ground water and product recovered to date at all sites with fluid recovery as required in the OCD's January 15, 1999 conditions of approval.

Response
The fluids removed from each recovery well are pumped directly from the windmills into an open top fiberglass tank. Each tank is equipped with a liquid level controller which, when activated, engages an electric pump that sends the fluids to a steel water storage tank used in conjunction with the normal operations of the oil wells at each location. The water is subsequently pumped into the Burro Pipeline disposal system to the Satellite 5 facility. Satellite 5 is equipped with separation equipment that strips the hydrocarbons from the water through gravity separation. The eventual fate of the hydrocarbon fractions is to the sales line, and the water into a Burro Pipeline disposal well.

The fluid volumes are so low that they cannot be accurately measured by comparing "before" and "after" process volumes. However, each windmill has the capacity to produce up to 1,375 gallons per day. The approximate ratio of recovered oil to water is 1:100. The windmills are shut in during freezing weather, and otherwise operate at an estimated efficiency of between 25-75% of capacity. We therefore estimate that a liberal estimate of the total fluid removal would be in the range of 50% of the windmill's capacity or 687 gallons per day with a hydrocarbon fraction of up to 6.9 g/d.

Using these figures, we calculate that each windmill has produced a water volume of approximately 17,862 gallons and a hydrocarbon volume of 179 gallons in the time period between September, 1997, (the date of their erection), and October, 1999.

Request # 7
A completed pit closure and remediation report for each site requested for closure. Each form will contain a discussion of the results of all soil and ground water site closure activities including all soil analytical data from the excavations and the backfilled materials as well as figures showing all sample locations.

Response
As requested, the information is provided to you under separate cover.

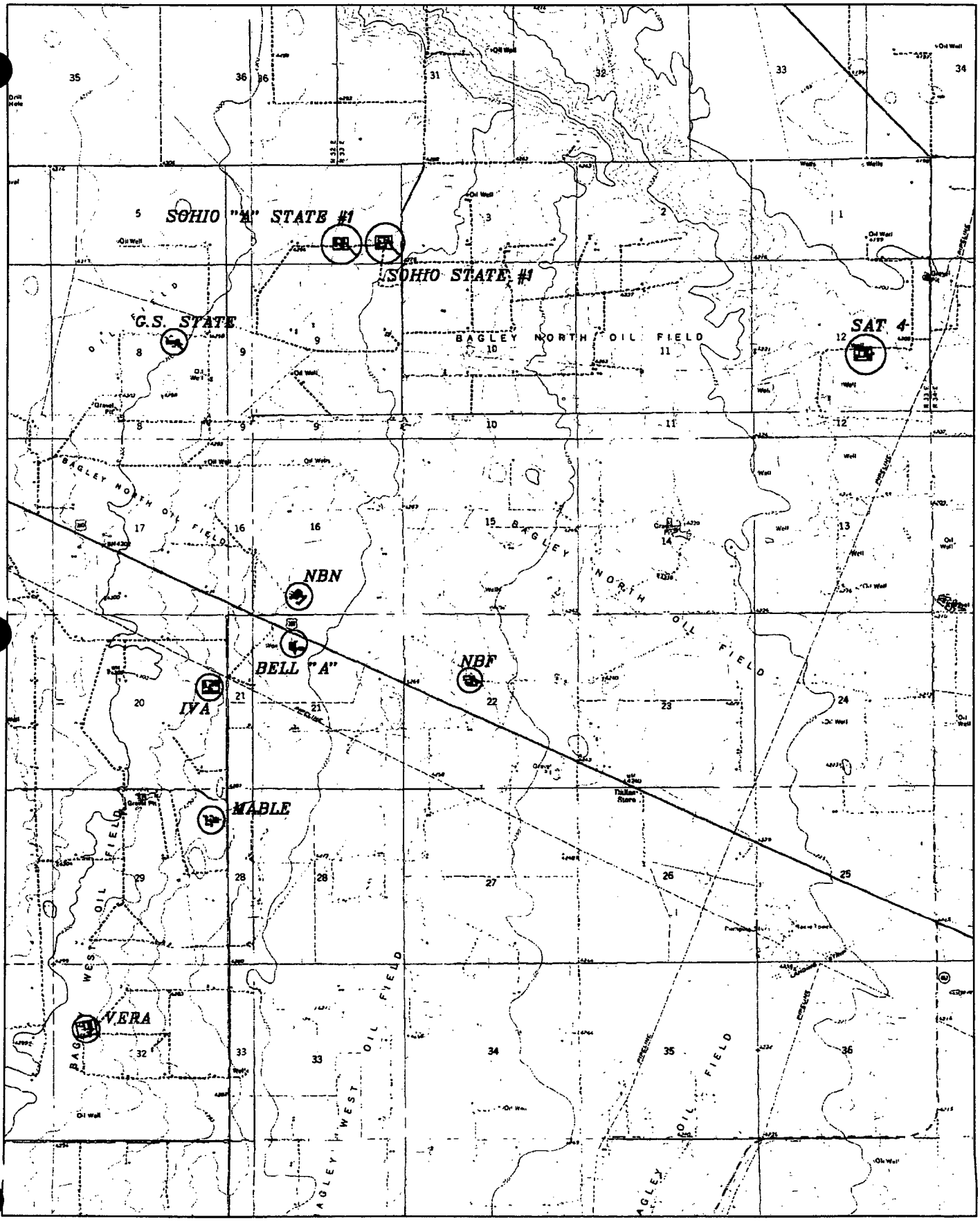
COORDINATE FILE : TIPARARY.CRD

ST COORDINATES

	PT#	NORTH	EAST	ELEV
SOHIO A STATE 1 PIT	253	870084.293	760084.206	4286.84
SOHIO A STATE 1 MW11	254	869981.125	760134.902	4285.88
SOHIO A STATE 1 MW19	255	869974.033	760205.397	4285.97
SOHIO A STATE 1 MW28	256	869892.771	760255.240	4285.61
SOHIO A STATE 1 MW31	257	869667.200	760452.460	4283.54
SOHIO STATE 1 PIT	258	870105.632	761381.498	4285.42
SOHIO STATE 1 MW10	259	870027.049	761459.334	4283.63
SOHIO STATE 1 MW17	260	869969.168	761443.837	4283.31
SOHIO STATE 1 MW18	261	870017.865	761533.683	4283.59
SOHIO STATE 1 MW28	262	869892.594	761534.416	4283.21
SOHIO STATE 1 MW30	263	869677.360	761728.469	4281.13
VERA 1 PIT	264	846366.089	752525.766	4289.49
VERA #1 MW5	265	846217.026	752582.067	4298.90
STATE NBF 1 PIT	266	856893.939	764024.682	4266.86
STATE NBF 1 MW8	267	856806.388	764165.403	4259.41
STATE NBF 1 MW15	268	856747.667	764157.788	4259.68
STATE NBF 1 MW16	269	856774.041	764241.604	4259.06
STATE NBF 1 MW26	270	856658.728	764331.675	4258.04
BELL A 1 PIT	271	857796.692	758625.535	4279.64
BELL A 1 MW6	272	857857.556	758583.503	4281.12
BELL A 1 MW13	273	857754.617	758597.054	4280.84
BELL A 1 MW14	274	857821.944	758664.690	4280.80
BELL A 1 MW25	275	857614.080	758714.518	4280.37
GS STATE 1 SOURCE	276	867037.530	755087.975	4307.00
GS STATE 1 MW21	277	866953.249	755213.712	4303.08
GS STATE 1 MW22	278	866905.186	755154.733	4302.77
GS STATE 1 MW29	279	866798.038	755260.271	4303.20
GS STATE 1 MW?	280	867001.862	755131.639	4303.27
MABEL COM 1 SOURCE	281	852659.555	756329.277	4290.55
MABEL COM 1 MW3	282	852517.536	756370.356	4287.22
MABEL COM 1 MW4	283	852592.288	756473.774	4287.46
STATE NBN 1 PIT	284	859499.318	758793.854	4282.45
STATE NBN 1 MW7	285	859397.517	758825.203	4281.59
SATELLITE 4 MW9	286	866587.512	775890.421	4208.66
SATELLITE 4 MW23	287	866507.846	775901.105	4209.03
SATELLITE 4 MW24	288	866562.481	775964.699	4208.64
IVA COM 1 SOURCE	289	856721.216	756252.189	4298.42
IVA COM 1 MW1	290	856654.035	756344.507	4292.10
IVA COM 1 MW2	291	856695.146	756388.036	4291.93

HORIZONTAL DATUM NAD 83
VERTICAL DATUM NAVD 88

WHOLE EARTH ENVIROMENTAL, INC.



BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO	W.O. Number: 9352	Drawn By: K. GOAD
	Date: 10-21-99	Disk: KJG #122 – WE9352.DWG

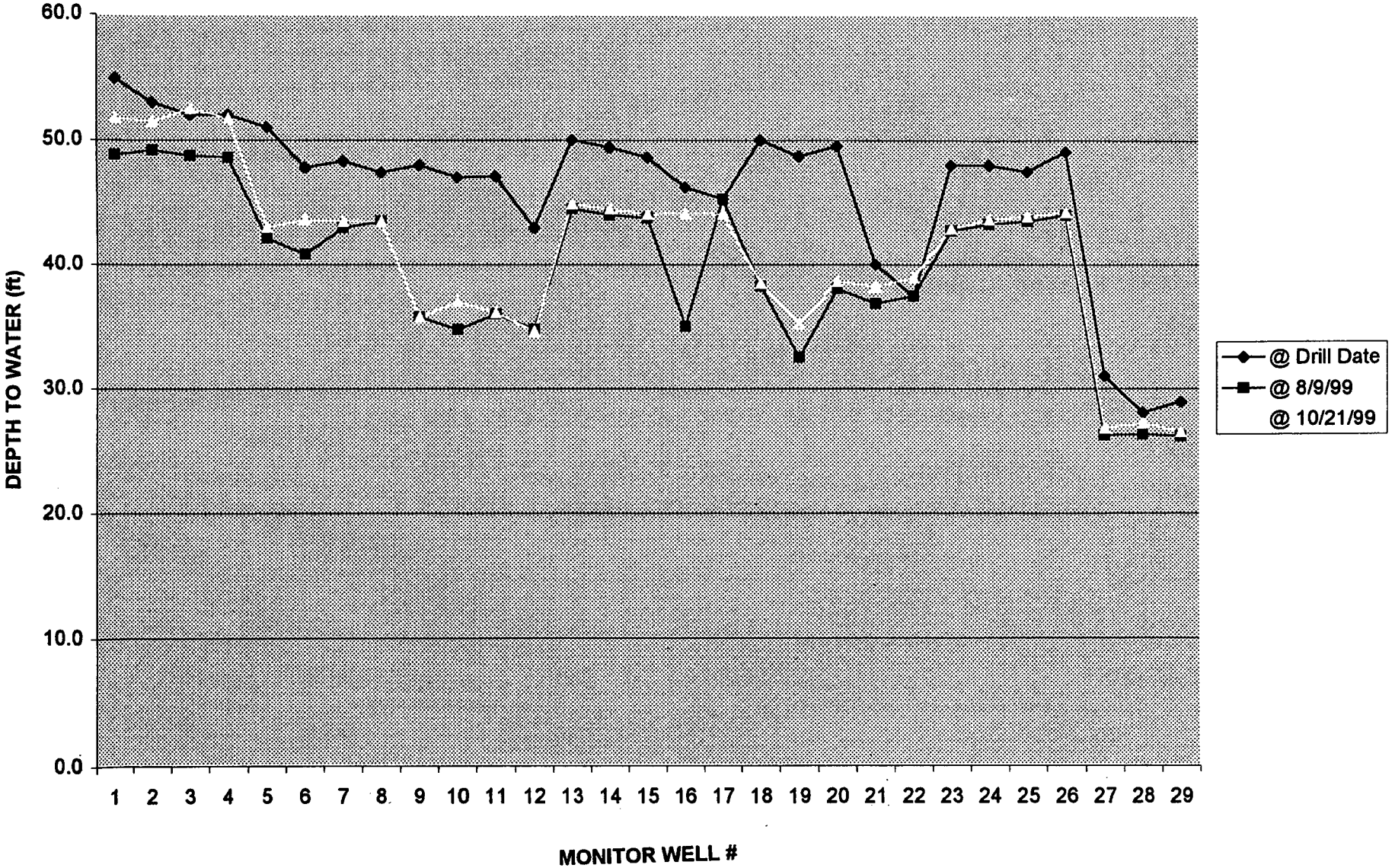
Tipperary

Tipperary Corporation
Tatum Pit Closure Project
Monitor Well Water Elevation Table

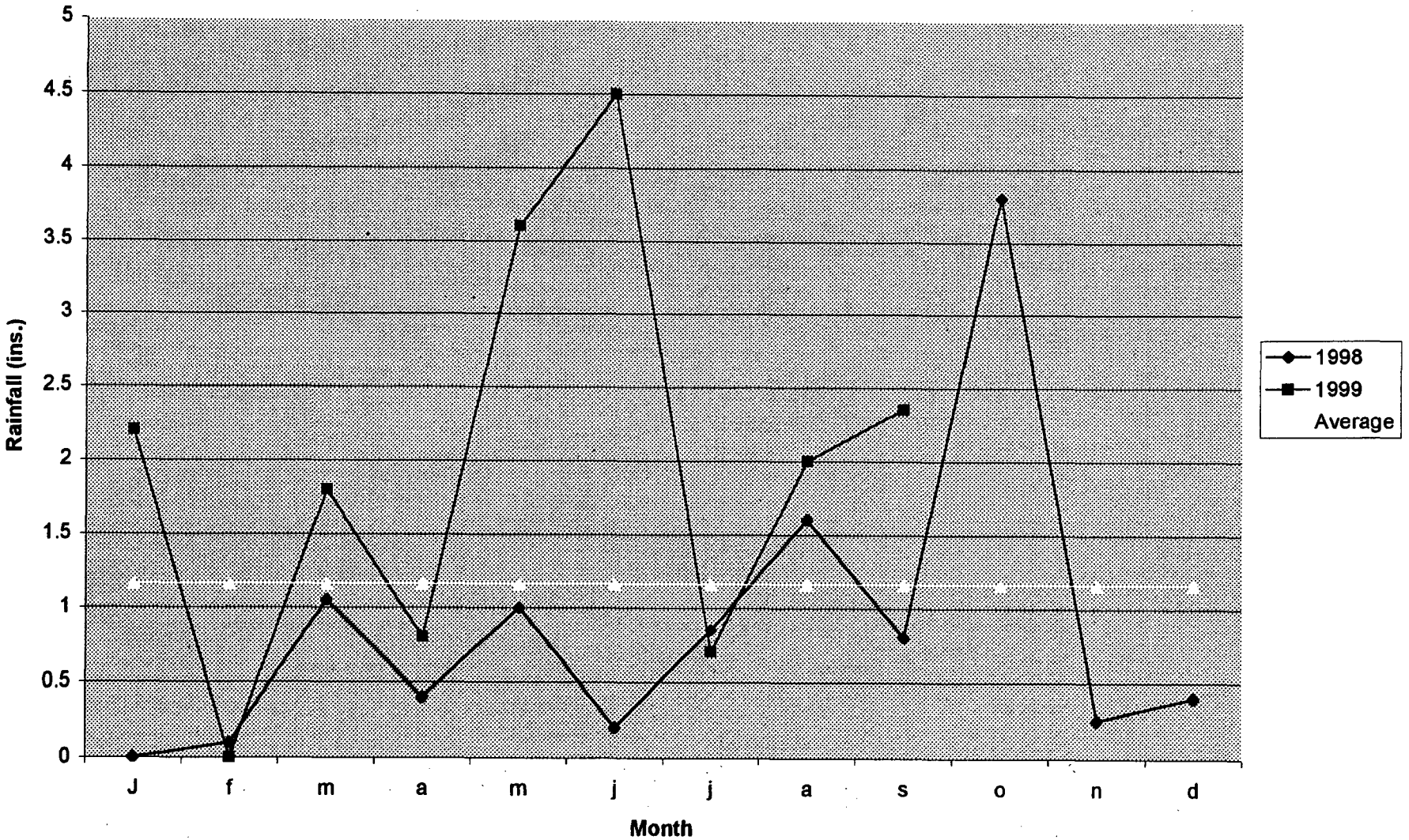
Well Name	Monitor Well No.	Surface Elevation	Date Well Drilled	Water Depth @ Drill Date	Water Elevation	Water Depth @ 8/5/99	Water Elev. @ 8/5/99	Water Depth @ 10/21/99	Water Elev. @ 10/21/99	Depth Change Aug. / Oct. '99	Distance to Pit Center (ft)	Gradient (Ft. / Ft.)	Gradient (Ft. /100 Ft.)
Ivd	Recovery Well	4,298.42	Aug-97	52.0	4,246.42								
	1	4,292.10	Aug-97	54.9	4,237.20	48.83	4,243.27	51.75	4,240.35	2.92	115	0.080174	8.02
	2	4,291.93	Aug-97	53.0	4,238.93	49.17	4,242.76	51.50	4,240.43	2.33	140	0.053500	5.35
Mable	Recovery Well	4,290.55	Aug-97	52.0	4,238.55								
	3	4,287.22	Aug-97	52.0	4,236.22	48.75	4,238.47	52.50	4,234.72	3.75	148	0.022500	2.25
	4	4,287.46	Aug-97	52.0	4,235.46	48.58	4,238.88	51.75	4,235.71	3.17	160	0.019313	1.93
Vera	Pit Center	4,292.98			4,289.50								
	5	4,286.90	Aug-97	53.0	4,235.90	51.50	4,237.40				159	-0.037233	-3.72
Bell	Pit Center	4,283.09			4,279.60								
	6	4,281.12	Aug-97	51.0	4,230.12	42.13	4,238.99	43.01	4,238.11	0.88	93	0.021183	2.12
	13	4,280.84	Oct-97	47.8	4,233.04	40.83	4,240.01	43.66	4,237.18	2.83	51	0.044118	4.41
	14	4,280.80	Oct-97	48.3	4,232.50	43.00	4,237.80	43.50	4,237.30	0.50	47	0.048723	4.87
	25	4,280.37	Mar-99	47.4	4,232.97	43.50	4,236.87	43.50	4,236.87	0.00	164	0.017662	1.77
NBN	Pit Center	4,282.45			4,282.45								
	7	4,281.59	Aug-97	50.0	4,231.59	43.50	4,238.09				107	0.008037	0.80
NBF	Pit Center	4,266.66			4,266.66								
	8	4,259.41	Aug-97	48.0	4,211.41	35.75	4,223.66	35.75	4,223.66	0.00	185	0.045152	4.52
	15	4,259.68	Oct-97	47.0	4,212.68	34.75	4,224.93	37.00	4,222.68	2.25	198	0.036263	3.63
	16	4,259.06	Oct-97	47.1	4,211.96	36.00	4,223.06	36.10	4,222.96	0.10	247	0.031579	3.16
	26	4,258.04	Mar-99	43.0	4,215.04	34.75	4,223.29	34.60	4,223.44	-0.15	387	0.022791	2.28
Sohio # 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	0.016273	1.63
	17	4,283.31	Oct-97	49.4	4,233.91	44.00	4,239.31	44.50	4,238.81	0.50	262	0.008063	0.81
	18	4,283.59	Oct-97	48.6	4,234.99	43.75	4,239.84	44.10	4,239.49	0.35	176	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	552	0.004004	0.40
	30	4,281.13	Aug-99	45.3	4,235.82	45.31	4,235.82	44.10	4,237.03	-1.21	776	0.005528	0.55
Sohio "A"	Pit Center	4,286.84			4,286.84								
	11	4,286.88	Aug-97	50.0	4,236.88	38.25	4,247.63	38.50	4,247.38	0.25	115	0.008348	0.83
	19	4,286.97	Sep-97	48.7	4,237.27	32.50	4,253.47	35.15	4,250.82	2.66	184	0.005305	0.53
	20	4,286.96	Sep-97	49.5	4,236.46	38.00	4,247.96	38.66	4,247.30	0.66	151	0.005828	0.58
	27	4,286.61	Mar-99	40.0	4,246.61	36.83	4,248.78	38.20	4,247.41	1.37	264	0.004659	0.47
	31	4,283.54	Aug-99	37.5	4,246.09	37.45	4,246.09	38.90	4,244.64	1.45	624	0.005288	0.53
G.S. State	Source Well	4,307.00	Sep-97	48.0	4,259.00								
	12	4,303.27	Aug-97	48.0	4,255.27	42.75	4,260.52	42.90	4,260.37	0.15	52	0.071731	7.17
	21	4,303.08	Oct-97	48.0	4,256.08	43.25	4,259.83	43.66	4,259.42	0.41	151	0.025960	2.60
	22	4,302.77	Oct-97	47.5	4,255.27	43.50	4,259.27	43.90	4,258.87	0.40	148	0.026203	2.62
	29	4,303.20	Mar-99	49.1	4,254.14	44.00	4,259.20	44.26	4,258.95	0.25	296	0.016475	1.65
Sat. # 4	Pit Center	4,211.49			4,208.00								
	9	4,208.66	Aug-97	31.0	4,177.66	26.17	4,182.49	26.75	4,181.91	0.58	80	0.035375	3.54
	23	4,209.03	Oct-97	28.0	4,181.03	26.25	4,182.78	27.15	4,181.88	0.90	158	0.015570	1.56
	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 Satellite 4 had significant subsidence within the pit area.
The red elevations include an added 3.49' (Ave. of seven other sites)
Correct elevations noted in column 6.

Tipperary Corporation Monitor Well Depths



Monthly Rainfall Totals



Le[illegible]ounty Electric Co-Op Inc.
18 W. Washington; P.O. Dr. 1447
Lovington, N.M. 88260

Weather Report 1998

L=Lightning I=Ice
W=Wind 35mph+ R=Rain
F=Fog S=Snow

January				February				March				April				May				June			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	59	26		1	57	20		1	51	12		1	74	21	W	1	87	48		1	103	52	
2	74	26		2	64	15		2	53	10		2	61	44	W	2	89	46		2	106	56	
3	64	31		3	59	28		3	68	23		3	69	34		3	83	47		3	104	62	
4	57	36		4	33	25	F	4	78	33		4	73	30		4	90	47		4	92	65	
5	56	29		5	45	31		5	62	29		5	78	32		5	87	50		5	83	54	
6	50	24		6	52	28		6	61	32	.05L	6	70	37	W	6	87	52		6	76	48	
7	46	26		7	61	23		7	58	33	S&W	7	68	32	W	7	84	46		7	79	56	
8	56	22		8	67	33		8	41	16	W	8	66	36		8	86	47	W	8	91	62	
9	59	22		9	63	31		9	47	10		9	72	24		9	83	45		9	95	54	
10	59	17	F	10	55	27	W	10	48	13		10	78	27		10	86	41		10	82	64	.2R
11	61	26		11	55	17		11	44	15		11	79	38	W	11	89	51	W	11	86	51	
12	64	22		12	52	21	W	12	49	14		12	78	42	W	12	89	51		12	94	58	
13	50	25		13	61	15		13	67	22	F	13	76	35		13	93	48		13	97	65	
14	53	28		14	64	36		14	67	36		14	79	47		14	87	57	W	14	94	56	
15	57	15		15	64	42	L&W.1	15	61	44	.5R&W	15	74	33		15	81	46	W	15	88	54	
16	58	32		16	56	30	W	16	40	36		16	65	26		16	91	38		16	99	64	
17	66	29		17	56	24		17	56	32	.5L	17	56	28	.4R	17	97	60		17	99	64	
18	61	30		18	54	31	W	18	68	34	W	18	66	26		18	94	62	W	18	98	58	
19	64	27		19	56	29		19	54	26	W	19	70	27		19	97	63	RLW	19	102	53	
20	66	36		20	58	25		20	78	20		20	69	39		20	99	55		20	104	65	
21	46	31		21	53	37		21	76	40		21	69	27		21	92	59		21	104	59	
22	52	15		22	67	26		22	70	42		22	75	31		22	85	66		22	103	67	
23	55	26		23	71	28		23	66	38		23	86	38		23	91	61		23	102	66	
24	60	23		24	77	30	W	24	64	44		24	88	53	W	24	93	48		24	104	70	
25	64	24		25	61	39	W	25	75	39		25	81	48		25	89	53		25	106	70	
26	61	20		26	50	28	W	26	70	42	W	26	72	42	W	26	86	51	1RL	26	107	68	
27	70	21		27	50	20		27	73	44	W	27	59	38		27	91	54		27	109	68	
28	69	30		28	55	25		28	77	39	W	28	65	32		28	97	59		28	107	68	
29	62	17		29				29	78	40	W	29	73	31		29	98	58		29	99	68	
30	66	28		30				30	67	33	W	30	82	36		30	99	62		30	96	67	
31	63	27		31				31	63	30		31				31	99	60		31			
H/L	74	15		H/L	77	15	.1"	H/L	78	10	1.05"	H/L	88	21	.4"	H/L	99	38	1	H/L	109	48	.2"

Le[redacted]ounty Electric Co-Op Inc.
16 W. Washington; P.O. Dr. 1447
Lovington, N.M. 88260

Weather Report 1998

L=Lightning I=Ice
W=Wind 35mph+ R=Rain
F=Fog S=Snow

July				August				September				October				November				December			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	94	67		1	96	65	L	1	90	58		1	94	54		1	55	36		1	65	29	
2	91	68		2	98	69		2	90	57		2	86	60	.1 L	2	60	34		2	70	40	
3	93	58		3	95	69		3	91	59		3	87	46		3	45	36	F	3	56	44	.4L
4	96	66		4	82	59	W	4	92	59		4	86	61	W	4	42	37	F	4	70	34	
5	100	68	L	5	77	61	.1 L&W	5	92	62		5	72	52		5	39	36	F	5	70	36	
6	101	68	.15L	6	86	56		6	90	60		6	70	32		6	42	35	F	6	70	36	
7	100	68		7	92	55		7	88	62		7	72	32		7	63	36	F	7	52	26	
8	100	67		8	95	64		8	92	59		8	76	46		8	69	37		8	44	12	
9	97	63		9	95	68		9	90	58	.5 L	9	86	44		9	71	39	F & W	9	44	20	
10	100	63		10	95	65		10	82	61	.3 L	10	89	44		10	53	27	W	10	48	30	S
11	104	69		11	96	65		11	92	54		11	92	44		11	65	24		11	44	26	
12	108	70		12	88	66	.1 L	12	84	56		12	78	49		12	56	31		12	54	14	
13	100	63	L	13	79	60	.75 L	13	91	56		13	87	44		13	56	38		13	60	20	
14	102	62	L	14	85	58		14	90	60		14	85	52		14	71	32		14	60	17	
15	99	64	L	15	90	57		15	83	61		15	86	52		15	70	29		15	54	17	
16	92	64	L	16	91	62		16	83	56		16	84	57		16	72	35		16	65	18	
17	94	62	L	17	89	59	F	17	84	54		17	74	42		17	71	29		17	52	20	
18	95	61	.6RL	18	88	62	F	18	86	57		18	68	32		18	79	43		18	64	36	RFW
19	96	64		19	84	66	F	19	93	60		19	70	40		19	73	37		19	42	25	F
20	96	71		20	82	65		20	98	61		20	44	43	0.3	20	45	30		20	62	33	F
21	94	68	.1RL	21	88	62	F	21	94	64		21	50	42	0.6	21	64	30		21	49	34	
22	95	60		22	89	59		22	84	57		22	57	45		22	75	33		22	20	2	
23	93	62		23	89	59		23	84	52		23	59	46		23	69	38		23	28	6	
24	95	63	L	24	91	58		24	92	63		24	70	41		24	74	25		24	36	12	
25	96	82		25	86	63		25	68	63		25	76	44		25	68	34		25	56	14	
26	96	65	L	26	89	65		26	94	62		26	74	55		26	74	28		26	62	18	
27	92	66	L	27	93	66		27	94	65		27	63	57	.9 L	27	75	35		27	59	40	W
28	95	63		28	81	63	.65" L	28	87	57		28	70	46		28	77	42		28	53	24	W
29	99	67		29	86	62		29	90	56		29	74	38		29	62	40		29	51	27	
30	102	68	L	30	90	56		30	92	58		30	73	53	1.8 LW	30	62	36	0.25	30	68	26	
31	95	61	L	31	90	57		31				31	60	48	.1 L	31				31	45	27	
H/L	108	58	.85"	H/L	98	55	1.6"	H/L	98	52	.6"	H/L	94	32	3.8"	H/L	79	24	.25"	H/L	70	2	.4

Lea County Electric Co-Op Inc.
1[illegible] Washington; P.O. Dr. 1447
Lovington, N.M. 88260

Weather Report 1999

L=Lightning I=Ice
W=Wind 35mph+ R=Rain
F=Fog S=Snow

January				February				March				April				May				June			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	57	32	F	1	60	30		1	76	37		1	72	42	W	1	71	47	0.2	1	88	56	
2	35	19		2	53	27		2	67	43		2	76	39	W	2	75	35		2	90	62	0.7 L,R
3	31	10		3	67	32	W	3	60	20		3	59	32	W	3	78	45		3	88	65	F
4	43	5		4	60	26	W	4	75	34		4	74	34	W	4	73	45		4	89	54	
5	66	22		5	74	38		5	72	44		5	67	34	W	5	66	43		5	84	57	
6	64	25		6	63	35		6	53	32		6	78	47	W	6	66	31		6	89	50	
7	68	23		7	70	31		7	39	34	.2" F,L	7	84	54		7	80	32		7	90	56	
8	68	27	W	8	73	39		8	62	33		8	75	55		8	90	52		8	91	68	
9	67	28		9	73	40		9	68	29		9	79	43		9	88	55		9	88	58	
10	65	28		10	78	34	W	10	77	34		10	73	37		10	85	52		10	93	56	
11	66	33		11	47	15	W	11	40	32	F	11	67	36		11	78	43		11	87	59	
12	69	35	W	12	40	10		12	52	31	F	12	72	44		12	76	42		12	79	52	
13	70	36		13	60	14		13	47	19	W	13	79	55	W	13	90	49		13	63	51	1.3R,L
14	69	34		14	53	22		14	63	23		14	76	46	W	14	93	52		14	72	55	0.1
15	70	29		15	73	31	W	15	79	40		15	64	30		15	91	53		15	78	50	
16	63	30		16	57	23		16	62	39	.8"	16	83	31		16	91	59		16	81	54	
17	68	28		17	67	30		17	70	31		17	87	51		17	78	53		17	76	51	
18	66	23		18	62	26		18	35	33		18	90	52		18	81	45		18	82	60	
19	74	35		19	70	27		19	48	28		19	96	54		19	85	48		19	83	60	L
20	73	33	W	20	57	30		20	64	25		20	96	54		20	91	52		20	79	56	1.6L
21	61	35	LW	21	69	23		21	70	33		21	91	55		21	86	53	L	21	80	62	
22	43	25	.1R.1SW	22	65	36		22	74	29		22	92	59		22	87	51	L,W	22	85	58	.6L
23	63	23		23	65	23		23	78	33		23	64	49		23	86	53	.3RLW	23	91	59	
24	78	41		24	75	27		24	73	31		24	44	37		24	82	55	.9RLW	24	84	62	.2L
25	72	35		25	76	30		25	60	41		25	73	41	0.2	25	66	52	LW	25	86	55	
26	68	31	W	26	74	45		26	52	46	.8" F L	26	76	35		26	68	50	F	26	96	64	
27	67	29		27	64	31		27	62	37	F L	27	83	45		27	72	50	F	27	99	65	
28	43	27	1RFLISW	28	75	36		28	59	47	F	28	86	43	W	28	86	51	.5RL	28	100	69	
29	48	24	1SFLIW	29				29	56	42	F	29	60	52	W	29	90	60	1.7RL	29	93	66	
30	42	23		30				30	66	43	F	30	63	56	.6 L,W	30	88	58		30	103	67	
31	55	24		31				31	77	46		31				31	87	52		31			
H/L	78	5	1.1S1.1R	H/L	78	10		H/L	79	19	1.6	H/L	96	30	0.8	H/L	93	31	3.6	H/L	103	50	4.5

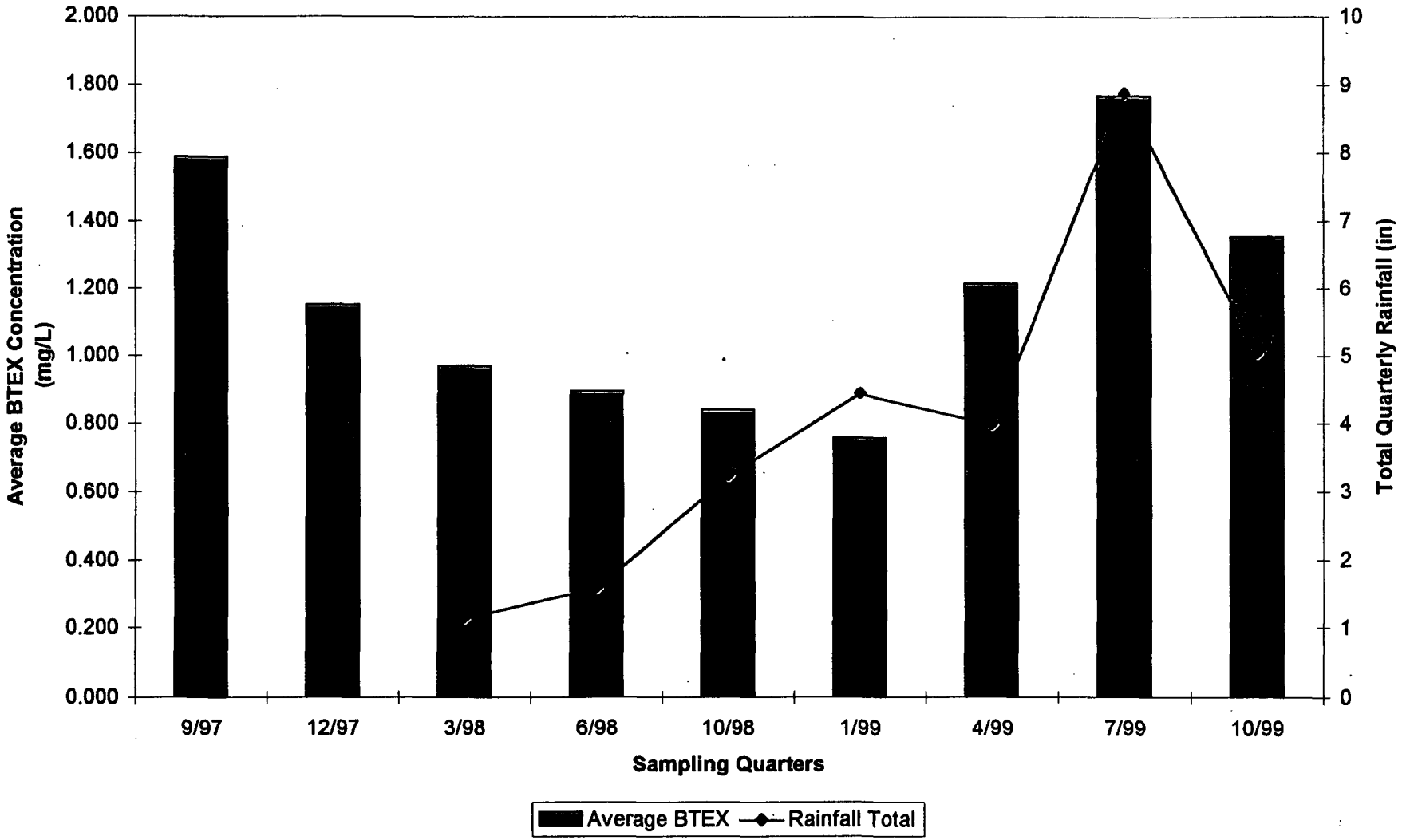
Lea County Electric Co-Op Inc.
1[illegible] Washington; P.O. Dr. 1447
Lovington, N.M. 88260

Weather Report 1999

L=Lightning I=Ice
W=Wind 35mph+ R=Rain
F=Fog S=Snow

July				August				September				October				November				December			
Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth	Day	Hi	Lo	Wth
1	99	66		1	89	62		1	92	62		1	86	46		1				1			
2	96	71		2	80	62	.3"R	2	89	60	.1"R L	2	72	42		2				2			
3	92	68		3	84	65	.5"R	3	89	61		3	91	44		3				3			
4	87	64		4	85	62		4	92	58	.9"R L	4	72	43		4				4			
5	88	61		5	83	60	1.1"R	5	80	59		5	86	40		5				5			
6	89	63		6	88	62		6	83	56		6	[illegible]	[illegible]		6				6			
7	91	58		7	92	62		7	88	59	.2"R L	7	84	58		7				7			
8	95	63		8	92	65		8	82	63		8	67	44		8				8			
9	95	68	L	9	92	60		9	82	56		9	77	38		9				9			
10	66	60	.5" R	10	96	66		10	90	56		10	84	36		10				10			
11	76	53		11	96	65		11	96	59		11	80	37		11				11			
12	82	50		12	97	60		12	82	58		12	83	40		12				12			
13	89	53		13	98	60		13	74	52		13	86	41		13				13			
14	93	52	.2" L&W	14	95	64		14	82	53		14	82	39		14				14			
15	88	67		15	95	61		15	78	57	.2"R L	15		50		15				15			
16	88	65		16	96	58		16	70	54	.8"R L	16				16				16			
17	87	64		17	96	61		17	76	53	.15"R L	17				17				17			
18	89	60		18	93	61		18	81	52		18				18				18			
19	88	59		19	93	57		19	89	52		19				19				19			
20	90	60		20	95	64		20	74	52	F	20				20				20			
21	91	61		21	99	61		21	66	48		21				21				21			
22	93	63		22	97	60		22	76	42		22				22				22			
23	95	61		23	93	62	.1"R	23	84	49		23				23				23			
24	99	66		24	85	61		24	89	54		24				24				24			
25	98	66		25	88	60		25	90	52		25				25				25			
26	94	60		26	91	60		26	93	56		26				26				26			
27	92	63		27	93	60		27	78	50		27				27				27			
28	94	60		28	97	59		28	58	41		28				28				28			
29	98	66		29	95	59		29	65	29		29				29				29			
30	97	66		30	95	56		30	81	39		30				30				30			
31	89	70	L	31	94	55		31				31				31				31			
H/L	99	50		H/L	99	55		H/L	96	29		H/L	91	36		H/L	0	0		H/L	0	0	

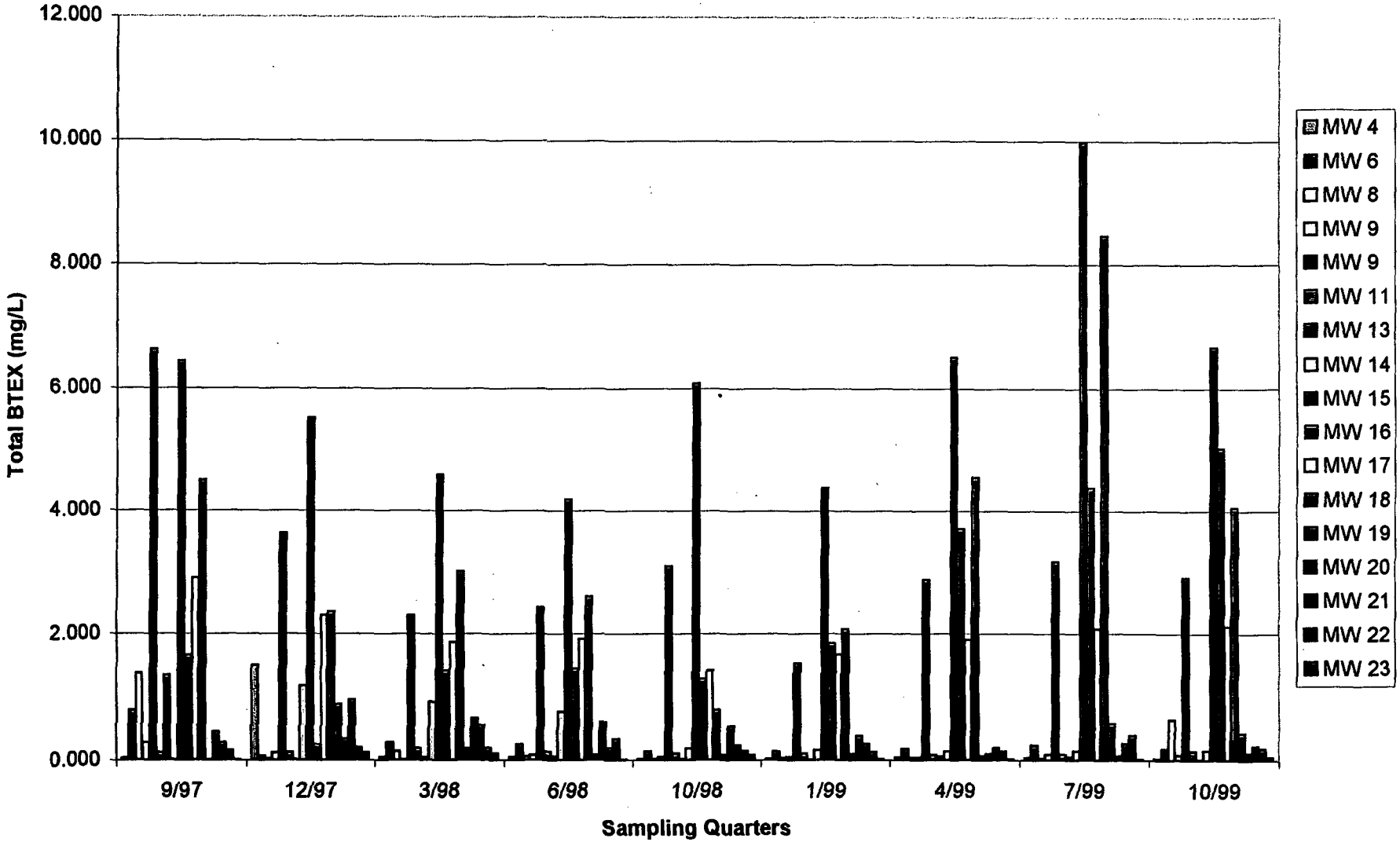
Comparison of Average BTEX and Total Rainfall



Tipperary Corporation
Tatum Pit Closure Project
Quarterly Sampling Comparison

Well #	9/5/97	12/3/97	3/23/98	6/25/98	10/1/98	1/6/99	4/1/99	7/14/99	10/5/99
4	0.031	1.501	0.047	0.049	0.013	0.019	0.038	0.034	0.025
6	0.790	0.068	0.281	0.249	0.141	0.137	0.175	0.232	0.175
8	1.377	0.023	0.146	0.058	0.018	0.036	0.042	0.028	0.634
9	0.285	0.123	0.007	0.081	0.050	0.049	0.042	0.090	0.080
10	6.626	3.626	2.292	2.423	3.096	1.532	2.878	3.172	2.913
11	0.122	0.124	0.184	0.141	0.108	0.105	0.084	0.091	0.143
13	1.346	0.010	0.037	0.056	0.017	0.007	0.057	0.045	0.007
14	0.005	1.183	0.918	0.764	0.184	0.161	0.141	0.146	0.155
15	6.432	5.499	4.588	4.189	6.086	4.380	6.506	9.972	6.665
16	1.662	0.256	1.419	1.446	1.287	1.845	3.709	4.379	5.016
17	2.908	2.305	1.863	1.920	1.419	1.665	1.907	2.083	2.125
18	4.498	2.361	3.013	2.601	0.786	2.072	4.544	8.472	4.060
19	0.011	0.875	0.184	0.079	0.082	0.094	0.068	0.579	0.432
20	0.454	0.345	0.658	0.604	0.539	0.390	0.100	0.065	0.110
21	0.287	0.953	0.554	0.198	0.238	0.259	0.193	0.272	0.227
22	0.152	0.200	0.195	0.344	0.144	0.134	0.141	0.396	0.184
23	0.009	0.122	0.106	0.008	0.078	0.014	0.014	0.018	0.051
	26.995	19.574	16.492	15.210	14.286	12.899	20.639	30.074	23.002

Quarterly BTEX Concentrations



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

Sample Type: Water
Sample Condition: Intact/Iced
Project #: None Given
Project Name: None Given
Project Location: None Given

Sampling Date: 10/05/99
Receiving Date: 10/06/99
Analysis Date: 10/6-10/8/99

ELT#	FIELD CODE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	m,p-XYLENE (mg/L)	o-XYLENE (mg/L)
20597	Iva Com #1 S/W	0.001	<0.001	<0.001	<0.001	0.001
20598	Mable Com #3 S/W	0.003	0.021	0.010	0.038	0.020
20599	Bell A M/W #6	0.149	<0.001	0.015	0.008	0.002
20600	NBF M/W #8	0.160	0.214	0.036	0.143	0.081
20601	Sohio St #1 M/W	2.04	0.255	0.157	0.261	0.200
20602	Sohio Sta M/W #11	0.056	0.022	0.008	0.035	0.022
20603	GS State #M/W #21	0.116	0.016	0.053	0.027	0.015
20604	Satellite #9	0.034	0.008	0.009	0.019	0.010
20605	Iva Com S/W	1.67	1.80	0.126	1.42	1.03
20606	Iva Com #2	0.001	<0.001	<0.001	<0.001	<0.001
20607	Mable Com #4	0.002	0.005	0.002	0.010	0.006
20608	Mable Com # S/W	0.467	0.395	0.094	0.868	0.685
20609	Bell A M/W #13	0.003	<0.001	<0.001	0.001	<0.001
20610	Bell A M/W #14	0.109	0.005	0.004	0.024	0.013
20611	Bell A M/W#25	0.001	<0.001	<0.001	<0.001	<0.001
20612	NBF M/W #15	2.85	1.85	0.303	1.05	0.612
20613	NBF M/W #16	3.22	0.776	0.179	0.576	0.265
20614	NBF M/W #26	0.066	0.059	0.016	0.057	0.031
20615	Sohio St #1 M/W #17	1.150	0.206	0.289	0.304	0.176
20616	Sohio St #1 M/W #18	2.47	0.486	0.066	0.594	0.444
20617	Sohio St #1 M/W #28	0.192	0.042	0.070	<0.001	0.034
20618	Sohio St #1 M/W #30	0.188	0.087	0.023	0.061	0.050
	% IA	98	92	94	96	95
	% EA	91	90	87	86	86
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Raland K. Tuttle

10-12-99
Date

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

Sample Type: Water
Sample Condition: Intact/Iced
Project #: None Given
Project Name: None Given
Project Location: None Given

Sampling Date: 10/05/99
Receiving Date: 10/06/99
Analysis Date: 10/8-10/8/99

ELT#	FIELD CODE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	m,p-XYLENE (mg/L)	o-XYLENE (mg/L)
20619	Sohio Sta M/W #19	0.346	0.020	0.008	0.038	0.020
20620	Sohio Sta M/W #20	0.023	0.023	0.008	0.035	0.021
20621	Sohio Sta M/W #27	0.265	0.014	0.006	0.029	0.017
20622	Sohio Sta M/W #31	0.362	0.015	0.006	0.039	0.022
20623	GS State M/W #22	0.070	0.015	0.047	0.032	0.020
20624	GS State M/W #29	0.022	0.017	0.008	0.035	0.038
20625	GS State M/W #12	0.008	0.007	0.008	0.024	0.007
20626	Satelite #23	0.007	0.009	0.006	0.019	0.010
20627	Satelite #24	0.011	0.011	0.006	0.021	0.012
	% IA	99	92	93	92	91
	% EA	91	90	87	86	86
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Raland K. Tuttle

10-12-99
Date

Environmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: V. A. Vice
Phone #: 505-398-6509
FAX #: 505-398-6510

Company Name & Address: TIPPERARY OIL & GAS CORP
Mike @ Ruffin 1-800-859-4358
Whole Earth

Project #:
Project Name:

Project Location:
Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
0597	Iva Com #1 #2 S/W	2									X			10/5/99		✓							
0598	Mablecom #3 #4 Source Water	2									X					✓							
0599	Bell-A M/W #6 #13 #14 #25	2									X					✓							
0600	NBF M/W #8 #15 #16 #26	2									X					✓							
0601	Schlo ST #1 M/W #10 #17 #18 #28 #30	2									X					✓							
0602	Schlo ST A M/W #11 #19 #20 #27 #31	2									X					✓							
0603	GS State #M/W #21 #22 #29 #32	2									X					✓							
0604	Satellite #9 #23 #24	2									X					✓							
0605	Iva Com Source Water	2														✓							

Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date: 10/6/99	Time: 10:45	Received by Laboratory:

REMARKS

252.

Environmental Lab of Texas, Inc.

12600 West I-20 East, Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: V.A Vice
Phone #:
FAX #:

Company Name & Address: Tipperary Oil & Gas Corp.

Project #:
Project Name:

Project Location:
Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
20606	Iva Com #2	2		✓							✓			10/5		✓							
20607	Mable Com #4			✓												✓							
20608	Mable Com #, Source Well			✓												✓							
20609	Bell A MW #13			✓												✓							
20610	" " #14			✓												✓							
20611	" " #25			✓												✓							
20612	NBF MW #15			✓												✓							
20613	" " #16			✓												✓							
20614	" " #26			✓												✓							
20615	Sohio ST #1 MW #17			✓												✓							
20616	" " 18			✓							✓			✓		✓							

Relinquished by:	Date:	Time:	Received by:	REMARKS
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by Laboratory:	

Environmental Lab of Texas, Inc.

12600 West I-20 East, Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: V. A. Vick
Phone #:
FAX #:
Company Name & Address: Tipperary Oil & Gas
Project #:
Project Name:
Project Location:
Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
20617	Sohio ST #1 MW-28	2		✓							✓			10/5/94		✓							
20618	Sohio ST #1 MW-30															✓							
20619	Sohio Sta MW-19															✓							
20620	" " 20															✓							
20621	" " 27															✓							
20622	" " 31															✓							
20623	GS State MW #22															✓							
20624	" " 29															✓							
20625	" " 12															✓							
20626	Satilite # 23															✓							
20627	" #24	↓		↓							↓			↓		✓							

Relinquished by:	Date:	Time:	Received by:	REMARKS
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by Laboratory:	

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: 1-281-646-8996

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl
Project #: Tatum Step-Out
Project Name: None Given
Project Location: 13 Miles West Tatum, N.M.

Sampling Date: 08/11/99
Receiving Date: 08/13/99
Analysis Date: 08/13/99

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
19165	MW-30	<0.001	<0.001	<0.001	0.001	<0.001
19166	MW-31	0.396	0.004	0.001	0.017	0.012
	% IA	96	88	85	86	89
	% EA	94	91	91	90	92
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Raland K. Tuttle

8-16-99
Date

Environmental Lab of Texas, Inc.

12600 West I-20 [illegible] Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: M. Griffin
Phone #: (800) 854-4358
FAX #: (281) 646-8996

Company Name & Address: Whole Earth Environmental

Project #: Tatum Step-out
Project Name:

Project Location: 13 miles west, Tatum NM.
Sampler Signature: M Griffin

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
1165	MW-30	2		✓					✓		✓			8-11		✓							
1166	MW-31	2		✓					✓		✓			8-11		✓							

Relinquished by:	Date:	Time:	Received by:
M. Griffin	8-13-99	1050	[signature]
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS

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: 281-846-8996 Mike Griffin

Sample Type: Water
Sample Condition: Intact/Iced
Project #: None Given
Project Name: None Given
Project Location: Tatum, New Mexico

Sampling Date: 07/14/99
Receiving Date: 07/15/99
Analysis Date: 07/16/99

ELT#	FIELD CODE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	m,p-XYLENE (mg/L)	o-XYLENE (mg/L)
18590	Iva Com Source Well	4.46	6.85	1.24	8.16	5.57
18591	Mable Com Source Well	0.568	0.376	0.068	1.23	0.908
18592	Mable Com #4 MW	0.008	0.006	0.002	0.012	0.006
18593	Bell A #6	0.177	0.010	0.020	0.015	0.010
18594	NBF #8	0.023	0.001	0.001	0.002	0.001
18595	Sohio St #1 - #10	2.34	0.110	0.243	0.343	0.136
18596	Sohio St #A #11	0.060	0.008	0.003	0.011	0.009
18597	GS St #21	0.140	0.010	0.044	0.062	0.016
18598	Satellite #4 - MW #9	0.010	0.004	0.009	0.020	0.007
18599	Bell A #13	0.011	0.011	0.005	0.012	0.006
18600	Bell A #14	0.132	0.005	0.002	0.005	0.002
18601	Bell A #25	0.012	0.010	0.002	0.006	0.004
18602	NBF #15	3.97	3.07	0.436	1.61	0.886
18603	NBF #16	3.64	0.116	0.151	0.343	0.129
18604	NBF #26	0.030	0.027	0.006	0.019	0.011
18605	Sohio St. #1 - #17	1.01	0.205	0.146	0.482	0.240
18606	Sohio St. #1 - #18	3.54	0.553	0.288	0.967	0.532
18607	Sohio St. #1 - #28	0.019	0.003	0.004	0.008	0.005
18608	Sohio St. A - #19	0.532	0.009	0.004	0.026	0.006
18609	Sohio St. A #20	0.023	0.010	0.006	0.016	0.010
18610	Sohio St. A #27	0.268	0.024	0.006	0.030	0.024
18611	GS St. #22	0.109	0.017	0.085	0.144	0.041
18612	GS St. #29	0.014	0.007	0.019	0.125	0.062
18613	Satellite #4 MW #23	0.003	0.002	0.002	0.008	0.003
	% IA	98	93	91	91	93
	% EA	98	93	91	90	93
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Raland K. Tuttle

07-16-99
Date

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: 04/02/99
Sample Type: Water
Project : None Given
Project Location: None Given

Analysis Date: 4/05 & 4/06/99
Sampling Date: 04/01/99
Sample Condition: Intact/Iced

ELT#	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m,p-XYLENE (mg/l)	o-XYLENE (mg/l)
17428	Iva Com Source Well	2.05	4.15	0.902	5.50	3.80
17429	Mable Com Source Well	0.486	0.432	0.066	1.00	0.713
17430	Mable Com #4	0.012	0.008	0.002	0.010	0.006
17431	Bell A #6	0.139	0.013	0.006	0.011	0.006
17432	Bell A #13	0.021	0.018	0.003	0.009	0.006
17433	Bell A #14	0.108	0.015	0.004	0.009	0.005
17434	NBF #8	0.032	0.002	0.004	0.003	0.001
17435	NBF #15	3.11	1.98	0.214	0.767	0.435
17436	NBF #16	3.15	0.164	0.078	0.219	0.098
17437	Sohio St. #1 - #10	2.34	0.067	0.168	0.203	0.100
17438	Sohio St. #1 - #17	1.35	0.092	0.079	0.248	0.138
17439	Sohio St. #1 - #18	3.35	0.331	0.114	0.469	0.280
17440	Sohio St. #1 - #28	0.446	0.065	0.011	0.041	0.058
17441	Sohio St. A - #11	0.048	0.008	0.004	0.014	0.010
17442	Sohio St. A - #19	0.026	0.010	0.006	0.016	0.010
17443	Sohio St. A - #20	0.547	0.011	0.005	0.030	0.009
17444	Sohio St. A - #27	0.056	0.007	0.006	0.007	0.013
17445	G.S. State #21	0.124	0.008	0.042	0.012	0.007
17446	G.S. State #22	0.059	0.010	0.036	0.022	0.014
17447	G.S. State #29	0.004	<0.001	<0.001	0.035	<0.001
17448	Satellite #4 - #9	0.027	0.005	0.004	0.004	0.002
17449	Satellite #4 - #23	0.004	0.004	0.001	0.003	0.002
	% IA	102	99	97	97	99
	% EA	100	97	97	91	95
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Raland K. Tuttle

4-7-99
Date

Environmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: TIPPERARY OIL & GAS — Phone #: 505-396-6509
FAX #:
Company Name & Address: Mike Griffin
Project #: — Project Name:
Project Location: — Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
17428	EVA Com Source Well	2		X							X			4-1		X							
17429	Mable Com Source well	2		X							X			4-1		X							
17430	Mable Com # 4	2		X							X			4-1		X							
17431	Bell A #6 #13 #14	2	EA	X							X			4-1		X							
17432	NBF #8 #15 #16	2	EA	X							X			4-1		X							
17433	Soho ST #1 #10 #17 #18 #28	2	EA	X							X			4-1		X							
17434	Soho ST #A #11 #19 #20 #27	2	EA	X							X			4-1		X							
17435	GS STAR #21 #22 #29	2	EA	X							X			4-1		X							
17436	SATELLITE #4 - #11 well #9 #23															X							

Relinquished by:	Date:	Time:	Received by:
J. A. Vera	4-2-99	1010	
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS

Environmental Lab of Texas, Inc.

12600 West I-20 ... dessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: | Phone #: | FAX #:

Company Name & Address: Tipperary

Project #: | Project Name : | Project Location: | Sampler Signature:

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
7431	BELA #6																						
7432	#13																						
7433	#14																						
7434	NBF #8																						
7435	#15																						
7436	#16																						
7437	Sohio St.#1 #10																						
7438	#17																						
7439	#18																						
7440	#28																						
7441	Sohio St. #A #11																						

Relinquished by:	Date:	Time:	Received by:	REMARKS
	04-02-99	1010		
Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by Laboratory:	

Environmental Lab of Texas, Inc.

12600 West I-20 . . . dessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager:

Phone #:

FAX #:

Company Name & Address:
Tipperary

Project #:

Project Name :

Project Location:

Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
17442	SonioSt. #A #19																						
17443	#20																						
17444	#27																						
17445	G.S.State #21																						
17446	#22																						
17447	#29																						
17448	Satellite #4 #9																						
17449	#23																						

Relinquished by:	Date:	Times:	Received by:	REMARKS
Relinquished by:	Date: 04-02-99	Times: 1010	Received by:	
Relinquished by:	Date:	Times:	Received by Laboratory:	

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY OIL & GAS
633 17TH
DENVER, COLORADO 80202
FAX: 281-646-8996(Mike Griffin)

Receiving Date: 03/17/99
Sample Type: Water
Project : Tatum Dileneation
Project Location: Tatum, N.M.

Analysis Date: See below
Sampling Date: 3/17/99
Sample Condition: Intact/Iced

ELT#	Field Code	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	CO3 (mg/L)	HCO3 (mg/L)
17265	#25 Bell	189	46	281	8.7	851	300	0	159
17266	#26 NBF	31.4	16	65	6.4	53	175	0	159
17267	#27 Sohio A	144	78	377	16.2	1028	195	0	329
17268	#28 Sohio #1	715	140	4660	20.8	8685	195	0	329
17269	#29 G.S. State	178	44	102	8.1	487	150	0	281
	ANALYSIS DATE	3/24/99	3/24/99	3/24/99	3/24/99	3/18/99	3/18/99	3/18/99	3/18/99
	QUALITY CONTROL	53.9	5.1	55.9	5.2	5140	48	*	*
	TRUE VALUE	50.0	5.0	50.0	5.0	5000	50	*	*
	% PRECISION	108	102	111	104	103	96	*	*

METHODS: EPA 4.1.1, 215.1,242.1, 273.1, 258.1,325.3, 375.4, 310.2.

Raland K. Tuttle

Raland K. Tuttle

3-26-99

Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY OIL & GAS
633 17TH
DENVER, COLORADO 80202
FAX: 281-646-8996(Mike Griffin)

Receiving Date: 03/17/99
Sample Type: Water
Project : Tatum Dileneation
Project Location: Tatum, N.M.

Analysis Date: Hg 3/23/99
Analysis Date: 3/25/99
Sampling Date: 3/17/99
Sample Condition: Intact/Iced

TOTAL METALS (mg/L)

ELT#	Field Code	Ag	As	Ba	Cd	Cr.	Hg	Pb	Se
17265	#25 Bell	ND	ND	0.250	ND	0.0110	ND	ND	ND
17266	#26 NBF	ND	ND	0.201	ND	0.0060	ND	ND	ND
17267	#27 Sohio A	ND	ND	0.276	ND	0.0110	ND	ND	ND
17268	#28 Sohio #1	ND	0.028	0.709	ND	0.0220	ND	0.0090	ND
17269	#29 G.S. State	ND	ND	0.369	ND	0.0080	ND	ND	ND
	REPORTING LIMIT	0.0050	0.005	0.010	0.0010	0.0050	0.00020	0.0030	0.0050
	% INSTRUMENT ACCURACY	100	106	95	100	94	103	98	112
	% EXTRACTION ACCURACY	96	104	97	100	96	96	99	102

ND = Not detected at the reporting limit.

METHODS: EPA 200.7, 245.2

Raland K. Tuttle

3-26-99
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

TIPPERARY OIL & GAS
633 17TH
DENVER, COLORADO 80202
FAX: 281-646-8996 (Mike Griffin)

Receiving Date: 03/17/99
Sample Type: Water
Project : Tatum Dileneation
Project Location: Tatum, New Mexico

Analysis Date: 03/17/99
Sampling Date: 03/17/99
Sample Condition: Intact/Iced

ELT#	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m,p-XYLENE (mg/l)	o-XYLENE (mg/l)
17265	#25 Bell	0.006	0.004	0.004	0.005	0.004
17266	#26 NBF	0.002	0.003	0.001	0.002	0.001
17267	#27 Sohio A	0.118	0.019	0.005	0.004	0.008
17268	#28 Sohio #1	0.156	0.008	0.003	0.010	0.005
17269	#29 G.S. State	0.012	0.012	0.004	0.021	0.041
	% IA	104	100	99	98	99
	% EA	108	104	101	102	103
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Raland K Tuttle

Raland K. Tuttle

3-26-99

Date

CORE LAB

GULF STATES LYTICAL
6310 Rothway, ouston, Texas 77040
(713) 690-4444, Fax (713) 690-5646

Company: Tippenany O&G
Address: 633 17th Denver, CO 80202
Tele #:
Fax #:

Reports Sent To: Whole Earth
P O #:
Project #:

Project Name: Tatum Dlineation
Project Location: Tatum, NM

Sampler(s) Name: (Signature) M. G[illegible]
Courier:

#	Sample	Date	Time	Water	Soil	Sludge	Oil	Other	# of Containers	Haz. Sample (Y/N)	BTEX	RCRA 8 Metals	Major cat & anions	Chlorides	carb/bicarb	SO_4^{2-}	Ca, Mg, K, Na
1.	#25 Bell (17265)	3-17	8:10	✓					3	N	✓	✓	✓				
2.	#26 NBE (17266)	3-17	8:26	✓					3	N	✓	✓	✓				
3.	#27 Sohio A (17267)	3-17	8:44	✓					3	N	✓	✓	✓				
4.	#28 Sohio #1 (17268)	3-17	9:05	✓					3	N	✓	✓	✓	✓			
5.	#29 GS State (17269)	3-17	9:25	✓					3	N	✓	✓	✓	✓			
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	

Relinquished by Sampler: (Signature)	Date	Time:	Received by: (Signature)	Date	Time:
M. Griffin	3-17-99	1345	[illegible signature]	3-17-99	1345
uished by: (Signature)	Date	Time:	Received by: (Signature)	Date	Time:
Relinquished by: (Signature)	Date	Time:	Received by Laboratory: (Signature)	Date	Time:

Remarks:

Requested Turnaround: Minutes?

GSAI Group:

Special Detection Limits

QC Package: (check one)
☐ CLP ☐ Site Specific
☐ Tier 1 ☐ Tier 2 ☐ QC Summary

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: 281-648-8996

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/Iced/HCl

ELT#	FIELD CODE	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYLBENZENE (mg/l)	m,p-XYLENE (mg/l)	o-XYLENE (mg/l)
16587	Sohio St. #1 - #17	0.676	0.136	0.094	0.339	0.163
16588	Sohio 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 Sat. M/W #20	0.341	0.010	0.005	0.026	0.006
16591	GS State M/W #21	0.133	0.010	0.054	0.056	0.006
16592	GS State M/W #22	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	Sat. #4 M/W #24	0.004	0.003	<0.001	0.002	<0.001
16595	Ivs Com. M/W #1	0.003	0.001	<0.001	0.002	0.004
16596	Ivs 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. M/W #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 #6	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	NBF M/W #8	0.026	0.001	0.003	0.003	<0.001
16603	Sat. 4 M/W #9	0.034	0.003	0.006	0.005	0.001
16604	Sohio St. #1 M/W #10	1.00	0.087	0.156	0.214	0.085
16605	Sohio Sta. M/W #11	0.061	0.011	0.005	0.018	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	0.726	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	89	90
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: SW 846-8020,5030

Roland K Tuttle
Roland K. Tuttle

1-11-99
Date

Environmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

V. A. Vice 7. Whole Earth

Project Manager: Tipperary Oil & Gas

Phone #: 1-800-864-4358

FAX #: 505-398-6509

Company Name & Address: Tatom, N. Mex #88267

Project #: M/W

Project Name:

Project Location: Tatum, N. Mex

Sampler Signature: D. A. [signature]

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
16595 16596	IVA Com. M/W #1 #2	2												1/6/99									
16597 16598	Mable Com. " # 3 #4	2												1/6/99									
16599	Vera " M/W #5	2												1/6/99									
16600	Bell A M/W # 6	2												1/6/99									
16601	NBN M/W #7	2												1/6/99									
16602	NBF M/W #8	2												1/6/99									
16603	Satilite 4 - M/W #9	2												1/6/99									
16604	Sohio St #1 - M/W #10	2												1/7/99									
16605	Sohio St A - M/W #11	2												1/7/99									
16606 16607	Bell A M/W # 13 #14	2												1/6/99									
16608 16609	NBF M/W # 15-16	1												1/6/99									

Relinquished by:	Date:	Time:	Received by:
[signature]	01-08-99	0855	J McMurry
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS

Environmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

V.A. Vice - Whole Earth

Project Manager: 11 505-398-6509 Off — Phone #: 1-800-854-4358

Tipperary Oil & Gas — FAX #:

Company Name & Address: Tatum, New Mexico 88267

Project #: — Project Name:

Project Location: — Sampler Signature: Victor A. Vice

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER*	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME
16587	Sohio STATE #17-18	2												1/7/99	
16588	Sohio STATE M/W #19-20	2												1/7/99	
16589	Sohio STATE M/W #21-22	2												1/7/99	
16590	GS STATE M/W #23-24	2												1/7/99	
16591	SATELITE #4 M/W #3 #24	2												1/6/99	

ANALYSIS REQUEST

BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI

Relinquished by:	Date:	Time:	Received by:
	01-08-99	0855	
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS

P.02

QP-28

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Developing Cased Water Monitoring Wells

Completed By: Approved By: Effective Date: / /

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 cross-contamination. 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.

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.

6.0 Records

6.1 Whole Earth will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.

Calculation for Determining the Minimum Bailing Volume for Monitor Wells

Formula $V = (\pi r^2 h)$

V= volume
π= pi
r= inside radius of the well bore
h= maximum height of well bore in water table

π	r^2	h (in)	V (cu. in)	V (gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.344	>10

Sohio A

Sohio State "A"
1999 Activity Summary

Monitor Well # 11
This well also reflected the "summer spike" in BTEX concentrations and is now reflecting declining values as the water table subsides.

Monitor Well # 19
This well also reflected the "summer spike" in BTEX concentrations and is now reflecting declining values as the water table subsides.

Monitor Well # 20
This well also reflected the "summer spike" in BTEX concentrations. We anticipate that the January 2000 sampling round will show lower results.

Monitor Well # 27
This lateral delineation well was drilled and completed in March 1999. This well also reflected the "summer spike" in BTEX concentrations and is now reflecting declining concentrations as the water table subsides.

Monitor Well # 31
This lateral delineation well was drilled and completed in August 1999. We anticipate that the January 2000 sampling round will show lower results. We will install yet another down-gradient monitor well to define lateral extent.

Monitor Well # 11
Sohio State "A"
Sampling Results

Lab #	12484	13132	14067	14666	15598	16605	17441	18596	20602
Sample Date	9/5/97	12/3/97	2/23/98	6/25/98	10/1/98	1/6/99	4/1/99	7/14/99	10/6/99
Benzene	0.096	0.057	0.126	0.093	0.070	0.061	0.048	0.060	0.056
Toluene	0.004	0.009	0.011	0.009	0.010	0.011	0.008	0.008	0.022
thylbenzen	0.002	0.007	0.007	0.005	0.003	0.005	0.004	0.003	0.008
m,p Xylene	0.008	0.035	0.026	0.02	0.014	0.016	0.014	0.011	0.035
o Xylene	0.012	0.016	0.014	0.014	0.011	0.012	0.010	0.009	0.022
Total Xylene	0.020	0.051	0.04	0.034	0.025	0.028	0.024	0.020	0.057
Total BTEX	0.122	0.124	0.184	0.141	0.108	0.105	0.084	0.091	0.143

Monitor Well # 19
Sohio State "A"
Sampling Results

Lab. #	12484	13132	14067	14866	15598	17267	17444	18608	20619
Sample Date	9/5/97	12/3/97	2/23/98	6/25/98	10/1/98	3/19/99	4/1/99	7/14/99	10/6/99
Benzene	0.096	0.057	0.126	0.093	0.070	0.118	0.056	0.532	0.346
Toluene	0.004	0.009	0.011	0.009	0.010	0.019	0.007	0.009	0.02
Ethylbenzene	0.002	0.007	0.007	0.005	0.003	0.005	0.006	0.004	0.008
m,p Xylene	0.008	0.035	0.026	0.020	0.014	0.004	0.007	0.028	0.038
o Xylene	0.012	0.016	0.014	0.014	0.011	0.008	0.013	0.006	0.02
Total Xylene	0.020	0.051	0.040	0.034	0.025	0.012	0.020	0.034	0.058
Total BTEX	0.122	0.124	0.184	0.141	0.108	0.154	0.089	0.579	0.432

Monitor Well # 20
Sohio State "A"
Sampling Results

Lab. #	12726	13190	14054	14674	15610	16590	18609	20620
Sample Date	10/2/97	12/3/97	3/23/98	6/26/98	10/1/98	1/6/99	7/14/99	10/6/99
Benzene	0.385	0.284	0.539	0.517	0.464	0.341	0.023	0.023
Toluene	0.009	0.005	0.016	0.009	0.011	0.01	0.01	0.023
Ethylbenzene	0.010	0.008	0.014	0.008	0.008	0.005	0.006	0.008
m,p Xylene	0.016	0.044	0.075	0.061	0.045	0.026	0.016	0.035
o Xylene	0.009	0.004	0.014	0.009	0.011	0.008	0.01	0.021
Total Xylene	0.025	0.048	0.089	0.07	0.056	0.034	0.026	0.056
Total BTEX	0.454	0.345	0.658	0.604	0.539	0.39	0.065	0.110

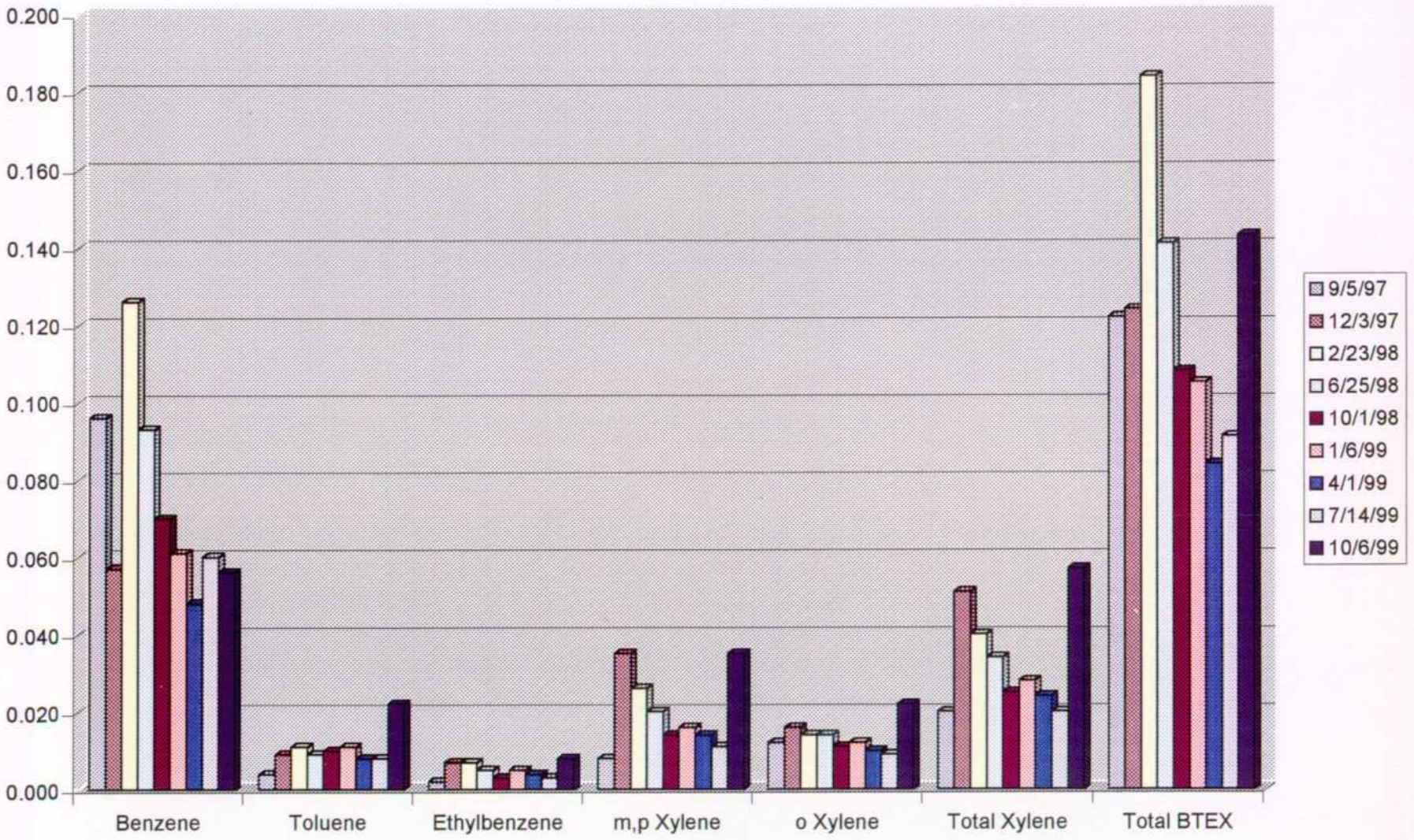
Monitor Well # 27
Sohio State "A"
Sampling Results

Lab. #	17267	17444	18610	20621
Sample Date	3/17/99	4/1/99	7/14/99	10/6/99
Benzene	0.118	0.056	0.268	0.265
Toluene	0.019	0.007	0.024	0.014
Ethylbenzene	0.005	0.006	0.006	0.006
m,p Xylene	0.004	0.007	0.030	0.029
o Xylene	0.008	0.013	0.024	0.017
Total Xylene	0.012	0.020	0.054	0.046
Total BTEX	0.154	0.089	0.352	0.331

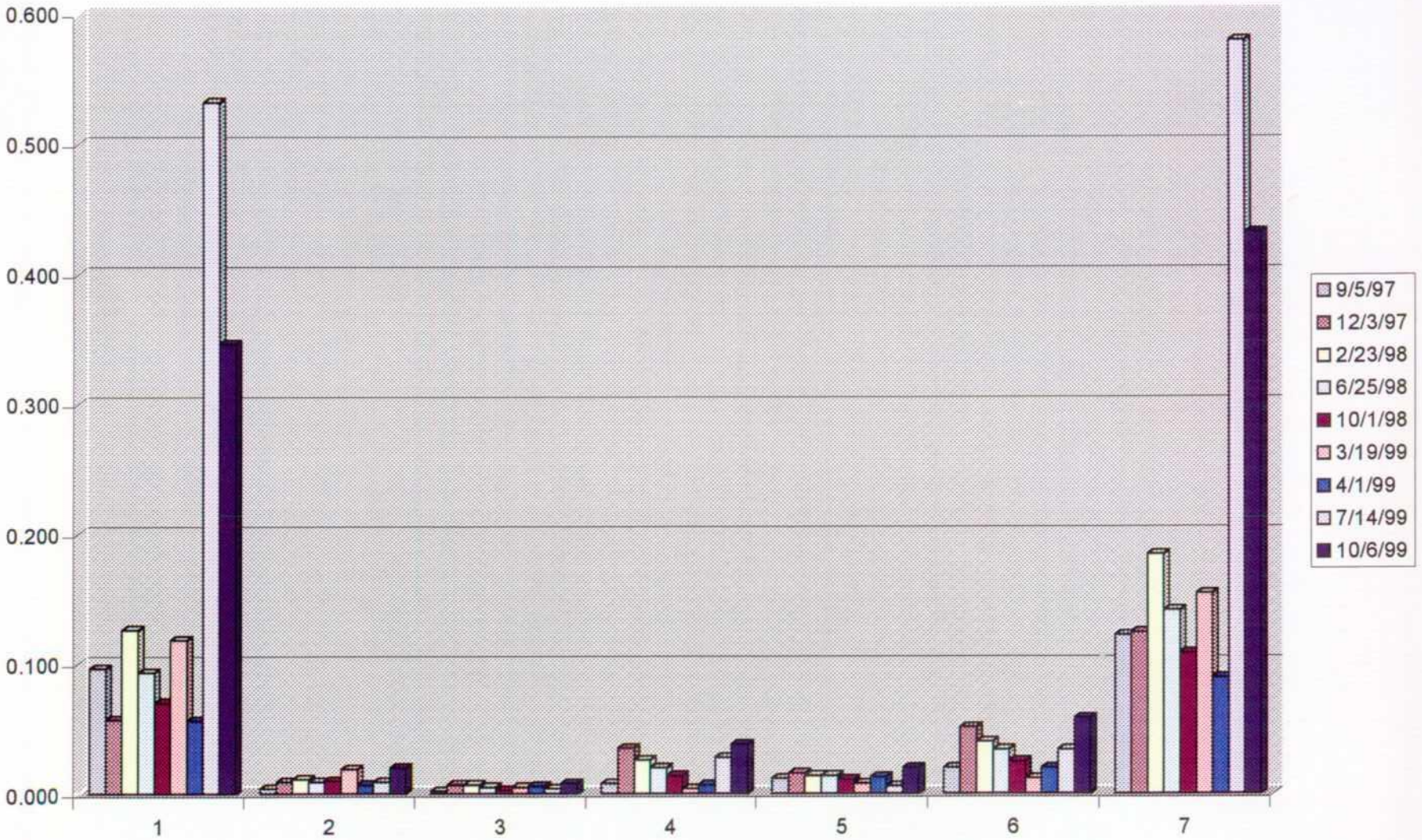
Monitor Well # 31
Sohio State "A"
Sampling Results

Lab. #	19166	20622
Sample Date	8/13/99	10/6/99
Benzene	0.396	0.362
Toluene	0.004	0.015
Ethylbenzene	0.001	0.006
m,p Xylene		
o Xylene		
Total Xylene	0.029	0.061
Total BTEX	0.430	0.444

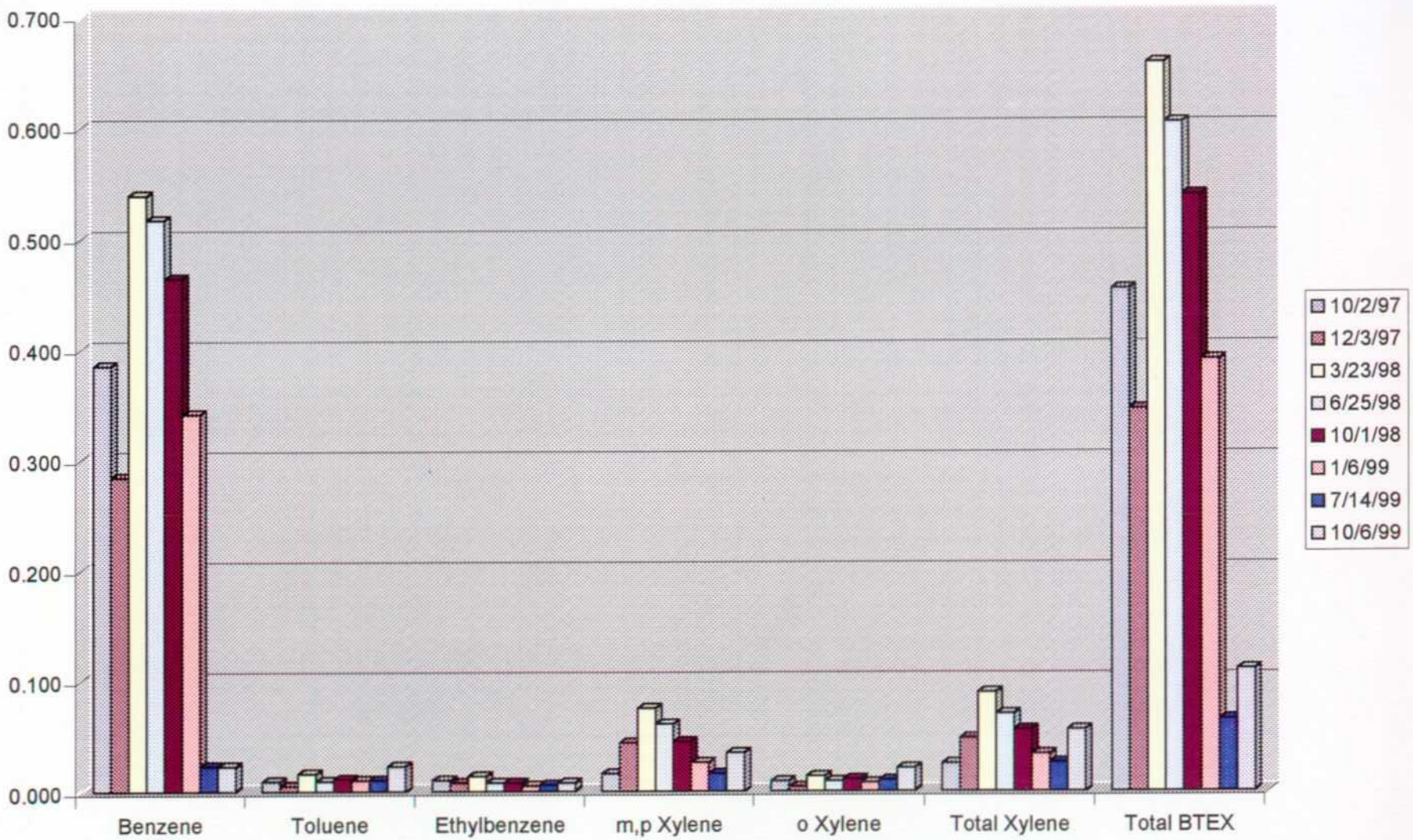
Sohio "A" MW # 11

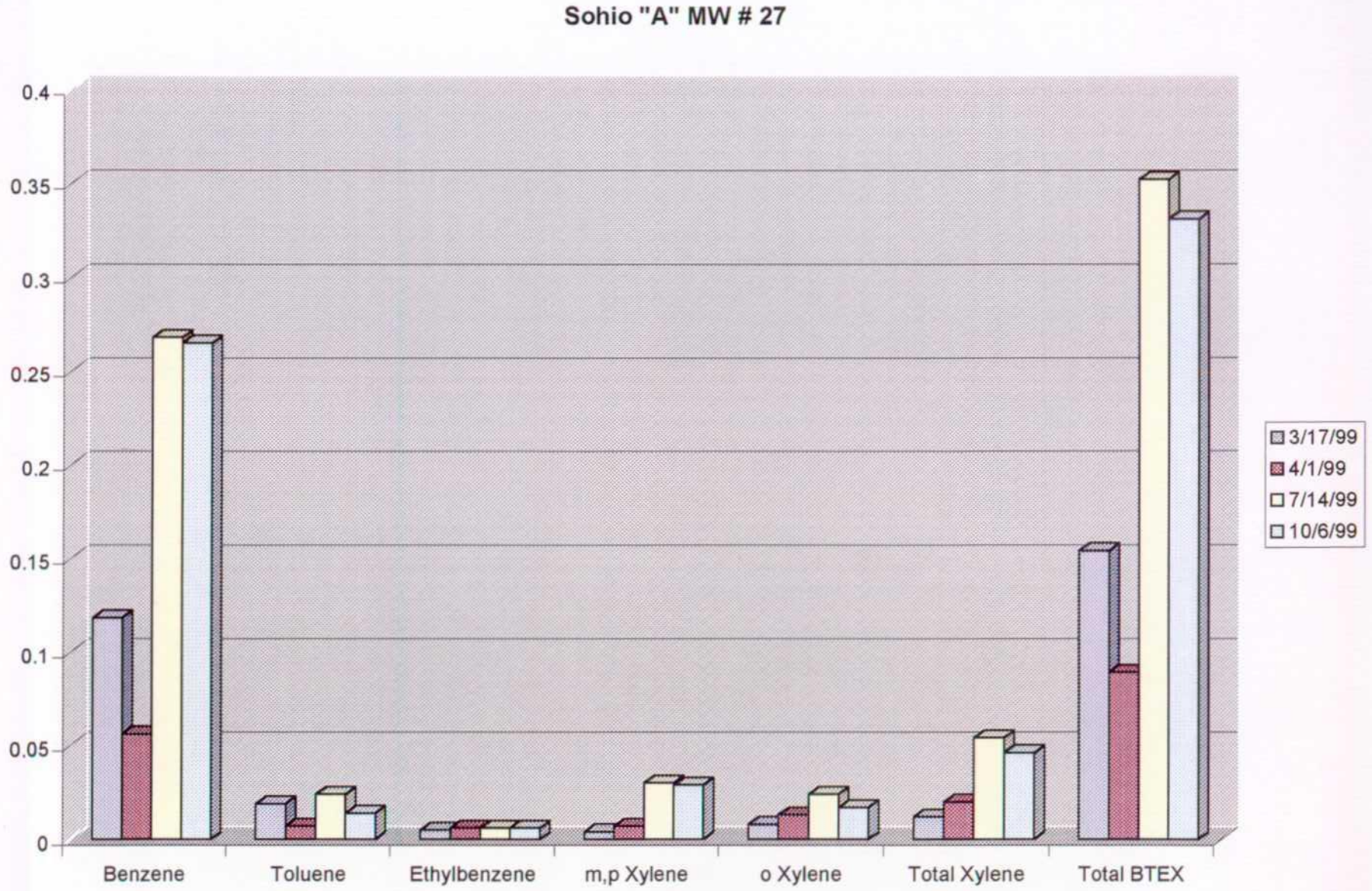

0.200
0.180
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
Benzene
Toluene
Ethylbenzene
m,p Xylene
o Xylene
Total Xylene
Total BTEX
9/5/97
12/3/97
2/23/98
6/25/98
10/1/98
1/6/99
4/1/99
7/14/99
10/6/99

Monitor Well # 19

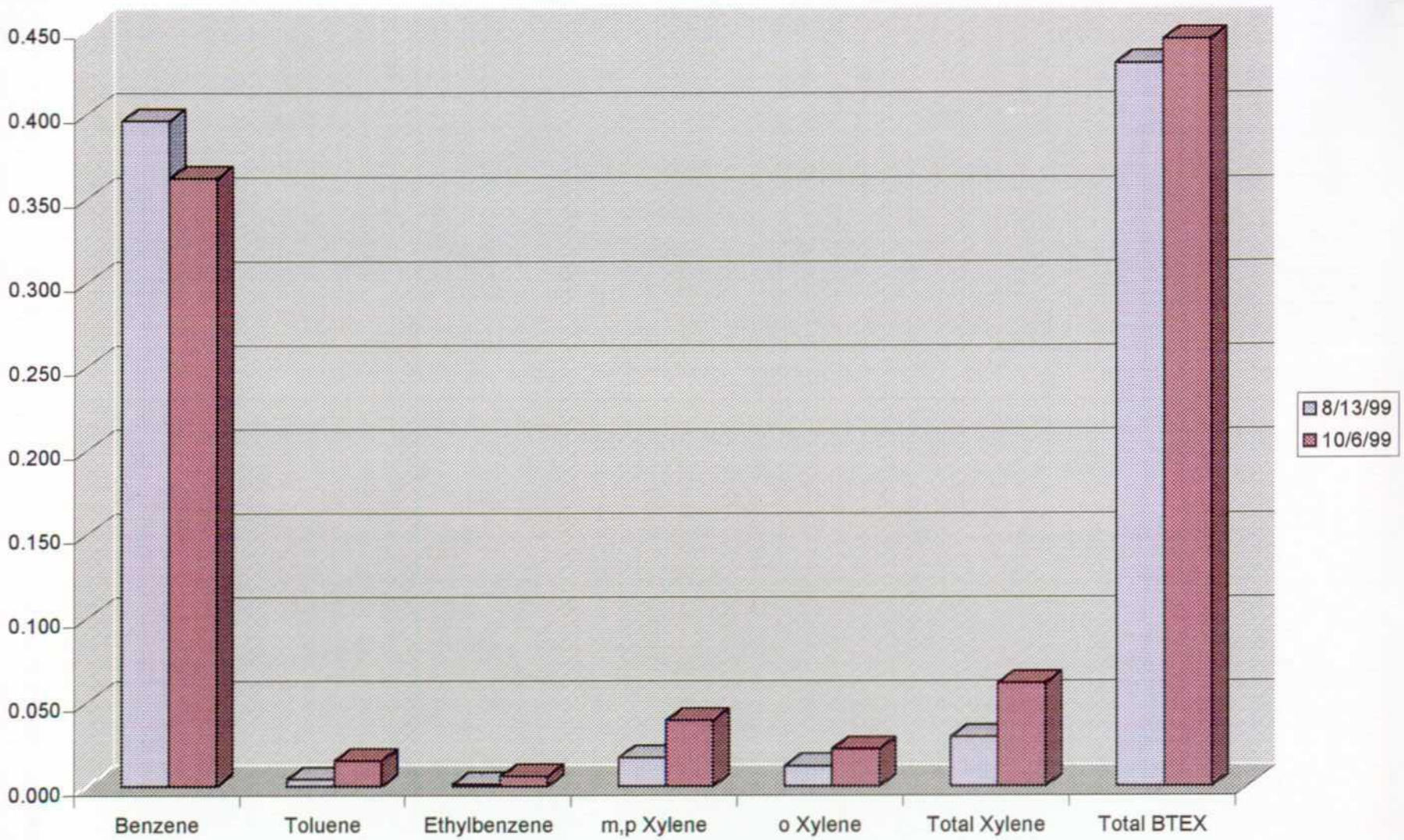


Sohio "A" MW # 20

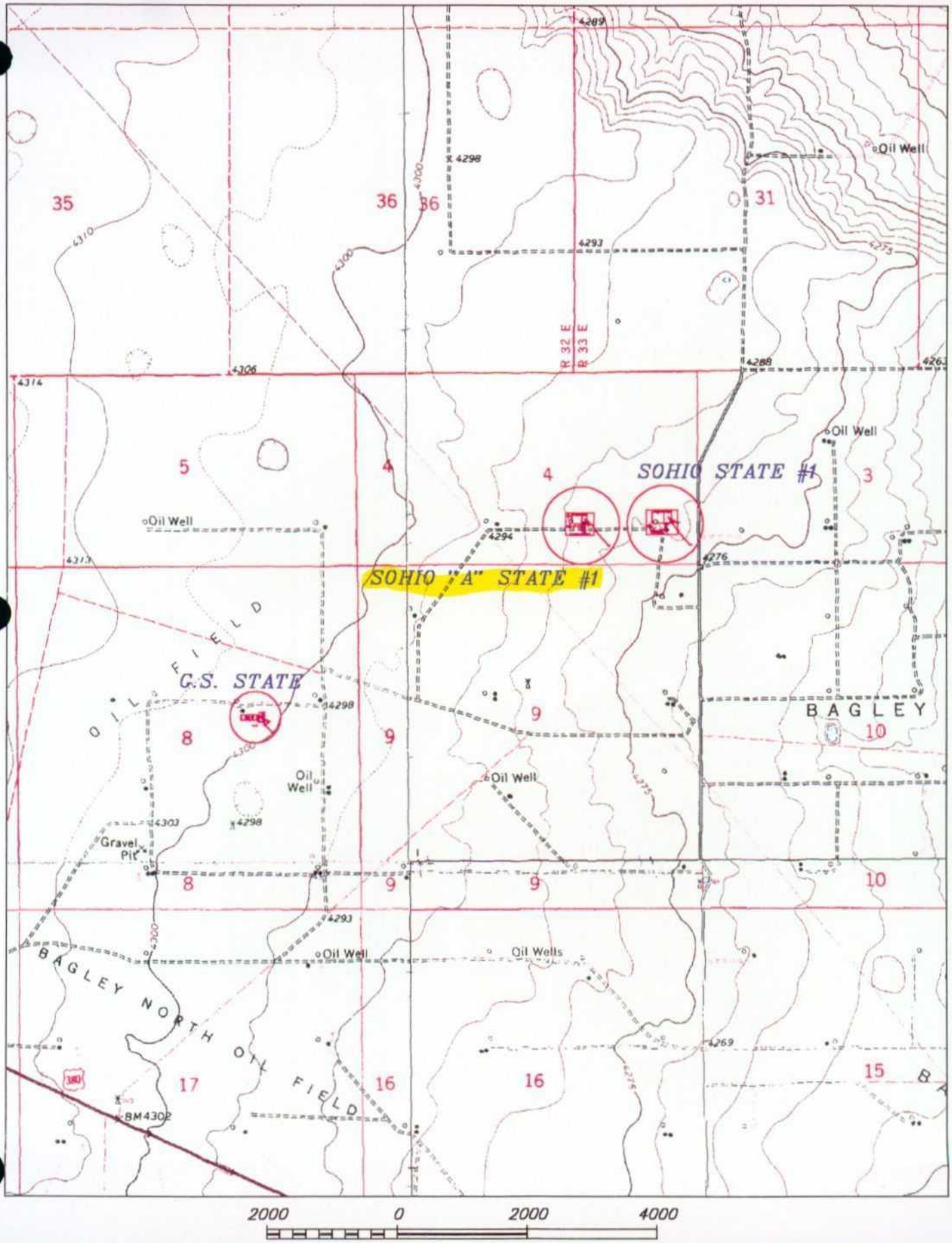

0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
Benzene
Toluene
Ethylbenzene
m,p Xylene
o Xylene
Total Xylene
Total BTEX
10/2/97
12/3/97
3/23/98
6/25/98
10/1/98
1/6/99
7/14/99
10/6/99


Sohio "A" MW # 27
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Benzene
Toluene
Ethylbenzene
m,p Xylene
o Xylene
Total Xylene
Total BTEX
3/17/99
4/1/99
7/14/99
10/6/99

Sohio "A" MW # 31

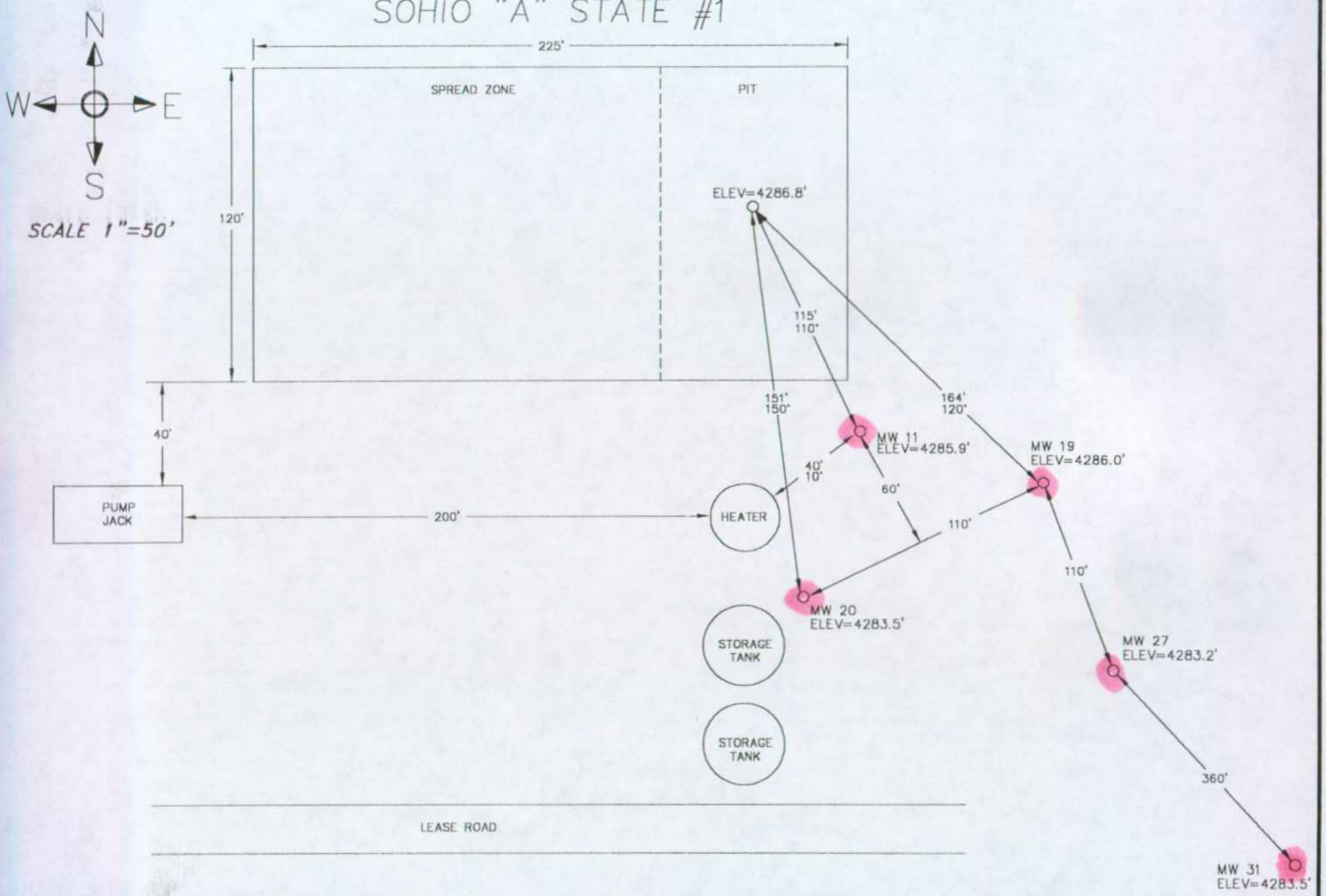

0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Benzene
Toluene
Ethylbenzene
m,p Xylene
o Xylene
Total Xylene
Total BTEX
8/13/99
10/6/99

WHOLE EARTH ENVIROMENTAL, INC.



BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO	W.O. Number: 9352	Drawn By: K. GOAD	
	Date: 10-21-99	Disk: KJG #122 – WE9352.DWG	

SOHIO "A" STATE #1



Tipperary

Tipperary Corporation
Tatum Pit Closure Project
Monitor Well Water Elevation Table

Well Name	Monitor Well No.	Surface Elevation	Date Well Drilled	Water Depth @ Drill Date	Water Elevation	Water Depth @ 8/9/99	Water Elev. @ 8/9/99	Water Depth @ 10/21/99	Water Elev. @ 10/21/99	Depth Change Aug. / Oct. '99	Distance to Pit Center (ft)	Gradient (Ft. / Ft.)	Gradient (Ft. /100 Ft.)
Iva	Recovery Well	4,298 42	Aug-97	52 0	4,246 42								
	1	4,292 10	Aug-97	54 9	4,237 20	48 83	4,243 27	51.75	4,240 35	2 92	115	0 080174	8 02
	2	4,291 93	Aug-97	53 0	4,238 93	49 17	4,242 76	51 50	4,240 43	2.33	140	0 053500	5 35
Mable	Recovery Well	4 290 55	Aug-97	52 0	4,238 55								
	3	4,287 22	Aug-97	52 0	4,235 22	48 75	4,238 47	52 50	4,234 72	3 75	148	0 022500	2.25
	4	4,287 46	Aug-97	52 0	4,235 46	48 58	4,238 88	51.75	4,235 71	3.17	160	0 019313	1 93
Vera	Pit Center	4 282 98			4,289 50								
	5	4,298 90	Aug-97	63 0	4,235 90	61 50	4,237 40				159	-0.037233	-3.72
Bell	Pit Center	4 283 09			4,279 60								
	6	4,281 12	Aug-97	51 0	4,230 12	42 13	4,238.99	43.01	4,238.11	0 88	93	0 021183	2 12
	13	4,280 84	Oct-97	47 8	4,233 04	40 83	4,240 01	43 66	4,237.18	2 83	51	0 044118	4 41
	14	4,280 80	Oct-97	48 3	4,232 50	43 00	4,237 80	43 50	4,237 30	0 50	47	0 048723	4 87
	25	4,280 37	Mar-99	47 4	4,232 97	43 50	4,236 87	43 50	4,236 87	0 00	154	0 017662	1 77
NBN	Pit Center	4,282 45			4,282 45								
	7	4,281 59	Aug-97	50 0	4,231 59	43 50	4,238 09				107	0 008037	0 80
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	0 00	165	0 045152	4 52
	15	4,259 68	Oct-97	47 0	4,212 68	34 75	4,224 93	37 00	4,222 68	2.25	198	0 036263	3 63
	16	4,259 06	Oct-97	47 1	4,211 96	36 00	4,223 06	36 10	4,222 96	0 10	247	0 031579	3 16
	26	4,258 04	Mar-99	43 0	4,215 04	34 75	4,223 29	34 60	4,223 44	-0.15	387	0 022791	2 28
Sohio # 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	0 016273	1 63
	17	4,283 31	Oct-97	49 4	4,233 91	44 00	4,239 31	44 50	4,238 81	0 50	262	0 008053	0 81
	18	4 283 59	Oct-97	48 6	4,234 99	43 75	4,239 84	44 10	4,239 49	0 35	176	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	552	0 004004	0 40
	30	4,281 13	Aug-99	45 3	4,235 82	45 31	4,235 82	44 10	4,237 03	-1 21	776	0 005528	0 55
Sohio "A"	Pit Center	4,286 84			4,286 84								
	11	4,285 88	Aug-97	50 0	4,235 88	38 25	4,247 63	38 50	4,247 38	0 25	115	0 008348	0 83
	19	4,285 97	Sep-97	48.7	4,237 27	32 50	4,253 47	35.15	4,250 82	2 65	164	0 005305	0 53
	20	4 285 96	Sep-97	49 5	4,236 46	38 00	4,247 96	38 66	4,247 30	0 66	151	0 005828	0 58
	27	4,285 61	Mar-99	40 0	4,245 61	36 83	4,248 78	38 20	4,247 41	1 37	264	0 004659	0 47
	31	4,283 54	Aug-99	37 5	4,246 09	37 45	4,246 09	38 90	4,244 64	1 45	624	0.005288	0 53
G S. State	Source Well	4,307 00	Sep-97	48 0	4,259 00								
	12	4,303 27	Aug-97	48 0	4,255 27	42 75	4,260.52	42 90	4,260 37	0.15	52	0 071731	7.17
	21	4,303 08	Oct-97	48 0	4,255 08	43 25	4,259 83	43 66	4,259 42	0 41	151	0 025960	2 60
	22	4,302 77	Oct-97	47 5	4,255 27	43 50	4,259 27	43.90	4,258 87	0 40	148	0 025203	2 52
	29	4,303 20	Mar-99	49 1	4,254 14	44.00	4,259 20	44.25	4,258 95	0 25	295	0.016475	1.65
Sat. # 4	Pit Center	4 311 49			4,208 00								
	9	4 208 66	Aug-97	31.0	4,177 66	26 17	4,182 49	26.75	4,181 91	0 58	80	0 035375	3 54
	23	4,209 03	Oct-97	28 0	4,181 03	26 25	4,182.78	27 15	4,181 88	0 90	158	0 015570	1 56
	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 Satellite 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