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REPORTS

DATE:

1984

GROUNDWATER
TECHNOLOGY
Consulting Groundwater Geologists
A Division of Oil Recovery Systems, Inc.
5047 CLAYTON ROAD • CONCORD, CA 94521 • (415) 671-2387

OCD

Late Report?

PRELIMINARY HYDROGEOLOGICAL INVESTIGATION AND RECOVERY EFFORTS REPORT TEXAS-NEW MEXICO PIPELINE MONUMENT, NEW MEXICO

December, 1984 DPR

Prepared for:

Mr. Bernie Lednicky
Manager, Texas-New Mexico Pipeline
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Geologist

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Manager, Western Region

INTRODUCTION

During the last week of September 1984, Texas-New Mexico Pipeline of Hobbs, New Mexico contracted Groundwater Technology, a division of Oil Recovery System Inc., to perform a subsurface assessment of potential crude oil loss at the Monument field pipeline. The pipeline group informed Groundwater Technology that a potential pipeline leak may have occurred which could threaten the nearby municipal water wells.

This report includes Groundwater Technology initial site assessment, investigative procedures, abatement installations, water sampling and analysis and comprehensive hydrogeological study for determining the possible effects of the inadvertantly released crude oil to the subsurface.

BACKGROUND

In response to Texas-New Mexico Pipeline's telephone request, Groundwater Technology hydrogeologist arrived on site on October 3, 1984 to begin site exploration. Dark patches of suspected crude oil were seen adjacent to a pipeline owned by Texas-New Mexico. An estimated acre of surface soils were contaminated with the leaked crude oil. As part of an emergency clean-up plan the Pipeline Company in cooperation with the Environmental Improvement Division and Oil Conservation Department of New Mexico excavated an acre of saturated soils to a depth of approximately 4 feet. An estimated 1000 barrels of crude oil was removed with the excavated soils. This conservative figure was calculated assuming that .3 barrel/cubic yard (12.6 gallons) were adsorbed onto the soils over one acre to a depth of 2-4 feet.

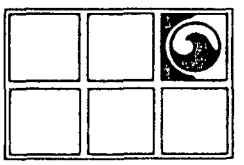
GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

In conjunction with soil excavation, the near by municipal well (located approximately 100 feet from the excavated area), was also shut down as free floating oil was observed to have impacted the well. Public water needs were then supplied by the remaining municipal water well located one quarter of a mile south of the excavated site. See the appendix for a well location map. A back up well located farther away from the investigation area was also refurbished by the Pipeline Company to ensure an adequate water supply.

LOCAL HYDROGEOLOGY

The Ogallala Aquifer underlies this section of southeastern New Mexico. In this area the major aquifer is a sand and gravel zone semi-confined between a top caliche layer and bottom red beds. Static water level was observed to be 17-20 feet below the ground surface. Soft and hard caliche was encountered from 1 foot to the water level. Below the caliche layer (20-55 feet), a fine to medium grained sand is encountered. The impermeable red beds begin at a depth of 50-55 feet.
(see Geologic cross-section)

The major water bearing zone was observed to be the medium-grained sand zone at 20-55 feet. Static water level was observed to vary between 17-20 feet below the ground surface and, due to the presence of the impermeable caliche layer the aquifer, is semi-confined or semi-artesian in some locations depending on depth of the water table and caliche. Natural groundwater movement (as defined by the groundwater gradient maps) was determined to flow from the north to the south or from the suspected loss area toward the municipal water supply well.

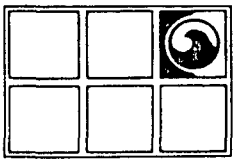


INITIAL INVESTIGATIVE PROCEDURES

On October 3, Groundwater Technology met with local drillers at Monument to discuss their availabilities and capabilities and were put on stand-by status. A meeting with the client, the Oil Conservation Department (OCD) and Groundwater Technology followed. The monitoring phase of the study site was discussed and permission was given by the OCD for drilling activities to begin. The purpose of the first phase of exploratory drilling was to determine the areal extent and concentration of fugitive product.

The initial site visit consisted of measuring the shut down water well for water level and possible product infiltration, locating several investigation wells to define the contaminated area and sampling the water from the remaining down gradient municipal wells to determine if these wells were impacted by free floating product and/or dissolved hydrocarbons.

This initial investigation determined that the closest municipal well was contaminated by four feet of product (floating on the water table inside the well bore). The remaining (at that time) municipal well was not impacted by product and subsequent laboratory analysis reported the remaining well was also not contaminated by dissolved hydrocarbons and was of acceptable quality for use. An old municipal well was refurbished (by Texas-New Mexico Pipeline) for possible use as a precaution. This refurbished well was brought on-line because of its remoteness to the contaminated area and to ensure the integrity of the water supply system.



In order to expedite recovery operations the contaminated water well was utilized as a recovery well. The town's submersible water pump was used to begin to apply hydraulic control in the contaminated area. A water disposal truck was used to pump 4,200 gallons of water that evening. The water was disposed of in a proper manner after the tank was full. During this time an increased thickness of product was observed in the water well. An automatic product recovery pump was later installed in the well to facilitate product retrieval.

When? Apparently Oct 3,

MONITORING WELL INSTALLATION

Drilling commenced on October 4, 1984 to install the first series of investigation wells. An air rotary rig was used to drill 8" bore holes. Hand slotted 5" PVC wells were placed in the bore holes. Eight wells were initially located by Groundwater Technology in order to begin defining the extent and magnitude of product in the vicinity of the excavated site and the contaminated water well. After these wells were installed additional wells were installed to continue to define the area of contamination. Presently, the site has twenty-nine observation wells.

All monitoring wells were drilled to approximately 30 feet, screened and cased with 5" PVC, sand packed to within 6 feet of the surface then surface sealed with Portland cement. The screen zones extend between 5-8 feet above and at least 20 feet below the water table. Wells were left as casing stick-ups about 1.5 feet above grade.

Keep wells in place, replace @ cocks.

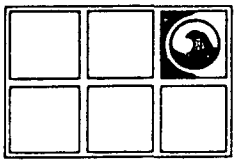
All wells were developed with a 15 foot rig bailer. At least four full bailer volumes were removed. The monitoring wells were cleaned and developed to reflect the true product/water levels found in the surrounding formation.

Wells were surveyed-in for location and vertical elevation control. By utilizing the elevation of the well, Groundwater Technology can correctly monitor depth to water and depth to product in the wells and relate the accumulated data to a common elevation. From this data ground water gradient, product thickness and water table fluctuations can be determined. See appendix for groundwater gradient maps before and after pumping and apparent product thickness maps.

RECOVERY EQUIPMENT INSTALLATION AND OPERATION

After the decision was made to recover oil from the water well, the original town water pump was purchased by the Pipeline Company and was kept operating in the well. This effort kept water and product moving toward the pumping well. A decision was reached to re-fit the water well to a product recovery point using specially designed product collection pumps. A double pump, explosion proof, recovery system was installed in the water well on October 12.

The selection of equipment was determined from the construction of the existing town well and the groundwater data accumulated by Groundwater Technology.



An Oil Recovery System 2hp stainless steel Water Table Depression Pump was selected for the project. This pump was chose due to its explosion proof/intrinsically safe design and its automatic controls. A float probe can be set at a predetermined depth in the Recovery Well. This probe will cycle the pump and keep a cone of depression in the well. By this means product within the radius of influence will begin to flow by gravity into the recovery well.

Discharge waters were pumped across the site into a waste water collection line. Permission was granted by the owner to utilize the pipeline for this purpose.

Once product accumulates in the recovery well a product pump remove the crude oil into a recovery tank. An Oil Recovery System Probe Scavenger was chosen as the product recovery unit. This system is also explosion-proof and communicates with a pump control system through intrinsically safe signals. By using a float conductivity sensor, the probe will tell the Scavenger when sufficient product has accumulated in the well for pumping (2-4 inches). The logic system will then automatically turn the pump on and remove the product.

220V and 110V electrical service was brought into the recovery shack and wired into explosion-proof receptacles.

After one day of pumping at approximately 25 gpm, a cone of depression drew significant amounts of product into the recovery well. The drawdown at this point was 17'. When the Probe Scavenger was put on-line it began to recover product immediately. Since initiation of product recovery system, approximately 100 gallons per day of product has been recovered and collected in the storage tank. Total recovery to date has exceeded 5,000 gallons.

What Date? Dec 84? (120615)

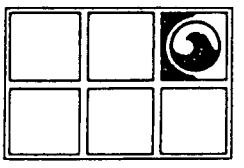
FURTHER INVESTIGATIVE PROCEDURES

Following the initiation of the product recovery system, additional investigative procedures were undertaken to further define the extent of contamination. By the beginning of November, twenty-nine monitoring wells were installed along 1/3 of a mile of pipeline. Areas to either side of the pipeline were explored as product was found in various configurations.

Monitoring Wells # 9-29 were designed similar to Monitoring Wells # 1-8. Five inch PVC was used with the hand slotted sections ranging from a depth of 30 to within 6-10 feet of the ground level. All Monitoring Wells were gravel packed with pea gravel and surface-sealed (at least 3 feet thick) with Portland cement. Bailing of the wells were completed as previously mentioned. Elevation control on all 29 wells was completed by King Surveying of Hobbs, New Mexico.

As a second phase design of controlling the plume, Well 11 was converted into a water table control point. Electrical and plumbing lines were run into a shed located over Monitoring Well 11. A submersible pump was installed and continually pumped to hydraulically control any product moving down gradient from Recovery Well #1. Product recovery was designed to begin as product thickness increased in the vicinity of Monitoring Well 11. Due to construction characteristics of the monitoring, the effectiveness of this water table control/product recovery well is limited. Currently, a properly designed recovery well will be installed in this area to replace the emergency use of this monitoring well and improve hydrogeologic control of the product plume in this area.

Where? When done?



WATER SAMPLING AND ANALYSIS

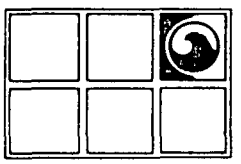
Observation wells not contaminated by free-floating product and the public water supply wells were incorporated into a sampling and analysis program to define the extent of dissolved hydrocarbon contamination and to monitor groundwater conditions.

The sampling procedures conducted on-site included the cleansing and washing of all sampling equipment with trisodium phosphate and distilled water prior to their introduction to each well.

A clean 12" acrylic bailer and the attached cord is soaked and washed in a TSP solution and rinsed several times with distilled water before being used to bail at least fifteen bailer volumes of water from well. Only wells without free floating product are sampled.

After this bailing procedure, a 12" all teflon (EPA recommended) sampler is washed and rinsed with distilled water. Care is made not to run the bailer along the well wall when taking a sample. After bailing 3 times, the fourth bailer of water is used to rinse the VOA vial and cap. After this precaution a water sample is poured from the teflon bailer into the teflon /glass vial taking care that no air bubbles are sealed into the vial. The vial is then tagged with a pre-labeled sticker and placed in an ice chest.

The collected samples are packed with new ice and sent next day air to Oil Recovery Systems Lab in New Hampshire for analysis.

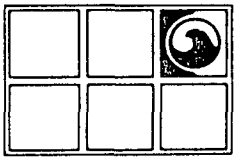


A gas chromatograph/flame ionization detector is used to analyze the static headspace of the samples for volatile hydrocarbons. Method detection limits (MDL) for Benzene and Toluene are 1 ppb, ethylbenzene 6 ppb, total xylenes 6 ppb and aliphatic and miscellaneous aromatics 20 ppb. Groundwater Technology Labs are certified and adhere to EPA performance criteria.

RESULTS/CONCLUSIONS

From the data collected on free-floating product patterns in the monitoring wells, it appears that two separate product plumes are situated around the pipeline. The North Plume is reacting to pumping actions in Recovery Well #1 and Recovery Well #2 (MW11). The down gradient extent of this plume appears to be between Monitoring Well 11 and Monitoring Well 12. A zero (no product) line extends from Monitoring Well 25 southwest to Monitoring Wells # 12 and 18. This is the boundary area between the two suspected plumes.

From the plotted free product data south of this zero line, one can suggest that a separate plume extends from Monitoring Well #24 southwest (transversing the pipeline) towards Monitoring Well #20. Since the groundwater gradient dips from a north to southerly direction a line leak from the Texas-New Mexico Pipeline would seem to flow along the pipeline and not toward the area North of Monitoring Well 26. The groundwater gradient and plume location suggest there is another source of product than the original loss area.

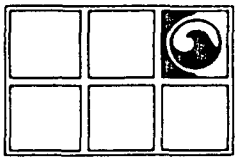


Another fact supporting the two plume theory was seen during the excavation of the Texas-New Mexico Pipeline. From the area of the initial soil excavation to the Town Road 322, the pipeline was excavated and showed no evidence of any past or present leaks. Minute seeps at couplings were noticed, although of no volumetric significance.

Texaco's Houston laboratory reported to Groundwater Technology the results of its crude oil analysis for sulfur content, API gravity and viscosity. From the preliminary findings, Plume 1 has shown an increasing weathering effect as product has traveled from the Recovery Well #1 area down gradient toward Monitoring Well #11. Sulfur content, viscosity, and API gravity measurements have increased which infers that an increased weathering (aging) effect has occurred as the crude oil has traveled away from its source. This is typical of a product plume configuration that the product farthest from the loss area has undergone the most weathering.

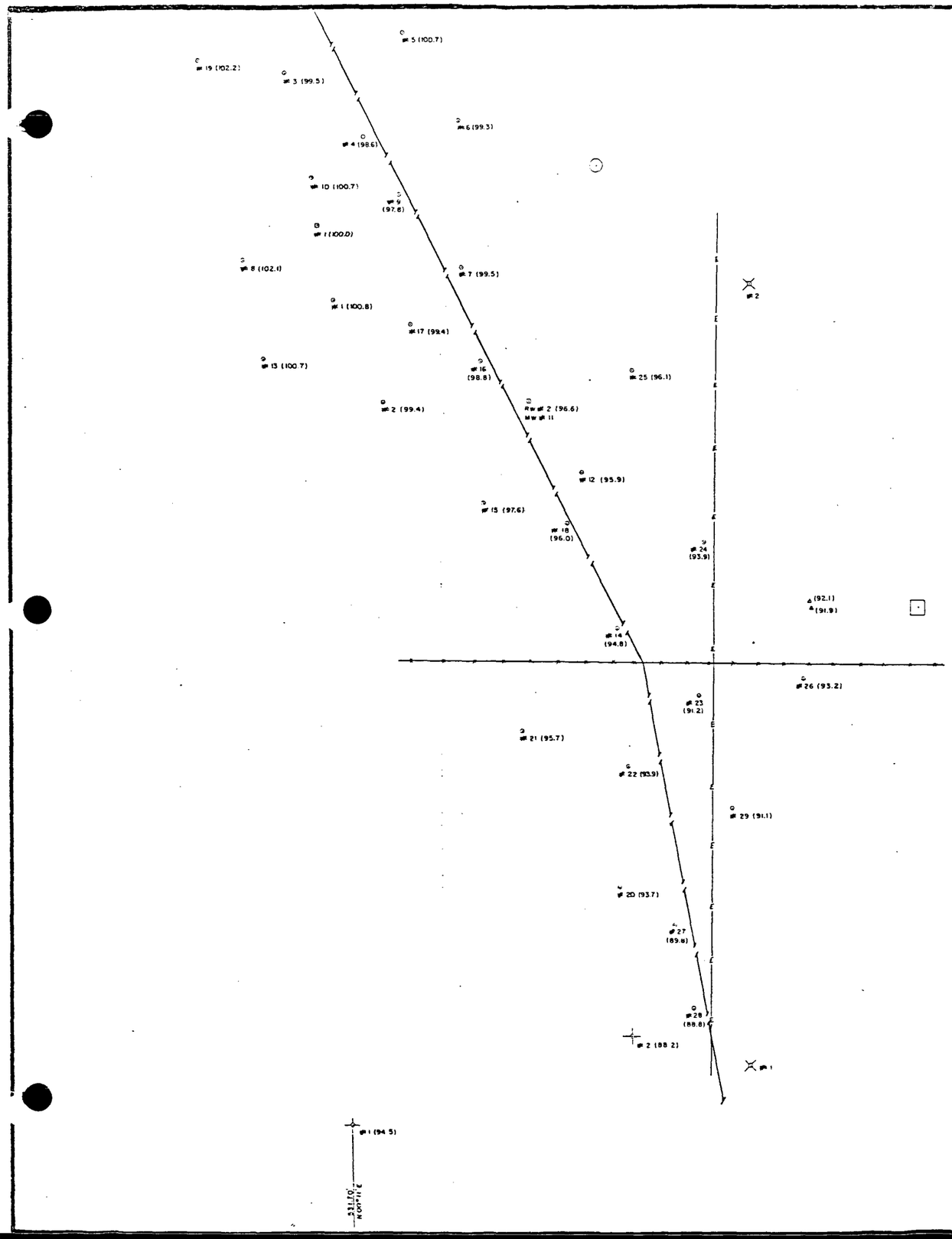
Similar results are being quantified from suspected Plume #2. A comparison between Plume #1 and Plume #2 are pending completion.

The sampling and analysis program has determined that, as expected, the dissolved hydrocarbon plume is slightly larger than the free-floating product plume with the boundaries of the dissolved hydrocarbon plume being similar to the configuration of the free product plume. Several rounds of sampling and analysis have defined the plume and have documented the remaining public water supply well to be non-contaminated. The site will continue to be monitored to determine the migrational path of the contaminated plume.



From the data Groundwater Technology has analyzed, a two plume system seems apparent. Further investigations involving water sampling and analysis and additional exploration are being conducted which will help support and clarify the site conditions.

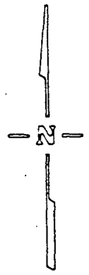
Need updated sample results, maps, recovered prod amount [illegible].



TEXAS-NEW MEXICO PIPE LINE CO.

MONUMENT TEST WELLS

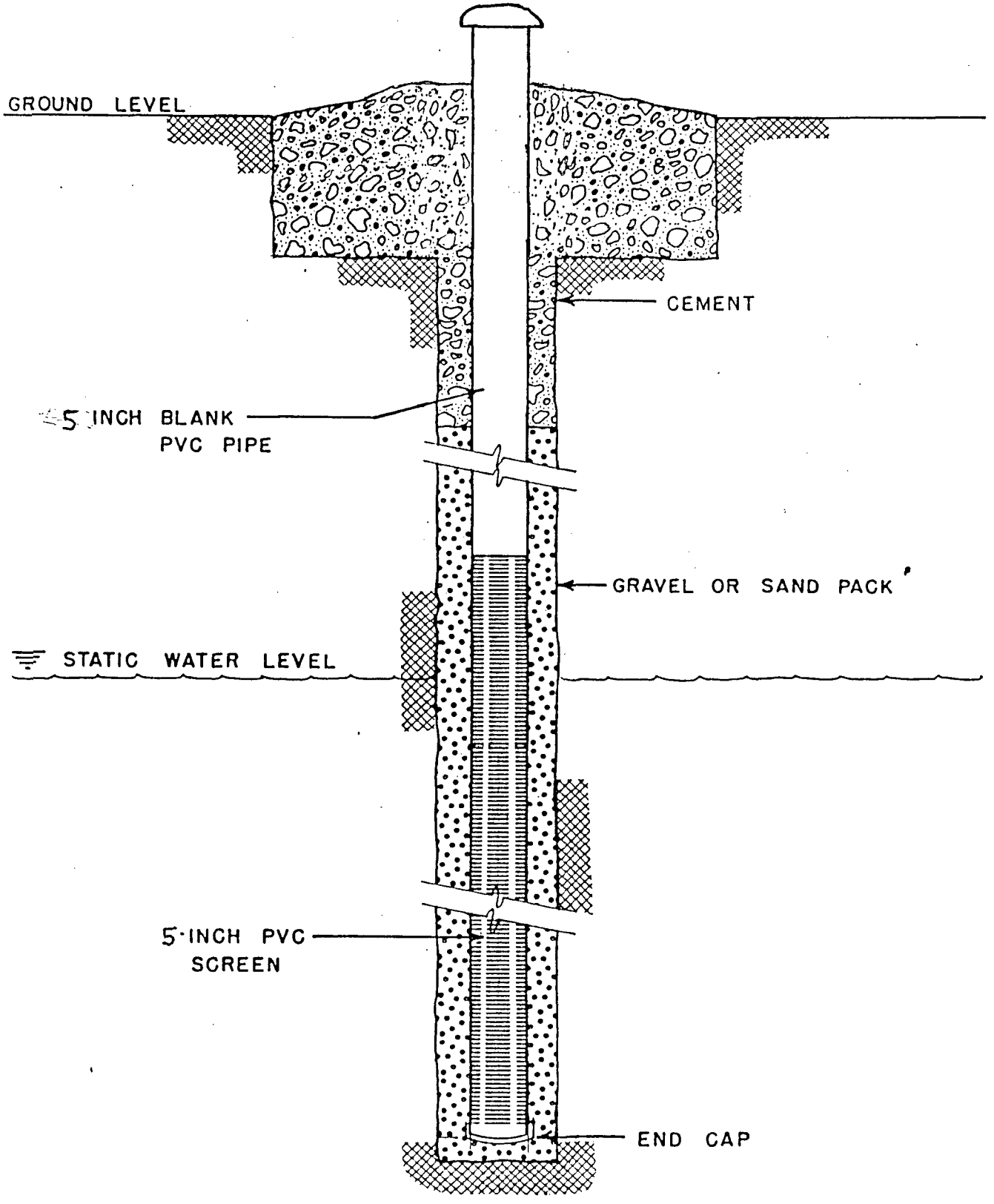
SEC. 29, T19S, R37E, N.M.P.M.,
Lea County, New Mexico



LOCATION	RELATIVE ELEVATION	NORTH COORD	EAST COORD
SW Sec. Corr.	N/A	000	000
SE Sec. Corr.	N/A	-16.9	5277.1
RW 1	100.0	2056.2	2514.9
RW 2 MW 11	96.6	1755.0	2881.6
MW 1	100.8	1928.2	2542.8
MW 2	98.4	1754.6	2630.7
MW 3	99.5	2314.4	2459.0
MW 4	98.6	2207.6	2593.9
MW 5	100.7	2383.6	2660.6
MW 6	99.3	2234.3	2759.5
MW 7	99.5	1983.3	2765.6
MW 8	102.1	1993.6	2387.0
MW 9	97.8	2108.4	2652.4
MW 10	100.7	2138.1	2507.7
MW 11 RW 2	96.6	1755.0	2881.6
MW 12	95.9	1636.2	2971.6
MW 13	100.7	1829.3	2422.3
MW 14	94.8	1372.1	3034.4
MW 15	97.6	1582.7	2804.6
MW 16	98.8	1827.7	2798.8
MW 17	99.4	1887.5	2675.3
MW 18	96.0	1549.9	295[illegible]
MW 19	102.2	2336.6	2306.9
MW 20	93.7	932.5	3039.2
MW 21	95.7	1195.7	2870.9
MW 22	93.9	1134.9	3057.5
MW 23	91.2	1257.1	3178.2
MW 24	93.3	1520.3	3185.9
MW 25	96.1	1811.2	3060.3
MW 26	93.2	1286.5	3357.2
MW 27	89.8	866.7	3133.6
MW 28	88.8	726.6	3166.3
MW 29	91.1	1064.6	3235.3
Vent Pt. 1	92.1	1419.4	3370.9
Vent Pt. 2	91.9	1402.7	3371.9
EW 1	94.5	523.4	2574.8
EW 2	88.2	679.2	3060.1
EW 3	89.6	521.6	3690.5
Pwr. Ln. (No.)	N/A	2027.5	3207.5
Pwr. Ln. (So.)	N/A	697.8	3198.8
Oil Well 1	N/A	629.8	3267.2
Oil Well 2	N/A	1957.7	3262.5
Storage Tank	N/A	2159.7	2998.1
Tank Battery	N/A	1406.9	3560.0
Fence (E)	N/A	1312.2	3294.1
Fence (W)	N/A	1314.5	2893.6
Pipeline (N)	N/A	2499.6	2461.3
Pipeline (P.L.)	N/A	1312.6	3080.1
Pipeline (S)	N/A	566.4	3219.4

LEGEND

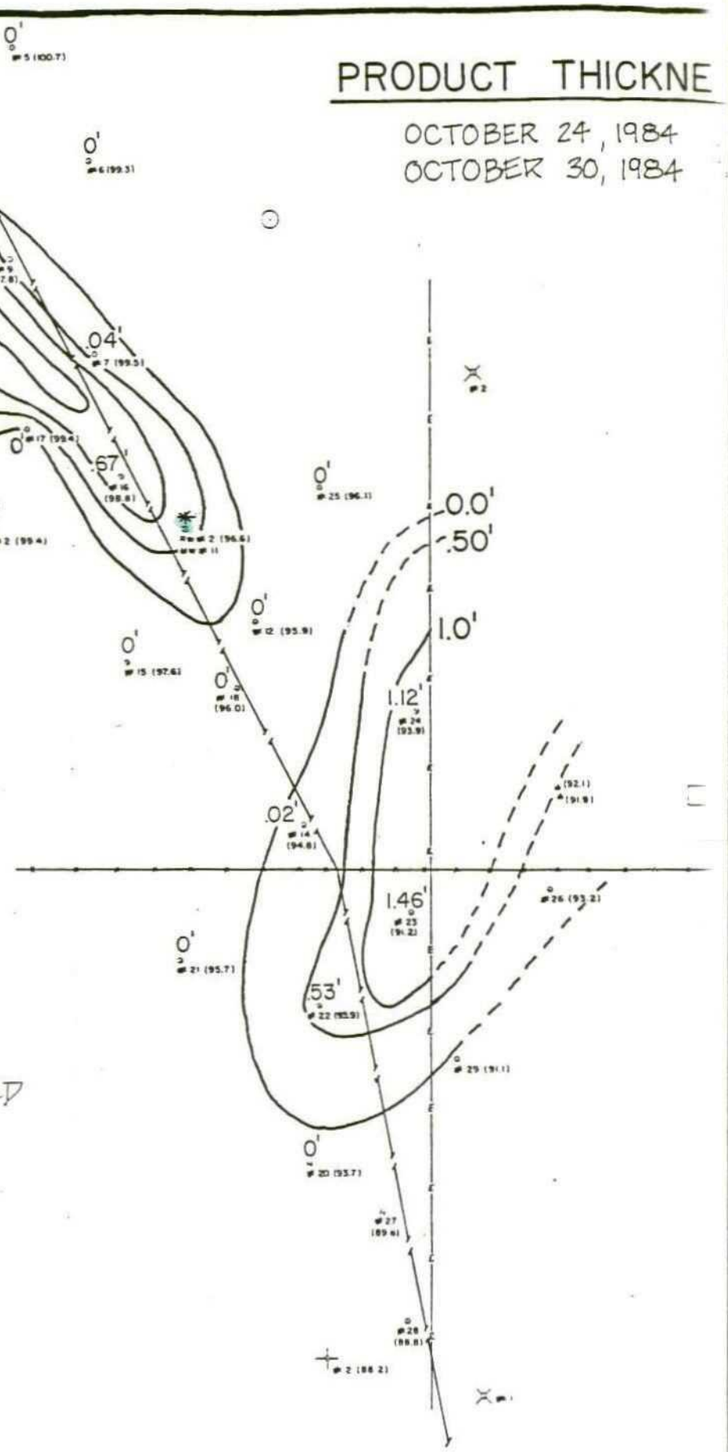
- Monitor Well
- Recovery Well
- ( ) Relative Elevation
- Electric Line
- Vent
- Domestic Well
- Oil Well
- Storage Tank
- Tank Battery
- Fence
- Buried Pipeline



TYPICAL DETAIL
MONITORING WELL CONSTRUCTION

PRODUCT THICKNE

OCTOBER 24, 1984
OCTOBER 30, 1984



* MW #11 (APPROX. 0.10'-0.50')
MW #26-29 NOT YET DRILLED

S MAP

N #1-19
N #20-25

TEXAS-NEW MEXICO PIPE LINE CO.

MONUMENT TEST WELLS

SEC. 29, T19S, R37E, N.M P.M.,
Lea County, New Mexico

LOCATION	RELATIVE ELEVATION	NORTH COORD	EAST COORD
SW Sec. Cor.	N/A	000	000 *
SE Sec. Cor.	N/A	-16.9	5277.1
RW 1	100.0	2056.2	2514.9
RW 2 MW 11	96.6	1755.0	2881.6
MW 1	100.8	1928.2	2542.8
MW 2	98.4	1754.6	2630.7
MW 3	98.5	2314.4	2459.0
MW 4	98.6	2207.6	2591.9
MW 5	100.7	2383.8	2660.6
MW 6	99.3	2234.3	2759.5
MW 7	99.5	1983.3	2765.6
MW 8	102.1	1993.6	2387.0
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MW 23	91.2	1257.1	3178.2
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- Monitor Well
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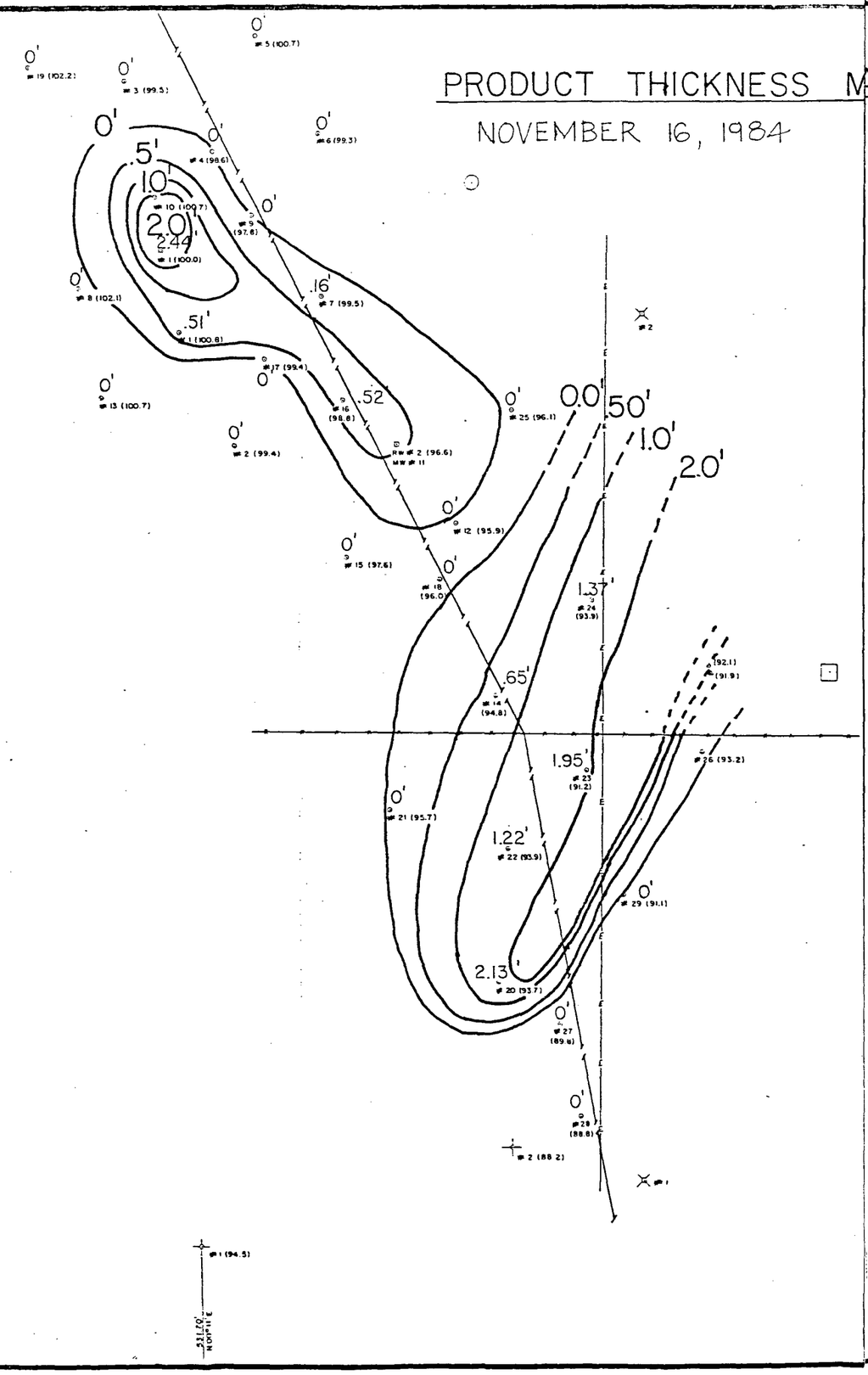
PRODUCT THICKNESS MAP

NOVEMBER 16, 1984



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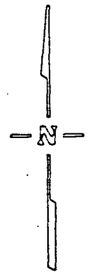

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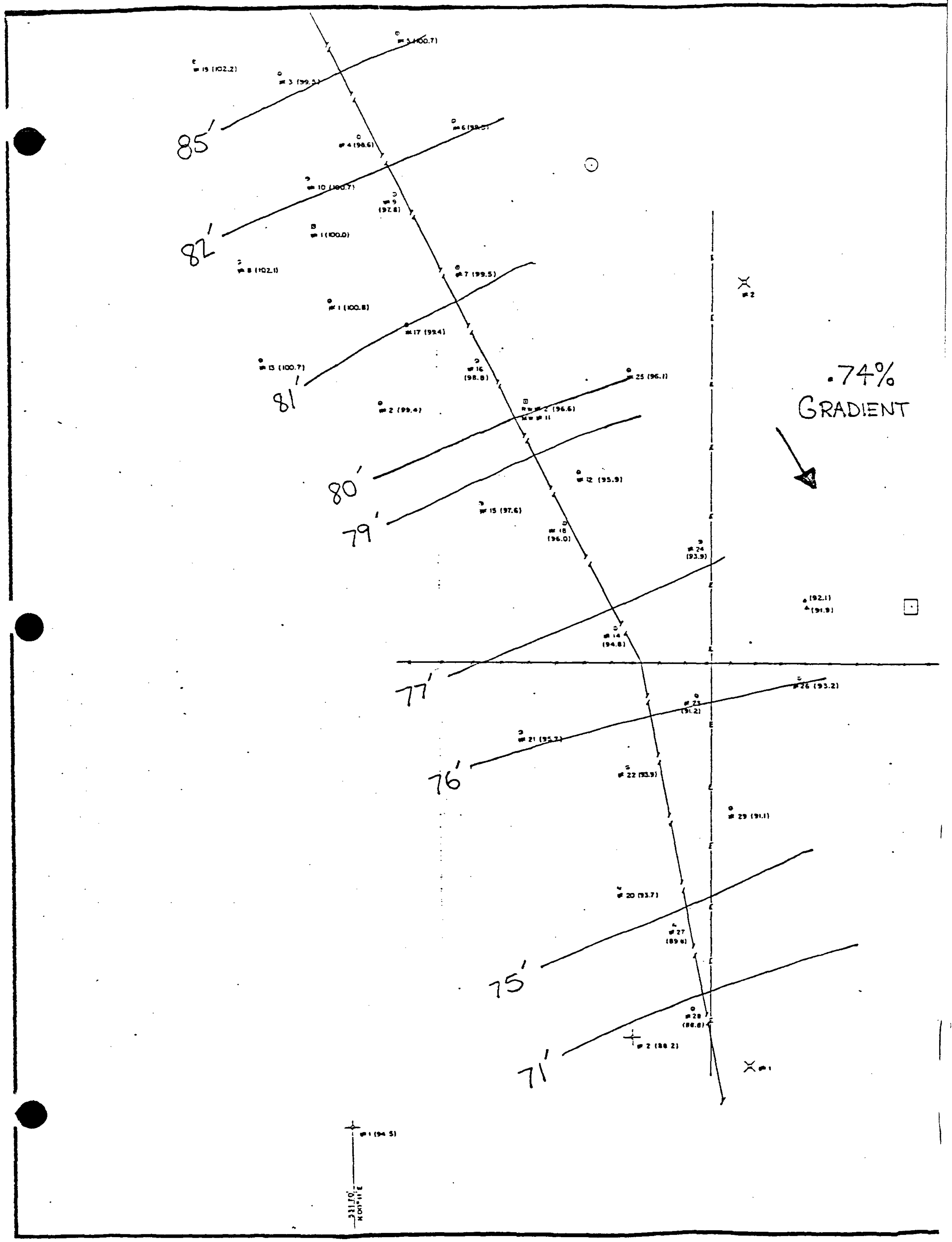
Pwr. Ln. (No.)	N/A	2027.5	3207.5
Pwr. Ln. (So.)	N/A	697.8	3198.8
Oil Well 1	N/A	629.8	3267.2
Oil Well 2	N/A	1957.7	3262.5
Storage Tank	N/A	2159.7	2998.1
Tank Battery	N/A	1406.9	3560.0
Fence (E)	N/A	1312.2	3294.1
Fence (W)	N/A	1314.5	2893.6
Pipeline (N)	N/A	2499.6	2461.3
Pipeline (P.I.)	N/A	1312.6	3080.1
Pipeline (S)	N/A	566.4	3219.4

LEGEND

- Monitor Well
- Recovery Well
- ( ) Relative Elevation
- Electric Line
- Vent
- Domestic Well
- Oil Well
- Storage Tank
- Tank Battery
- Fence
- Buried Pipeline

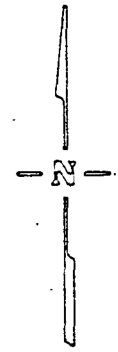
#3 (89.6)

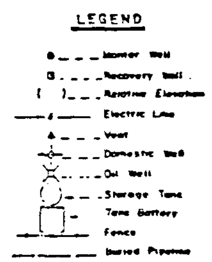


TEXAS-NEW MEXICO PIPE LINE CO.

MONUMENT TEST WELLS

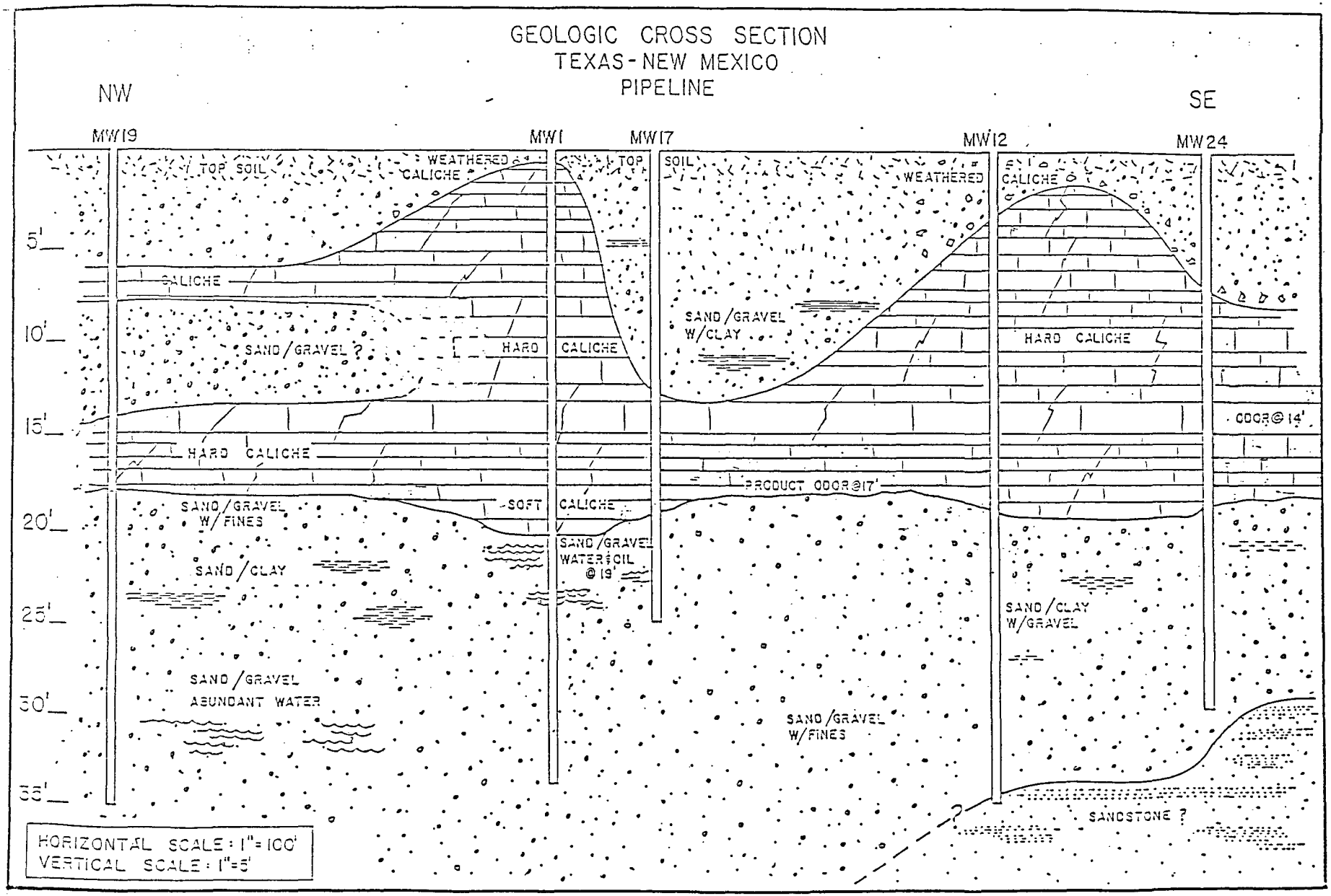
SEC. 29, T.19S, R37E, N.M.P.M.,
Lea County, New Mexico

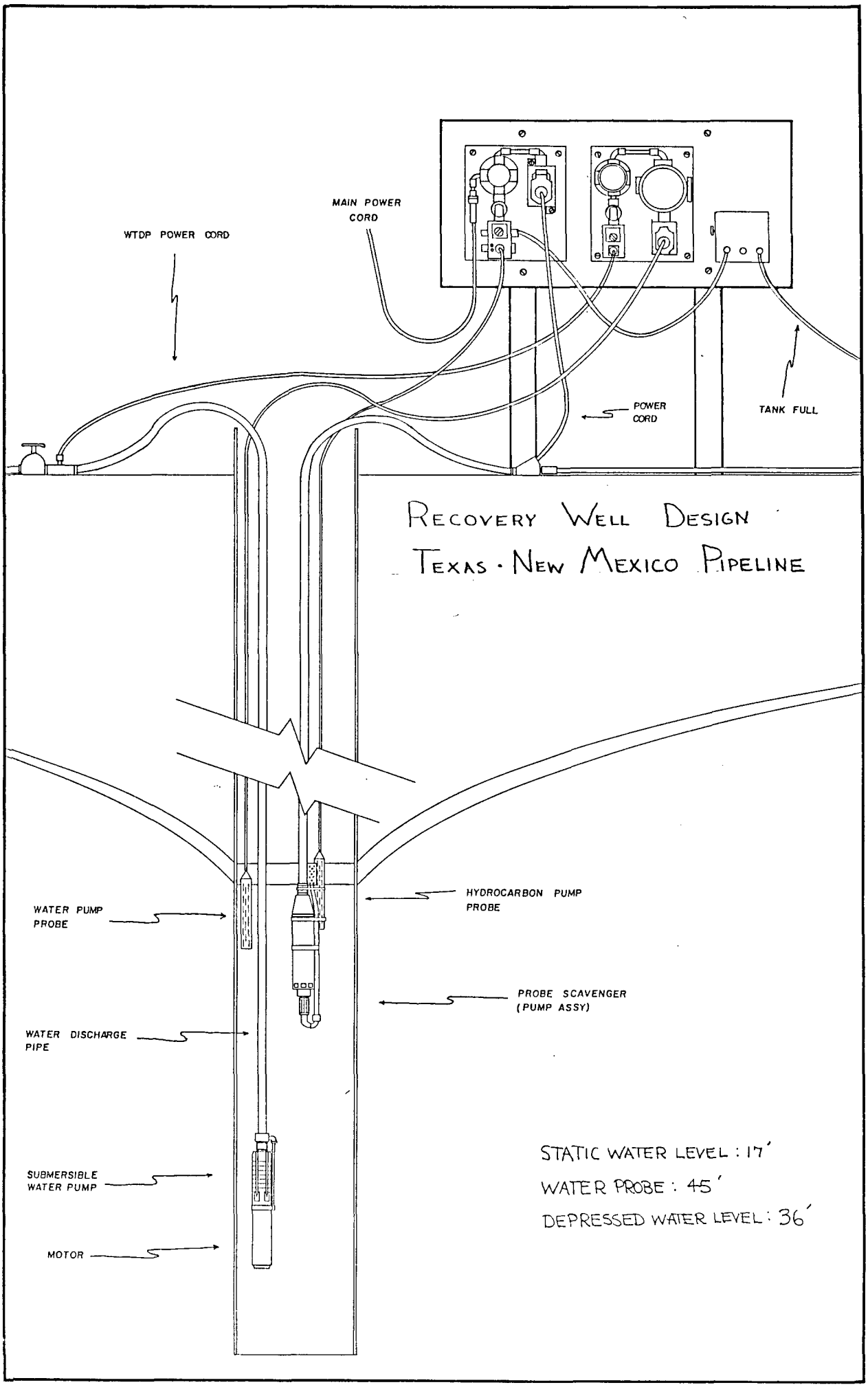




LOCATION	RELATIVE ELEVATION	NORTH COORD	EAST COORD
SW Sec. Cor.	N/A	000	000
SE Sec. Cor.	N/A	[illegible]	[illegible]
RW 1	100.0	2056.2	2514.9
RW 2 / MW 11	**96.6**	**1755.0**	**2881.6**
MW 1	100.8	1928.2	2542.8
MW 2	99.4	1754.6	2630.7
MW 3	99.5	2314.4	2459.0
MW 4	98.6	2207.6	2593.9
MW 5	100.7	2383.6	2660.6
MW 6	99.3	2234.3	2759.5
MW 7	99.5	1983.3	2765.6
MW 8	102.1	1993.6	2367.0
MW 9	97.8	2106.4	2652.4
MW 10	100.7	2138.1	2507.7
MW 11 / RW 2	**96.6**	**1755.0**	**2881.6**
MW 12	95.9	1636.2	2971.6
MW 13	100.7	1629.3	2422.3
MW 14	94.8	1372.1	3034.4
MW 15	97.6	1582.7	2804.6
MW 16	98.8	1627.7	2796.8
MW 17	99.4	1687.5	2675.3
MW 18	96.0	1549.9	2951.1
MW 19	102.2	2336.6	2306.9
MW 20	93.7	932.5	3039.2
MW 21	95.7	1195.7	2870.9
MW 22	93.9	1134.9	3057.5
MW 23	91.2	1257.1	3178.2
MW 24	93.3	1520.3	3185.9
MW 25	96.1	1811.2	3060.3
MW 26	93.2	1286.5	3357.2
MW 27	89.8	966.7	3133.6
MW 28	88.8	726.6	3166.3
MW 29	91.1	1064.6	3235.3
Vent Pt. 1	92.1	1419.4	3370.9
Vent Pt. 2	91.9	1402.7	3371.9
DW 1	94.5	523.4	2574.8
DW 2	86.2	679.2	3060.1
DW 3	89.6	521.6	3690.5
Pwr. Ln. (No.)	N/A	2027.5	3207.5
Pwr. Ln. (So.)	N/A	697.8	3198.8
Oil Well 1	N/A	629.8	3267.2
Oil Well 2	N/A	1957.7	3262.5
Storage Tank	N/A	2159.7	2998.1
Tank Battery	N/A	1406.9	3560.0
Fence (E)	N/A	1312.2	3294.1
Fence (W)	N/A	1314.5	2893.6
Pipeline (N)	N/A	2499.6	2461.3
Pipeline (P.I.)	N/A	1312.6	3080.1
Pipeline (S)	N/A	566.4	3219.4

GEOLOGIC CROSS SECTION
TEXAS-NEW MEXICO
PIPELINE





Recovery Well Design
Texas · New Mexico Pipeline

STATIC WATER LEVEL : 17'
WATER PROBE : 45'
DEPRESSED WATER LEVEL : 36'

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 1

Project Texas-New Mexico P/L Owner Same

Location Monument, N.Mex. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 9' Type PVC

Drilling Company Larry's Drill Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Hard Caliche
2					Same
4					Same
6					Same
8					Same
10					Same
12					Soft Caliche to 19'
14					Same
16					Same
18					Same
20					Sand and gravel, oil smell at 18', oil at 19'. 19-24'
22					
24					Water, sand and gravel
37					
					25' screen
					9' blank
					3' CAVE-IN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 2

Project Texas New Mexico Pipeline Owner Same

Location Monument, New Mex. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 12' Type PVC

Drilling Company Larrys Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Hard Caliche
2					Same
4					Same
6					Same
8					Same
10					Same
12					Soft Caliche, wet at 21'
14					Same
16					Same
18					Same
20				▽	Same
22					Sand, clay and some gravel 22'-31'
24					Same
26					Same
28					Same
30					Same
32					Sand and gravel, water strong at 31'
34					Same
36					Same
38					Bottom of well 37'
					Screen 37-12'
					Cased 0-12'

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 3

Project Texas-New Mexico Pipeline Owner Same

Location Monumwnt, New Mex. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 26' Slot Size Hand

Casing: Dia. 5" Length 12' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Black dirt 0-1'
2					Soft caliche 1-15'
4					
6					
8					
10					Same
12					
14					
16					Gravel and sand 15-21'
18				▽	
20					Same
22					Brown and red clay 21-27'
24					
26					Same
28					Clay and gravel 27-29'
30					Clay, sand and gravel wet 29-31'
32					Sand and gravel
34					Same
36					Sand-Lots of water
38					Bottom of well 37'
					26' Screen
					12' Blank

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 4

Project Texas-New Mexico Pipelin Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37 Diameter 8"

Surface Elevation ____ Water Level, Initial ____ 24-hrs. ____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 14' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil-some oil
2					Caliche with oil
4					Same
6					Caliche-clean 6-11'
8					Same
10					Same
12					Sand and caliche 11-17'
14					
16				▽	Same
18					Clay and sand -water 17-21'
20					Same
22					Clay and same 21-27'
24					
26					Same
28					Sand and gravel 27-31'
30					Same
32					Sand 31-35'
34					Same
36					Bottom of well 37'
					20' Screen
					14' Blank
					1' CAVE-IN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 5

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 15' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche hard 0-9'
2					
4					
6					Same
8					
10					Sand and caliche soft 9-15'
12					
14					Same
16				▽	Sand and clay-wet clay 21 feet 15-21'
18					Same
20					Same
22					Clay some gravel 21-26'
24					Same
26					Clay, gravel and sand to 31'
28					Same
30					Same
32					Gravel and sand 31-35'
34					Same
36					Bottom of well 35'
					20' Screen
					15' Blank
					2' CAVE-IN

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 6

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 14' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Black soil no oil
2					Hard caliche
4					
6					Same
8					
10					Soft caliche to 15'
12					
14					Same
16					Wet clay, sand and caliche 15-20'
18					Same
20					Clay, sand and gravel-water to 27'
22					
24					Same
26					
28					Some sand and gravel 27-29'
30					Sand and lots of gravel 29-39'
32					
34					Same
36					
38					Bottom of well 37'
40					
					20' Screen
					14' Blank
					3' CAVE-IN

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 7

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 37' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 15" Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Hard caliche to 5'
2					Same
4					Same
6					Soft caliche and sand 5-17'
8					
10					
12					
14					Same
16					
18					Clay and sand-oil smell 17-20'
20					Clay and sand-water
22					Same
24					Clay and gravel to 31'
26					
28					Same
30					
32					Sand and gravel-water at 31 feet 31-35'
34					
36					Bottom of well 37'
					20' Screen
					15' Blank
					2' CAVE-IN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 8

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10-6 Total Depth of Hole 37' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 15' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Hard caliche
2					Sand and gravel to 11'
4					
6					Same
8					
10					
12					Hard caliche 11-22'
14					
16					Same
18					
20					
22					Clay 23-25'
24					Same
26					Clay and sand 25-27'
28					Sand and gravel 27-36'
30					
32					
34					Same
36					Bottom of well 37'
					20' Screen
					15' Blank
					2' CAVE IN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 9

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 35' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 21' Slot Size Hand

Casing: Dia. 5" Length 14' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil to 1'
2					Hard caliche 1-4'
4					Gravel, sand to 7'
6					Same
8					Soft caliche 7-15'
10					Same
12					
14					Same
16					Sand and gravel 15-17'
18					Sand, gravel and clay 17-19'
20					Sand and clay (damp) smell stops 19-23'
22					Same
24					Clay, gravel and sand. Water 27' 23-28'
26				▽	Same
28					
30					Bottom of well 35'
32					
34					14' BLANK
36					21' SCREEN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 10

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 35' Diameter 8"

Surface Elevation ____ Water Level, Initial ____ 24-hrs. ____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil to 1'
2					Caliche hard 1-7'
4					Same
6					Same
8					Caliche soft and sand 7-14'
10					
12					Same
14					Sand and gravel some clay to 17'
16					Same
18					Smell sand, gravel and clay 17-19'
20					Sand and clay. No smell water at 29' 19-29'
22					
24					Same
26					
28				▽	Same
30					Sand and sand stone lots of water oil in water. 29-35'
32					
34					
36					Bottom of well 35'
					10' BLANK
					25' SCREEN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 11

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 38' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 11' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil to 1'
2					Hard caliche 1-5'
4					Same
6					Sand gravel and caliche 5-14'
8					
10					Same
12					
14				▽	Hard caliche, rock
16					Gravel, caliche, smell
18					Caliche to 23'
20					Same
22					Same
24					Clay and sand, hard 23-36'
26					
28					
30					Same
32					
34					Same
36					Sand and sand stone soft, water
38					Bottom of well 38', CASING PULLED UP 4' FROM 35'
					11' BLANK
					20' SCREEN

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 12

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 35 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil, loose rock to 1'
2					Caliche hard 1-19'
4					
6					
8					
10					Same
12					
14					
16					Same
18					
20					Clay, sand some gravel 19-25'
22					
24					Same
26					Clay and sand 25-28'
28					Clay, sand some gravel
30				▽	Real soft sand and clay. Water
32					Same
34					Harder sand and sand stone to 35'
36					Bottom of well 35'
					10' BLANK
					25' SCREEN

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 13

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 34' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 29' Slot Size Hand

Casing: Dia. 5" Length 5' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Loose rock
2					Hard caliche
4					
6					
8					Same
10					
12					
14					Soft caliche and sand to 17'
16					Same
18					Hard white caliche 17-20'
20					Sand and clay and gravel to 29'
22					
24					Same
26					
28				▽	Same
30					Water, clay and same 29-31'
32					Sand and sandstone 31-35'
34					
36					Bottom of well 34'

29' SCREEN
5' BLANK

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW14

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 34' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 9' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche, smell at 16', water and oil to 19'
2					
4					
6					Same
8					
10					
12					
14					Same
16					
18					Same
20				▽	Caliche, sand and clay 19-28'
22					
24					Same
26					
28					Soft sand and clay
30					Gravel, sand and sandstone, clay to 35'
32					
34					Same
36					Bottom of well 34'

25' SCREEN
9' BLANK

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 15

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 35' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche to 7'
2					
4					Same
6					
8					Sand and gravel 7-11'
10					White caliche and gravel. Smell at 17'. 11-19'
12					
14					
16					Same
18					
20				▽	Water, caliche and clay 19-21'
22					Clay, gravel and sand 21-23'
24					Clay and sand 23-25'
26					Clay, sand, gravel and more water. Soft 27-29' 25-35'
28					
30					
32					
34					Cased
36					Bottom of well 35'
					25' SCREEN
					10' BLANK

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 16

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 25' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 5' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil to 1'
2					Caliche, smell at 16' 1-17'
4					
6					
8					Same
10					
12					
14					Same
16					
18					Sand, gravel and clay 17-19'
20					Sand and clay. Little water at 19' 19-25'
22					
24					Same
26					Bottom of well 25'

20' SCREEN
5' BLANK

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 17

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Loose rock to 1'
2					Sand, gravel and some clay 1-10'
4					
6					Same
8					
10					Clay some gravel to 13'
12					Same
14					Hard white caliche 13-16'
16					Sand and gravel. Smell at 17' to 19'
18					Same
20					Clay and sand 19-23'
22				▽	
24					Clay, sand and gravel 23-25'
26					Bottom of well 30'

20' SCREEN
10' BLANK

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 18

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 28' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 8' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Loose rock to 1'
2					Caliche, gravel and sand soft 1-12'
4					
6					Same
8					
10					Same
12					Hard white caliche
14					Same
16					Sand, gravel and clay. Smell
18					Sand and gravel to 19'
20				▽	Sand, clay and gravel 19-22'
22					Sand and gravel
24					Same
26					Same
28					Same
30					Bottom of well 28'

20' SCREEN
8' BLANK

02100144

GROUNDWATER TECHNOLOGY
Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 19

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 34 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 25' Slot Size Hand

Casing: Dia. 5" Length 9' Type PVC

Drilling Company Larry's Drilling Drilling Method Air-Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil and rock
2					Same
4					Same
6					Caliche
8					Sand and gravel
10					Sand
12					Sand
14					Sand and caliche hard
16					Same
18					Sand, clay and gravel
20					Sand, clay damp
22					
24					Same
26					
28					Sand and gravel. Water at 31' to 35'
30				▽	
32					Same
34					
36					Bottom of well 34'
					25' SCREEN
					9' BLANK

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 20

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil, loose rock 0-6"
2					Caliche soft to 12' 6"-16'9"
4					
6					
8					Same
10					
12					
14					Same
16					
18					Sand and clay 16'9"-27' (water)
20					
22					
24					
26					Same
28					Soft sand
30					Bottom of well
					20' Screen
					10' Blank

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 21

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche hard to 11'
2					
4					
6					Same
8					
10					
12					Caliche, sand and clay 11-18'
14					
16					Same
18					Clay, sand and gravel(damp) to 21'
20					Same
22					Clay, sand and gravel 21-23'
24					Red clay 23-26'
26					Clay and sand water
28					Same
30					Bottom of well
					20' Screen
					10' Blank

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 22

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche
2					
4					
6					Same
8					
10					
12					Soft caliche to 16 1/2. Odor at 14 1/2
14					Same
16					
18					Caliche water at 19' 16 1/2-19
20					Clay and sand. Lots of crude at 19'
22					
24					Same
26					
28					
30					Bottom of well
					20' Screen
					10' Blank

02100144

GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 23

Project Texas New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Top soil 0-1'
2					Caliche(odor at 12'). 1-12'
4					
6					
8					Same
10					
12					Caliche 12-13 1/2'
14					Sand and gravel 13 1/2-18'
16					Same
18					Clay and sand. Blowing out oil at 19'
20					Clay, sand and gravel 19-30'
22					
24					
26					Same
28					
30					Bottom of well

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GROUNDWATER TECHNOLOGY
Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 24

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche and soil
2					
4					Same
6					Caliche hard
8					
10					Same
12					Caliche soft (odor at 14')
14					
16					Caliche, sand and gravel
18					Same
20					Clay, sand and gravel
22					Clay and sand. Water at 24'
24					Same
26					Clay, sand, some gravel oil show on water
28					Same
30					Bottom of well
					20' Screen
					10' Blank

02100144

GROUNDWATER TECHNOLOGY
Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 25

Project Texas-New Mexico Pipeline Owner Sune

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30 Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10" Type PVC

Drilling Company Larrt's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Sand, caliche and gravel
2					Same
4					Same
6					Caliche
8					Same
10					Sand, clay and gravel. Wet at 15'
12					Same
14					Same
16					Sand, clay and gravel 15-18'
18					Sand and clay
20					Same
22					Same
24					Sand, clay and gravel. No odors
26					
28					Same
30					Bottom of well
					20' Screen
					10' Blank

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 26

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 34' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 14' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Sand, gravel and caliche
2					
4					Same
6					Sand, gravel and caliche
8					Caliche
10					Same
12					Sand and gravel
14					Sand and gravel
16					Same
18					Sand and clay
20					
22					Same
24					Sand and clay
26					Same
28					Sand and clay
30					Same
32				▽	Sand, clay some gravel. Water at 32'. No odors
34					Bottom of well
					20' Screen
					14' Blank

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 27

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 24' Slot Size Hand

Casing: Dia. 5" Length 6' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Caliche hard
2					Same
4					Same
6					Same
8					Caliche, sand and gravel to 11'
10					Same
12					Sand and clay 11-26'
14					
16					
18					Same
20					
22					
24					Same
26				▽	Sand and gravel
28					Same
30					Bottom of well
					24' Screen
					6' Blank

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 28

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 24' Slot Size Hand

Casing: Dia. 5" Length 6' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Hard caliche to 15'
2					
4					
6					Same
8					
10					
12					Same
14					
16					Sand, clay and caliche 15-20'
18					Same
20					Clay and sand to 23'
22				▽	Clay and sand (damp) 23-24'
24					Sand and gravel. Water at 24'
26					Same
28					Same
30					Bottom of well
					24' Screen
					6' Blank

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GROUNDWATER TECHNOLOGY

Division of Oil Recovery Systems, Inc.

Drilling Log

Well Number MW 29

Project Texas-New Mexico Pipeline Owner Same

Location Monument, N.M. Project Number 20-2050

Date Drilled 10/4-10/6 Total Depth of Hole 30' Diameter 8"

Surface Elevation _____ Water Level, Initial _____ 24-hrs. _____

Screen: Dia. 5" Length 20' Slot Size Hand

Casing: Dia. 5" Length 10' Type PVC

Drilling Company Larry's Drilling Drilling Method Air Rotary

Driller Larry Log by Driller

Sketch Map

Notes

Depth (Feet)	Well Construction	Notes	Sample Number	Graphic Log	Description/Soil Classification (Color, Texture, Structures)
0					Hard caliche to 13'
2					
4					
6					Same
8					
10					
12					Same
14					Caliche, sand and clay 13-18'
16					Same
18				▽	Clay and sand (damp) to 19'
20					Sand, gravel and clay. Water at 19'
22					
24					
26					Same
28					
30					Bottom of well
					20' Screen
					10' Blank

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GROUNDWATER TECHNOLOGY

DATA GATHERED DURING PUMPING TEST

Job: Tex/N.Mex

Name: C.H.

Date: OCT 15+16

Well Designation: MW 1+2

Pump & Setting: 2 HP FRANKLIN

Oil Recovery Systems

	Time	Elapsed Time (min)	Discharge (gpm)	DTP	DTW	PT	Drawdown
MW1 10/15	12^12 PM		25	19.23	19.44	.21	
	12^20		↓	19.24	19.46	.22	
	12^40		↓	19.24	19.48	.24	
	12^56		↓	19.24	19.48	.24	
	1^50		30	19.25	19.50	.25	
	2^18		↓	19.26	19.50	.24	
	3^10		35	19.28	19.54	.26	
	3^52		↓	19.29	19.56	.27	
	7^21		↓	19.34	19.66	.32	
			↓				
MW1 10/16	9^00 AM		40	19.40	19.92	.52	
	6^20 PM		↓	19.45	20.05	.60	
	7^18 PM		↓	19.45	20.06	.61	
MW2	12^12 PM		25	—	18.62	NONE	
	12^23		↓		18.64	↓	
	12^36		↓		18.61	↓	
	12^53		↓		18.61	↓	
	1^25		↓		18.61	↓	
	2^13		↓		18.60	↓	
	3^10		↓		18.60	↓	
11/16	9^10 AM		40		18.64	↓	
	6^20 PM		↓	—	18.67	↓	

GROUNDWATER TECHNOLOGY

DATA GATHERED DURING PUMPING TEST

Job: TEX/N.MEX

Name: CH

Date: 10/15+16

Well Designation: MW3,4,5

Pump & Setting: 2 HP FRANKLIN

Oil Recovery Systems

	Time	Elapsed Time (min)	Discharge (gpm)	DTP	DTW	PT	Drawdown
MW3 10/15	12^12		25		15.25	NONE	
	12^49		↓		↓	↓	
	1^17		↓		↓	↓	
	2^07		↓		15.26	↓	
	2^37		↓		15.25	↓	
	7^14 pm		40		15.28	↓	
10/16	8^48 AM		↓		15.31	↓	
	6^50 PM		↓		15.34	↓	
MW5 10/15	12^12 PM		25		16.51	NONE	
10/16	9^55 AM		40		16.51	↓	
	6^30 PM		40		16.52	↓	
MW4 10/15	12^12 PM		25		15.64	NONE	
	1^10		↓		15.66	↓	
	2^05		↓		15.65	↓	
	2^34		↓		15.66	↓	
	3^24		↓		15.67	↓	
	7^10		40		15.70	↓	
10/16	8^40 AM		↓		15.75	↓	
	6^45 PM		↓		15.77	↓	

GROUNDWATER TECHNOLOGY

DATA GATHERED DURING PUMPING TEST

Job: Tex/N.Mex

Name: CH

Date: 10/15 + 10/16

Well Designation: MW6,7

Pump & Setting: 2HP FRANKLIN

Oil Recovery Systems

	Time	Elapsed Time (min)	Discharge (gpm)	DTP	DTW	PT	Drawdown
MW6							
10/15	12^12		25		16.41	NONE	
	12^29		↓		16.42	↓	
	12^46		↓		16.41	↓	
	1^15		↓		16.41	↓	
	2^00		↓		16.41	↓	
10/16	9^48 AM		40		16.42	↓	
	6^30 PM		↓		16.42	↓	
MW7							
10/15	12^12 PM		25		18.08	NONE	
	12^25		↓		18.09	↓	
	12^38		↓		18.08	↓	
	1^47		↓		18.08	↓	
	2^15		↓		18.08	↓	
10/16	9^20 AM		40		18.11	↓	
	6^30 PM		40		18.12	↓	
MW8	12^12 PM		25		19.69	NONE	
10/15	1^20		↓		19.67	↓	
	2^08		↓		↓	↓	
	2^30		↓		↓	↓	
	7^16		↓		19.72	↓	
10/16	9^00 AM		40		19.83	↓	
	6^20 PM		40		19.87	↓	

GROUNDWATER TECHNOLOGY

Job: TEXAS · NEW MEXICO PIPELINE

Job No: 20-2050

Date: OCT. 4, 1984

PUMP TEST

Well No. RW1 Elev:

Oil Recovery Systems

Time	Elapsed min.	GPM	DTW	DTP	PT	Adjust DTW	Drawdown	Piez. Elev.
9:05			17.70	17.67	.03'			
10:50			17.69	17.67	.02'			
10:53	0	25	17.69	17.67	.02'		0	
11:06	13		31.54	30.76	.78'		13.85	
11:08	15		31.84	31.11	.73'		14.15	
11:10	17		32.14	31.29	.85'		14.45	
11:12	19		32.35	31.43	.92'		14.66	
11:14	21		32.59	31.58	1.01'		14.90	
11:16	23		32.33	31.69	1.04'		14.64	
11:18	25		32.88	31.80	1.08'		15.19	
11:20	27		33.02	31.89	1.13'			
11:22	29		33.14	31.97	1.17'			
11:24	31		33.25	32.03	1.22'			
11:26	33		33.35	32.08	1.27'			
11:28	35		33.43	32.12	1.31'		15.74	
11:30	37		33.56	32.16	1.40'			
11:32	39		33.61	32.20	1.41'			
11:34	41		33.67	32.24	1.43'			
11:36	43		33.74	32.26	1.48'			
11:38	45		33.75	32.29	1.46'		16.06	
11:40	47		33.75	32.32	1.43'			
11:42	49		33.71	32.35	1.36'			
11:44	51		33.75	32.28	1.37'			
11:46	53		33.75	32.42	1.33'		16.06	
11:48	55		33.72	32.45	1.27'		16.03	
11:50	57		33.72	32.48	1.24'			
11:52	59		33.75	32.51	1.24'			

GROUNDWATER TECHNOLOGY

Job: TEXAS-NEW MEXICO PIPELINE

Job No: 20-2050

te: Oct 4, 1984

PUMP TEST

Well No. RW1 Elev:

Oil Recovery Systems

	Time	Elapsed min.	GPM	DTW	DTP	PT	Adjust DTW	Drawdown	Piez. Elev.
0/4	11:54	61	25	33.75	32.54	1.21			
	11:56	63		33.75	32.57	1.18			
	11:58	65		33.75	32.60	1.15		16.06	
	12:00	67		33.75	32.64	1.11			
	12:02	69		33.75	32.66	1.09			
	12:04	71		33.75	32.70	1.05			
	12:06	73		33.75	32.72	1.03			
	12:08	75		33.72	32.74	.98			
	12:10	77		33.70	32.77	.93			
	12:12	79		33.75	32.80	.95			
	12:16	83		33.75	32.86	.89			
	12:26	93		33.35	32.99	.76			
	12:32	99		33.69	33.06	.63			
	12:40	107		33.75	33.13	.62			
	12:44	111		33.75	33.18	.57			
	12:52	119		33.75	33.26	.49			
	1:02	129		33.75	33.35	.40			
	1:15	142		33.75	33.45	.30		↓	
	1:32	159	↓	33.75	33.55	.20		16.06	
0/15	12:12PM		25	17.99	17.88	—			
	12:59			27.74	27.25	.49			
	1:55			30.31	29.44	.87			
	2:21			30.53	29.50	1.03			
	3:12		↓	33.39	31.73	1.66			
0/16	8:00AM		40	37.15	27.83	9.32			
	1:20PM			32.40	31.60	.80	AFTER PRODUCT PUMPING		
	7:18PM		↓	33.20	32.09	1.11			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.		DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
10/3 * RW	1[30]	21.53	17.10	4.43			ORIGINAL TOWN TANK (1 HP) SET AT 63.8' BY DRILLERS. RAISED TO 43.8' BY GT.
	4[00]	21.50	17.09	4.41			RECHARGE 3.0 Ft/52 second.

* ORIGINALLY THE NORTH MUNICIPAL WATER WELL.

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW1	10-24-84	20.27	19.74	.43			
	10-25-84	20.26	19.75	.51			
	10-26-84	28.75	19.78	.52			
	10-27-84	19.67	19.61	.06			
	10-28-84	19.52	19.44	.08			
	10-29-84	20.62	20.46	.16			
	10-30-84	20.51	20.42	.09			
	10-31-84	19.86	19.52	.34			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW3	10-24-84	15.40	15.40				
	10-25-84	15.40	15.40				
	10-26-84	15.43	15.43				
	10-27-84	15.33	15.33				
	10-28-84	15.28	—				
	10-29-84	15.29	—				
	10-30-84	15.29	15.29				
	10-31-84	15.32	15.32				

GROUNDWATER
TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW4	10-24-84	15.87	15.87				
	10-25-84	15.86	15.86				
	10-26-84	15.89	15.89				
	10-27-84	15.74	15.74				
	10-28-84	15.67	—				
	10-29-84	15.70	—				
	10-30-84	15.70	15.70				
	10-31-84	15.75	15.74				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW5	10-24-84	16.51	16.51				
	10-25-84	16.52	16.52				
	10-26-84	16.52	16.52				
	10-27-84	16.50	16.50				
	10-28-84	16.50	—				
	10-29-84	16.50	—				
	10-30-84	16.51	16.51				
	10-31-84	16.50	16.50				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW6	10-24-84	16.43	16.43				
	10-25-84	16.44	16.44				
	10-26-84	16.44	16.44				
	10-27-84	16.43	16.43				
	10-28-84	16.42	—				
	10-29-84	16.41	—				
	10-30-84	16.42	16.42				
	10-31-84	16.42	16.42				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW-7	10-24-84	18.45	18.41	.04			
	10-25-84	18.43	18.40	.03			
	10-26-84	18.45	18.43	.02			
	10-27-84	18.40	18.39	.01			
	10-28-84	18.28	18.26	.02			
	10-29-84	18.25	18.23	.02			
	10-30-84	18.22	18.21	.01			
	10-31-84	18.26	18.25	.01			

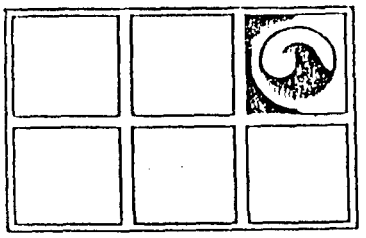
GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW10	10-24-84	20.34	18.60	1.74			
	10-25-84	20.27	18.58	1.69			
	10-26-84	20.60	18.68	1.92			
	10-27-84	18.94	18.27	.67			
	10-28-84	19.94	18.14	1.80			
	10-29-84	18.98	18.20	.78			
	10-30-84	18.90	18.16	.74			
	10-31-84	19.19	18.41	1.28			



GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW 11	10-24-84		21.55				
			20.50				
			19.10				
	10-25-84		18.42				
			22.56				
			21.95				
			24.78				
	10-26-84		24.52				
	10-27-84		22.30				
			22.30				
			20.86				
	10-28-84		23.47				
			22.10				
	10-29-84		20.85				
	10-30-84		22.41				
	10-31-84		20.68				
			20.62				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW12	10-24-84	16.47	16.47				
	10-25-84	16.48	16.48				
	10-26-84	16.57	16.57				
	10-27-84	16.60	16.60				
	10-28-84	16.56	—				
	10-29-84	16.47	—				
	10-30-84	16.47	16.47				
	10-31-84	16.49	16.49				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW13	10-24-84	19.48	19.48				
	10-25-84	19.50	19.50				
	10-26-84	19.50	19.50				
	10-27-84	19.42	19.42				
	10-28-84	19.28	—				
	10-29-84	19.28	—				
	10-30-84	19.26	19.26				
	10-31-84	19.30	19.30				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW14	10-24-84	16.25	16.23	.02			
	10-25-84	16.29	16.27	.02			
	10-26-84	16.32	16.30	.02			
	10-27-84	16.36	16.34	.02			
	10-28-84	16.38	16.36	.02			
	10-29-84	16.37	16.35	.02			
	10-30-84	16.35	16.33	.02			
	10-31-84	16.34	16.32	.02			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW15	10-24-84	18.02	18.02				
	10-25-84	18.04	18.04				
	10-26-84	18.11	18.11				
	10-27-84	18.14	18.14				
	10-28-84	18.11	—				
	10-29-84	18.03	—				
	10-30-84	18.00	18.00				
	10-31-84	17.98	17.98				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW16	10-24-84	19.24	18.57	.67			
	10-25-84	19.23	18.54	.69			
	10-26-84	19.30	18.63	.67			
	10-27-84	19.30	18.64	.66			
	10-28-84	19.25	18.58	.67			
	10-29-84	19.17	18.45	.72			
	10-30-84	19.13	18.44	.69			
	10-31-84	19.12	18.45	.67			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW17	10-24-84	18.68	18.68				
	10-25-84	18.69	18.69				
	10-26-84	18.73	18.73				
	10-27-84	18.66	18.66				
	10-28-84	18.52	—				
	10-29-84	18.50	—				
	10-30-84	18.47	18.47				
	10-31-84	18.50	18.50				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW18	10-24-84	16.87	16.87				
	10-25-84	16.89	16.89				
	10-26-84	16.95	16.95				
	10-27-84	16.97	16.97				
	10-28-84	16.98	—				
	10-29-84	16.93	—				
	10-30-84	16.92	16.92				
	10-31-84	16.92	16.92				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW19	10-24-84	17.02	17.02				
	10-25-84	17.02	17.02				
	10-26-84	170.5	17.05				
	10-27-84	17.99	17.99				
	10-28-84	16.98	—				
	10-29-84	16.98	—				
	10-30-84	16.98	16.98				
	10-31-84	17.00	17.00				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, N.M.
DATE: October 24-31, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
MW20	10-29-84	17.40	—				
	10-30-84	17.41	17.41				
	10-31-84	17.43	17.43				
MW21	10-29	17.74	—				
	10-30	17.70	—				
	10-31	17.70	—				
MW22	10-29	17.03	16.97	.06			
	10-30	17.45	16.92	.53			
	10-31	17.95	16.85	1.10			
MW23	10-30	13.72	13.62	.10			
	10-31	15.10	13.64	1.46			
MW24	10-31	15.77	14.65	1.12			
MW25	10-31	16.00	—	—			

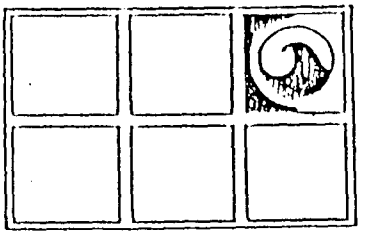
GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
1	11-13-84	34.19	31.42	2.77			
	11-14-84	34.78	31.50	3.28			
	11-15-84	34.50	31.66	2.84			
	11-16-84	34.55	31.75	2.80			
	11-17-84	34.20	31.76	2.44			
	11-18-84	22.12					
	11-18-84	38.90	32.62	6.28			
	11-18-84	34.53	32.95	1.58			
	11-19-84	21.24	18.95	2.29			
	11-13-84	20.46	19.91	.55			
	11-14-84	20.45	19.92	.53			
	11-15-84	20.48	19.95	.53			
	11-16-84	20.47	19.96	.51			
	11-17-84	20.48	19.97	.51			
	11-18-84	20.47	19.95	.52			
	11-19-84	20.48	19.85	.53			



GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
2	11-13	19.25	—				
	11-14	19.28	—				
	11-15	19.31	—				
	11-16	19.32	—				
	11-17	19.35	—				
	11-18	19.36	—				
	11-19	19.34	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
3	11-13	15.50	—				
	11-14	15.53	—				
	11-15	15.53	—				
	11-16	15.53	—				
	11-17	15.53	—				
	11-18	15.53	—				
	11-19	15.53	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
4	11-13	15.98	—				
	11-14	16.01	—				
	11-15	16.00	—				
	11-16	16.02	—				
	11-17	16.01	—				
	11-18	16.01	—				
	11-19	15.93	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
5	11-13	16.52	—				
	11-14	16.56	—				
	11-15	16.53	—				
	11-16	16.54	—				
	11-17	16.53	—				
	11-18	16.52	—				
	11-19	16.52	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
6	11-13	16.47	—				
	11-14	16.47	—				
	11-15	16.48	—				
	11-16	16.48	—				
	11-17	16.48	16.47	TRACE			
	11-18	16.46	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
7	11-13-84	18.67	18.55	.12			
	11-14-84	18.70	18.56	.14			
	11-15-84	18.73	18.59	.14			
	11-16-84	18.76	18.60	.16			
	11-17-84	18.79	18.60	.19			
	11-18-84	18.83	18.62	.21			
	11-19-84	18.80	18.60	.20			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
8	11-13	20.27	—				
	11-14	20.29	—				
	11-15	20.30	—				
	11-16	20.32	—				
	11-17	20.31	—				
	11-18	20.31	—				
	11-19	20.15	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
9	11-13	15.92	—				
	11-14	15.95	—				
	11-15	15.96	—				
	11-16	15.97	—				
	11-17	15.98	—				
	11-18	15.98	—				
	11-19	15.87	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
10	11-13-84	20.73	18.75	1.98			
	11-14-84	20.75	18.75	2.00			
	11-15-84	20.76	18.78	1.98			
	11-16-84	20.79	18.79	2.00			
	11-17-84	20.75	18.79	1.96			
	11-18-84	20.30	18.71	1.59			
	11-19-84	19.15	18.72	.63			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
11	11-13		21.10				
	11-14		21.05				
	11-15		23.58				
	11-15		21.54				
	11-16		20.79				
	11-16		23.50				
	11-17		22.60				
	11-18		23.20				
	11-19		23.22				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
12	11-13	16.70	—				
	11-14	16.74	—				
	11-15	16.77	—				
	11-16	16.78	—				
	11-17	16.82	—				
	11-18	16.84	—				
	11-19	16.90	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
13	11-13	19.65	—				
	11-14	19.67	—				
	11-15	19.67	—				
	11-16	19.68	—				
	11-17	19.69	—				
	11-18	19.70	—				
	11-19	19.65	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
14	11-13	17.03	16.40	.63			
	11-14	17.05	16.40	.65			
	11-15	17.10	16.43	.67			
	11-16	17.11	16.46	.65			
	11-17	17.24	16.46	.78			
	11-18	17.34	16.47	.87			
	11-19	17.50	16.55	.95			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
15	11-13	18.25	—				
	11-14	18.29	—				
	11-15	18.31	—				
	11-16	18.33	—				
	11-17	18.36	—				
	11-18	18.38	—				
	11-19	18.40	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
16	11-13-84	19.37	18.77	.60			
	11-14-84	19.38	18.78	.60			
	11-15-84	19.35	18.82	.53			
	11-16-84	19.34	18.82	.52			
	11-17-84	19.32	18.84	.48			
	11-18-84	19.32	18.88	.44			
	11-19-84	19.35	18.90	.45			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
17	11-13	18.86	—				
	11-14	18.87	—				
	11-15	18.90	—				
	11-16	18.92	—				
	11-17	18.94	—				
	11-18	18.95	—				
	11-19	18.90	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
18	11-13	17.11	—				
	11-14	17.13	—				
	11-15	17.15	—				
	11-16	17.17	—				
	11-17	17.22	—				
	11-18	17.21	—				
	11-19	17.24	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
19	11-13	17.07	—				
	11-14	17.10	—				
	11-15	17.10	—				
	11-16	17.11	—				
	11-17	17.09	—				
	11-18	17.09	—				
	11-19	17.09	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
20	11-13	19.26	17.35	1.91			
	11-14	19.30	17.32	1.98			
	11-15	19.35	17.32	2.03			
	11-16	19.39	17.26	2.13			
	11-17	19.45	17.20	2.25			
	11-18	19.54	17.20	2.34			
	11-19	19.57	17.20	2.37			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
21	11-13	17.83	—				
	11-14	17.86	—				
	11-15	17.84	—				
	11-16	17.85	—				
	11-17	17.85	—				
	11-18	17.87	—				
	11-19	17.88	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
22	11-13	18.23	16.94	1.29			
	11-14	18.19	16.95	1.24			
	11-15	18.21	16.97	1.24			
	11-16	18.24	16.98	1.26			
	11-17	18.20	16.95	1.25			
	11-18	18.20	16.97	1.23			
	11-19	18.20	16.97	1.23			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
23	11-13	15.63	13.70	1.93			
	11-14	15.68	13.73	1.95			
	11-15	15.71	13.75	1.96			
	11-16	15.72	13.77	1.95			
	11-17	15.71	13.76	1.95			
	11-18	15.72	13.78	1.94			
	11-19	15.74	13.79	1.95			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
24	11-13	16.14	14.75	1.39			
	11-14	16.13	14.77	1.36			
	11-15	16.16	14.80	1.36			
	11-16	16.18	14.81	1.37			
	11-17	16.15	14.82	1.33			
	11-18	16.18	14.84	1.34			
	11-19	16.19	14.86	1.33			

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
25	11-13	16.18	—				
	11-14	16.22	—				
	11-15	16.26	—				
	11-16	16.27	—				
	11-17	16.30	—				
	11-18	16.32	—				
	11-19	16.35	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
26	11-13	17.33	—				
	11-14	17.35	—				
	11-15	17.35	—				
	11-16	17.34	—				
	11-17	17.30	—				
	11-18	17.30	—				
	11-19	17.30	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT×.8	ADJ. DTW	ELEV. WATER
27	11-13	16.94	—				
	11-14	16.49	—				
	11-15	16.40	—				
	11-16	16.28	—				
	11-17	16.14	—				
	11-18	16.13	—				
	11-19	16.10	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
28	11-13	17.77	—				
	11-14	17.11	—				
	11-15	16.96	—				
	11-16	16.76	—				
	11-17	16.56	—				
	11-18	16.52	16.51	TRACE			
		16.50	—				

GROUNDWATER TECHNOLOGY
Consulting Groundwater Geologists

GROUNDWATER GRADIENT DATA

CLIENT: Texas-New Mexico Pipeline
LOCATION: Monument, NM
DATE: November 30, 1984

OBSERVATION WELL

NO.	DATE	DTW	DTP	PT	PT x .8	ADJ. DTW	ELEV. WATER
29	11-13	15.00	—				
	11-14	15.01	—				
	11-15	15.03	—				
	11-16	15.03	—				
	11-17	15.00	—				
	11-18	15.01	—				
	11-19	15.01	—				

GROUNDWATER TECHNOLOGY LABORATORY

ANALYTICAL & CONSULTING SERVICES
Division of Oil Recovery Systems, Inc.
4 Mill St., Greenville, NH 03048
Tel: (603) 878-2500

Consulting Offices:
Needham, MA — Redondo Beach, CA
Chadds Ford, PA — Concord, CA
Novi, MI

Laboratory Test Results

10/11/84
Report No. 20-2050-1
Submitted to: Cliff Harper
Groundwater Technology
5047 Clayton Rd.
Concord, CA 94519

The attached report covers water samples 12442-12443 taken by C. Harper at site 20-2050, Monument, New Mexico and analyzed by GC/FID Static Headspace Analysis for volatile hydrocarbons, analyst J.P.M.

Method Detection Limits (MDL) listed are the levels above which quantitation is considered reliable: benzene and toluene 1 ppb, ethylbenzene 2 ppb, total xylenes 6 ppb, total aliphatic hydrocarbons and miscellaneous aromatics 20 ppb.

If noted on report, MDL is increased by a factor of 44 for dilutions made in order to maintain calibrated range. Precision for levels above 10 times MDL is 10%. Precision at MDL equals 30%. Hexane and ortho-xylene used as calibration standards for aliphatic hydrocarbons and miscellaneous aromatics, respectively.

Respectfully submitted,

Michael D. Webb

Michael D. Webb
Technical Director

VOA Report No.
20-2050-1

HYDROCARBONS IN WATER µg/L (ppb)

SAMPLE NO.	I.D.	DATE SAMPLED	DATE RUN	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	C4-C12 ALIPHATIC HYDROCARBONS	MISC. AROMATICS C7-C10	TOTAL
12442	SW	10/4/84	10/9/84	ND	ND	ND	ND	ND	ND	ND
12443	FDW	10/4/84	10/9/84	ND	ND	ND	ND	ND	ND	ND

*NOTES:

ND = NONE DETECTED
SW = SCHOOL WELL
FDW = FIRE DEPARTMENT WELL

GROUNDWATER TECHNOLOGY LABORATORY
#4 Mill Street, Greenville, New Hampshire 03048

VOA Report No.

20-2050-2

HYDROCARBONS IN WATER µg/L (ppb)

SAMPLE NO.	I.D.	DATE SAMPLED	DATE RUN	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	C4-C12 ALIPHATIC HYDROCARBONS	MISC. AROMATICS C7-C10	TOTAL	
12509	MW1	10/11/84	10/20/84	ND	ND	ND	ND	TRACE	ND	TRACE	
12513	MW2	10/11/84	10/22/84	ND	ND	ND	ND	TRACE	ND	TRACE	*5
12511	MW3	10/11/84	10/22/84	ND	ND	ND	ND	29	ND	29	
12514	MW4	10/11/84	10/22/84	221	102	10	26	357	TRACE	716	*2
12512	MW5	10/11/84	10/22/84	ND	ND	ND	ND	ND	ND	ND	
12515	MW6	10/11/84	10/22/84	ND	ND	ND	ND	TRACE	ND	TRACE	
12508	MW7	10/11/84	10/20/84	16600	10400	669	1710	3520	1570	34500	*1,4
12510	MW8	10/11/84	10/20/84	2	ND	ND	ND	TRACE	ND	2	

*NOTES:

ND = NONE DETECTED
TRACE = COMPOUND(S) DETECTED BUT BELOW LEVEL FOR RELIABLE QUANTITATION

1 = METHANE DETECTED AT 10-100 PPB.
2 = METHANE DETECTED AT 100-1000 PPB.
4 = SAMPLE DILUTED; MDL TIMES 44
5 = UNCATEGORIZED COMPOUND(S) PRESENT.

GROUNDWATER TECHNOLOGY LABORATORY
44 Mill Street, Greenville, New Hampshire 03048

VOA Report No.
20-2050-3

HYDROCARBONS IN WATER µg/L (ppb)

SAMPLE NO.	I.D.	DATE SAMPLED	DATE RUN	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	C4-C12 ALIPHATIC HYDROCARBONS	MISC. AROMATICS C7-C10	TOTAL	
12533	W14	10/16/84	10/18/84	15800	9710	1870	1480	6410	878	36200	*5
12534	W15	10/16/84	10/18/84	17300	11100	1970	1960	6370	1160	40000	*5
12535	W2	10/16/84	10/18/84	TRACE	2	ND	ND	TRACE	ND	2	*5
12536	W8	10/16/84	10/18/84	ND	ND	ND	ND	ND	ND	ND	
12537	W.W.	10/16/84	10/18/84	ND	ND	ND	ND	ND	ND	ND	
12538	BLANK	10/16/84	10/18/84	ND	ND	ND	ND	ND	ND	ND	

*NOTES:

ND = NONE DETECTED
TRACE = COMPOUND(S) DETECTED BUT BELOW LEVEL FOR RELIABLE QUANTITATION
W.W. = WATER WELL

5 = UNCATEGORIZED COMPOUND(S) PRESENT.

GROUNDWATER TECHNOLOGY LABORATORY
#4 Mill Street, Greenville, New Hampshire 03048

VOA Report No.
20-2050-4

HYDROCARBONS IN WATER µg/L (ppb)

SAMPLE NO.	I.D.	DATE SAMPLED	DATE RUN	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	C4-C12 ALIPHATIC HYDROCARBONS	MISC. AROMATICS C7-C10	TOTAL
12551	MW3	10/17/84	10/24/84	ND	ND	ND	ND	TRACE	ND	TRACE *1
12549	MW4	10/17/84	10/24/84	ND	ND	ND	ND	39	ND	39
12554	MW5	10/17/84	10/24/84	ND	ND	ND	ND	TRACE	ND	TRACE
12548	MW6	10/17/84	10/23/84	ND	ND	ND	ND	81	83	164
12550	MW9	10/17/84	10/24/84	ND	ND	ND	ND	131	64	195
12553	MW13	10/17/84	10/24/84	ND	TRACE	ND	ND	ND	ND	TRACE
12552	MW19	10/17/84	10/24/84	ND	ND	ND	ND	ND	ND	ND

*NOTES:

ND = NONE DETECTED
TRACE = COMPOUND(S) DETECTED BUT BELOW LEVEL FOR RELIABLE QUANTITATION

1 = METHANE DETECTED AT 10-100 PPB.

GROUNDWATER TECHNOLOGY LABORATORY
44 Mill Street, Greenville, New Hampshire 03048

VOA Report No.

20-2050-5

HYDROCARBONS IN WATER µg/L (ppb)

SAMPLE NO.	I.D.	DATE SAMPLED	DATE RUN	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	C4-C12 ALIPHATIC HYDROCARBONS	MISC. AROMATICS C7-C10	TOTAL	
12627	MW3	10/25/84	10/31/84	ND	ND	ND	ND	180	ND	180	*1
12628	MW4	10/25/84	10/31/84	1020	82	ND	53	2290	36	3480	*7
12629	MW5	10/25/84	10/31/84	ND	ND	ND	ND	TRACE	ND	TRACE	*6
12630	MW6	10/25/84	10/31/84	ND	ND	ND	ND	TRACE	ND	TRACE	
12631	MW8	10/25/84	10/31/84	ND	ND	ND	ND	ND	ND	ND	
12632	MW9	10/25/84	10/31/84	6450	3320	296	430	258	3760	14500	
12633	MW13	10/25/84	10/31/84	ND	ND	ND	ND	ND	ND	ND	
12634	MW15	10/25/84	10/31/84	19100	12100	2020	1690	10800	1940	46500	
12635	MW17	10/25/84	10/31/84	1520	79	ND	148	866	154	2770	*2

*NOTES:

ND = NONE DETECTED
TRACE = COMPOUND(S) DETECTED BUT BELOW LEVEL FOR RELIABLE QUANTITATION

1 = METHANE DETECTED AT 10-100 PPB.
2 = METHANE DETECTED AT 100-1000 PPB.
6 = UNCATEGORIZED COMPOUND PRESENT; POSSIBLY NOT GASOLINE RELATED.
7 = TOTAL ALIPHATICS INCLUDES METHANE.

SAMPLES OF MW12, 18, & 19 WERE BROKEN VIA SHIPPING.

GROUNDWATER TECHNOLOGY LABORATORY
44 Hill Street, Greenville, New Hampshire 03048

20-2[illegible]-6

HYDROCARBONS IN WATER µg/L (ppb)

SAMPLE NO.	I.D.	DATE SAMPLED	DATE RUN	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	C4-C12 ALIPHATIC HYDROCARBONS	MISC. AROMATICS C7-C10	TOTAL
12809	MWW	11/6/84	11/12/84	ND	ND	ND	ND	ND	ND	ND
12810	MWWS	11/6/84	11/12/84	ND	ND	ND	ND	ND	ND	ND
12811	MW 23	11/6/84	11/12/84	ND	ND	ND	ND	ND	ND	ND
12812	BLNK	11/6/84	11/12/84	ND	ND	ND	ND	ND	ND	ND

*NOTES:

ND = NONE DETECTED
MWW = MUNI WATER WELL
MWWS = MUNI WATER WELL STANDBY
BLNK = BLANK

GROUNDWATER TECHNOLOGY LABORATORY
4 MILL STREET, GREENVILLE, NEW HAMPSHIRE 03048

TEXAS-NEW MEXICO PIPE LINE COMPANY

B L Lednicky
District Manager

PO Box 2528
Hobbs NM 88241
505 393 2135

February 7, 1985

Mr. Jerry Sexton
State of New Mexico
Oil Conservation Division
P.O.Box 1980
Hobbs, New Mexico 88241

Dear Jerry:

Re: Monument Water Wells

As per our discussion today attached is an analysis of the water samples taken on January 9, 1985. When Cliff Harper and myself visited with you and Eddie Seay about January 9 you requested that we obtain the samples on the wells drilled by the Oil Conservation Division.

I had previously given this information to Eddie Seay by telephone.

Yours very truly,

B L Lednicky

BLL:DDM
Attachment

Preliminary

EASYLINK MBX 5733473A001 15JAN85 12:08/12:35 EST
FROM: TLX 752858 ORS INC GRN UD
OIL RECOVERY SYSTEMS INC
TO: 62725550

Laboratory Test Results

1/15/85
Report No. 20-2050-8
Submitted to: Cliff Harper
Groundwater Technology
5047 Clayton Rd.
Concord, CA 94519

The attached report covers water samples 13536-13546 taken by C. Harper at site 20-2050, Monument, New Mexico and analyzed by GC/FID Static Headspace Analysis for volatile hydrocarbons, analysts D.G. and J.P.

Method Detection Limits (MDL) listed are the levels above which quantitation is considered reliable: benzene and toluene 1 ppb, ethylbenzene 2 ppb, total xylenes 6 ppb. The level for reliable quantitation for total aliphatic hydrocarbons and miscellaneous aromatics is 20 ppb.

If noted on report, MDL is increased by a factor of 44 for dilutions made in order to maintain calibrated range. Precision for levels above 10 times MDL is 10%. Precision at MDL equals 30%. Hexane and ortho-xylene used as calibration standards for aliphatic hydrocarbons and miscellaneous aromatics, respectively.

Respectfully submitted,
Michael D. Webb
Technical Director

MMMM

EASYLINK MBX 5736521A001 15JAN85 12:18/12:35 EST
FROM: TLX 752858 ORS INC GRN UD
OIL RECOVERY SYSTEMS INC

HYDROCARBONS IN WATER ug/L (ppb)

Sample	I.D.	SAMPLED	RUN	BENZENE	TOLUENE	E.BENZ	T.XYLENES	ALIHYDRO	MISC.ARO	TOTAL
13536	BLANK	1/9/85	1/14/85	ND	ND	ND	ND	TRACE	ND	TRACE
13537	OCD 1	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13538	OCD 2	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13539	OCD 3	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13540	OCD 4	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13541	OCD 6	1/9/85	1/14/85	ND	ND	ND	ND	TRACE	ND	TRACE
13542	MW 12	1/9/85	1/14/85	3780	132	ND	95	1470	65	5550 *2
13543	MW 25	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13544	MW 26	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13545	MW 27	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND
13546	MW 28	1/9/85	1/14/85	ND	ND	ND	ND	ND	ND	ND

*NOTES:
ND = NONE DETECTED
TRACE = COMPOUND DETECTED BUT BELOW LEVEL FOR RELIABLE QUANTITATION.
2 = METHANE DETECTED AT 100-1000 PPB

REPORT NO. 20-2050-8

GROUNDWATER TECHNOLOGY
Division of Oil Recovery Systems, Inc.

Offices: Greenville, NH
Needham, MA — Chadds Ford, PA
Los Angeles, CA — Concord, CA

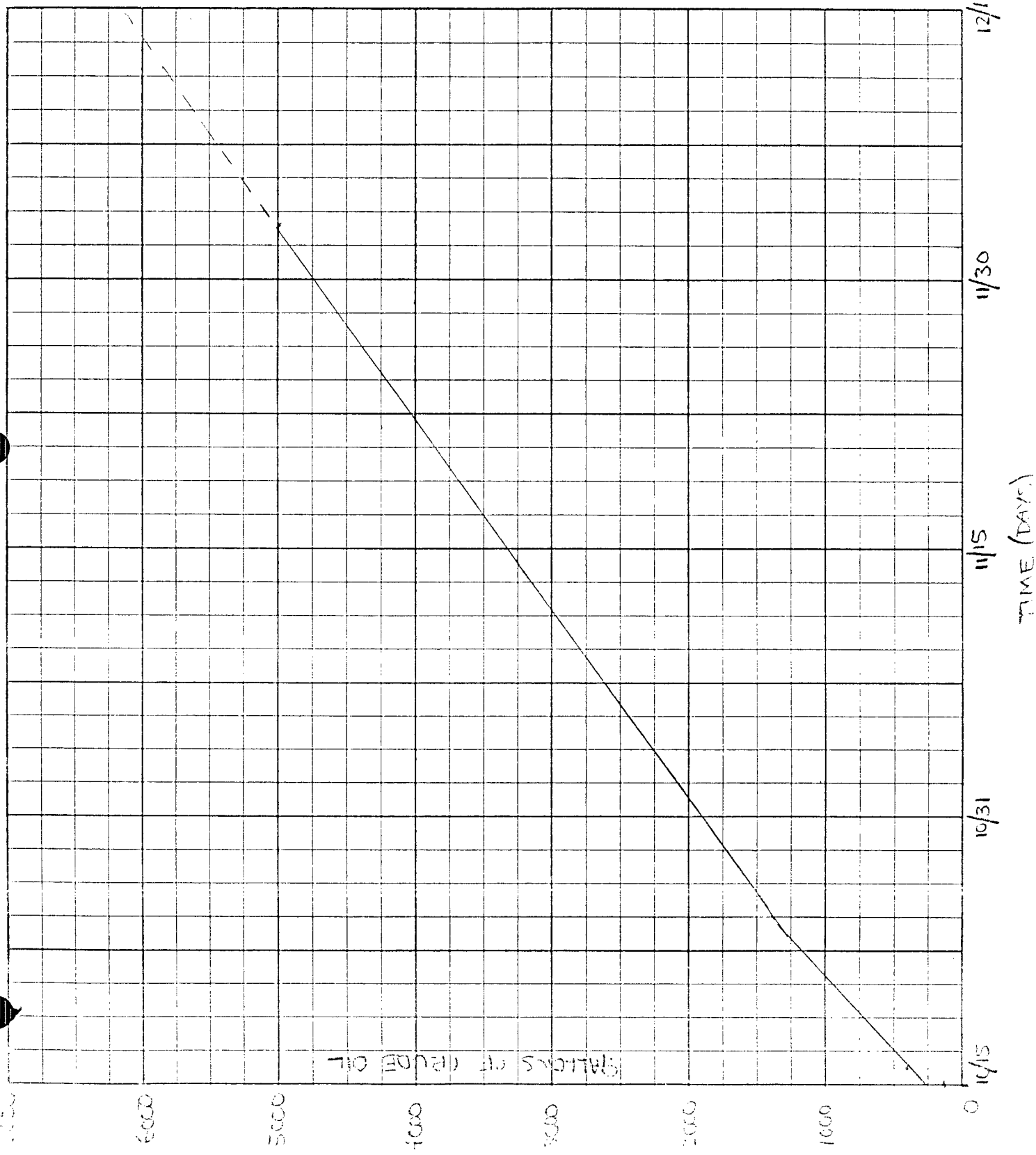
CONSULTING GROUNDWATER GEOLOGISTS

299 Second Avenue, Needham, MA 02194
Tel: (617) 449-5222

PROJECT Texas/New Mexico Pipeline PROJECT NUMBER 20.2050

SUBJECT Recovered Product Amounts from RW 1 BY CH DATE 11/30

PAGE 1 OF 1



TEXAS-NEW MEXICO PIPE LINE CO.

MONUMENT TEST WELLS

SEC. 29, T19S, R37E, N.M.P.M.,
Lea County, New Mexico

LOCATION	RELATIVE ELEVATION	NORTH COORD	EAST COORD
SW Sec. Cor.	N/A	000	000
SE Sec. Cor.	N/A	-16.9	5277.1
RW 1	100.0	2056.2	2514.9
RW 2	96.6	1755.0	2881.6
MW 11			
MW 1	100.8	1928.2	2542.8
MW 2	99.4	1754.6	2630.7
MW 3	99.5	2314.4	2459.0
MW 4	98.6	2207.6	2593.9
MW 5	100.7	2383.8	2660.6
MW 6	99.3	2234.3	2759.5
MW 7	99.5	1983.3	2765.6
MW 8	102.1	1991.6	2387.0
MW 9	97.8	2108.4	2652.4
MW 10	100.7	2138.1	2507.7
MW 11 RW 2	96.6	1755.0	2881.6
MW 12	95.9	1636.2	2971.6
MW 13	100.7	1829.3	2422.3
MW 14	94.8	1372.1	3034.4
MW 15	97.6	1582.7	2804.6
MW 16	98.8	1827.7	2798.8
MW 17	99.4	1887.5	2675.3
MW 18	96.0	1549.9	2951.1
MW 19	102.2	2336.6	2306.9
MW 20	93.7	932.5	3039.2
MW 21	95.7	1195.7	2870.9
MW 22	93.9	1134.9	3057.5
MW 23	91.2	1257.1	3178.2
MW 24	93.3	1520.3	3185.9
MW 25	96.1	1811.2	3060.3
MW 26	93.2	1286.5	3357.2
MW 27	89.8	866.7	3133.6
MW 28	88.8	726.6	3166.3
MW 29	91.1	1064.6	3235.3
Vent Pt. 1	92.1	1419.4	3370.9
Vent Pt. 2	91.9	1402.7	3371.9
DW 1	94.5	523.4	2574.8
DW 2	88.2	679.2	3060.1
DW 3	89.6	521.6	3690.5
Pwr. Ln. (No.)	N/A	2027.5	3207.5
Pwr. Ln. (So.)	N/A	697.8	3198.8
Oil Well 1	N/A	629.8	3267.2
Oil Well 2	N/A	1957.7	3262.5
Storage Tank	N/A	2159.7	2998.1
Tank Battery	N/A	1406.9	3560.0
Fence (E)	N/A	1312.2	3294.1
Fence (W)	N/A	1314.5	2893.6
Pipeline (N)	N/A	2499.6	2461.3
Pipeline (P.I.)	N/A	1312.6	3080.1
Pipeline (S)	N/A	566.4	3219.4

LEGEND

- Monitor Well
- Recovery Well
- Relative Elevation
- Electric Line
- Vent
- Domestic Well
- Oil Well
- Storage Tank
- Tank Battery
- Fence
- Buried Pipeline

OCD #1 Proposed 125 feet N of Village Well #2 toward well #20
OCD #2 Proposed 200 feet NW of west School well
OCD #3 Proposed 275 feet (approximately) west of OCD #1 toward OCD #2 (Location approximate depending on drilling results of OCD #1 & 2.)
OCD #4 Proposed 250 feet west of the west School well.

Annotated by D. Boyer
11/19/84

KING SURVEYING
618 SOUTH TURNER HOBBS, N. M. 88240
SCALE: 1" = 100' DRAWN BY: MAUDIE W.
DATE: 11/2/84 TO 11/5/84 SHEET 1 OF 1