AP - 24

STAGE 1 & 2 WORKPLANS

DATE:

Feb. 15, 2005

AP 24

Yates Petroleum Company
Amended Stage 1 Abatement Plan
Proposal and Work Plan
Inex Pit Site (AP-24)

Unit F, Section 26, Township 18S, Range 26E
Eddy County, New Mexico

February 15, 2005

Prepared for:

Yates Petroleum Company
105 South 4th Street
Artesia, New Mexico 88210

By:

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AP22
AP23
AP24
AP25

MARTIN YATES, III
1912 - 1985
FRANK W. YATES
1936 - 1986

YATES PETROLEUM CORPORATION

S. P. YATES
CHAIRMAN OF THE BOARD
JOHN A. YATES
PRESIDENT
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EXECUTIVE VICE PRESIDENT
RANDY G. PATTERSON
SECRETARY
DENNIS G. KINSEY
TREASURER

105 SOUTH FOURTH STREET
ARTESIA, NEW MEXICO 88210-2118
TELEPHONE (505) 748-1471

02-15-05

Mr. Ed Martin
Environmental Bureau
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Stage 1 Abatement Plan Proposals
Williams Pit Site (AP-22)
Lattion Pit Site (AP-23)
Inex Pit Site (AP-24)
Scripps Pit Site (AP-25)

Dear Mr. Martin:

Enclosed please find the amended Stage 1 Abatement Plan Proposals for the above sites. The New Mexico Oil Conservation Division (NMOCD) has required submittal of abatement plans for the subject sites. Preliminary site investigation reports dated June 2003 were previously submitted to the Division. On October 6, 2004, the OCD responded with a letter stating that a review of the reports showed that the extent of groundwater contamination at the sites had not been determined. The letter requested that work plans for further delineation be submitted by December 31, 2004. A 45 day extension to February 15 was requested for submittal of the work plan, which was approved by you December 17, 2004.

While the amended abatement plan proposals are under review, Yates will monitor water levels quarterly or more frequently as necessary to determine groundwater flow direction. Additionally, the monitor wells will be sampled for BTEX, chlorides and TDS on a quarterly basis.

If you have any questions on the submittals, please contact me at 505-748-4181.

Sincerely,

Dan Dolan, CWC
Environmental Regulatory Agent

TABLE OF CONTENTS

I. Company Contacts

Name, Company	Telephone	E-mail
Bob Allen, SESI	505-397-0510	ballen@sesi-nm.com
David Boyer, SESI	505-397-0510	dgboyer@sesi-nm.com
Dan Dolan, Yates	505-748-4181	ddolan@ypcnm.com

II. Purpose

The purpose of this amended abatement plan is to propose additional investigatory work to delineate the extent of possible groundwater contamination at the subject site located at the Yates Inex battery approximate to Unit letter F, Section 26, Township 18S, Range 26E Eddy County, New Mexico (Figure 1). Possible contamination could have resulted from a pit associated with oil and gas exploration and production activities at the Inex battery. The pit has since been closed.

III. Background

The New Mexico Oil Conservation Division (NMOCD) has required submittal of an abatement plan (AP-24) for the subject site. A "Preliminary Site Investigation Report" dated June 2003 was submitted to the Division. The report provided information on groundwater elevations, direction of flow and water quality. On October 6, 2004, the OCD responded with a letter stating that a review of the report showed that the extent of groundwater contamination at the site had not been determined. The letter requested that a work plan for further delineation be submitted by December 31, 2004. A 45 day extension to February 15 was requested for submittal of the work plan, which was approved by Ed Martin of the OCD in Santa Fe on December 17, 2004.

IV. Contaminants and Size of Area

The suspected contaminants at the location are inorganic chlorides and total dissolved solids, and dissolved phase hydrocarbons (benzene, toluene, ethylbenzene and xylenes, i.e. BTEX) from produced water and/or other oilfield wastes from the battery which may have been placed in the now-closed pit. These wastes are considered RCRA-exempt oilfield wastes. The former pit occupied an area with exterior dimensions of approximately 100 ft. by 50 ft. or 5,000 sq. ft. (0.11 acres) (Figure 2).

V. Vertical and Horizontal Extent of Contamination

Vertical and horizontal delineation was performed during the preliminary site investigation reported in June 2003. Soil borings drilled during the investigation documented hydrocarbon contamination to a depth of 20 ft. in the boring that penetrated the pit (MW-4). That boring was free of hydrocarbons at 45 ft. Hydrocarbons were absent in all other borings from surface to total depth (Table 1).

Chlorides elevated above the NMOCD guideline of 250 mg/Kg were found in soil samples from MW-1, MW-3 and MW-4. Chlorides at 10,600 mg/Kg were found at 35 ft. in MW-1 but declined to below 250 mg/Kg deeper in the boring. Chlorides in MW-3 were less than the guideline at 30 ft. (106 mg/Kg) but increased to 7,800 mg/Kg at 60 ft. Chloride in MW-4 was highest at a depth of 10 ft. (9,040 mg/Kg) and decreased to 933 mg/Kg at 45 ft. There is no apparent readily discernable pattern of chloride distribution in the boreholes; the highest concentration is in MW-1 at 35 ft. while MW-3 had a highly elevated concentration at 60 ft.

VI. Groundwater

Groundwater at the site is at a depth of approximately 47-50 ft. below the surface (Table 2). Recent groundwater flow direction is generally from northeast to southwest. However, water levels taken during September 2002 show groundwater flow from southeast to northwest. Although some variation is most likely due to recharge from relatively large precipitation events that occurred in the fourth quarter of 2004, the cause of the flow reversal shown in that figure is unknown. The situation is further clouded by elevated water levels in MW-4, which are sometimes over a foot higher than levels in the surrounding wells.

Water quality of the groundwater is poor with chlorides in the monitor wells sampled in November 2004 ranging between 636 mg/L (MW-2) and 38,990 mg/L (MW-3). November water quality in the pit well MW-4 was 4,600 mg/L chlorides and 8,000 mg/L total dissolved solids (TDS). However, this was a decline from 21,300 mg/L chloride and 38,200 mg/L TDS measured in 2002. All concentrations exceed water quality standards for human or animal use (Table 3). Ethylbenzene was detected in MW-4 at a concentration of 0.006 mg/L which is well below the regulatory standard of 0.750 mg/L and just above the reporting level of 0.002 mg/L.

The source of the highly elevated chlorides in monitor well MW-3 is unknown. The boring samples showed the highest concentration (7,800 mg/Kg) at a depth of 60 ft. which is 8 ft. below the top of the water table. The highest concentration in the pit well, MW-4, is 9,040 mg/Kg at a depth of 10 ft.; chloride concentrations decrease with depth to less than 1,000 mg/Kg at 45 ft. Additional work is proposed below which should assist in determining whether the now closed pit is the source or contributed to the observed levels of inorganic constituents.

VII. Action Plan

Based on evaluation of the existing information, the conditions at this site appear to be related to an outside source of groundwater contamination rather than contamination by the pit. To verify if that is the situation, we propose the following work:

1. Resurvey monitor well elevations.
   No information was provided in the report as to when the survey was performed or who did it. Because of the closeness of the monitor wells and because water levels for MW-4 appear anomalous compared to the other wells, a current elevation survey is necessary to determine more accurately groundwater flow direction.
2. Install two additional monitor wells.
   An additional monitor well will be installed upgradient of the site to determine if background shallow water quality is as poor as indicated by the analytical results for the existing wells. The well will be installed in an area which shows no evidence of disturbance. The most likely location to drill the well will be north of the lease road. The exact location will be determined following resurvey of the wells and re-plotting of the water level measurements. A second well will be installed downgradient of the pit as determined by measurements following the resurvey of existing wells. If warranted following installation of that well, additional wells may be drilled to ascertain whether contamination from MW-3 is from the pit or another outside source. At least three soil samples will be collected during drilling and analyzed for chlorides.

3. Plug monitoring well MW-4.
   This well was drilled through the center of the pit. Water levels in the well are noticeably different than the surrounding wells indicating possible impact from the pit. During the November 2004 sampling dissolved BTEX was detected with ethylbenzene slightly above the reporting level. It is unknown whether drilling of the well provided a vertical pathway for contaminant migration, however it would be best to plug the well and monitor groundwater quality from outside the pit boundaries. We propose to plug the well by injecting pressurized bentonite/cement mix grout down the casing and through the screen. We will remove the steel protection box and cut off the casing below the surface.
4. Measure water levels and monitor groundwater quality.
   Water levels and groundwater quality will be sampled in MW-4 before plugging and in all monitor wells following installation of the new monitor well. Analyses will include BTEX and major cations and anions.
5. Prepare an updated site investigation report.
   This report will be prepared and submitted to the NMOCD within 60 days of completion of the field work. It will present the data collected and summarize the results of the investigation.

VIII. Tables and Figures

Table 1. Soil Sampling Results, Inex Pit Site, September 2002

Sample Location, Date	Depth (ft.)	Chloride (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl-benzene (mg/Kg)	Total Xylenes (mg/Kg)	Total BTEX (mg/Kg)	GRO (C6-C12) (mg/Kg)	DRO (>C12-C35) (mg/Kg)	TPH (C6-C35) (mg/Kg)
MW-1	35	10,600	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/09/02	55	177	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
	70	70.9	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
MW-2	35	112	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/10/02	55	<20.0	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
	65	<20.0	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
MW-3	30	106	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/10/02	50	603	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
	60	7,800	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
MW-4	10	9,040	6.79	1.56	29.8	47.1	85.3	1,570	3,170	4,740
09/11/02	20	3,540	5.2	0.565	20.3	9.1	35.2	588	1,350	1,938
	45	993	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0

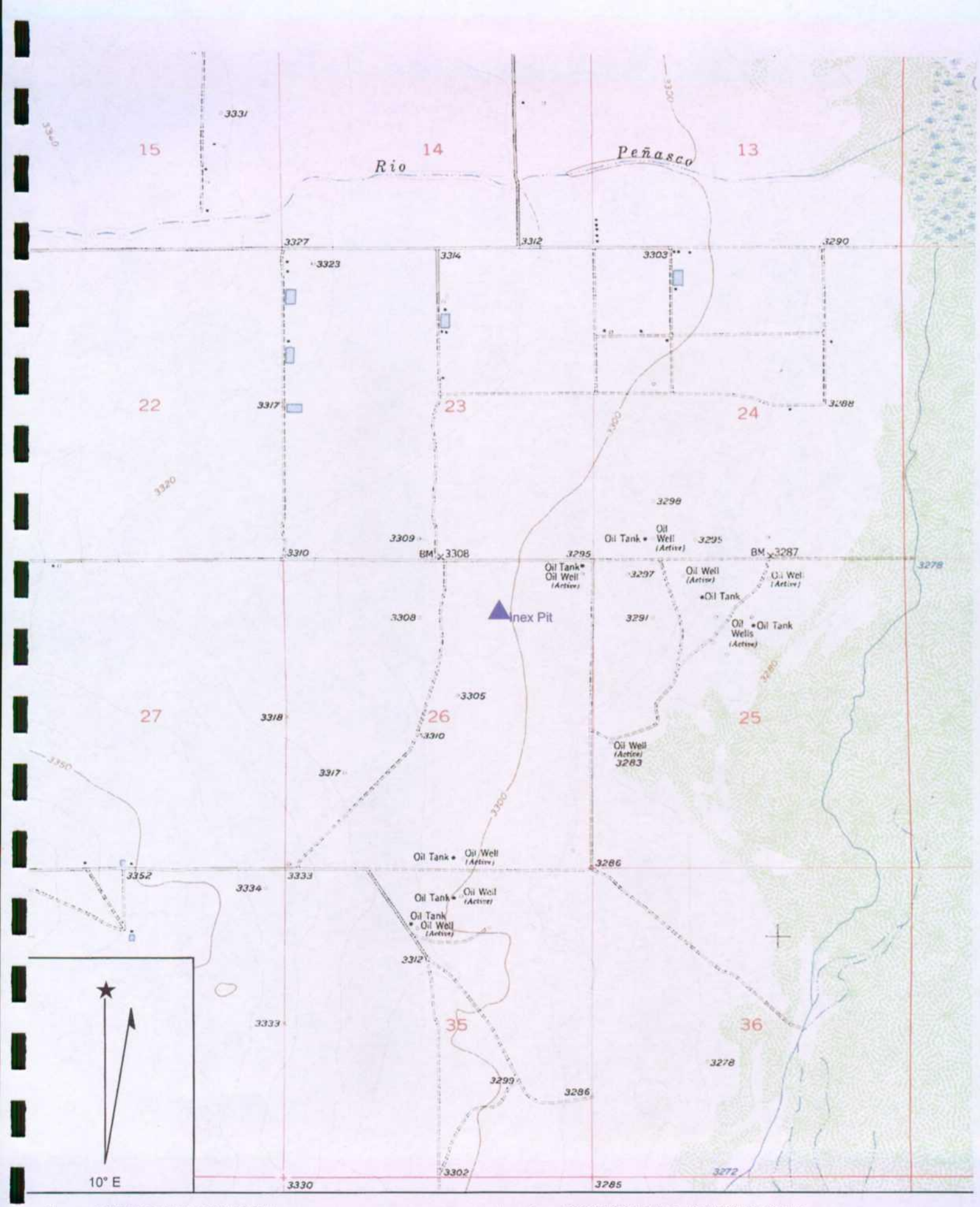
Table 2. Water Level Measurements, Inex Pit Site, 2002-2005

Monitor Well Name, Total Depth Below TOC (ft.)	Elevation Top of Casing (feet)	Measure-ment Date	Depth to Water Below TOC (feet)	Water Level Elev. (feet)	Water Saturated Thickness (feet)	Water Level Change (ft)
MW-1	3,301.73	09/18/02	53.23	3,248.50	19.6	- -
72.80		09/19/02	53.24	3,248.49	19.6	-0.01
		11/03/04	51.75	3,249.98	21.1	1.49
		12/01/04	- -	- -	- -	- -
		12/15/04	51.75	3,249.98	21.1	0.00
		12/21/04	50.35	3,251.38	22.5	1.40
		12/30/04	50.09	3,251.64	22.7	0.26
		02/10/05	48.94	3,252.79	23.9	1.15
MW-2	3,301.67	09/18/02	52.82	3,248.85	15.5	- -
68.32		09/19/02	54.11	3,247.56	14.2	-1.29
		11/03/04	52.86	3,248.81	15.5	1.25
		12/01/04	51.87	3,249.80	16.5	0.99
		12/15/04	51.51	3,250.16	16.8	0.36
		12/21/04	51.18	3,250.49	17.1	0.33
		12/30/04	50.89	3,250.78	17.4	0.29
		02/10/05	49.63	3,252.04	18.7	1.26
MW-3	3,302.19	09/18/02	54.14	3,248.05	8.9	- -
63.07		09/19/02	52.95	3,249.24	10.1	1.19
		11/03/04	52.68	3,249.51	10.4	0.27
		12/01/04	52.41	3,249.78	10.7	0.27
		12/15/04	52.20	3,249.99	10.9	0.21
		12/21/04	52.08	3,250.11	11.0	0.12
		12/30/04	51.92	3,250.27	11.2	0.16
		02/10/05	51.27	3,250.92	11.8	0.65
MW-4	3,301.02	09/18/02	53.11	3,247.91	9.5	- -
62.58		09/19/02	53.43	3,247.59	9.2	-0.32
		11/03/04	50.95	3,250.07	11.6	2.48
		12/01/04	49.77	3,251.25	12.8	1.18
		12/15/04	49.36	3,251.66	13.2	0.41
		12/21/04	48.97	3,252.05	13.6	0.39
		12/30/04	48.62	3,252.40	14.0	0.35
		02/10/05	47.16	3,253.86	15.4	1.46
(Table updated 02/11/2005)						

Table 3. Water Quality Sampling Results, Inex Pit Site, 2002-2004

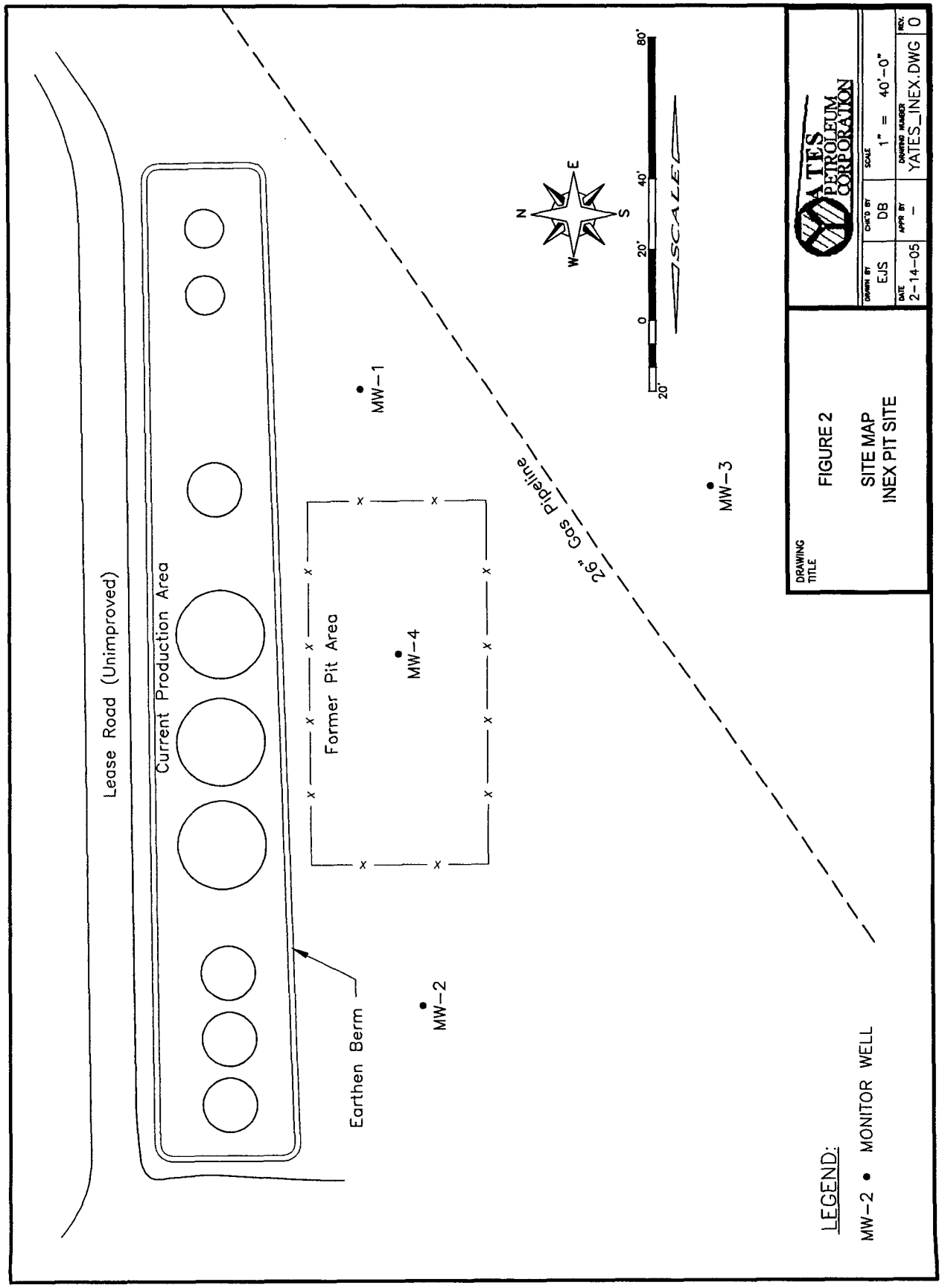
Sample Location	Date	Chloride (mg/L)	TDS (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethyl-benzene (mg/L)	Total Xylenes (mg/L)
MW-1	09/19/02	1,110	3,880	<0.001	<0.001	<0.001	<0.001
	11/03/04	3,099	6,796	<0.002	<0.002	<0.002	<0.006
MW-2	09/19/02	319	2,270	<0.001	<0.001	<0.001	<0.001
	11/03/04	636	2,984	<0.002	<0.002	<0.002	<0.006
MW-3	09/19/02	37,200	67,400	<0.001	<0.001	<0.001	<0.001
	11/03/04	38,988	52,200	<0.002	<0.002	<0.002	<0.006
MW-4	09/19/02	21,300	38,200	<0.001	<0.001	<0.001	<0.001
	11/03/04	4,599	7,996	<0.002	<0.002	0.006	<0.006
NM WQCC Groundwater		250	1,000	0.010	0.750	0.750	0.650

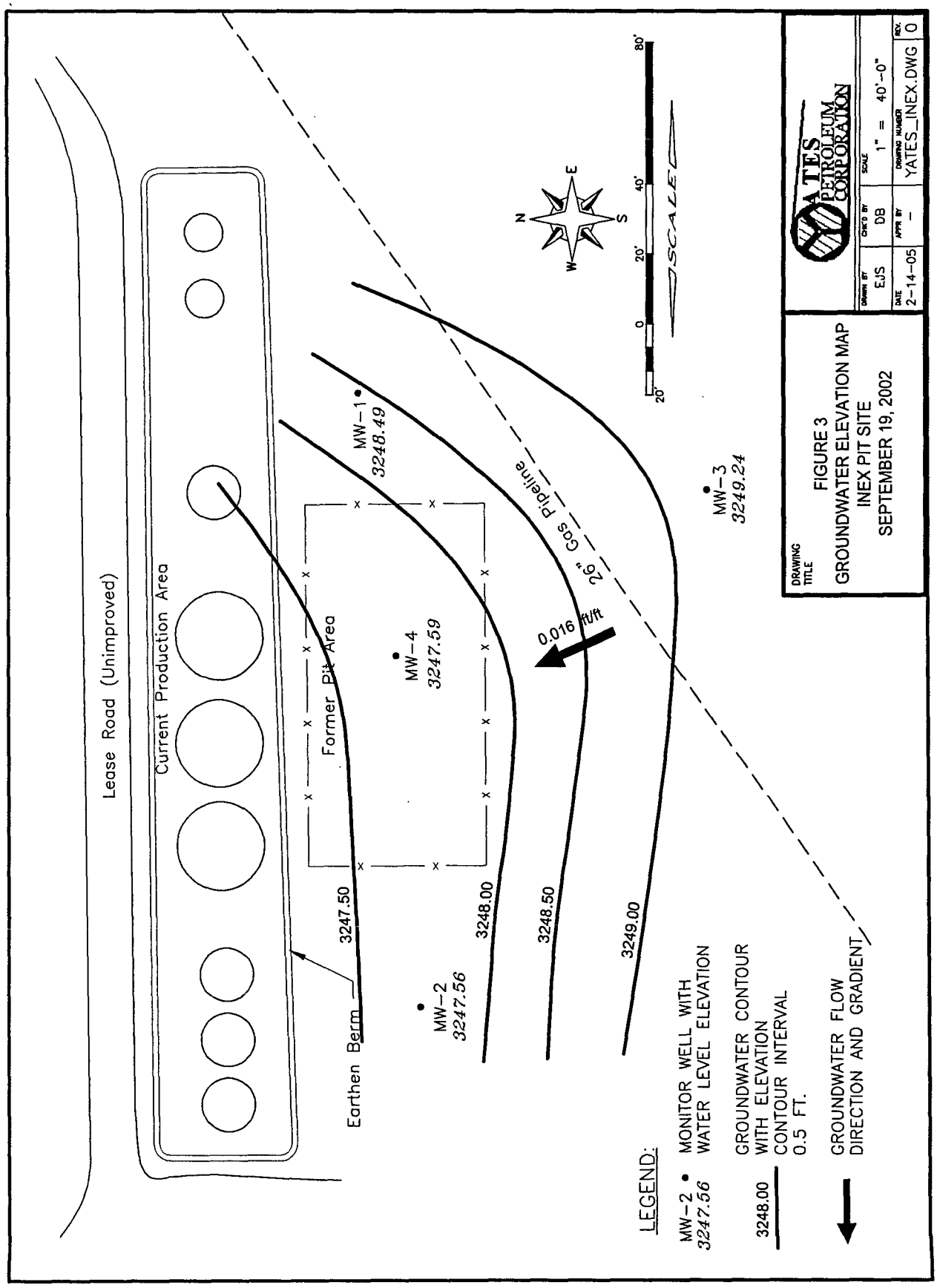
Figure 1. Vicinity Map, Inex Pit Site



Name: LAKE MC MILLAN NORTH
Date: 1/28/105
Scale: 1 inch equals 2000 feet

Location: 032° 43' 24.7" N 104° 20' 55.2" W
Caption: Yates Petroleum
Sec 26, T18S, R26E
Eddy County, New Mexico


Lease Road (Unimproved)
Current Production Area
Former Pit Area
Earthen Berm
26" Gas Pipeline
MW-1
MW-2
MW-3
MW-4
N
E
S
W
0
20'
40'
80'
SCALE
20'
LEGEND:
MW-2 • MONITOR WELL
DRAWING TITLE
FIGURE 2
SITE MAP
INEX PIT SITE
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 40'-0"
DATE 2-14-05
APPR BY -
DRAWING NUMBER YATES_INEX.DWG
REV. 0


Lease Road (Unimproved)
Current Production Area
Former Pit Area
Earthen Berm
MW-1
3248.49
MW-2
3247.56
MW-3
3249.24
MW-4
3247.59
26" Gas Pipeline
0.016 ft/ft
3247.50
3248.00
3248.50
3249.00
N
S
E
W
0
20'
40'
80'
SCALE
LEGEND:
MW-2 • 3247.56 MONITOR WELL WITH WATER LEVEL ELEVATION
3248.00 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
DRAWING TITLE
FIGURE 3
GROUNDWATER ELEVATION MAP
INEX PIT SITE
SEPTEMBER 19, 2002
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
APPR BY -
DATE 2-14-05
SCALE 1" = 40'-0"
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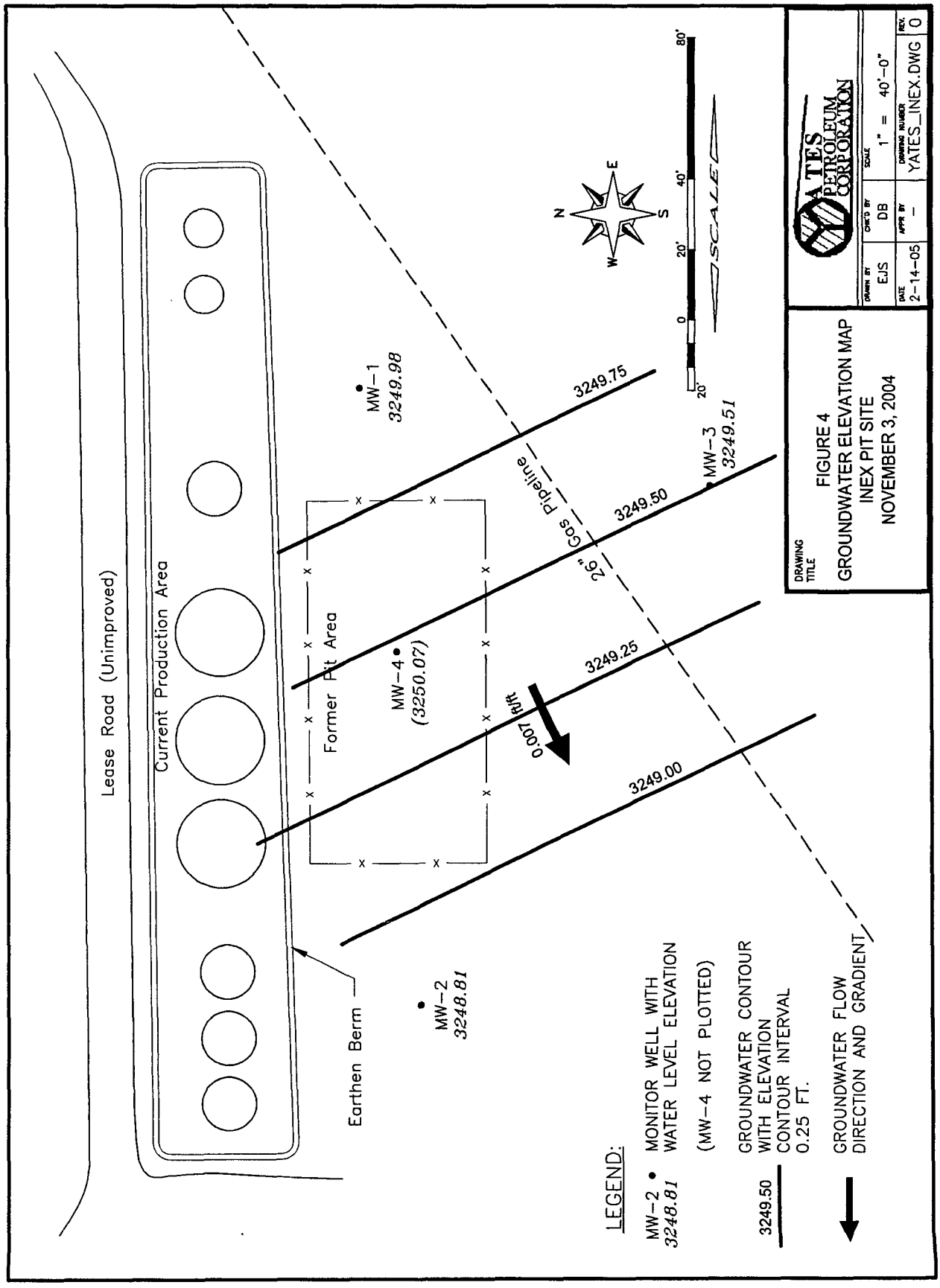
REV. 0


Lease Road (Unimproved)
Current Production Area
Former Pit Area
Earthen Berm
MW-1
3249.98
MW-2
3248.81
MW-3
3249.51
MW-4
(3250.07)
3249.75
3249.50
3249.25
3249.00
Gas pipeline
2"
0.007 ft/ft
LEGEND:
MW-2 • 3248.81 MONITOR WELL WITH WATER LEVEL ELEVATION
(MW-4 NOT PLOTTED)
3249.50 GROUNDWATER CONTOUR WITH ELEVATION
CONTOUR INTERVAL 0.25 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
N
E
S
W
0
20'
40'
80'
SCALE
DRAWING TITLE
FIGURE 4
GROUNDWATER ELEVATION MAP
INEX PIT SITE
NOVEMBER 3, 2004
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
APPR BY -
DATE 2-14-05
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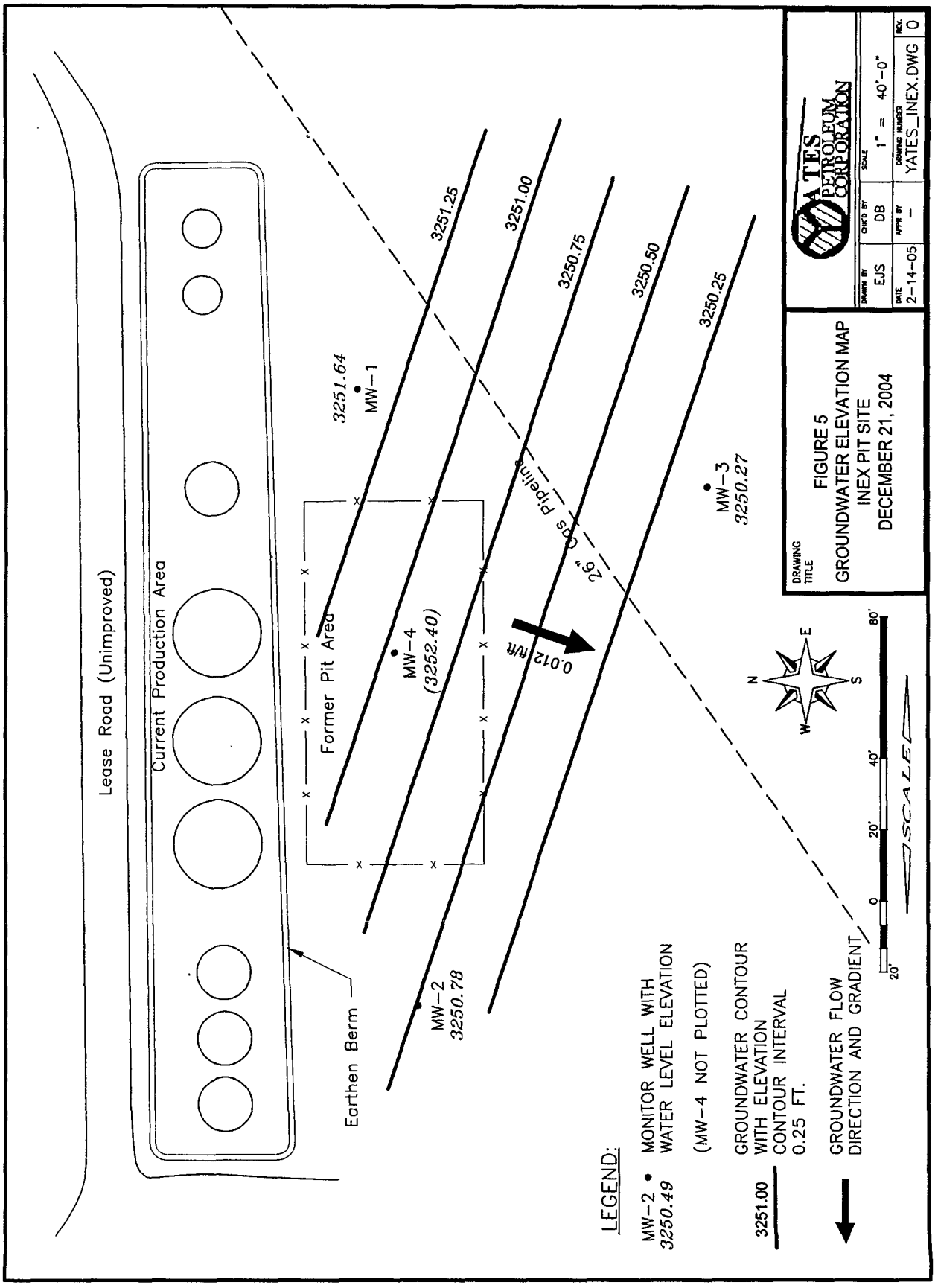
Lease Road (Unimproved)
Current Production Area
Former Pit Area
Earthen Berm
MW-1
3251.64
MW-2
3250.78
MW-3
3250.27
MW-4
(3252.40)
3251.25
3251.00
3250.75
3250.50
3250.25
0.012 ft/ft
26" OCS pipeline
LEGEND:
MW-2 • 3250.49 MONITOR WELL WITH WATER LEVEL ELEVATION
(MW-4 NOT PLOTTED)
3251.00 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.25 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
SCALE
0
20'
40'
80'
N
E
S
W
DRAWING TITLE
FIGURE 5
GROUNDWATER ELEVATION MAP
INEX PIT SITE
DECEMBER 21, 2004
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
APPR BY -
DATE 2-14-05
SCALE 1" = 40'-0"
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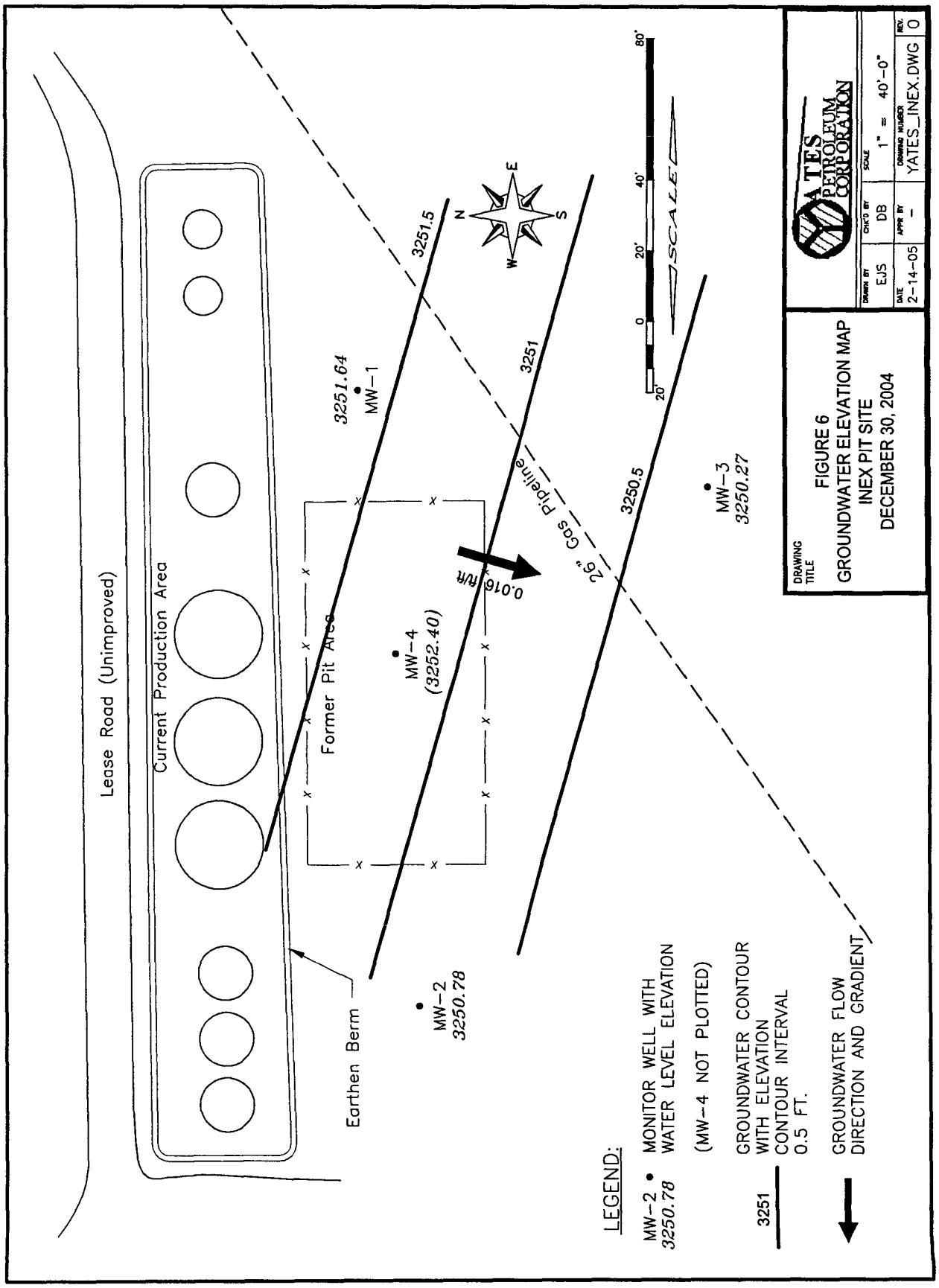
Lease Road (Unimproved)
Current Production Area
Former Pit Area
Earthen Berm
MW-1
3251.64
MW-2
3250.78
MW-3
3250.27
MW-4
(3252.40)
3251.5
3251
3250.5
0.016 ft/ft
26" Gas Pipeline
N
S
E
W
0
20'
40'
80'
SCALE
LEGEND:
MW-2 • 3250.78 MONITOR WELL WITH WATER LEVEL ELEVATION
(MW-4 NOT PLOTTED)
3251 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
DRAWING TITLE
FIGURE 6
GROUNDWATER ELEVATION MAP
INEX PIT SITE
DECEMBER 30, 2004
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
APPR BY -
SCALE 1" = 40'-0"
DATE 2-14-05
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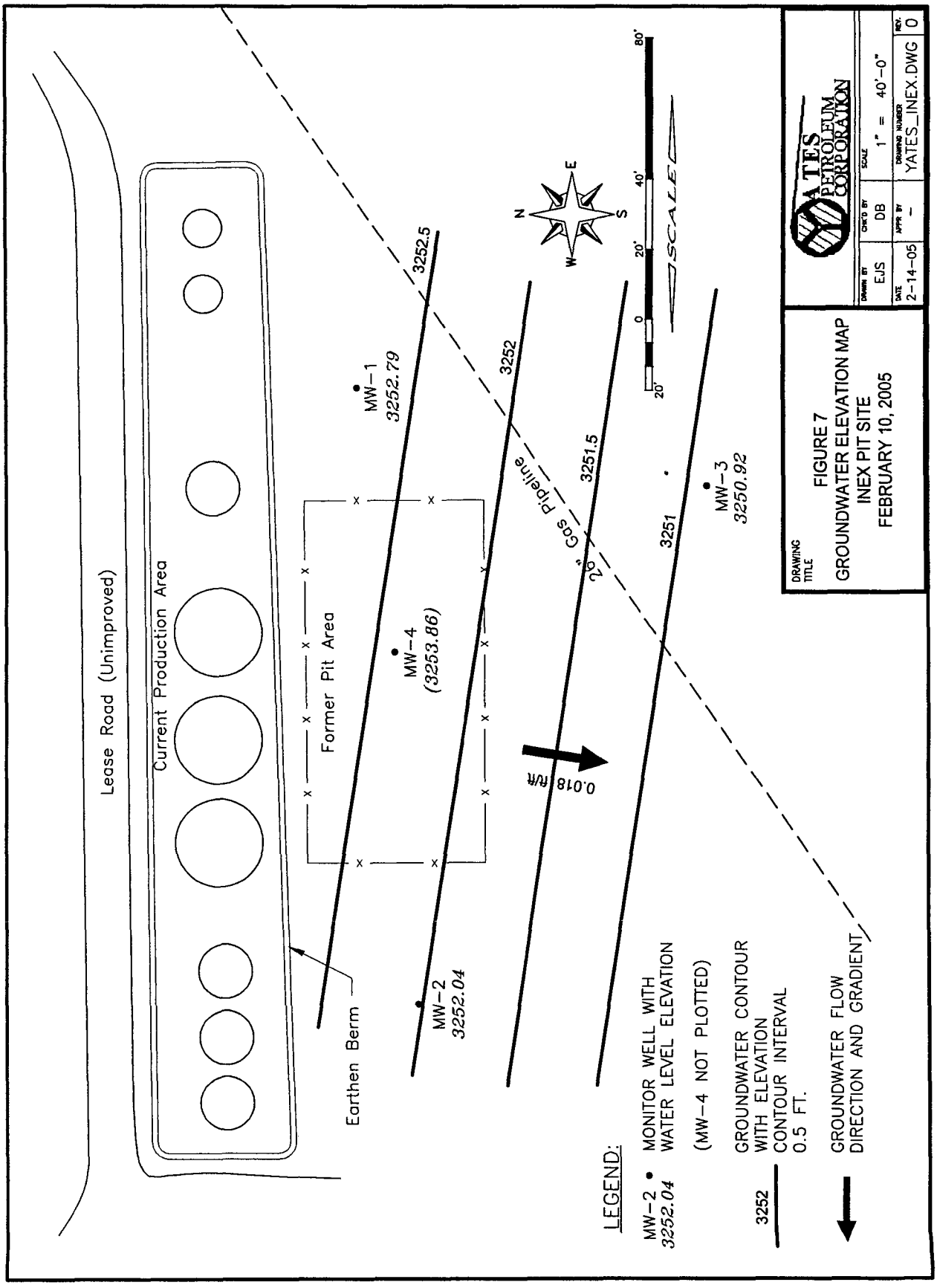
Lease Road (Unimproved)
Current Production Area
Former Pit Area
Earthen Berm
MW-1
3252.79
MW-2
3252.04
MW-4
(3253.86)
MW-3
3250.92
3252.5
3252
3251.5
3251
Gas pipeline
0.018 ft/ft
N
E
S
W
0
20'
40'
80'
SCALE
LEGEND:
MW-2 • 3252.04 MONITOR WELL WITH WATER LEVEL ELEVATION
(MW-4 NOT PLOTTED)
3252 GROUNDWATER CONTOUR WITH ELEVATION
CONTOUR INTERVAL 0.5 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
DRAWING TITLE
FIGURE 7
GROUNDWATER ELEVATION MAP
INEX PIT SITE
FEBRUARY 10, 2005
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 40'-0"
DATE 2-14-05
APPR BY -
DRAWING NUMBER YATES_INEX.DWG
REV. 0