AP - 023

STAGE 1 & 2 WORKPLANS

DATE:

Feb. 15, 2005

AP23

Yates Petroleum Company
Amended Stage 1 Abatement Plan
Proposal and Work Plan
Lattion Pit Site (AP-23)

Unit K, Section 23, 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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Hobbs, New Mexico 88240
(505) 397-0510

AP22
AP23
AP24
AP25

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

YATES PETROLEUM CORPORATION

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

S. P. YATES
CHAIRMAN OF THE BOARD
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RANDY G. PATTERSON
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TREASURER

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 Lattion battery approximate to Unit letter K, Section 23, 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 Lattion battery. The pit has since been closed.

III. Background

The New Mexico Oil Conservation Division (NMOCD) has required submittal of an abatement plan (AP-23) 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 290 ft. by 200 ft. or 58,000 sq. ft. (1.3 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 did not document hydrocarbon contamination at a depth of 20 ft. in the boring that penetrated the pit (MW-4) (Table 1). Further, hydrocarbons were not detected in deeper soil samples from MW-4 or in any soil sample from any of the other borings. Chlorides elevated above the NMOCD guideline of 250 mg/Kg were found in soil samples from MW-1, MW-3 and MW-4. MW-1 is upgradient of the pit and MW-3 would be considered partially off-gradient. The highest chloride concentration was found in MW-4 at a depth of 20 ft.

VI. Groundwater

Groundwater at the site varies from a depth of approximately 29 ft. below ground surface (bgs) in upgradient MW-1 to 59 ft. bgs in MW-2 (Table 2). Groundwater flow is generally from north to south. However inclusion of well MW-4 on the maps produces an anomalous groundwater high that is inconsistent with water levels in the wells. It may be that leakage from the surface is providing an elevated water level in that well.

Water levels decline from 30 ft. bgs to 60 ft. bgs from north to south across the site. The high water level in MW-1 and subsequent decline to the south is likely due to infiltration of water from the irrigated fields immediately adjacent to the north side of the battery.

Water quality of the groundwater varies depending on the location of the monitor wells. The two wells with poorest quality of water are located nearest to the irrigated acreage. MW-1 has the highest concentration of chlorides and total dissolved solids (TDS) with MW-4 (the pit well) having the second highest concentrations. TDS in upgradient MW-1 is over 8,100 mg/L. Chlorides and TDS of the other two wells show lower concentrations (Table 3). Except for chloride in MW-3, all concentrations exceed NM water quality standards for human or animal use (Table 3). Dissolved phase BTEX hydrocarbons were not detected in detected in any monitor well sample taken in 2002 or 2004.

Seepage loses from irrigation water are known to affect groundwater quality in the valley fill in the Pecos River valley, though to a lesser degree than evapotranspiration by phreatophytes at locations closer to the river[1].

VII. Action Plan

Based on evaluation of the existing information, the conditions at this site appear to be related to increased mineralization of the soil and groundwater from irrigation seepage rather than contamination by the pit. To clarify the situation, the following work is proposed:

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 an additional monitor well.
   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 area will be to the north of the pit location. 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 quality in the well has elevated chlorides and TDS but less so that the upgradient well. No dissolved phase hydrocarbons were detected in the well. However, water levels are somewhat anomalous compared to the other wells. 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.

1 Mower, R.W., Hood, J.W., Cushman, R.L., Borton, R.L., and Galloway, S.E., 1964. "An Appraisal of Potential Ground-Water Salvage Along the Pecos River between Acme and Artesia, New Mexico", US Geological Water-Supply Paper 1659, Washington, D.C.

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, Lattion 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	390	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/03/02	58	35.4	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
	70	<20.0	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
MW-2	25	74.6	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/3-4/02	55	106	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
	70	35.4	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
MW-3	15	177	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/4-5/02	35	382	<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-4	20	2,390	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
09/4-5/02	45	213	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0
	55	<20.0	<0.025	<0.025	<0.025	<0.025	<0.025	<10.0	<10.0	<10.0

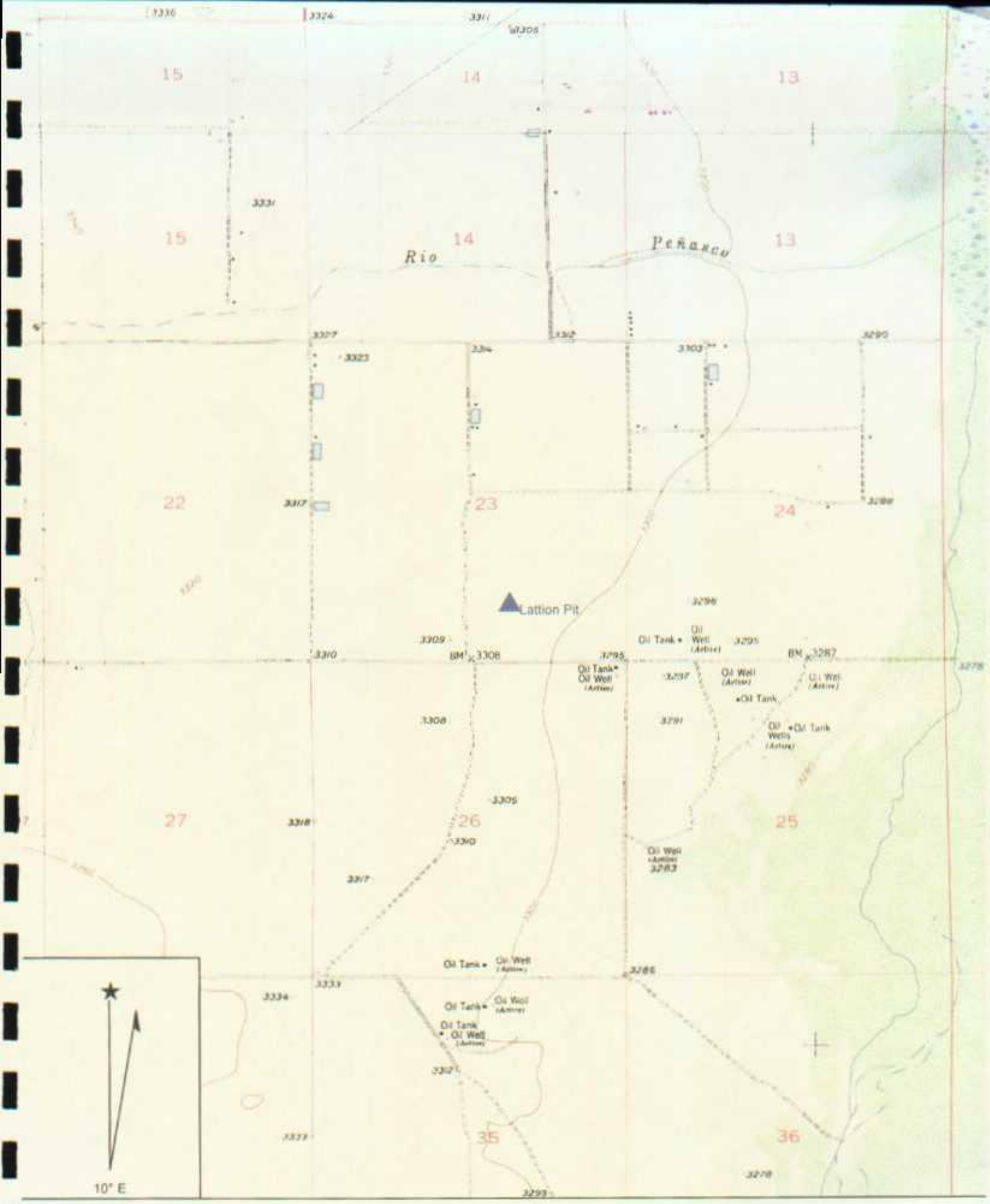
Table 2. Water Level Measurements, Lattion Pit Site, 2002-2004

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	3,309.05	09/18/02	34.42	3,274.63	38.8	- -
73.24		09/19/02	34.54	3,274.51	38.7	-0.12
		11/03/04	28.75	3,280.30	44.5	5.79
		12/02/04	31.02	3,278.03	42.2	-2.27
		12/15/04	31.94	3,277.11	41.3	-0.92
		12/21/04	31.92	3,277.13	41.3	0.02
		12/30/04	32.41	3,276.64	40.8	-0.49
MW-2	3,307.92	09/18/02	61.40	3,246.52	11.0	- -
72.43		09/19/02	61.65	3,246.27	10.8	-0.25
		11/03/04	62.04	3,245.88	10.4	-0.39
		12/02/04	61.67	3,246.25	10.8	0.37
		12/15/04	61.76	3,246.16	10.7	-0.09
		12/21/04	61.31	3,246.61	11.1	0.45
		12/30/04	61.13	3,246.79	11.3	0.18
MW-3	3,307.90	09/18/02	55.08	3,252.82	11.6	- -
66.66		09/19/02	58.73	3,249.17	7.9	-3.65
		11/03/04	51.28	3,256.62	15.4	7.45
		12/02/04	50.38	3,257.52	16.3	0.90
		12/15/04	50.30	3,257.60	16.4	0.08
		12/21/04	50.01	3,257.89	16.7	0.29
		12/30/04	49.91	3,257.99	16.8	0.10
MW-4	3,307.63	09/18/02	38.17	3,269.46	19.8	- -
57.98		09/19/02	38.23	3,269.40	19.8	-0.06
		11/03/04	32.95	3,274.68	25.0	5.28
		12/02/04	33.96	3,273.67	24.0	-1.01
		12/15/04	34.43	3,273.20	23.6	-0.47
		12/21/04	34.32	3,273.31	23.7	0.11
		12/30/04	34.70	3,272.93	23.3	-0.38
(Table updated 01/03/2005)						

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

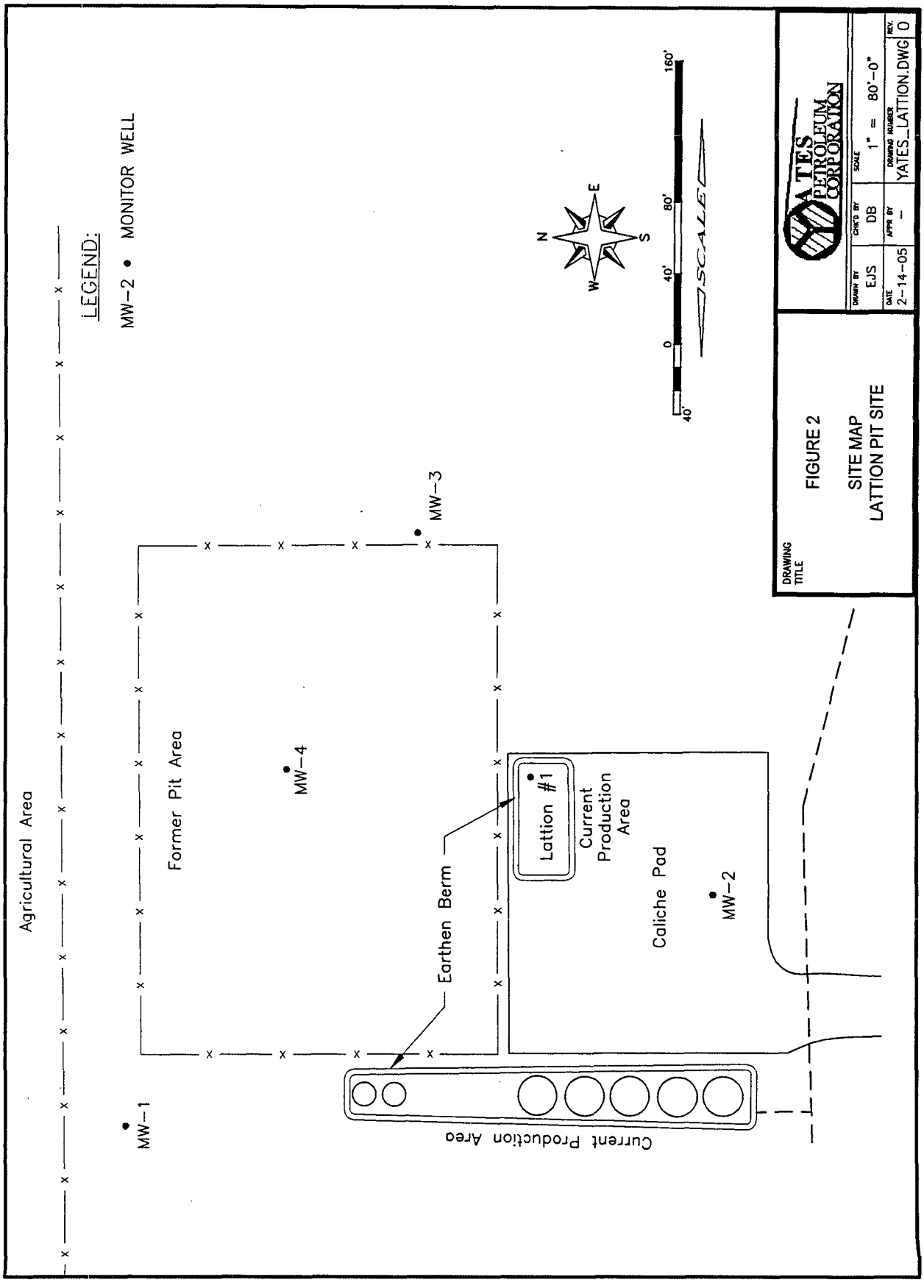
Sample Location	Date	Chloride (mg/L)	TDS (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethyl-benzene (mg/L)	Total Xylenes (mg/L)
MW-1	09/19/02	1,770	6,140	<0.001	<0.001	<0.001	<0.001
	11/03/04	2,899	8,172	<0.002	<0.002	<0.002	<0.006
MW-2	09/19/02	709	3,420	<0.001	<0.001	<0.001	<0.001
	11/03/04	740	3,216	<0.002	<0.002	<0.002	<0.006
MW-3	09/19/02	59	1,700	<0.001	<0.001	<0.001	<0.001
	11/03/04	64	1,545	<0.002	<0.002	<0.002	<0.006
MW-4	09/19/02	1,280	5,350	<0.001	<0.001	<0.001	<0.001
	11/03/04	1,899	5,650	<0.002	<0.002	<0.002	<0.006
NM WQCC Groundwater		250	1,000	0.010	0.750	0.750	0.650

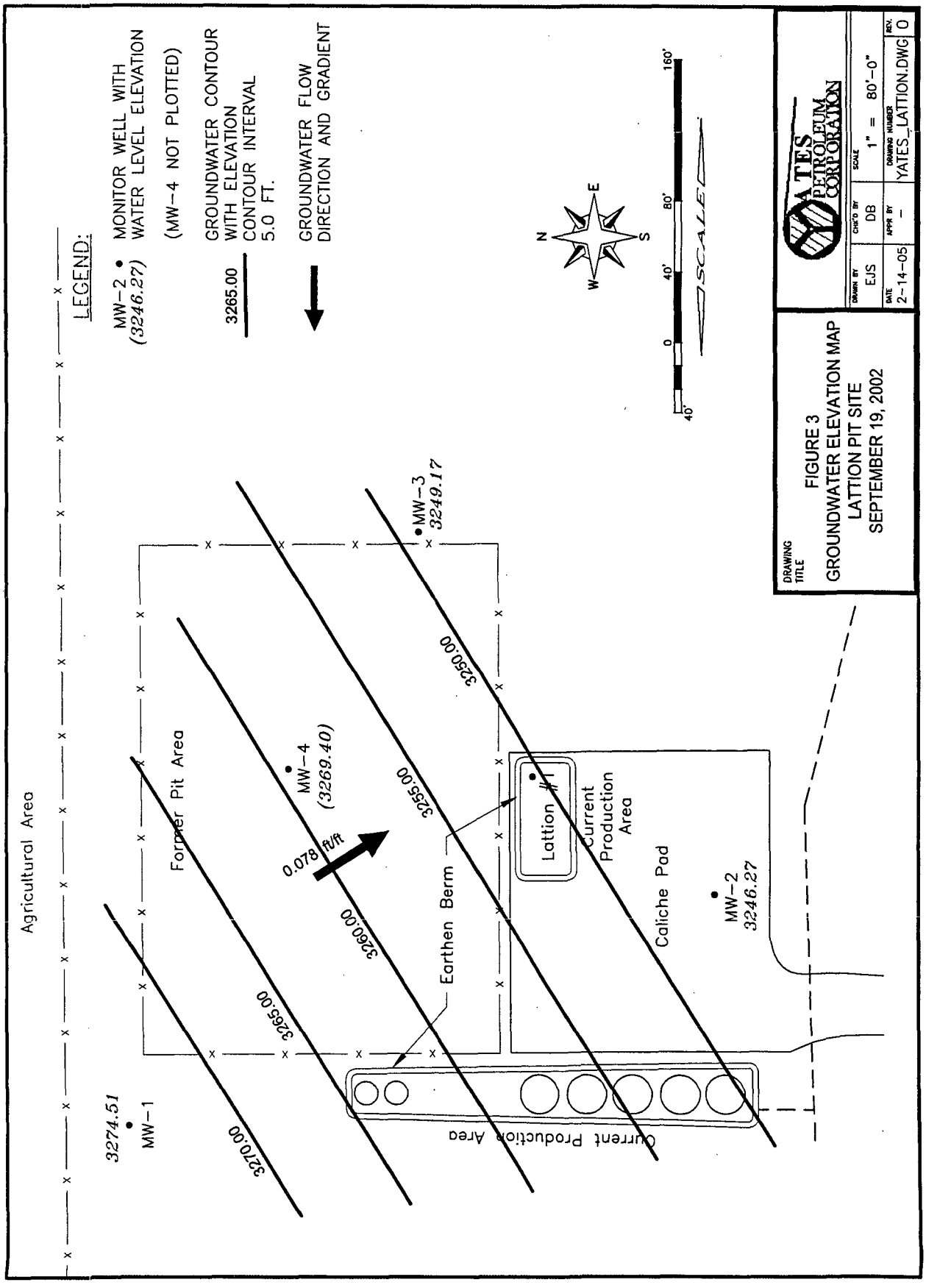
Figure 1. Vicinity Map, Lattion Pit Site



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

Location: 032° 43' 42.9" N 104° 20' 59.0" W
Caption: Yates Petroluem
Sec 23, T18S, R26E
Eddy County, New Mexico


LEGEND:
MW-2 • MONITOR WELL
N
E
S
W
0
40'
80'
160'
SCALE
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
APPR BY -
DATE 2-14-05
SCALE 1" = 80'-0"
DRAWING NUMBER YATES_LATTION.DWG
REV. 0
DRAWING TITLE
FIGURE 2
SITE MAP
LATTION PIT SITE
Agricultural Area
Former Pit Area
MW-1
MW-3
MW-4
Earthen Berm
Lattion #1
Current Production Area
Caliche Pad
MW-2
Current Production Area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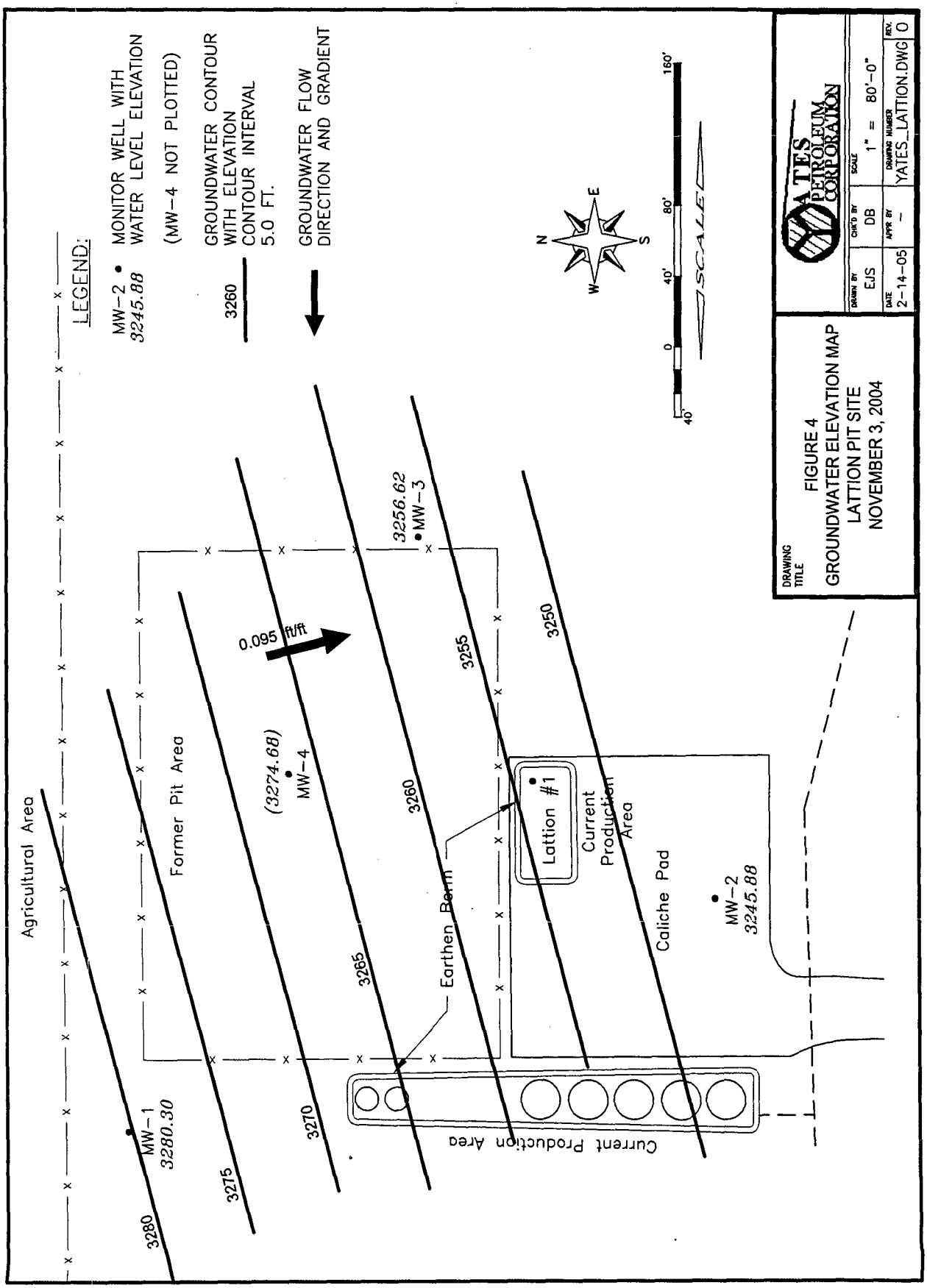
MW-2 • (3246.27) MONITOR WELL WITH WATER LEVEL ELEVATION
(MW-4 NOT PLOTTED)
3265.00 GROUNDWATER CONTOUR WITH ELEVATION
CONTOUR INTERVAL 5.0 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
N E S W
0 40' 80' 160'
SCALE
40'
Agricultural Area
Former Pit Area
MW-1 3274.51
MW-4 (3269.40)
MW-3 3249.17
MW-2 3246.27
0.078 ft/ft
3270.00
3265.00
3260.00
3255.00
3250.00
Earthen Berm
Lattion #1
Current Production Area
Caliche Pad
Current Production Area
DRAWING TITLE
FIGURE 3
GROUNDWATER ELEVATION MAP
LATTION PIT SITE
SEPTEMBER 19, 2002
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 80'-0"
DATE 2-14-05
APPR BY -
DRAWING NUMBER YATES_LATTION.DWG
REV. 0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MW-2 • 3245.88 MONITOR WELL WITH WATER LEVEL ELEVATION
(MW-4 NOT PLOTTED)
3260 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 5.0 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
0.095 ft/ft
Agricultural Area
Former Pit Area
Earthen Berm
Lattion #1
Current Production Area
Caliche Pad
Current Production Area
MW-1 3280.30
(3274.68) MW-4
3256.62 MW-3
MW-2 3245.88
3280
3275
3270
3265
3260
3255
3250
N
E
S
W
0
40'
80'
160'
40
SCALE
DRAWING TITLE
FIGURE 4
GROUNDWATER ELEVATION MAP
LATTION PIT SITE
NOVEMBER 3, 2004
YATES PETROLEUM CORPORATION
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CHK'D BY DB
SCALE 1" = 80'-0"
DATE 2-14-05
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DRAWING NUMBER YATES_LATTION.DWG
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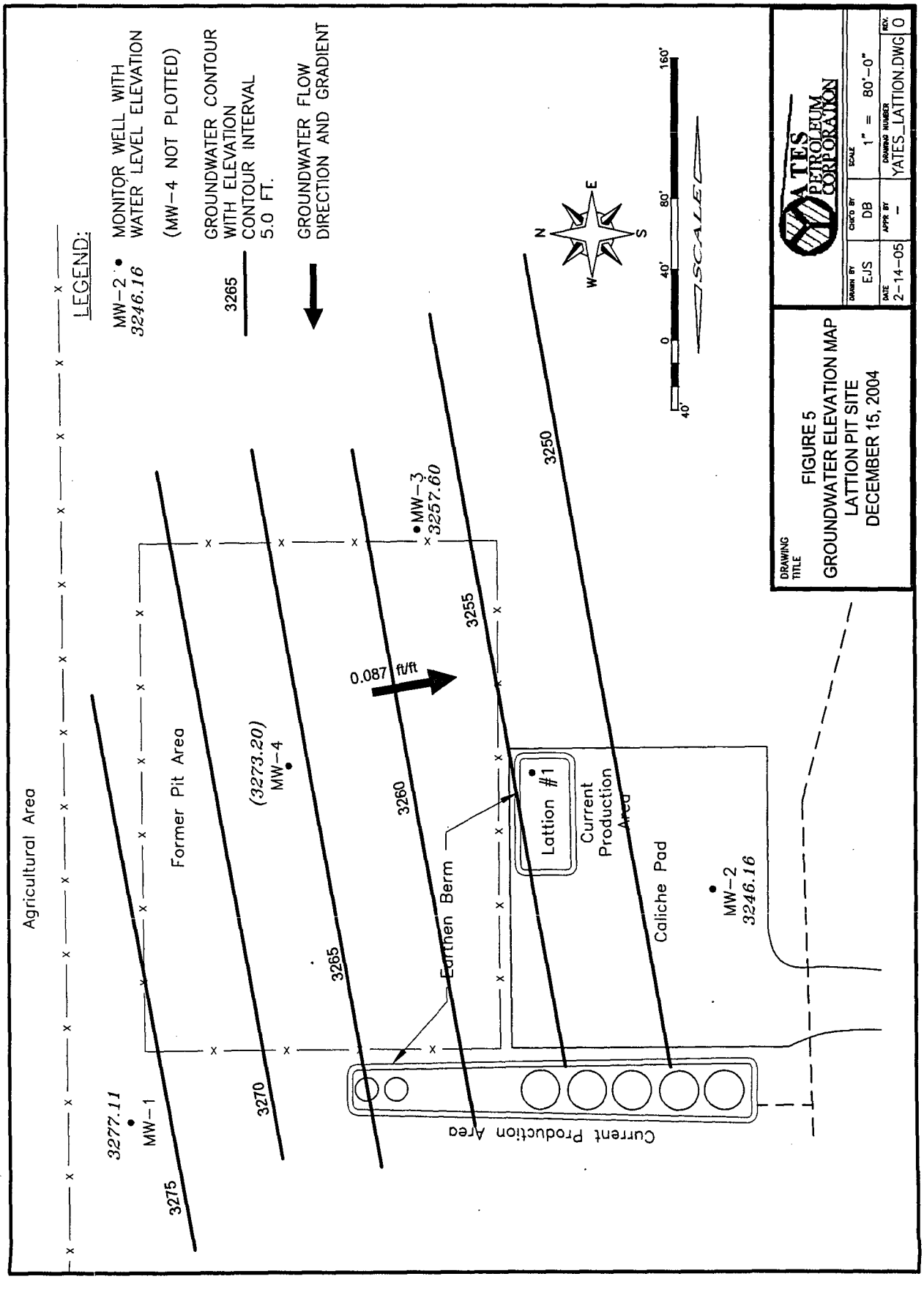
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(MW-4 NOT PLOTTED)
3265 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 5.0 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
Agricultural Area
Former Pit Area
3277.11 MW-1
(3273.20) MW-4
MW-3 3257.60
MW-2 3246.16
3275
3270
3265
3260
3255
3250
0.087 ft/ft
Earthen Berm
Lattion #1
Current Production Area
Caliche Pad
Current Production Area
N
S
E
W
0
40'
80'
160'
SCALE
DRAWING TITLE
FIGURE 5
GROUNDWATER ELEVATION MAP
LATTION PIT SITE
DECEMBER 15, 2004
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 80'-0"
DATE 2-14-05
APPR BY -
DRAWING NUMBER YATES_LATTION.DWG
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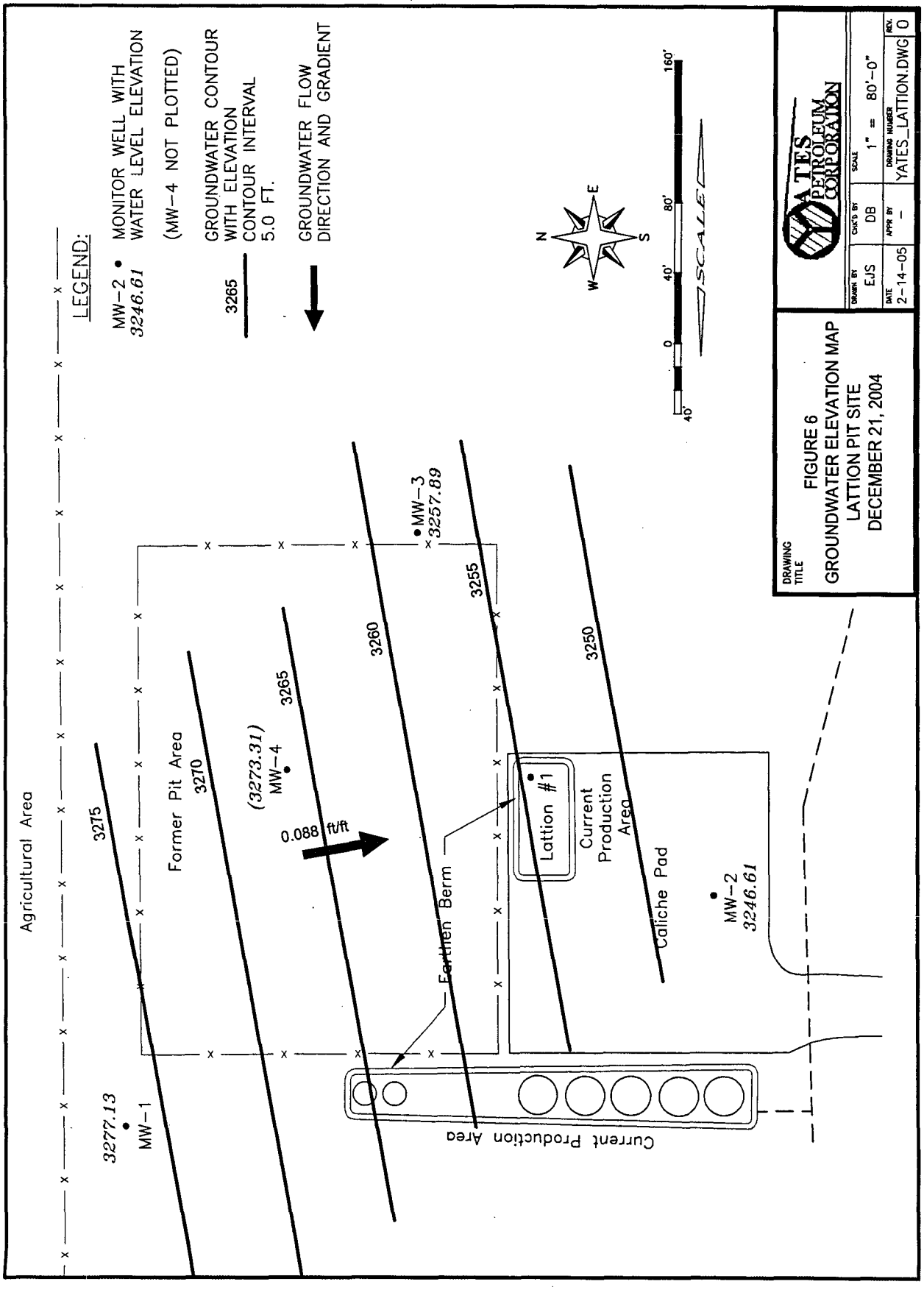
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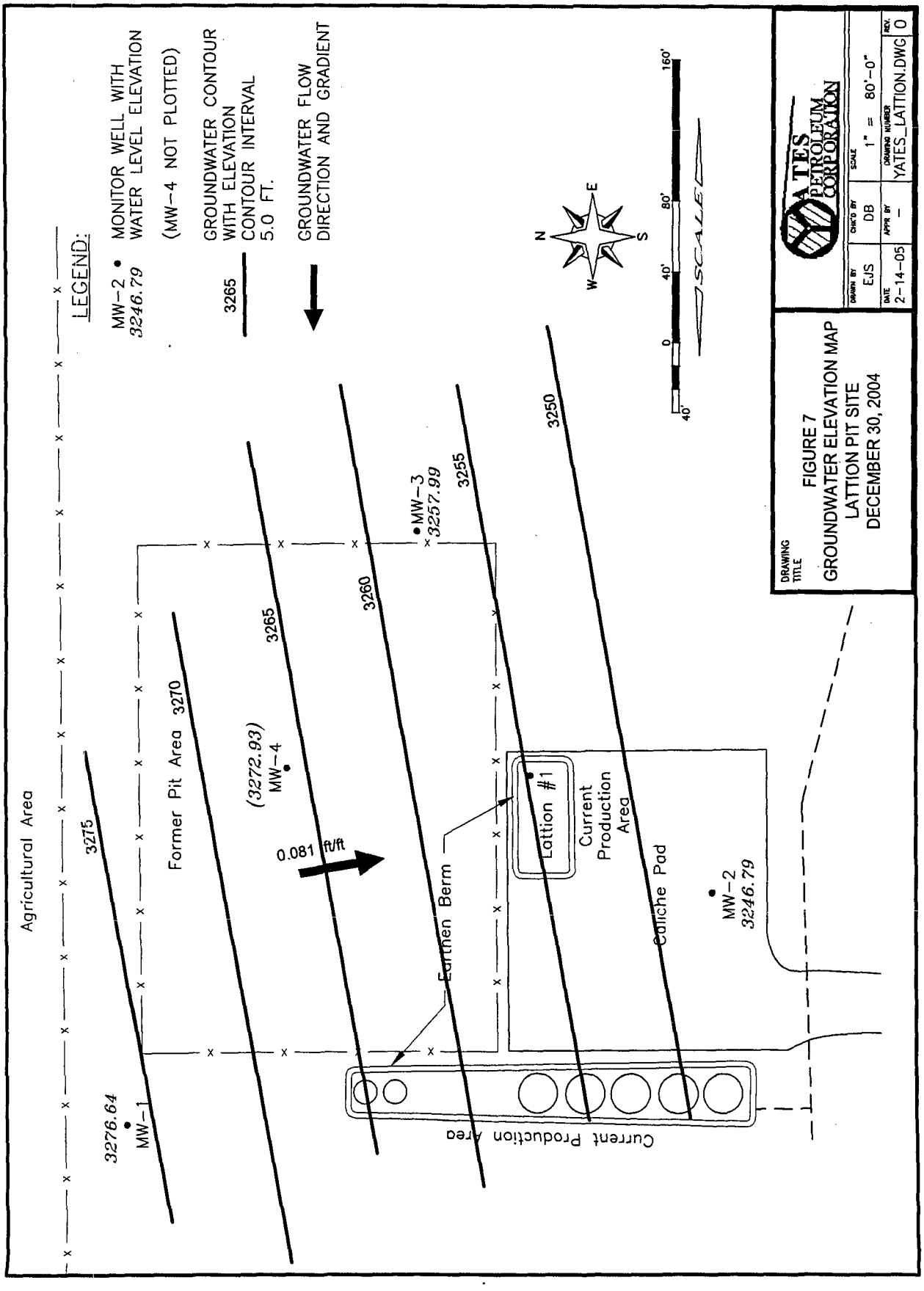
(MW-4 NOT PLOTTED)
3265 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 5.0 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
N E S W
0 40' 80' 160'
SCALE
40'
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
SCALE 1" = 80'-0"
DATE 2-14-05
APPR BY -
DRAWING NUMBER YATES_LATTION.DWG
REV. 0
DRAWING TITLE
FIGURE 6
GROUNDWATER ELEVATION MAP
LATTION PIT SITE
DECEMBER 21, 2004
Agricultural Area
Former Pit Area
3277.13 MW-1
3275
3270
(3273.31) MW-4
3265
0.088 ft/ft
3260
MW-3 3257.89
3255
3250
Earthen Berm
Lattion #1
Current Production Area
Caliche Pad
MW-2 3246.61
Current Production Area


LEGEND:
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(MW-4 NOT PLOTTED)
3265 GROUNDWATER CONTOUR WITH ELEVATION CONTOUR INTERVAL 5.0 FT.
GROUNDWATER FLOW DIRECTION AND GRADIENT
N E S W
0 40' 80' 160'
SCALE
40
Agricultural Area
Former Pit Area
3270
3275
3265
3260
3255
3250
3276.64
MW-1
(3272.93)
MW-4
0.081 ft/ft
MW-3
3257.99
Lattion #1
Current Production Area
Caliche Pad
Earthen Berm
MW-2
3246.79
Current Production Area
DRAWING TITLE
FIGURE 7
GROUNDWATER ELEVATION MAP
LATTION PIT SITE
DECEMBER 30, 2004
YATES PETROLEUM CORPORATION
DRAWN BY EJS
CHK'D BY DB
APPR BY -
DATE 2-14-05
SCALE 1" = 80'-0"
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