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REPORTS

YEAR(S):

1998

**Comprehensive
Site Characterization Report
Indian Basin Remediation Project
New Mexico**

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OIL CONSERVATION DIVISION

Volume 1 of 3

1991 - 1998

Project No. 105469

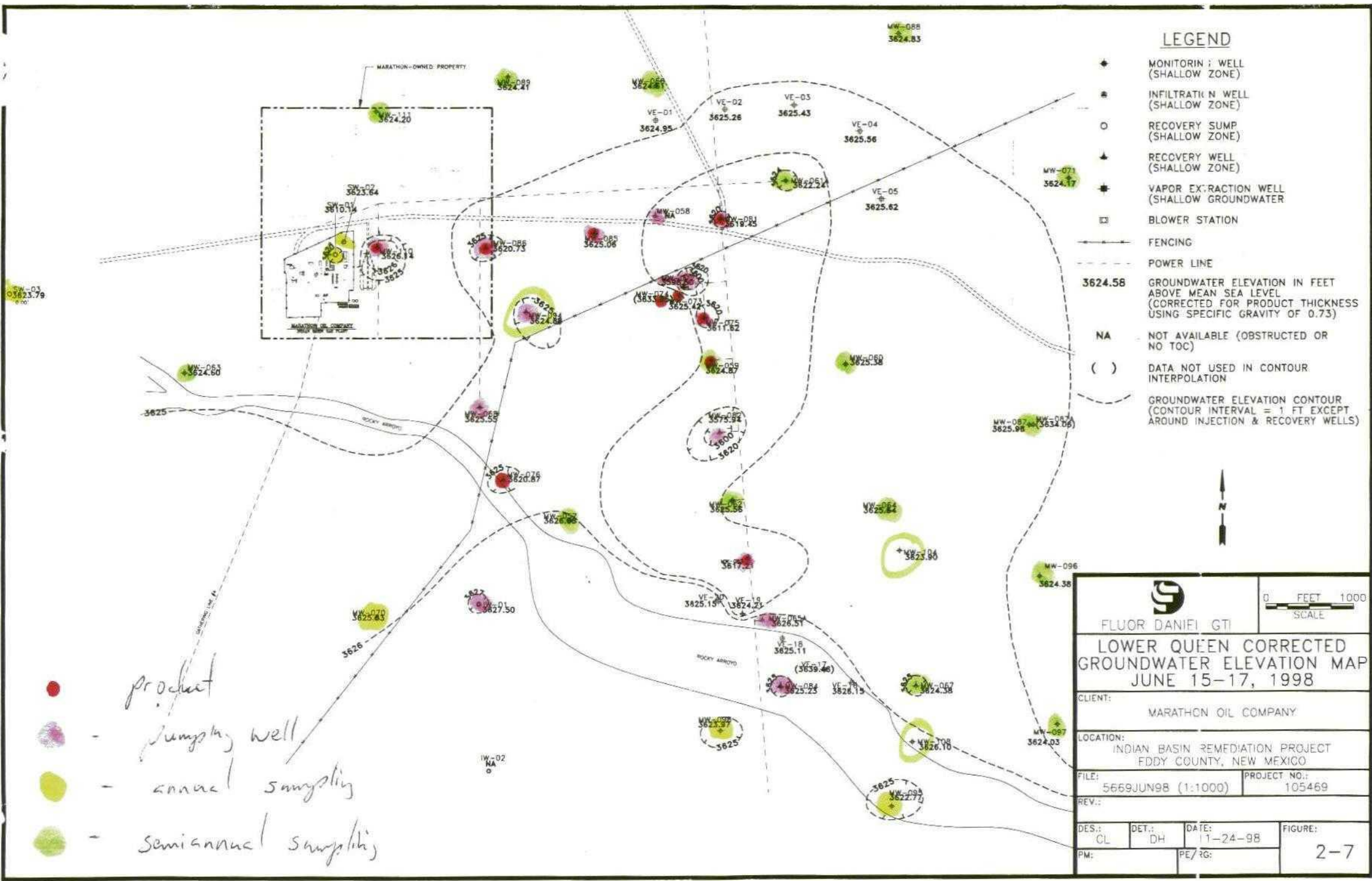
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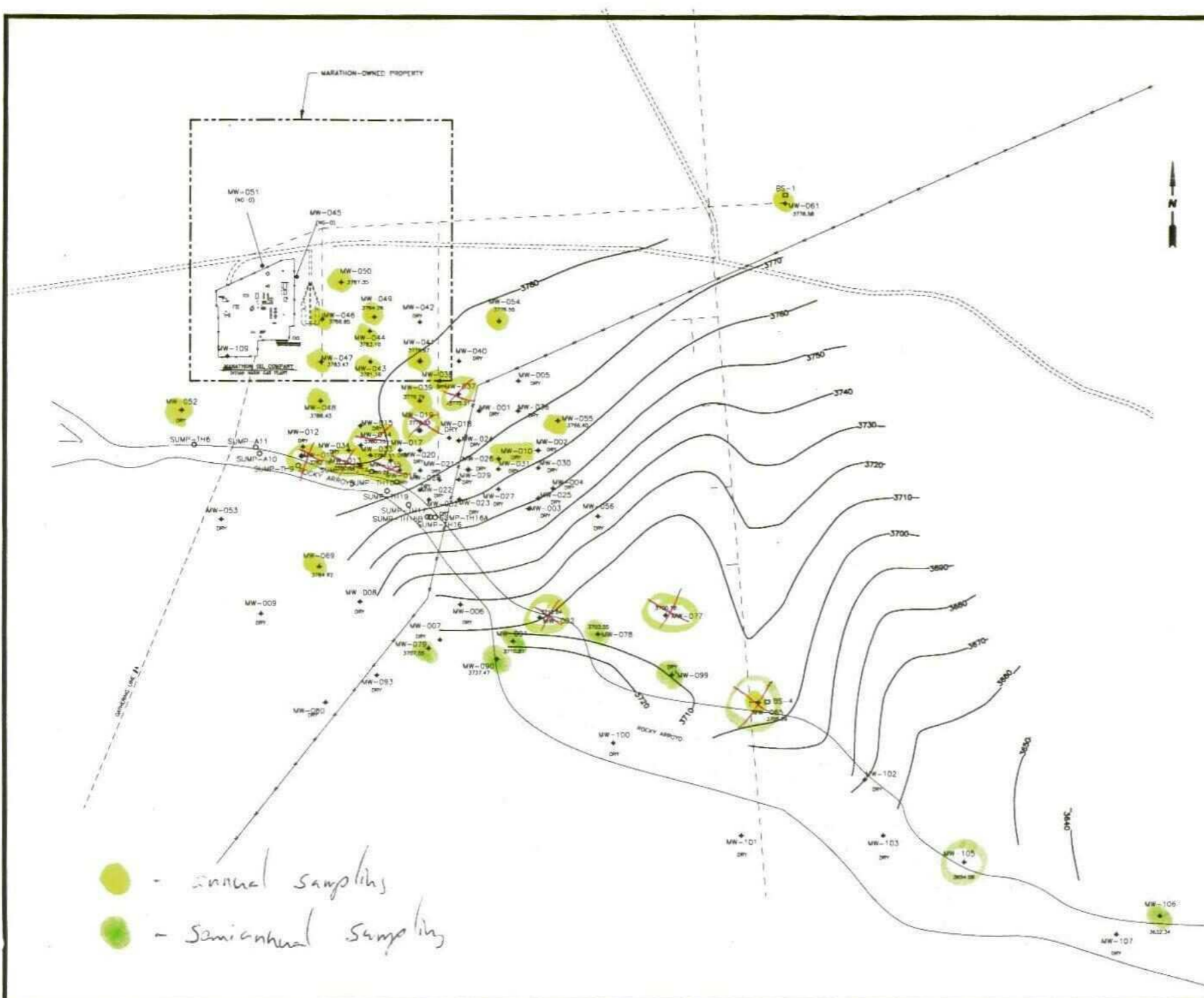
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IT CORPORATION
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LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY PUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 3654.09 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 3660 - GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 10 FEET)
- DRY WELL DRY
- NG-O NOT GAUGED - OBSTRUCTED

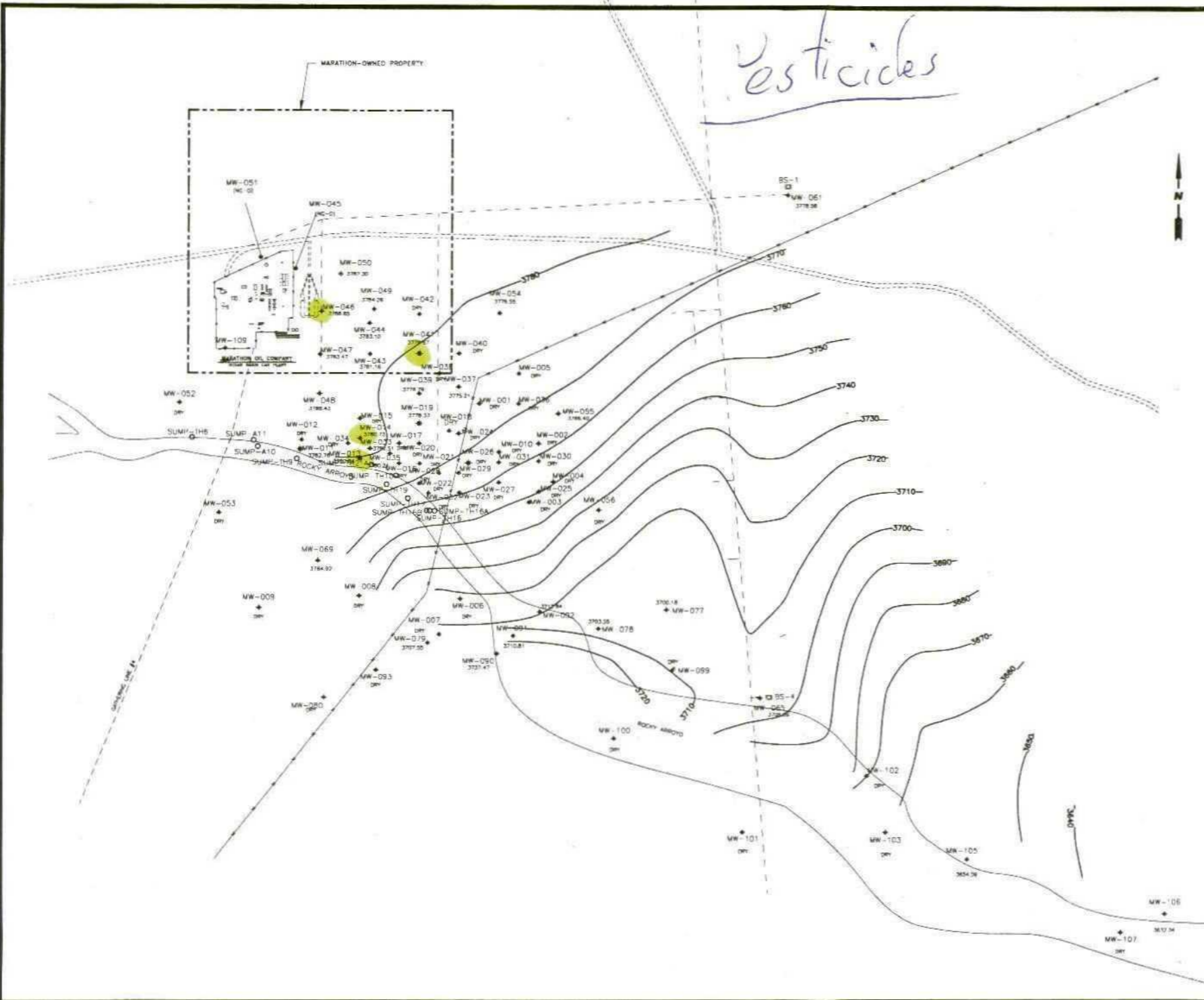
● - Annual samplings
 ● - Semiannual samplings


 FLUOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE CORRECTED GROUNDWATER ELEVATION MAP JUNE 15-17, 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
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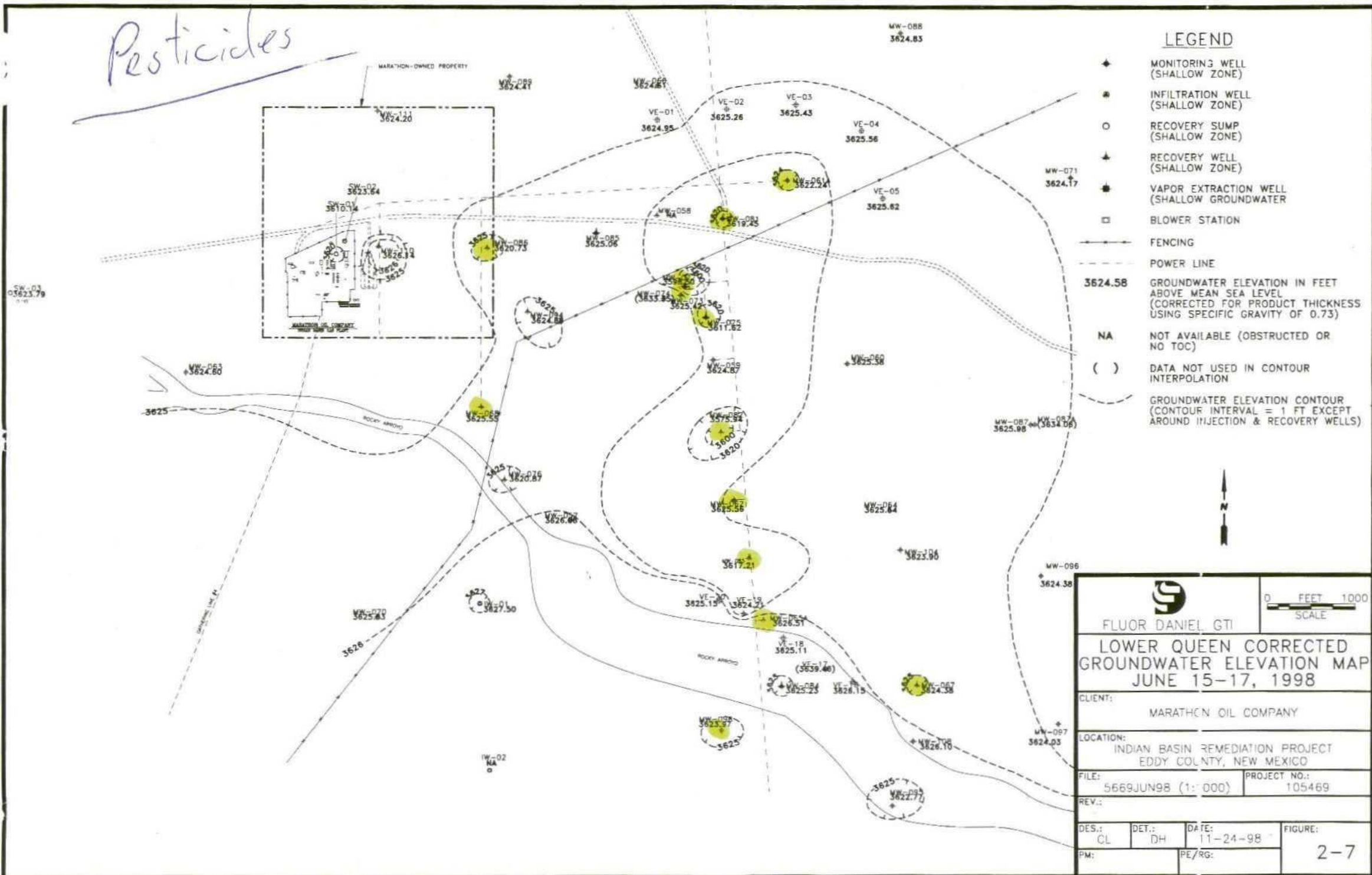
LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- ◆ VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 3654.09 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 3660 — GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 10 FEET)
- DRY WELL DRY
- NO-0 NOT GAUGED - OBSTRUCTED



 FLUOR DANIEL GTI		0 FEET 1000 SCALE	
SHALLOW ZONE CORRECTED GROUNDWATER ELEVATION MAP JUNE 15-17, 1998			
CLIENT:			
MARATHON OIL COMPANY			
LOCATION:			
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO			
FILE:		PROJECT NO.:	
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DES.:	DET.:	DATE:	FIGURE:
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Pesticides



LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- ◆ VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 3624.58 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (CORRECTED FOR PRODUCT THICKNESS USING SPECIFIC GRAVITY OF 0.73)
- NA NOT AVAILABLE (OBSTRUCTED OR NO TOC)
- () DATA NOT USED IN CONTOUR INTERPOLATION
- - - GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 1 FT EXCEPT AROUND INJECTION & RECOVERY WELLS)



 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN CORRECTED GROUNDWATER ELEVATION MAP JUNE 15-17, 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
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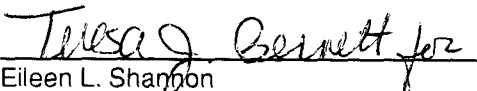
COMPREHENSIVE
SITE CHARACTERIZATION REPORT
INDIAN BASIN REMEDIATION PROJECT
NEW MEXICO
1991 - 1998


Project No. 105469

December 1998


Prepared for:
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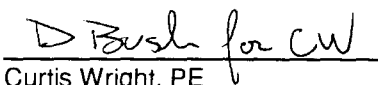
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EXECUTIVE SUMMARY

This document has been prepared in response to the New Mexico Oil Conservation Division (OCD)'s correspondence dated December 11, 1997 regarding the Comprehensive Site Characterization Report (CSCR) dated August 25, 1997 for the Marathon Oil Company (Marathon) Indian Basin Remediation Project (IBRP). The OCD comments required additional investigation and a comprehensive groundwater sampling event, the results of which are included herein. This report summarizes site investigation activities conducted for the IBRP from 1991 through 1998.

The report provides the following information:

- Summary of the IBRP physical setting, release history, and surrounding land use
- Chronology of assessment and remediation activities performed from 1991 through 1998
- Description of regional and local hydrogeology and results of aquifer testing
- Comprehensive summary of soil and soil vapor analytical results
- Summary of June 1998 site investigation activities (MW-109, MW-110, and MW-111)
- Summary of groundwater analytical results of the June 1998 comprehensive groundwater sampling event
- Description of planned additional monitoring activities

Laboratory analytical data for the June and October 1998 groundwater sampling events and the additional investigative activities related to wells MW-109, MW-110, and MW-111 are provided in appendices. Per the OCD's request, well logs for all site monitoring wells (except MW-059) are included in an appendix to this report. The open borehole videotapes are also provided as an attachment.

In response to a condensate gathering pipeline release discovered in April 1991 near Marathon's Indian Basin Gas Plant, Marathon has installed 111 monitoring wells, two infiltration wells, one additional water supply well, and 10 vapor extraction wells for the IBRP. Assessment data indicate that the subsurface geology of the IBRP is characterized by a discontinuous, heterogeneous alluvial fill material consisting of cobbles, boulders, sand, and silt, and the Queen Formation, a fractured bedrock formation consisting of interbedded sandstone, limestone, and dolomite. Two aquifers are present at the site. The Shallow Zone aquifer is in the perched alluvial zone and upper fractured bedrock of the Queen Formation. The Lower Queen aquifer is present at a depth of 130 to 200 feet below ground surface, and is the regional groundwater aquifer.

Soil and groundwater analytical results indicate that the primary constituents present are separate-phase natural gas condensate (condensate) and dissolved-phase benzene, toluene, ethylbenzene, and total xylenes (BTEX), semi-volatile organic compounds (SVOCs), total dissolved solids (TDS), chloride, fluoride, sulfate, and dissolved barium, iron, and manganese. The extent of these parameters has been adequately defined for assessment and remediation efforts.

Remediation efforts have been ongoing at the IBRP since April 1991. The purpose of the remediation activities is to remove condensate and contain dissolved-phase hydrocarbon compounds from further downgradient migration.

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1.0 INTRODUCTION

1.1 Document Scope and Objective

Fluor Daniel GTI, Inc. (Fluor Daniel GTI) was contracted by Marathon Oil Company (Marathon) to prepare a revised *Comprehensive Site Characterization Report* (CSCR) for the Indian Basin Remediation Project (IBRP). This report is submitted in accordance with the New Mexico Oil Conservation Division (OCD)'s correspondence dated December 11, 1997 which provided comments on the August 25, 1997 CSCR. The purpose of this document is to present the results of the site investigation activities and comprehensive groundwater sampling event conducted in response to the OCD's comments. The following information is provided in this report:

- Summary of the IBRP physical setting, release history, and surrounding land use
- Chronology of assessment and remediation activities performed from 1991 through 1998
- Description of regional and local hydrogeology and results of aquifer testing
- Comprehensive summary of soil and soil vapor analytical results
- Summary of June 1998 site investigation activities (MW-109, MW-110, and MW-111)
- Summary of groundwater analytical results of the June 1998 comprehensive groundwater sampling event
- Description of planned additional monitoring activities

Laboratory analytical data which have been previously submitted to the OCD are not included in this report. Chemical distribution data have been displayed graphically and summarized in tabular format. Laboratory analytical results, lithologic information, and reports not previously submitted to the OCD are provided in the supporting appendices and attachments.

1.2 Document Organization

This document is organized in the following manner: the remainder of section 1 summarizes the IBRP physical setting, known release history, surrounding land use, and IBRP chronology; section 2 describes the regional and local hydrogeologic setting, and summarizes known aquifer properties; section 3 presents investigation results for soil and groundwater; section 4 provides the proposed groundwater monitoring program; and section 5 contains a list of references. Supporting information is provided in tables, figures, and appendices. The down-hole borehole videos are provided as an attachment.

1.3 Site Definition

The IBRP is located approximately 18 miles northwest of Carlsbad, New Mexico and is located in portions of Sections 13, 23, 24, 25 and 26 of Township 21 South, Range 23 East; in parts of Section 19 and Section 30 of Township 21 South, Range 24 East, in Eddy County, New Mexico. The IBRP is defined as the Marathon-operated Indian Basin Gas Plant (Plant) and the area surrounding the Plant within the limits of the defined extent of hydrocarbons in subsurface soil and groundwater. The site definition includes upgradient and downgradient monitoring, recovery, and infiltration wells installed for assessment, remediation, and water supply purposes.

The Plant primarily processes natural gas from the Indian Basin Morrow and Upper Pennsylvanian gas pools. Condensate is produced with the gas and separated at the wellhead, gathered, stabilized, and sold via truck from the loading area on the east side of the Plant. The condensate and produced water gathering system consists of 50 miles of underground pipeline. The liquid gathering system contains four primary low pressure lines that feed to the Plant.

1.4 Physical Setting

The IBRP lies in the eastern portion of Indian Basin. In the vicinity of the IBRP, the regional topography of Indian Basin dips eastward at about 50 feet per mile. Small intermittent streams traverse the basin in an east to northeasterly direction. The most prominent of these streams, Rocky Arroyo, is located directly south of the Plant (Figure 1-1). Rocky Arroyo is located in the 100-year flood plain, and exhibits a typical braided stream depositional pattern. The arroyo is comprised of two distinct stream beds separated by an in-channel gravel bar, which is vegetated and topographically situated at a higher elevation than either stream bed. The stream bed distribution is an expression of the structural surface of the Queen Formation bedrock, as discussed in section 2.

Indian Basin is arid, with monthly precipitation ranging from 0 inches to 7.6 inches and an average of 1.19 inches (as estimated from the rain gauge at the Plant). The average annual total is 14.3 inches. The greatest precipitation events typically occur in June through October, during seasonal thunderstorms. Temperatures range from a mean summer high of 80 degrees Fahrenheit (F) to a mean winter low of 40 degrees F, with an average annual temperature in the mid 60s.

Due to the low precipitation rates, low humidity, and high temperatures, the IBRP site exhibits a net negative evapotranspiration rate. Average annual shallow lake evaporation is approximately 82 inches (ESE, January 1992).

1.5 Surrounding Land Use

The land use and ownership within and adjacent to the IBRP is illustrated in Figure 1-2. Adjacent lands are predominantly federal, managed by the Bureau of Land Management (BLM). In accordance with the Carlsbad Resource Management Plan (BLM's land use plan), the lands are designated to remain in federal ownership, and can only be used for the development of oil and gas resources and permitted livestock grazing. The closest private lands used for residential and agricultural/grazing purposes are located approximately 1 mile east of the IBRP. The location of known water supply wells in the vicinity of the IBRP are also illustrated in Figure 1-2, and information regarding these wells is provided in Table 1-1.

1.6 Project Chronology

Site assessment and remediation activities have been conducted at the IBRP since April 1991, when a subsurface release in the number 4 gathering line was detected where the line crosses Rocky Arroyo, approximately 0.2 miles south of the Plant. Based on production records, it is estimated that 35,000 barrels of condensate and 20,000 barrels of produced water were released over a five-month period from November 1990 to April 1991. To characterize the nature and extent of the subsurface release, 111 monitoring wells have been installed by Marathon from 1991 through 1998. In addition, over the past six years, up to 20 monitoring wells have been used at various times as groundwater/condensate recovery wells, and 10 soil vapor extraction wells, two infiltration wells, and one additional water supply well have been installed. The locations of all wells are illustrated in Figure 1-3.

The project chronology follows, and pertinent site reports are referenced, with full references provided in section 5:

<u>Date</u>	<u>Activity</u>
April 12, 1991	Release discovered by Marathon in gathering line number 4 - Production shut down on 23 wells that produce to line.
April 12, 1991	Release reported to National Response Center, BLM, OCD.
April 12-16, 1991	Investigation, excavation, repair and testing of number 4 line at crossing point of Rocky Arroyo, 5 feet below arroyo channel bed. Line placed back in operation on April 16, 1991. Fourteen excavations installed in arroyo to delineate extent. Five excavations completed with 24-inch conduit as product recovery sumps.
April 17-28, 1991	Soil vapor survey conducted in 200 ft by 200 ft grid in vicinity of release site to focus future assessment activities.
April 22, 1991	Written notification per Rule 116 to OCD and BLM.

- April 29, 1991 *Site Characterization Plan* (Marathon, April 1991) submitted to OCD - summarized activities conducted from April 12 - 28, 1991, and proposed additional plans for investigation.
- April -November 1991 Installation of Boreholes BH-1 through BH-97, 70 borings converted to monitoring wells MW-001 through MW-070. Water samples collected from supply wells at Plant (SW-01 and SW-02) and surrounding water supply wells and surface water on weekly to quarterly basis.
- June 28, 1991 *Amended Site Characterization Plan* (Marathon, June 1991) submitted to OCD in response to OCD request for additional information.
- September 1991 Condensate/groundwater recovery initiated from Lower Queen.
- September -
November 1991 Soil vapor extraction pilot test conducted in Shallow Zone in vicinity of MW-014 (methods and results summarized in *Soil Vapor Extraction Pilot Study*, ESE, January 1992).
- September 1991-
present Condensate/groundwater recovery ongoing in Lower Queen.
- September 1991-
present Quarterly groundwater monitoring conducted in selected wells, and reported in multiple Quarterly Progress Reports (see section 5).
- November 15, 1991 Point-in-Time Sampling Analyses, September 19-29, 1991 submitted to OCD.
- March 5, 1992 *Indian Basin Environmental Treatment Plan* (Marathon, March 1992) submitted to OCD.
- March 5, 1992 Proposal to reduce rancher well sampling frequency (letter) submitted to OCD.
- March 1992 to
May 1994 Operation of Shallow Zone soil vapor extraction system.
- August 1993 Monitoring wells MW-071 and MW-072 installed for downgradient definition and recovery purposes, respectively.
- November 11, 1994 Indian Basin Treatment Plan Modification (letter report) submitted to OCD. Proposal to convert MW-061A from a pumping well to a downgradient monitoring well.
- November -
December 1994 Monitoring wells MW-073 through MW-076 installed for soil vapor extraction pilot tests of Lower Queen; MW-077 through MW-080 installed for delineation in Shallow Zone.
- December 1994 -
January 1995 Soil vapor extraction pilot tests conducted on Shallow Zone and Lower Queen Formation (GTI, March 1995).

January 5, 1995	OCD approval letter of Marathon's 1994 Indian Basin Treatment Plan Modification to convert MW-061A from a pumping well to a monitoring well.
June 1995	Pump test conducted in well MW-072 (GTI, November 1995) - submitted to OCD on February 26, 1996, with additional modeling runs.
September 1995	Wells MW-081 through MW-083 installed to further define extent of dissolved phase in Lower Queen, and for future use as pumping wells.
December 12, 1995	Work plan to conduct risk assessment to develop alternative abatement standards submitted to OCD (GTI, September 1995).
January 15, 1996	Indian Basin Plant Groundwater Discharge Plan (GW-21) Modification submitted to OCD to allow discharge of treated groundwater from the IBRP to the Shallow Zone and Lower Queen aquifers.
April 18, 1996	Indian Basin Plant Groundwater Discharge Plan Amended Modification submitted to OCD to address changes to the January 15, 1996 submittal.
May 3, 1996	Air permit application submitted to New Mexico Environment Department (NMED) for 2,400 SCFM barrier vapor extraction system (BVES).
May 9, 1996	OCD approval of Indian Basin Plant Groundwater Discharge Plan (GW-21) Modification.
June-July 1996	Wells MW-084, MW-085, MW-086, MW-094, IW-01, IW-02, SW-03 installed for Lower Queen containment, infiltration of treated water, and livestock water supply.
June - October 1996	Condensate recovery conducted in then Shallow Zone well MW-086.
August 1996	Well MW-087, MW-087A, MW-088, MW-089 installed for additional Lower Queen dissolved-phase delineation.
September 1996	Well MW-082 deepened and completed as Lower Queen Well.
September - October 1996	GORE-SORBER sm survey conducted along Rocky Arroyo to focus downgradient Shallow Zone assessment (W.L. Gore, October 1996).
October 1996	Indian Basin Plant Assessment conducted (Indian Environmental Services [IES], December 1996)
October 1996	Well MW-086 deepened and completed as Lower Queen well.
November 18, 1996	Air permit No. 1859 issued for BVES.
December 1996	Vapor extraction wells VE-1 through VE-5 installed for BVES Blower Station No. 1.
January 24, 1997	Submittal of Proposed Groundwater Monitoring Plan Modification to OCD.

January 1997 Wells MW-090, MW-099, MW-100, MW-101, MW-102, MW-103, MW-105, MW-106, and MW-107 installed based on GORE-SORBERsm survey for Shallow Zone downgradient delineation.

January 1997 Blower Station No. 1 installed and start up testing performed at northern edge of IBRP (Fluor Daniel GTI, April 1997).

March 12, 1997 OCD approval of the Proposed Groundwater Monitoring Plan Modification.

March 1997 Wells MW-095, MW-096, MW-097, MW-098 installed for additional Lower Queen dissolved-phase delineation in southeast part of plume.

March 1997 Selected wells sampled in special sampling event. Results submitted to OCD in April 25, 1997 letter report.

January - June 1997 Blower Station No. 1 operated continuously.

May - June 1997 Lower Queen wells MW-104, MW-108 and vapor extraction wells VE-16 through VE-20 installed.

May 1997 Shallow Zone well MW-046 sampled.

June 1997 Blower Station No. 4 installed with wells VE-16 through VE-20 connected and start-up testing performed along northern edge of Rocky Arroyo in southeast part of IBRP.

August 1997 CSCR (Fluor Daniel GTI, 1997) submitted to OCD. Shallow zone vapor extraction testing was conducted and SZ Blower Station #1 started up for ongoing operation. Respirometry testing was conducted on well VE-20.

April 1998 *Site Investigation Work Plan* (Marathon, 1998) submitted to OCD to address investigation requirements in OCD's comments letter dated 12/11/97 on the CSCR.

May 1998 OCD approved the *Site Investigation Work Plan* in 05/20/98 letter. Annual Monitoring Report (Fluor Daniel GTI, 1998) for 1997 submitted in response to OCD letter dated 03/12/97.

June 1998 Additional monitoring wells MW-109, MW-110, and MW-111 installed in response to 12/11/97 OCD comments on the CSCR.

June-July 1998 Comprehensive groundwater sampling event conducted.

2.0 REGIONAL AND LOCAL HYDROGEOLOGY

2.1 Geologic Setting

The IBRP area is underlain by the Permian-aged Queen Formation, a carbonate facies consisting mainly of limestone, dolomite, and sandstone. The formation approaches 600 feet in thickness. The basal 100 feet and upper 50 feet of the Queen Formation are sandstone. The remaining section of the Queen consists of alternating sandstone, dolomite, and limestone (Cox, 1967). Outcrops of the Queen Formation in the vicinity of the IBRP are highly fractured and parted at bedding planes.

Alluvial deposits consisting of clayey silt, gravel, cobbles, and large boulders directly overlie the Queen Formation in the vicinity of the IBRP. These alluvial deposits range from 0 to approximately 25 feet in thickness. The deposits are comprised of 5 to 10 feet of clay and silty clay underlain mainly by boulders, which are predominately clast-supported with clay, sand, gravel, and cobbles comprising the matrix. The boulders are predominately limestone or dolomite in composition.

Lithologic logs and well completion details for all monitoring wells (except MW-059) installed for the IBRP since 1994 are provided in Appendix A. The structure contour map, constructed on the top of the Queen Formation, is provided in Figure 2-1. This map illustrates the local structural highs and lows of the bedrock. Figure 2-2 shows the locations of three geologic cross sections (A-A', B-B', C-C') presented in Figures 2-3 through 2-5. The alluvium overlying the fractured bedrock is of variable thickness and mimics the bedrock structural highs and lows.

2.2 Hydrogeologic Setting

Two aquifers have been encountered at the site:

- 1) The "Shallow Zone" which is interpreted as occurring in alluvial gravels and the adjacent Upper Queen Formation (fractured bedrock) at depths between approximately 15 to 60 feet below grade (depending on topography); and
- 2) The Lower Queen Formation regional aquifer, which occurs between 130 and 200 feet below grade depending upon topography. The Lower Queen aquifer occurs in fractured limestone, sandstone, and dolomite, is confined to unconfined, and moderate to high yielding.

The gradient of the Shallow Zone is to the southeast, generally following the topography of the bedrock (Figure 2-1), and the gradient of the Lower Queen is nearly flat and to the north-northeast under static conditions. The dip of the Queen Formation's bedding plane fractures is 2 to 3 degrees east.

At the IBRP site, the two aquifers are separated by approximately 150 feet of partially fractured bedrock. The aquifers are partially connected via the fractures, as evidenced by some saturated fracture zones encountered during borehole installation.

Since 1991, 111 monitoring wells, two infiltration wells, one water supply well, and 10 vapor extraction wells have been drilled for the IBRP. The locations of all wells and borings are shown in Figure 1-3. Well completion details for all wells at the site are summarized in Table 2-1. Surrounding water supply well locations are illustrated in Figure 1-2, and known ownership and well completion information is summarized in Table 1-1.

2.3 Fluid-Level Measurements

Fluid-level measurements have been conducted quarterly at the IBRP since 1991. Depth to groundwater has been measured to determine the groundwater gradient and flow direction in the Shallow Zone and Lower Queen aquifers, and to determine the effectiveness of the Lower Queen groundwater/condensate recovery system. Hydrographs for selected wells in both aquifers are presented in Appendix B. These hydrographs illustrate the change in groundwater elevation through time.

In general, depth to groundwater fluctuates seasonally, in response to precipitation events. Typically, the site receives the highest precipitation between June and October. From the rain gauge monitored at the Plant since 1993, months with the highest precipitation were August 1994 (4.3 inches), June 1996 (3.95 inches), August 1996 (7.55 inches), and May 1997 (3.6 inches). The hydrographs show rebounds in water levels in both Shallow Zone and Lower Queen monitoring wells following these events.

The Shallow Zone is a perched aquifer that is not used for drinking water supply. Groundwater occurs sporadically in the Shallow Zone, possibly related to fracture occurrence or the elevation of the top of bedrock (see Figure 2-1). The boundary of the perched aquifer is shown in Figure 2-6, approximately 2,000 feet east of the Plant south to Rocky Arroyo, and approximately 2,000 feet south of Rocky Arroyo near gathering line number 4 east to where Rocky Arroyo widens.

Table 2-2 summarizes the Shallow Zone fluid levels during the June 1998 monitoring event. Of the 76 Shallow Zone wells, 45 wells are consistently dry:

- North of Rocky Arroyo, wells MW-001 through MW-005, MW-010, MW-012, MW-015 through MW-018, MW-020 through MW-032, MW-034, MW-036, MW-038, MW-040, MW-042, MW-056, and MW-109

- South of Rocky Arroyo, wells MW-006 through MW-009, MW-052, MW-053, MW-080, and MW-093
- Downgradient along Rocky Arroyo, wells MW-077, MW-099, MW-100, MW-101, MW-102, MW-103, and MW-107

Of the remaining Shallow Zone wells, several have a limited (less than 1 foot) saturated thickness, including MW-011, MW-013, MW-019, MW-033, MW-035, MW-037, MW-039, MW-046 through MW-048, MW-051, MW-065, MW-091, MW-092, and MW-105. These wells do not recharge well after purging for sampling. The 13 wells in the Shallow Zone that consistently do contain groundwater sufficient for sampling are MW-041, MW-043, MW-044, MW-049, MW-050, MW-054, MW-055, and MW-061 to the north of Rocky Arroyo and MW-069, MW-078, MW-079, MW-090, and MW-106 to the south of Rocky Arroyo and further downgradient of the Plant. Water also occurs in MW-061 east-northeast of the Plant.

A review of well logs was conducted and indicated that all Shallow Zone wells fully penetrate the unconsolidated sediments. Therefore, wells previously designated on figures as "not deep enough" (NDE) have been re-designated as "dry". Localized highs in the bedrock result in dry areas where perched groundwater is not present.

Groundwater elevation contour maps for June 1998 are presented in Figures 2-6 and 2-7 for the Shallow Zone and Lower Queen aquifers, respectively. In the areas where groundwater is present in the Shallow Zone, groundwater flow is to the southeast, generally following the structural surface of the underlying bedrock, at an approximate gradient of 0.076 ft/ft. During the June 1998 event, the depth to water in the Shallow Zone ranged from 18.88 feet in MW-019 to 89.63 feet in MW-106.

In the Lower Queen, the groundwater gradient is generally to the north-northeast, at a nearly flat gradient of 0.003 ft/ft. The gradient has been locally affected due to ongoing groundwater recovery and infiltration activities. Mounding is observed near infiltration wells IW-01 and IW-02 and depressions are noted in the vicinity of the active recovery wells. During the June 1998 event, the depth to water in the Lower Queen ranged from 113.92 feet at MW-096 to 249.20 feet at MW-082 (a pumping well). Table 2-3 presents fluid levels measured in Lower Queen wells during the June 1998 monitoring event.

The well couple MW-087 and MW-087A located approximately 4,500 feet east of the Plant exhibit an anomaly in water level elevations. The wells are located next to one another and consistently contain concentrations of water quality parameters differing by an order of magnitude, with MW-087A having the higher levels. Well MW-087 is screened from 148 to 168 feet bgs, while MW-087A is open hole from 12 to 132 feet bgs. Although there is less than a foot of difference in the top of casing elevation between the two wells, the depth to groundwater differs by approximately 9 feet, with MW-087A having the higher groundwater elevation. MW-087A recharges very slowly after purging (during the October

1998 event it failed to recharge within 24 hours of purging). From this, it is believed that MW-087A intersects a perched fracture zone that does not connect to the regional Lower Queen aquifer. Therefore, Lower Queen distribution maps for water quality parameters were constructed without using the data from MW-087A.

2.4 Aquifer Properties

2.4.1 Shallow Zone Aquifer Properties

During the initial site investigations conducted in 1991, slug tests were conducted in wells MW-054 and MW-055. Mean hydraulic conductivity (K) values of 75.91 gallons per day per square foot (gpd/ft²) in well MW-054 and 73.36 gpd/ft² in well MW-055 were calculated.

2.4.2 Lower Queen Aquifer Properties

Slug tests were conducted in Lower Queen wells MW-057, MW-059, and MW-060 in 1991. K values ranged from 6.28 gpd/ft² in MW-059 to 850.25 gpd/ft² in MW-060. Pump tests were also conducted in Lower Queen wells MW-058, MW-059, MW-062, MW-061A, and SW-002 in 1991. K values from this testing ranged from 6.30 gpd/ft² in MW-062 to 2,056.71 gpd/ft² in SW-002. This broad range reinforces the significance of the interconnectedness of fractures in bedrock permeability.

In June 1995, aquifer testing was conducted in the Lower Queen aquifer to determine optimum pumping rates for containment purposes. A step-drawdown test, constant-rate aquifer test, and recovery test were conducted on Lower Queen well MW-072, to evaluate aquifer transmissivity and storage coefficient. Aquifer parameters were subsequently used to simulate various extraction/infiltration scenarios to assist in optimizing the existing groundwater extraction system in the Lower Queen aquifer. Test procedures and analysis results were documented in the *Aquifer Testing and Groundwater Flow Modeling Report* (GTI, November 1995), previously submitted to the OCD. Using various aquifer analysis techniques, the estimated transmissivities for the various methods of analysis used ranged from 13,500 to 25,300 gallons per day per foot (gpd/ft) for fracture transmissivity (T_f), with a mean of 18,300 gpd/ft. The storage coefficient of the fractures (S_f) ranged from 3.6×10^{-4} to 4.8×10^{-4} , with a mean of 4.1×10^{-4} . The storage coefficient of the formation matrix (S_m) was calculated at 1.2×10^{-2} . K values ranged from 260 to 480 gpd/ft², with a mean of 350 gpd/ft², based on a 53-foot-thick aquifer.

As part of the current effort to create a detailed conceptual model of groundwater flow across the site, the data from the 1995 aquifer test were re-evaluated. Of particular interest was the observation that during each test in well MW-072, the observed drawdown would at first proceed rapidly reaching a maximum of between 19 and 21 feet, followed by a rise in the water table with the final drawdown

ranging from 5.6 to 15 feet as the pumping rate was increased. The time for this reversal to occur ranged from 1.6 to 16 minutes as the pumping rate was increased from 11.7 to 24.3 GPM. At the time, it was believed that this phenomenon was due to an increased pumping rate as the piping filled with water. Since most of these wells are open boreholes, storage in the well annulus was not considered. The results of additional aquifer tests performed as part of the 1998 field testing confirmed this effect, leading to the hypothesis that fracture flow may be the cause. A more detailed analysis of this issue is ongoing.

2.5 Borehole Videos

Borehole videotaping was conducted to determine predominant fracture trace patterns in order to better predict contaminant migration in the subsurface. Comment 12 of the OCD's December 11, 1997 letter required the submission of a copy of the videotapes from the open borehole video survey and a discussion of the results. This section provides the discussion of the results. Copies of the videotapes are in Attachment A of this report.

Down-hole videos were performed on monitoring wells MW-073, MW-074, MW-075 and MW-076. After drilling these wells, the boreholes were left open for the video recording. The best method for understanding fracture density, fracture orientation, and geological changes with depth is to directly observe these elements in open borings/wells. The subject wells were drilled during November and December 1994. The videos for all the wells were recorded on January 5, 1995.

To enable the viewer to observe a borehole in its entirety, the videos were recorded using a camera equipped with a fish eye lens. The distance below top of casing was recorded continuously, and a compass was mounted in front of the camera to aid in fracture orientation. Different lighting equipment was used on each well. The different types of lighting were necessary to aid in the identification of features and fluids present in the wells. The running time for a single well video is approximately 45 to 60 minutes. The following observations and interpretations of the videos have been generalized because foot by foot descriptions and comparisons would be impractical.

General Observations

The following is a list of general observations for all of the wells:

- Each well had a build up of condensate vapors in the upper portion of the well.
- Changes of lithology were more evident in the videos than in the drilling logs, although there is fair correlation between the logs and videos.
- Lithologic beds are horizontal, as are most of the joints and fractures.
- The thickness of the beds was generally 0.5 to 2.0 inches.

- Vertical fractures/joints were recorded from each well. The length and duration of these features could be many tens of feet, but typically ended at significant lithologic changes.
- Some small vugs were observed in each well, but they were not common.
- Changes in rock color and fracture density usually meant changes in lithology.
- Correlation of lithology and other features between the four wells utilizing the videos was difficult.

Limitations

As with most subsurface investigative techniques, these down-hole videos do have some limitations. They must be used in conjunction with other techniques and site information. These videos recorded conditions in a well(s) on a given day, and those wells occupy only a small fraction of the IBRP area.

3.0 INVESTIGATION RESULTS

Numerous investigations have been conducted at the IBRP to identify the nature and extent of subsurface hydrocarbons and inorganic compounds related to the 1991 release. This section summarizes the known distribution of organic and inorganic constituents in soil and groundwater at the site.

3.1 Soil Investigation Results

3.1.1 Investigations Prior to 1997

Due to the nature of the subsurface (cobbles and bedrock), limited soil samples have been collected for laboratory analysis. Soil and rock samples were collected during the initial site investigation in 1991 for field screening of organic headspace vapors, but no laboratory analyses were conducted. In order to more fully characterize the IBRP, a limited site assessment was conducted by Indian Environmental Services (IES) within and adjacent to the Plant in October 1996. The results of the investigation are contained in the *Phase II Site Assessment Report* (IES, December 1996) previously submitted with the August 1997 CSCR. Soil samples were collected at sampling intervals of 0 to 1 foot and 7 to 17 feet below ground surface and analyzed for mercury, polychlorinated biphenyls (PCBs), total volatile organic compounds (VOCs), and SVOCs, by EPA Methods 6010/8080/8260/8310, respectively.

Mercury and PCBs were not detected in any of the soil samples analyzed. VOCs were not detected in 75 of the 85 soil samples analyzed. Concentrations of VOCs, including carbon disulfide, ethylbenzene, total xylenes, benzene, vinyl acetate, tetrachloroethane, and styrene, were detected in 10 soil samples, four of which only contained carbon disulfide, a known laboratory contaminant. The remaining six samples contained VOC concentrations primarily at the water table interface (13 to 15 feet below ground surface). SVOCs were nondetectable in 23 of the 85 soil samples analyzed. The remaining soil samples contained detectable concentrations of one or more of the following SVOCs: acenaphthene, acenaphthylene, anthracene, enzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, 1-methylnaphthalene, and 2-methylnaphthalene.

A GORE-SORBERSM survey was conducted along Rocky Arroyo to define the extent of impacts from condensate to the southeast in the arroyo and assist in locating additional downgradient Shallow Zone monitoring wells. The results of the survey are contained in the report entitled *GORE-SORBERSM Screening Survey* (W.L. Gore, October 1996). The data indicate that condensate was transported down the arroyo in the Shallow Zone. Based on the survey, the downgradient extent of elevated benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations ended just south of MW-083.

A high concentration of total petroleum hydrocarbons (TPH) was detected south of MW-067. These results were used to locate groundwater monitoring wells outside the downgradient edge of the dissolved plume to monitor the effectiveness of the recovery system in capturing the plume and preventing its migration.

3.1.2 1998 Investigations (MW-109, MW-110 and MW-111 Installation)

The OCD letter dated December 11, 1997 required additional investigation of the Shallow Zone contamination in vicinity of the line number 1 pipeline spill and of the Lower Queen in the area of the loading dock east of the Plant (comments 2 and 3, respectively). Marathon submitted a *Site Investigation Work Plan* dated April 17, 1998 to the OCD. The work plan was approved in the OCD's letter dated May 20, 1998. Field work began June 15, 1998, with the installation of monitoring well MW-110 directly north and east of the loading dock. The well was installed by West Texas Drilling Co. using a Gardner-Denver air rotary rig. The total depth of the well is 230 feet, 8-inch steel casing was set at 39.5 feet below ground surface (bgs), after encountering competent bedrock at 34 feet bgs. The well is open hole from 39.5 to 230 feet.

The work plan indicated that should groundwater in MW-110 contain constituents above the New Mexico Water Quality Control Commission (WQCC) standards, well MW-111 would be installed downgradient (north) of MW-110. Since MW-110 contained separate phase condensate, MW-111 was installed in the northern part of the Marathon-owned property (Figure 2-7) using the same drilling method and crew; however, its construction was different from that of MW-110. MW-111 is constructed of 4-inch diameter, schedule 40 PVC, with 0.010-inch slot screen from 185 to 225 feet bgs and casing to the surface. Silica sand filter pack was emplaced in the annular space to 10 feet above the top of screen, followed by a 10-foot thick bentonite seal, and cement/bentonite grout to the surface. The wellhead consists of a locking, steel standpipe within a concrete pad.

Drilling at MW-109 in the southwestern corner of the Plant began on June 17, 1998, using a reverse air dual tube drilling rig so that split-spoon soil samples could be collected continuously through the Shallow Zone. The boring was drilled to 20 feet bgs and soil samples were field-screened using a photoionization detector (PID). PID readings were nondetectable or low from the surface to approximately 7 feet bgs. The highest PID readings were found at 12 feet bgs, where hydrocarbons were observed in the sample, and PID readings diminished at the top of bedrock (20 feet bgs). The boring/well log is contained in Appendix A.

The sample from the bottom of the boring was submitted for laboratory analysis of BTEX by EPA Method 8260 and for TPH by EPA Method 418.1. Of the BTEX constituents, only m&p-xylenes were detected at 0.69 mg/kg. TPH was detected at 250 mg/kg in the soil sample. Soil in the vicinity of Line #1 has been adequately characterized. The laboratory report for the soil sample analysis is contained in Appendix C. The work plan indicated that a monitoring well would be installed if the vertical extent of soil contamination could not be determined prior to encountering the saturated zone or bedrock.

Therefore, the soil boring was completed as a 4-inch diameter, schedule 40 PVC monitoring well, with 0.010-inch slot screen from 8 to 18 feet bgs and casing to the surface. The wellhead is a flush-mount, steel, manhole in a concrete pad.

Wells MW-110 and MW-111 were developed following installation by purging water from the well column until it was sediment-free and field parameters such as pH, temperature, and conductivity had equilibrated. Groundwater sampling of the wells was conducted as part of the June 1998 comprehensive groundwater sampling event.

3.2 Groundwater Results

Comment 9 of the OCD letter dated December 11, 1998 required a comprehensive groundwater sampling event including all wells for all parameters in 20 New Mexico Administrative Code (NMAC) 6.2.3103 and all toxic pollutants listed in 20 NMAC 6.2 1101, including wells that contain light non-aqueous phase liquids (LNAPLs). Clarification of the sampling methodology and requirements was provided by OCD in subsequent discussions and meeting with Marathon. The sampling event replaced the third quarterly event scheduled for July. Purging of wells containing LNAPL was not performed, as it would contaminate the pump apparatus, resulting in cross-contamination. Except for supply wells, samples were collected using disposable bailers, consistent with the sampling protocol employed during previous sampling events. Samples from supply wells (SW-01, SW-03, and the Lyman well) were collected from the discharge piping of the pumps. Supply well SW-02 was sampled using a disposable bailer without purging.

Sampling was conducted from 15 June to 2 July 1998. Re-sampling of several wells for specific parameters was conducted, since several coolers were above temperature upon sampling receipt. Groundwater analytical reports are contained in Appendix D. Tables 3-1 through 3-12 provide summarized groundwater analytical results and Figures 3-1 through 3-24 present contaminant distribution maps for the June 1998 event.

3.2.1 VOCs/Condensate

VOC analyses were performed using EPA Methods 8260, 8021, and 504.1. Analyses were performed by American Environmental Network (AEN) in Albuquerque, NM. 1,2-Dibromoethane (EDB) by EPA Method 504.1 was not detected in any of the samples. Tetrachloroethene and vinyl chloride by EPA Method 8021 were not detected in any of the samples.

3.2.1.1 Shallow Zone Distribution. Figure 3-1 presents the interpreted condensate distribution observed in Shallow Zone wells during the June 1998 monitoring event. As stated in section 2.3, 45 of

the 76 Shallow Zone wells were dry when gauged. Only one well, MW-069, contained a measurable condensate thickness, 0.79 feet. One other well, MW-014, had some condensate on the probe (COP) when gauged.

Eighteen Shallow Zone monitoring wells, the Lyman supply well, and Rocky Arroyo were sampled for VOC analysis during the June-July 1998 event. Table 3-1 summarizes the results of VOC analysis of Shallow Zone wells. No VOCs were detected in either the Lyman supply well or the arroyo sample.

The primary contaminants found in Shallow Zone monitoring wells are BTEX and benzene derivatives. Only two VOCs exceeded WQCC human health standards for groundwater: benzene and ethylbenzene. Ethylbenzene was detected in seven of the 18 Shallow Zone wells sampled, but only one well, MW-014 at 0.84 milligrams per liter (mg/L), exceeded the WQCC standard of 0.75 mg/L. Benzene was above the WQCC standard of 0.01 mg/L in eight of nine wells which contained detectable concentrations. Detected concentrations ranged from 0.0073 mg/L in MW-043 to 1.7 mg/L in MW-046 just east of the loading area. Figure 3-2 presents the interpreted distribution of benzene in the Shallow Zone. The extent of VOCs in the Shallow Zone has been defined.

Other VOCs detected in one or more Shallow Zone wells include: acetone, total xylenes, isopropyl benzene, n-propyl benzene, 1,3,5-trimethyl benzene, tert-butyl benzene, 1,2,4-trimethyl benzene, sec butyl benzene, p-isopropyl toluene, n-butylbenzene, and naphthalene. None of these compounds were detected in downgradient wells MW-078, MW-079, MW-090, MW-105, or MW-106. Except for naphthalene, none of these compounds has a WQCC standard. Naphthalene was also reported under the polynuclear aromatic hydrocarbons (PAH) analysis by EPA Method 8310, and is in the section discussing those results.

3.2.1.2 Lower Queen Distribution. Figure 3-3 presents the interpreted LNAPL distribution observed in Lower Queen wells during the June 1998 monitoring event. Eight Lower Queen wells contained a measurable LNAPL thickness: MW-059, MW-065A, MW-068, MW-083, MW-084, MW-085, MW-098, and MW-110. LNAPL thicknesses ranged from 0.05 feet in MW-098 to 9.51 feet in MW-083. It should be noted that all but MW-098 are recovery wells, equipped with either product only or total fluid pumps. Seven other wells had LNAPL on the probe (thicknesses less than 0.01 ft) when gauged: IW-01, MW-073, MW-074, MW-075, MW-076, MW-081, and MW-086. Based on fluid level measurements, the LNAPL plume is interpreted to cover much of the area east of the site, extending south across Rocky Arroyo. The condensate plume, however, has not migrated east of the north-south line of recovery wells from MW-081 to MW-084. Although the condensate plume covers a large area, there are presently two known areas where condensate was not detected, one near MW-057, and one near VE-19 and VE-20.

Forty-one Lower Queen wells (38 monitoring wells and three supply wells) were sampled for VOC analysis during the June 1998 event. Table 3-2 summarizes the results of VOC analysis of Lower Queen wells. VOCs were not detected in any of the supply wells. The primary contaminants found in Lower Queen monitoring wells are BTEX and benzene derivatives. The extent of the VOCs in the Lower Queen has been defined. Figure 3-4 presents the interpreted distribution of benzene in the Lower Queen. The area of highest dissolved benzene is east of the Plant. This area is above WQCC standards, and closely corresponds to the interpreted condensate plume (Figure 3-3). Benzene was detected in 13 of the 41 Lower Queen wells sampled, at concentrations ranging from 0.0011 at MW-073 to 0.39 mg/L MW-068. Ten wells contain benzene above the WQCC human health standard for groundwater of 0.01 mg/L. Figure 3-5 presents the interpreted distribution of total xylenes in the Lower Queen. Xylene was detected in 16 wells, at concentrations ranging from 0.0015 mg/L in MW-081 to 1.01 mg/L in MW-098. Two wells contain xylenes above the WQCC standard of 0.62 mg/L: MW-068 (0.99 mg/L) and MW-098 (1.01 mg/L).

Other VOCs detected in one or more Lower Queen wells include: acetone, toluene, ethylbenzene, isopropyl benzene, n-propyl benzene, 1,3,5-trimethyl benzene, 1,2,4-trimethyl benzene, sec butyl benzene, p-isopropyl toluene, n-butylbenzene, and naphthalene. None of these compounds were detected in downgradient wells MW-066, MW-071, MW-087, MW-087A, MW-088, MW-089, MW-095, MW-096, MW-097 or MW-111. Except for naphthalene, none of these compounds has a WQCC standard. As indicated in Section 3.2.1.1 above, naphthalene is reported under the section discussing the PAH results.

3.2.2 SVOCs

SVOC analyses were performed by EPA Methods 8270 and 8310 by Severn Trent Laboratories (STL) in Pensacola, FL. Benzo(a)pyrene results used for comparison with the WQCC standard and on Figures 3-7 and 3-9 are those from Method 8310, since the detection limit is much lower than that for Method 8270. Although phenol was analyzed for by Method 8270, the total phenols results by Method 420.1 are used for comparison with the WQCC standard in Section 3.2.3 and on Figures 3-10 and 3-15.

3.2.2.1 Shallow Zone Distribution. Seventeen Shallow Zone wells were sampled for SVOC analysis during the June-July 1998 event. Table 3-3 summarizes the results of SVOC analysis of Shallow Zone wells. The only contaminants found in Shallow Zone wells for which there are WQCC standards are PAHs and benzo(a)pyrene.

The WQCC defines PAHs as the total of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene. PAHs were not detected in 7 of the 17 Shallow Zone monitoring wells or in the samples collected from the Lyman well and the arroyo. Detected PAH concentrations range from 0.0020 mg/L

in MW-044 to 0.374 mg/L in MW-013, with only three wells exceeding the WQCC standard for PAHs in groundwater of 0.03 mg/L: MW-013, MW-014, and MW-069. Figure 3-5 presents the interpreted distribution of PAHs in the Shallow Zone during the June 1998 event. The extent of PAHs in the Shallow Zone has been defined. The area of PAH impact appears to be limited to the area south of the Plant and east of gathering line number 4.

Benzo(a)pyrene was detected in two Shallow Zone wells, MW-013 at 0.0015 mg/L and MW-046 at 0.0004 mg/L. Figure 3-7 presents the interpreted distribution of benzo(a)pyrene in the Shallow Zone during the June 1998 event. The extent of benzo(a)pyrene in the Shallow Zone has been defined. Only the MW-013 detection, south of the Plant, exceeds the WQCC standard of 0.0007 mg/L for benzo(a) pyrene.

Other SVOCs detected in one or more Shallow Zone wells include: bis(2-ethylhexyl)phthalate, fluorene, phenanthrene, and phenol. None of these compounds were detected in downgradient wells MW-078, MW-079, or MW-106. None of these compounds has a corresponding WQCC standard.

3.2.2.2 Lower Queen Distribution. Thirty-eight Lower Queen wells were sampled for SVOC analysis during the June-July 1998 event. Table 3-4 summarizes the results of SVOC analysis of Lower Queen wells. The only contaminants found in Shallow Zone wells for which there are WQCC standards are PAHs and benzo(a)pyrene.

PAHs were not detected in 20 of the 38 Lower Queen monitoring wells or in the samples collected from the three supply wells. Detected PAH concentrations range from 0.02 mg/L in MW-061A to 0.57 mg/L in MW-085, with 16 wells exceeding the WQCC standard for PAHs in groundwater of 0.03 mg/L. Figure 3-8 presents the interpreted distribution of PAHs in the Lower Queen during the June 1998 event. The extent of PAHs in the Lower Queen has been defined. The area of PAH impact appears to cover the same area as the condensate and dissolved BTEX plumes east and southeast of the Plant. The areas of highest PAH impact in the Lower Queen appears to center around wells MW-085 and MW-059.

Benzo(a)pyrene was detected in 11 Lower Queen wells, at concentrations ranging from 0.0003 mg/L in MW-073 to 0.0099 mg/L in MW-068. Eight wells exceed the WQCC standard of 0.0007 mg/L for benzo(a)pyrene. Figure 3-9 presents the interpreted distribution of benzo(a)pyrene in the Lower Queen during the June 1998 event. The extent of benzo(a)pyrene in the Lower Queen has been defined. There are currently three areas of benzo(a)pyrene concentrations above WQCC standards, near MW-068 to the south of the Plant, and MW-081/MW-085 and MW-059 east of the Plant.

Other SVOCs detected in one or more Lower Queen wells include: 2,4-dimethyl phenol, bis(2-ethylhexyl)phthalate, dimethyl phthalate, di-n-butyl phthalate, fluorene, phenanthrene, and phenol.

None of these compounds were detected in downgradient wells MW-066, MW-071, MW-087, MW-087A, MW-088, MW-089, MW-096, or MW-097. None of these compounds has a corresponding WQCC standard.

3.2.3 Water Quality Parameters

During the June-July 1998 event, groundwater samples were analyzed for water quality parameters, including the following:

- Chloride by EPA Method 325.2
- Total cyanide by EPA Method 335.2
- Fluoride by EPA Method 340.2
- Nitrate/Nitrogen by EPA Method 354.1
- Nitrate-Nitrite/Nitrogen by EPA Method 353.2
- Nitrate/Nitrogen by EPA Method 353.2-354.1
- pH by EPA Method 150.1
- Total phenols by EPA Method 420.1
- Sulfate by EPA Method 375.4
- Total dissolved solids (TDS) by EPA Method 160.1

Analyses were performed by STL in Pensacola, FL. Tables 3-5 and 3-6 summarize the results of the water quality analyses for Shallow Zone and Lower Queen wells, respectively.

3.2.3.1 Shallow Zone Distribution. As shown on Table 3-5, nitrite/nitrogen was not detected in any of the Shallow Zone well samples. Nitrate/nitrogen concentrations ranged from not detected (10 wells) to 7.1 mg/L in MW-090. Similarly, nitrate-nitrite/nitrogen concentrations ranged from not detected (10 wells) to 7.1 mg/L in MW-090, all below the WQCC standard of 10 mg/L for nitrate in groundwater. The range of pH of groundwater samples was within the WQCC standard of 6.5 - 8.5 s.u. Cyanide was not detected in any well except MW-049 at 0.050 mg/L, well below the WQCC standard of 0.2 mg/L. Parameters with exceedances of WQCC standards in the Shallow Zone wells include total phenols, TDS, fluoride, chloride, and sulfate and are discussed further below.

Total Phenols

Table 3-5 shows total phenols results for Shallow Zone wells by Method 420.1. Figure 3-10 presents the interpreted distribution of total phenols in the Shallow Zone during the June 1998 event. The extent of phenols in the Shallow Zone has been defined. Total phenols were detected above the WQCC standard in nine Shallow Zone wells and in the arroyo, at concentrations ranging from 0.006 mg/L (arroyo) to 0.040 mg/L (MW-044).

TDS

Figure 3-11 presents the interpreted distribution of TDS in the Shallow Zone during the June 1998 event. Concentrations ranged from 380 mg/L in MW-106 to 5,900 mg/L in MW-050. Of the 17 samples analyzed, 11 (including the Lyman well) contained TDS concentrations at or above the WQCC standard of 1,000 mg/L in groundwater. The highest TDS concentrations were found in wells MW-050 (5,900 mg/L), MW-061 (3,200 mg/L), and MW-049 (2,800 mg/L), located east and northeast of the Plant. The Lyman well was resampled in August 1998 and contained TDS at 920 mg/L, less than the WQCC standard.

Fluoride

Figure 3-12 presents the interpreted distribution of fluoride in the Shallow Zone during the June 1998 event. Concentrations ranged from not detected (MW-078) to 2.2 mg/L in MW-061. Of the 17 samples analyzed, only two contained fluoride above the WQCC standard of 1.6 mg/L: 1.8 mg/L in MW-054 and 2.2 mg/L in MW-061 located east and northeast of the Plant.

Chloride

Figure 3-13 presents the interpreted distribution of chloride in the Shallow Zone during the June 1998 event. Concentrations ranged from 4 mg/L in MW-106 to 630 mg/L in MW-049. Of the 17 samples analyzed, six contained chloride above the WQCC standard of 250 mg/L: MW-014, MW-044, MW-049, MW-050, MW-055, and MW-061, located east and northeast of the Plant.

Sulfate

Figure 3-14 presents the interpreted distribution of sulfate in the Shallow Zone during the June 1998 event. Concentrations ranged from not detected (wells MW-013, MW-014, MW-069, and MW-078) to 3,800 mg/L in MW-050. Of the 17 samples analyzed, five contained sulfate concentrations above the WQCC standard of 600 mg/L: the Lyman well, MW-049, MW-050, MW-054, and MW-061, located east and northeast of the Plant. The Lyman well was resampled in August 1998 and contained sulfate at 540 mg/L, less than WQCC standard.

3.2.3.2 Lower Queen Distribution. As shown on Table 3-6, nitrite/nitrogen was not detected in any of the Lower Queen well samples. Nitrate/nitrogen concentrations ranged from not detected (16 wells) to 7.1 mg/L in MW-063. Similarly, nitrate-nitrite/nitrogen concentrations ranged from not detected (16 wells) to 7.1 mg/L in MW-063, all below the WQCC standard of 10 mg/L for nitrate in groundwater. The range of pH of groundwater samples was within the WQCC standard of 6.5 - 8.5 s.u. Cyanide was detected in three wells: MW-061A (0.025 mg/L), MW-066 (0.761 mg/L), and MW-089 (0.247 mg/L), the latter two exceeding the WQCC standard of 0.2 mg/L. These three wells were resampled for cyanide during the October 1998 event and cyanide was nondetectable in all three samples. Parameters with exceedances of WQCC standards in the Lower Queen wells include total phenols, TDS, fluoride, chloride, and sulfate and are discussed further below.

Wells MW-087 and MW-087A are located next to one another and consistently contained concentrations of water quality parameters differing by an order of magnitude, with MW-087A having the higher levels. Well MW-087 is screened from 148 to 168 feet bgs, while MW-087A is open hole from 12 to 132 feet bgs. Although there is less than a foot of difference in the top of casing elevation between the two wells, the depth to groundwater differs by approximately 9 feet, with MW-087A having the higher groundwater elevation. MW-087A recharges very slowly after purging (during the October 1998 event it failed to recharge within 24 hours of purging). From this, it is believed that MW-087A intersects a perched fracture zone that does not connect to the regional Lower Queen aquifer. Therefore, Lower Queen distribution maps for water quality parameters were constructed without using the data from MW-087A.

Total Phenols

Table 3-6 shows total phenols results for Lower Queen wells by Method 420.1. Total phenols was detected above the WQCC standard in 17 Lower Queen wells, at concentrations ranging from 0.005 mg/L (several) to 0.077 mg/L (MW-075). Figure 3-15 presents the interpreted distribution of total phenols in the Lower Queen during the June 1998 event. The extent of phenols in the Lower Queen has been defined. The area of phenols impact appears to cover the same area as the condensate and dissolved BTEX plumes east and southeast of the Plant. The areas of highest phenols impact in the Lower Queen appear to center around wells MW-086 and MW-075 east of the Plant.

TDS

Figure 3-16 presents the interpreted distribution of TDS in the Lower Queen during the June 1998 event. Concentrations ranged from 310 mg/L in MW-098 to 4,100 mg/L in MW-059. Of the 41 samples analyzed, seven contained TDS concentrations above the WQCC standard of 1,000 mg/L in groundwater. The highest TDS concentrations were found in wells MW-059 (4,100 mg/L) and MW-073 (3,700 mg/L), located east of the Plant. There appears to be an offsite source of elevated TDS in the area of MW-071. Well MW-071 was resampled for TDS during the October 1998 event and the result was consistent (1,200 mg/L) with the June 1998 concentration (1,100 mg/L).

Fluoride

Figure 3-17 presents the interpreted distribution of fluoride in the Lower Queen during the June 1998 event. Concentrations ranged from 0.3 mg/L (MW-098) to 2.4 mg/L in MW-087A. Of the 41 samples analyzed, only two contained fluoride above the WQCC standard of 1.6 mg/L: 2.2 mg/L in MW-071 and 2.4 mg/L in MW-087A. As discussed above, MW-087A is believed to monitor a perched zone. There appears to be an offsite source of elevated fluoride in the area of MW-071. Well MW-071 was resampled for fluoride during the October 1998 event and the result was consistent (2.0 mg/L) with the June 1998 concentration (2.2 mg/L).

Chloride

Figure 3-18 presents the interpreted distribution of chloride in the Lower Queen during the June 1998 event. Concentrations ranged from 4 mg/L in MW-061A and MW-071 to 560 mg/L in MW-059. Of the 41 samples analyzed, four contained chloride above the WQCC standard of 250 mg/L: MW-059, MW-073, MW-074, and MW-086, located east of the Plant.

Sulfate

Figure 3-19 presents the interpreted distribution of sulfate in the Lower Queen during the June 1998 event. Concentrations ranged from not detected (wells MW-058, MW-064, MW-084, and MW-085) to 2,800 mg/L in MW-078. Of the 41 samples analyzed, four contained sulfate concentrations above the WQCC standard of 600 mg/L: MW-059, MW-071, MW-073, and MW-087A. As discussed above, MW-087A is believed to monitor a perched zone. There is most probably an offsite source of elevated sulfate in the area of MW-071. Well MW-071 was resampled for sulfate during the October 1998 event and the result was relatively consistent (550 mg/L) with the June 1998 concentration (650 mg/L), although below the WQCC standard.

3.2.4 Metals

Groundwater samples were analyzed for uranium by EPA Method 200/3005 by North Creek Analytical in Portland, OR. Samples were also field-filtered and analyzed for dissolved Target Analyte List (TAL) metals by EPA Methods 6010A/7470A by STL in Pensacola, FL. The TAL metals include aluminum, arsenic, barium, boron, cadmium, chromium, cobalt, copper, iron, manganese, mercury, molybdenum, nickel, lead, selenium, silver, and zinc.

3.2.4.1 Shallow Zone Distribution. Seventeen Shallow Zone wells were sampled for metals analyses during the June 1998 event. Table 3-7 summarizes the results of metals analyses of Shallow Zone wells.

Only three metals exceeded WQCC standards in one or more Shallow Zone wells: barium, iron, and manganese. Figure 3-20 presents the interpreted distribution of barium in Shallow Zone wells during the June 1998 event. The barium WQCC human health standard of 1.0 mg/L was exceeded in one Shallow Zone well, MW-069, at 1.2 mg/L. The detected barium concentrations ranged from 0.015 mg/L (MW-054) to 1.2 mg/L (MW-069). Figure 3-21 presents the interpreted distribution of iron in the Shallow Zone wells during the June 1998 event. Five Shallow Zone wells did not contain detectable concentrations of iron. The iron concentrations detected in Shallow Zone wells ranged from 0.014 mg/L in MW-046 to 4.7 mg/L in MW-014. Six wells exceeded WQCC standards for domestic water supply for iron of 1.0 mg/L: 1.6 mg/L in MW-078, 2.2 mg/L in MW-055, 2.6 mg/L in MW-043, 2.7 mg/L in MW-069, 3.4 mg/L in MW-013, and 4.7 in MW-014. The occurrence of iron may be due to microbial activity associated with biodegradation of hydrocarbons.

Figure 3-22 presents the interpreted distribution of manganese in Shallow Zone wells during the June 1998 event. Two Shallow Zone wells did not contain detectable manganese concentrations, the Lyman supply well and MW-090. The detected manganese concentrations ranged from 0.0010 mg/L in MW-060 and 0.82 mg/L in MW-078. Six wells met or exceeded the WQCC standard for manganese of 0.2 mg/L: 0.20 mg/L in MW-041 and MW-043, 0.22 mg/L in MW-013, 0.24 mg/L in MW-014, 0.59 mg/L in MW-069, and 0.82 mg/L in MW-078. The occurrence of manganese may be due to microbial activity associated with biodegradation of hydrocarbons.

3.2.4.2 Lower Queen Distribution. Forty-one Lower Queen wells were sampled for metals analyses during the June 1998 event. Table 3-8 summarizes the results of metals analyses of Lower Queen wells.

Only two metals exceeded WQCC standards in one or more Lower Queen wells: iron and manganese. Figure 3-23 presents the interpreted distribution of iron in Lower Queen wells during the June 1998 event. Thirteen Lower Queen wells did not contain detectable concentrations of iron. The iron concentrations detected in Lower Queen wells ranged from 0.014 mg/L in MW-089 to 1.3 mg/L in MW-074. Three wells met or exceeded WQCC standards for domestic water supply for iron of 1.0 mg/L: 1.0 mg/L in MW-057 and MW-085 and 1.3 mg/L in MW-074. The occurrence of iron may be due to microbial activity associated with biodegradation of hydrocarbons.

Figure 3-24 presents the interpreted distribution of manganese in Lower Queen wells during the June 1998 event. Three Lower Queen wells did not contain detectable manganese concentrations, MW-097, MW-098, and MW-104. The detected manganese concentrations ranged from 0.0004 mg/L in MW-060 to 1.5 mg/L in MW-059. Thirteen wells met or exceeded the WQCC standard for manganese of 0.2 mg/L: 0.20 mg/L in MW-057 and MW-081, 0.22 mg/L in MW-111, 0.25 mg/L in MW-84, 0.26 mg/L in MW-075, 0.28 mg/L in MW-058, 0.33 mg/L in MW-074, 0.39 mg/L in MW-062, 0.44 mg/L in MW-065A, 0.54 mg/L in MW-083, 0.65 mg/L in MW-072, 0.82 mg/L in MW-067, and 1.5 mg/L in MW-059. The occurrence of manganese may be due to microbial activity associated with biodegradation of hydrocarbons.

3.2.5 Pesticides/PCBs

Groundwater samples were analyzed for pesticides/PCBs by EPA Method 8080 during the June 1998 event. Analyses were performed by STL in Pensacola, FL. Tables 3-9 and 3-10 summarize the results of pesticides and PCB analyses for the Shallow Zone and Lower Queen wells, respectively. No PCBs were detected in any of the wells.

3.2.5.1 Shallow Zone Distribution. Seventeen Shallow Zone wells were sampled for pesticides and PCBs analyses during the June 1998 event. There are no WQCC standards for pesticides, and therefore no exceedances. Delta BHC was detected in two wells, MW-013 and MW-014, at 0.00022 mg/L and 0.00017 mg/L, respectively. Gamma BHC (lindane) was also detected in two wells, MW-041 and MW-046, at 0.00002 mg/L and 0.00006 mg/L, respectively. Aldrin at 0.00014 mg/L, alpha BHC at 0.00043 mg/L, beta BHC at 0.00047 mg/L, 4,4'-DDD at 0.00022 mg/L, and endosulfan I at 0.00002 mg/L were also detected in MW-013. None of these compounds were detected in downgradient wells MW-078, MW-079, or MW-106. No other pesticides or PCBs were detected in Shallow Zone wells.

3.2.5.2 Lower Queen Distribution. Forty-one Lower Queen wells were sampled for pesticides and PCBs analyses during the June 1998 event. There are no WQCC standards for pesticides, and therefore no exceedances. Aldrin was detected in one well only, MW-086, at 0.00016 mg/L. Dieldrin was also detected in one well only, MW-73, at 0.00006 mg/L. Alpha BHC was detected in two wells, at 0.00018 mg/L in MW-068 and at 0.00046 mg/L in MW-086. Beta BHC was detected in 12 wells, ranging from 0.00003 mg/L in MW-067 to 0.00129 mg/L in MW-068. Delta BHC was detected in eight wells, ranging from 0.00004 mg/L in MW-065A, MW-082, and MW-083 to 0.00026 mg/L in MW-068. Gamma BHC (lindane) was detected in nine wells, ranging from 0.00003 mg/L in MW-098 to 0.00053 mg/L in MW-086. None of these compounds were detected in downgradient wells MW-066, MW-071, MW-087, MW-087A, MW-088, MW-089, MW-095, MW-096, MW-097, or MW-111. No other pesticides or PCBs were detected in Lower Queen wells.

3.2.6 Radium

Groundwater samples were analyzed for radium 226 and radium 228 by STL of Morrisville, NC. Tables 3-11 and 3-12 summaries the results of these analyses for Shallow Zone and Lower Queen wells, respectively. None of the Shallow Zone or Lower Queen samples exceeded the WQCC standard of 30 picocuries per liter (pCi/L) for combined radium 226/radium 228.

4.0 GROUNDWATER MONITORING PLAN MODIFICATION

The following are proposed changes to the Groundwater Monitoring Plan dated January 24, 1997. The proposed monitoring program is presented in Table 5-1.

For the Shallow Zone, 18 wells will be gauged annually (April) for depth to water and thickness of LNAPL and sampled for analysis of BTEX by EPA Method 8020. Six downgradient wells will be sampled semiannually (April and October) for analysis of BTEX by EPA method 8020. Wells that have historically been dry have been removed from the monitoring program for the Shallow Zone.

For the Lower Queen aquifer, 38 wells will be gauged semiannually (April and October) for depth to water and thickness of LNAPL. Eleven downgradient wells (MW-060, MW-061A, MW-066, MW-071, MW-087, MW-087A, MW-088, MW-089, MW-096, MW-097, and MW-111) and five wells within the hydrocarbon plume (MW-057, MW-059, MW-062, MW-064, and MW-067) will be sampled semiannually (April and October); seven wells located upgradient of the hydrocarbon plume (MW-063, MW-070, MW-095, MW-098, SW-01, SW-02, and SW-03) will be sampled annually (April). Groundwater samples from the semiannual and annual monitoring events will be analyzed for BTEX by EPA Method 8020.

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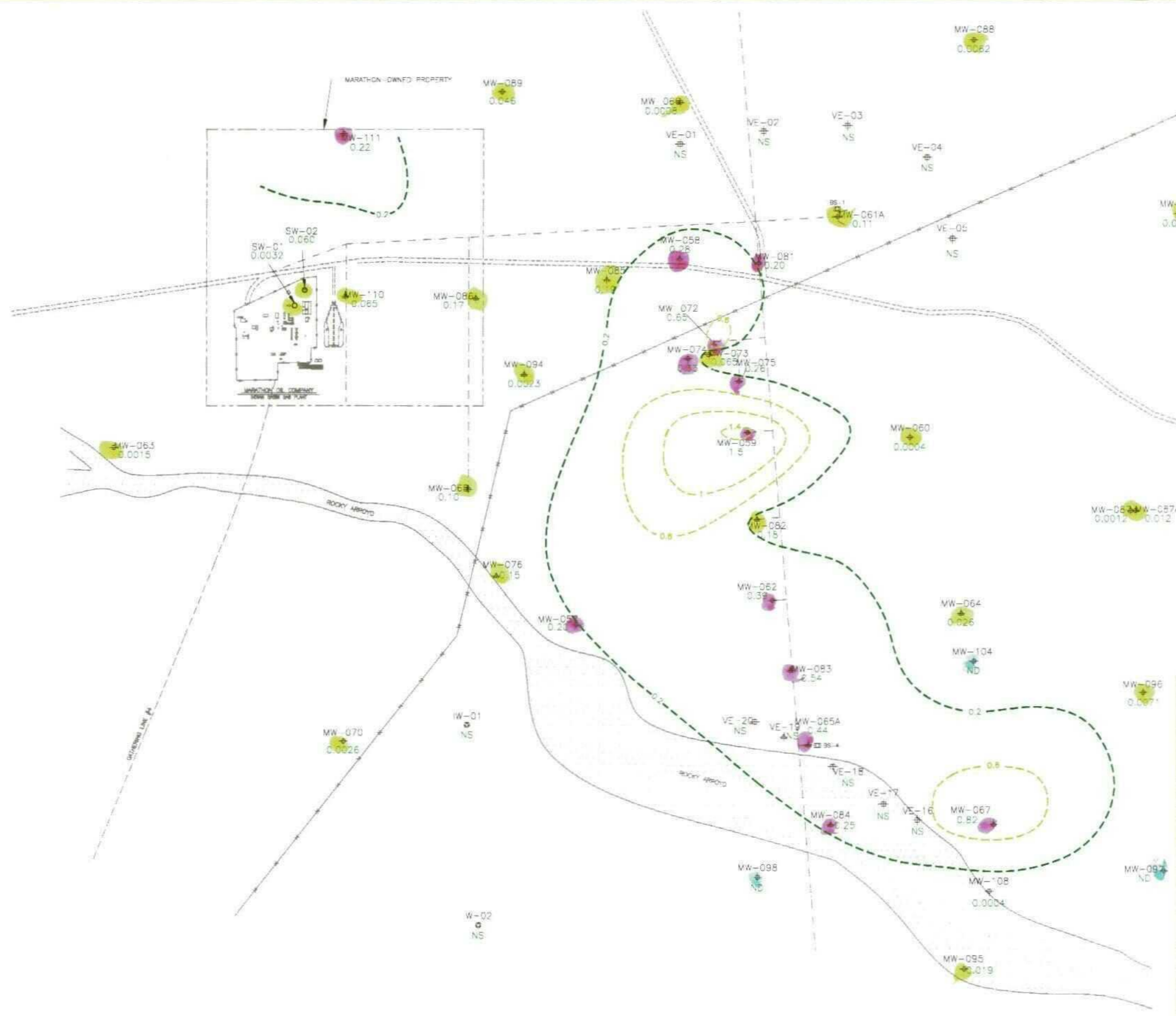
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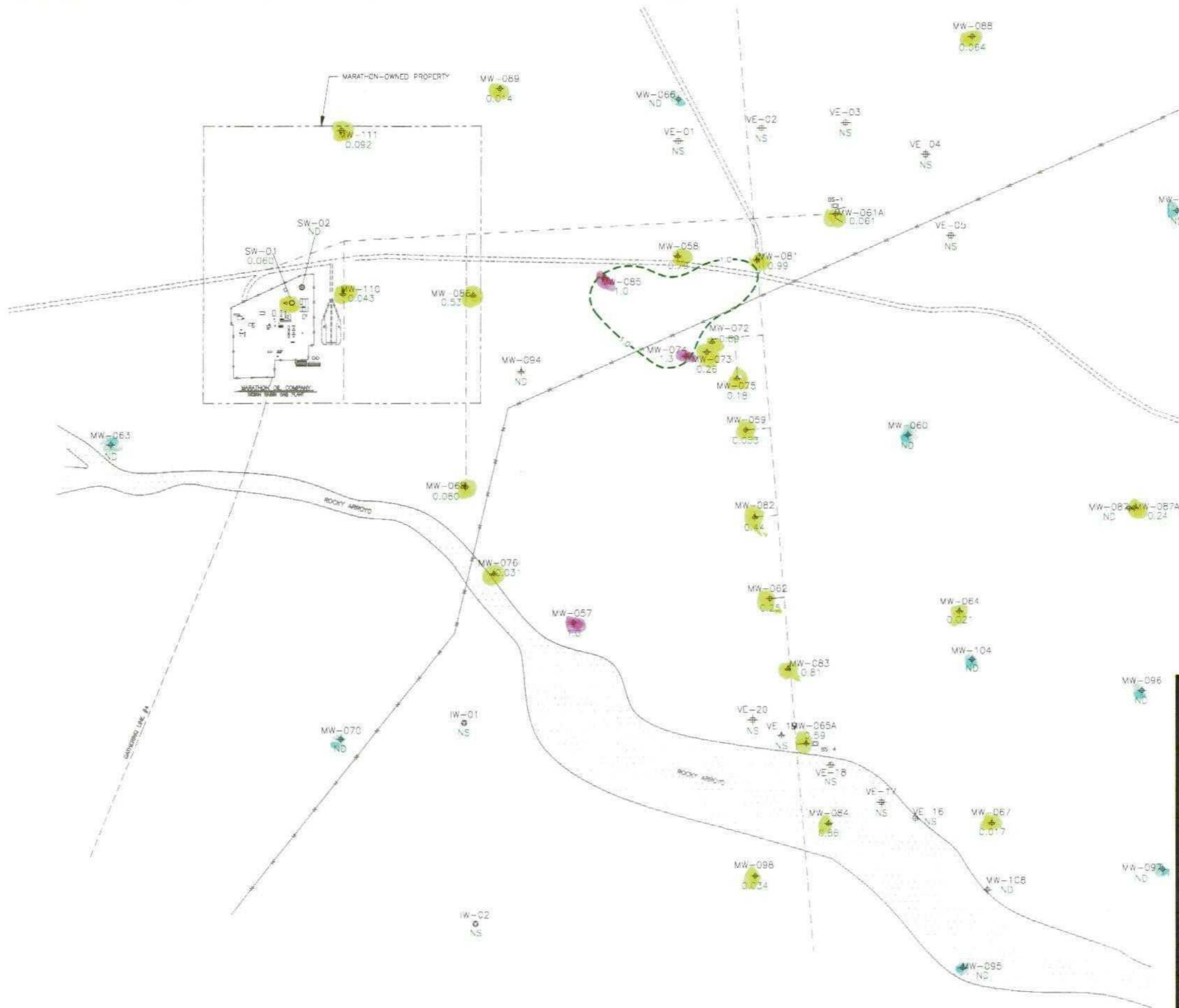
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LEGEND


- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 0.11 DISSOLVED MANGANESE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- NS NOT SAMPLED
- 0.8 INTERPRETED CONCENTRATION ISOPLETH FOR DISSOLVED MANGANESE
- 0.2 WQCC STANDARD FOR DISSOLVED MANGANESE (ISOPLETH INTERPRETED) IN mg/L
- ☐ BLOWER STATION
- — — — — FENCE
- - - - - POWER LINES

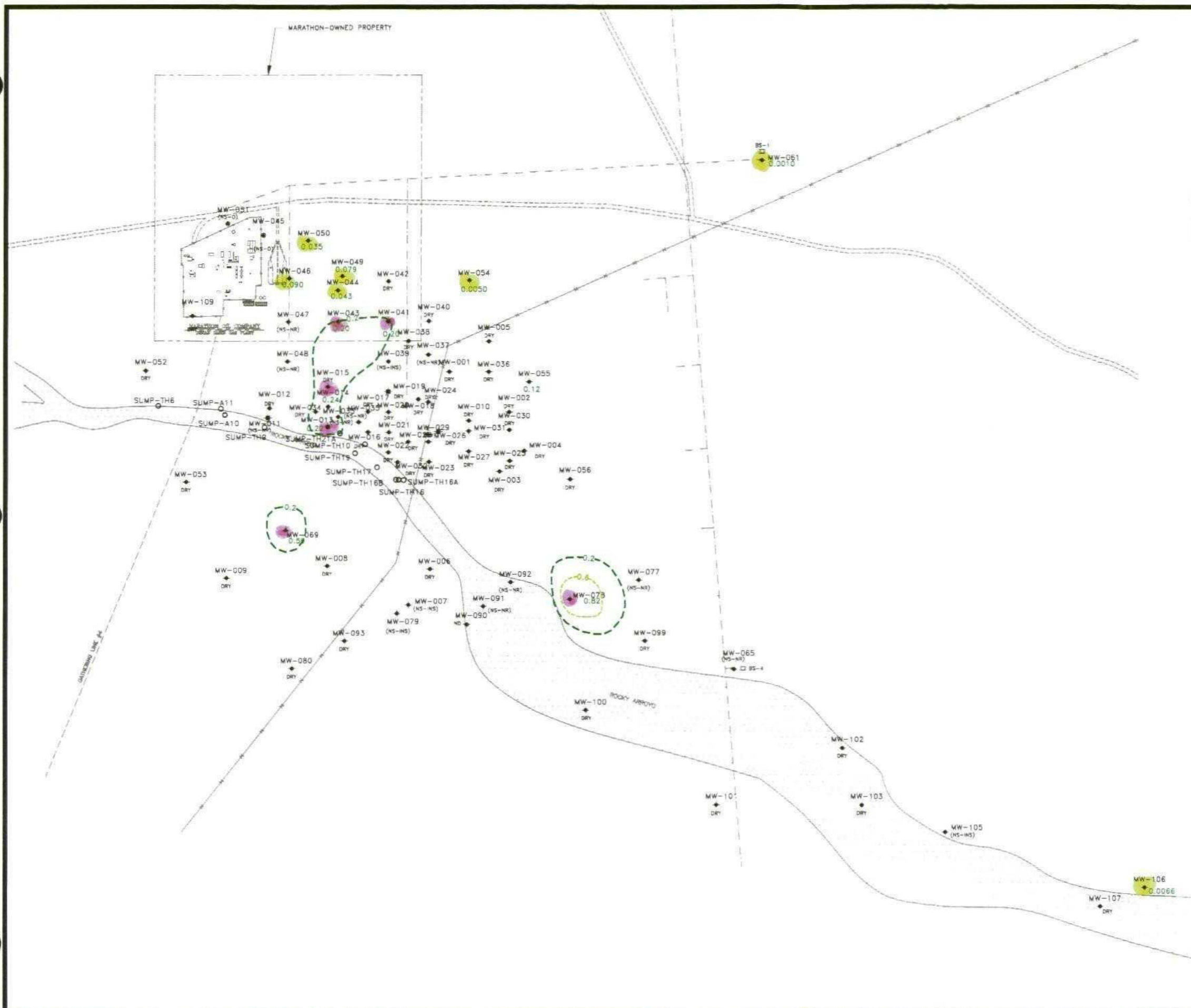
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LOWER QUEEN DISSOLVED MANGANESE DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
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REV.:		
DES.:	DET.:	DATE:
ES	SWL	10/12/98
PM:	PE/RG:	FIGURE:
		3-24




LEGEND

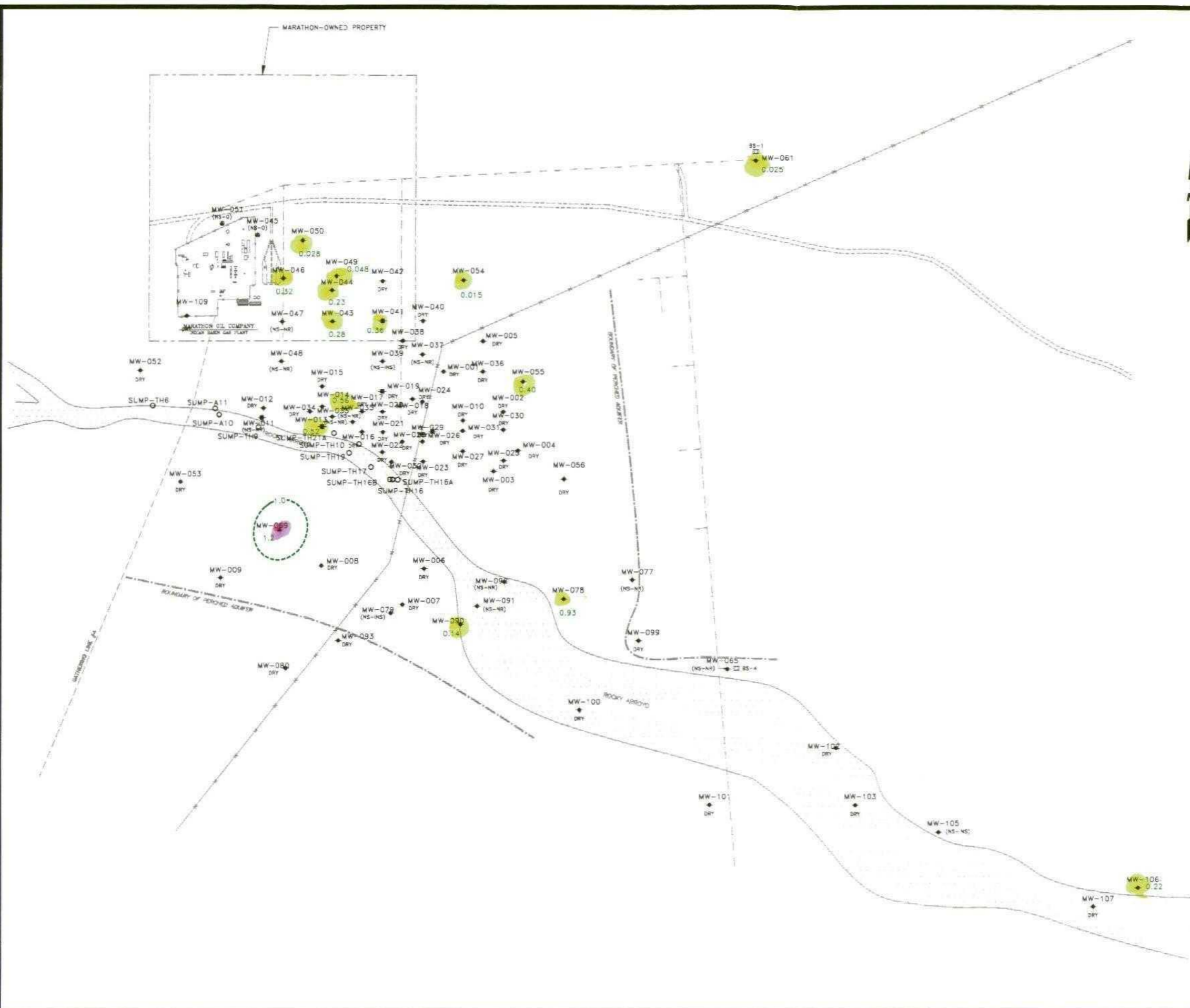
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- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 1.3 DISSOLVED IRON CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- NS NOT SAMPLED
- 1.0 WQCC STANDARD FOR DISSOLVED IRON (ISOPLETH INTERPRETED) IN mg/L
- ☐ BLOWER STATION
- *—*—*— FENCE
- - - - - POWER LINES

 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN DISSOLVED IRON DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: IRON_LQ (1:1000)	PROJECT NO.: 105469	
REV.:		
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PM:	PE/RG:	FIGURE: 3-23




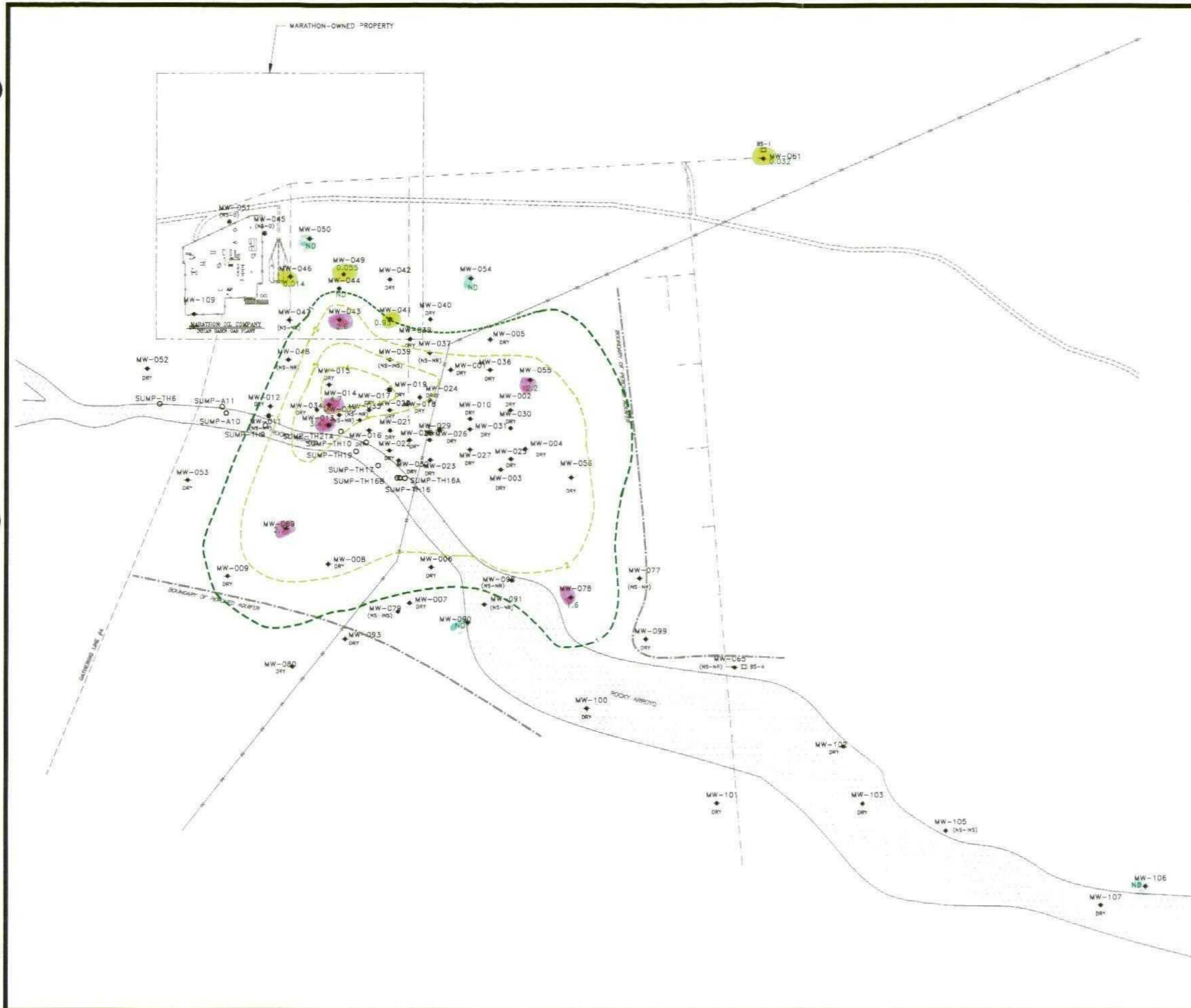
- ### LEGEND
- MONITORING WELL (SHALLOW ZONE)
 - ▲ INFILTRATION WELL (SHALLOW ZONE)
 - RECOVERY SUMP (SHALLOW ZONE)
 - ▲ RECOVERY WELL (SHALLOW ZONE)
 - VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
 - BLOWER STATION
 - FENCING
 - - - POWER LINE
 - 0.6 (yellow dashed line) INTERPRETED DISSOLVED CONCENTRATION ISOPLETH FOR MANGANESE
 - 0.2 (green dashed line) WQCC STANDARD FOR DISSOLVED MANGANESE IN mg/L (ISOPLETH INTERPRETED)
 - 0.0066 DISSOLVED MANGANESE CONCENTRATION IN mg/L
 - ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
 - DRY WELL DRY
 - NS-C NOT SAMPLED - OBSTRUCTED
 - NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
 - NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING

 FLUOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE DISSOLVED MANGANESE DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: MANG_SH2 (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: DH	DATE: 11/18/98
PM:	PE/RG:	FIGURE: 3-22




- ### LEGEND
- ◆ MONITORING WELL (SHALLOW ZONE)
 - INFILTRATION WELL (SHALLOW ZONE)
 - RECOVERY SUMP (SHALLOW ZONE)
 - ▲ RECOVERY WELL (SHALLOW ZONE)
 - VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
 - BLOWER STATION
 - FENCING
 - - - POWER LINE
 - WCC STANDARD FOR BARIUM IN mg/L (ISOPLETH INTERPRETED)
 - 1.2 BARIUM CONCENTRATION IN mg/L
 - DRY WELL DRY
 - NS-O NOT SAMPLED - OBSTRUCTED
 - NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
 - NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING

 FLUOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE DISSOLVED BARIUM DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
BAR_SH2 (1:1000)	105469	
REV.:		
DES.:	DET.:	DATE:
ES	DH	11/18/98
PM:	PE/RG:	FIGURE:
		3-21



LEGEND

- MONITORING WELL (SHALLOW ZONE)
- ⊕ INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- POWER LINE
- INTERPRETED CONCENTRATION ISOPLETH FOR IRON
- WQCC STANDARD FOR IRON IN mg/L (ISOPLETH INTERPRETED)
- 0.22 IRON CONCENTRATION IN mg/L
- ND IRON NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-O NOT SAMPLED - OBSTRUCTED
- NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING


 FLUOR DANIEL GT		0 FEET 1000 SCALE
SHALLOW ZONE DISSOLVED IRON DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
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PM:	PE/RG:	FIGURE: 3-20

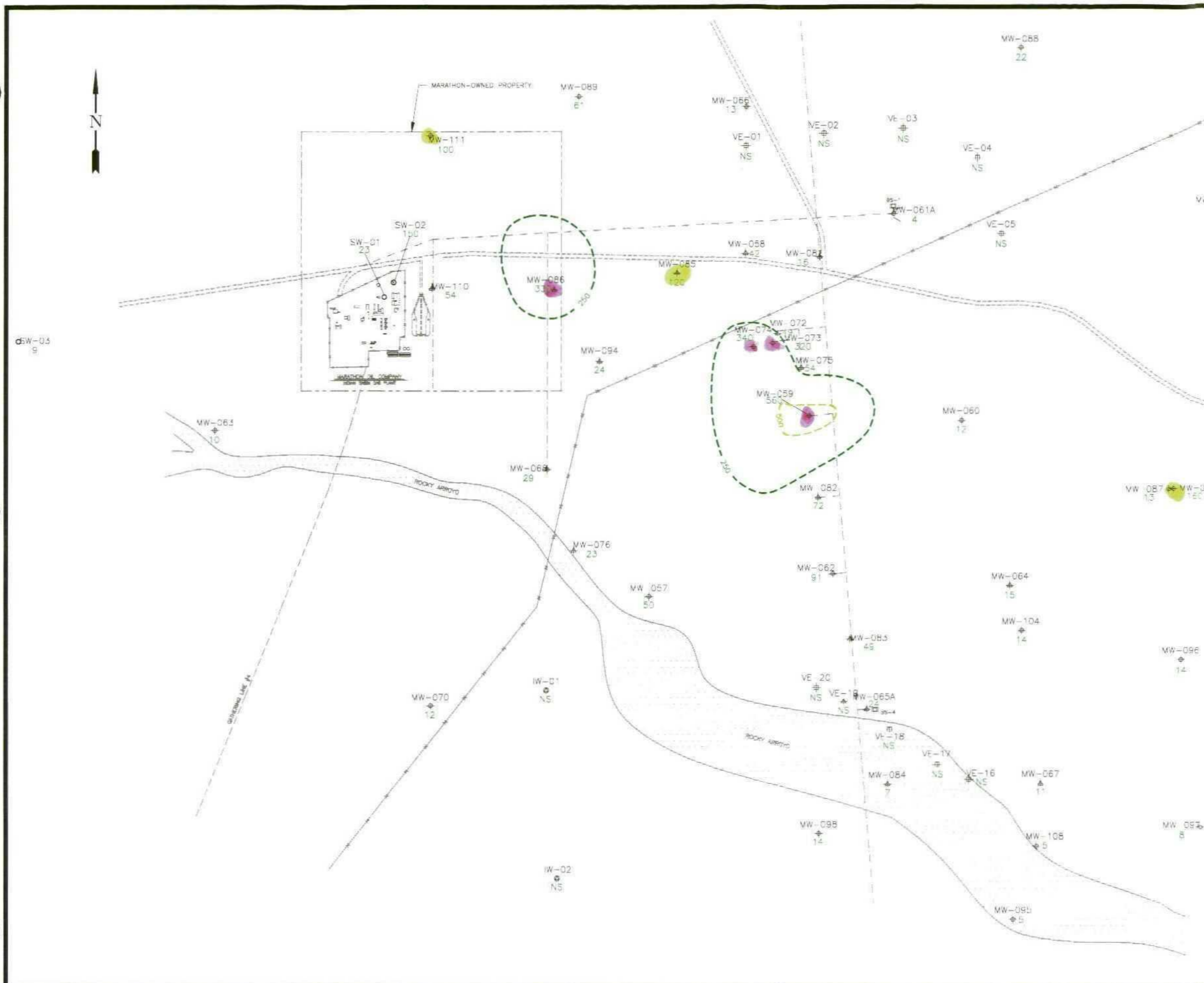


LEGEND

- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 390 SULFATE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- NS NOT SAMPLED
- 1200 --- INTERPRETED CONCENTRATION ISOPLETH FOR SULFATE
- 600 --- WQCC STANDARD FOR SULFATE (ISOPLETH INTERPRETED) IN mg/L
- ☐ BLOWER STATION
- FENCE
- POWER LINES


NOTE:
MW-087A NOT USED FOR CONTOURING

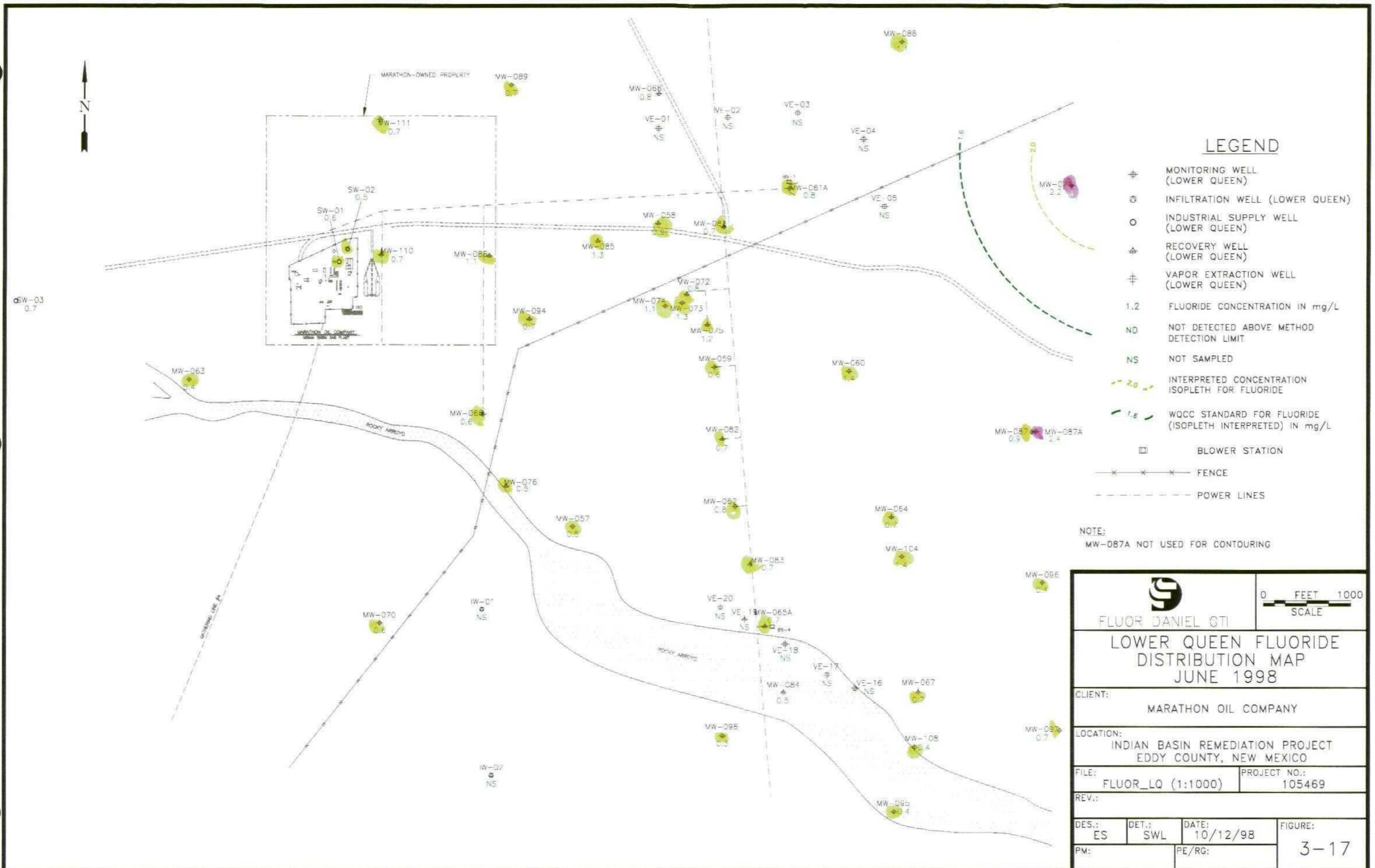
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LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: SULF_LQ (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: SWL	DATE: 11/18/98
PM:	PE/RG:	FIGURE: 3-19



LEGEND

- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- BLOWER STATION
- *—*—*— FENCE
- - - - - POWER LINES
- 560 CHLORIDE CONCENTRATION IN mg/L
- NS NOT SAMPLED
- 560 INTERPRETED CONCENTRATION ISOPLETH FOR CHLORIDE
- 250 WQCC STANDARD FOR CHLORIDE (ISOPLETH INTERPRETED) IN mg/L


 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN CHLORIDE DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
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DES.:	DET.:	DATE:
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PM:	FE/RG:	FIGURE:
		3-18

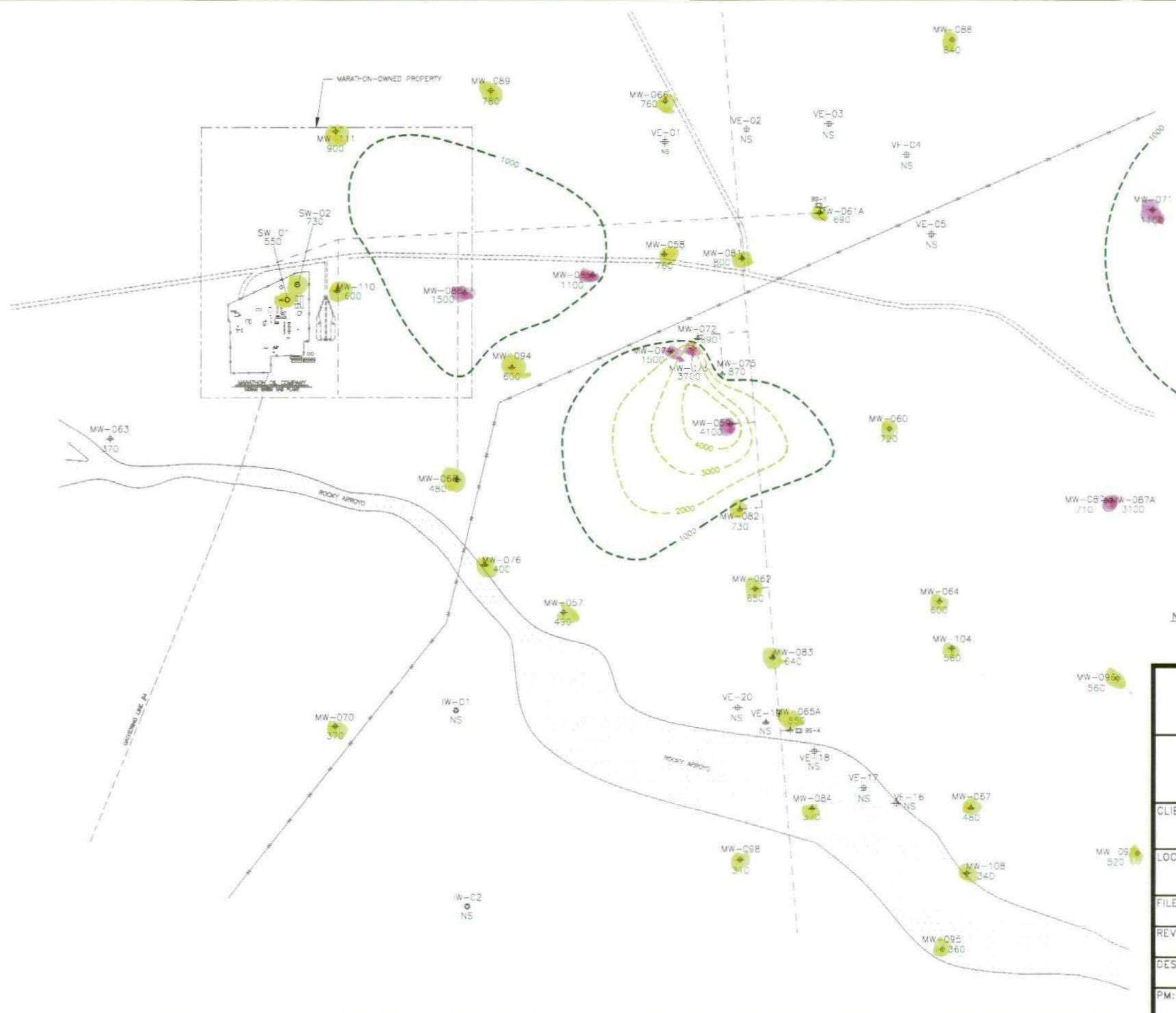


LEGEND

- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊙ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 1.2 FLUORIDE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- NS NOT SAMPLED
- - - 2.0 - - - INTERPRETED CONCENTRATION ISOPLETH FOR FLUORIDE
- - - 1.6 - - - WQCC STANDARD FOR FLUORIDE (ISOPLETH INTERPRETED) IN mg/L
- BLOWER STATION
- × × × × FENCE
- - - - - POWER LINES

NOTE:
MW-087A NOT USED FOR CONTOURING

 FLUOR DANIEL GTI		0 FEET 1000 SCALE	
LOWER QUEEN FLUORIDE DISTRIBUTION MAP JUNE 1998			
CLIENT:			
MARATHON OIL COMPANY			
LOCATION:			
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO			
FILE:		PROJECT NO.:	
FLUOR_LQ (1:1000)		105469	
REV.:			
DES.:	DET.:	DATE:	FIGURE:
ES	SWL	10/12/98	3-17
PM:	PE/RG:		




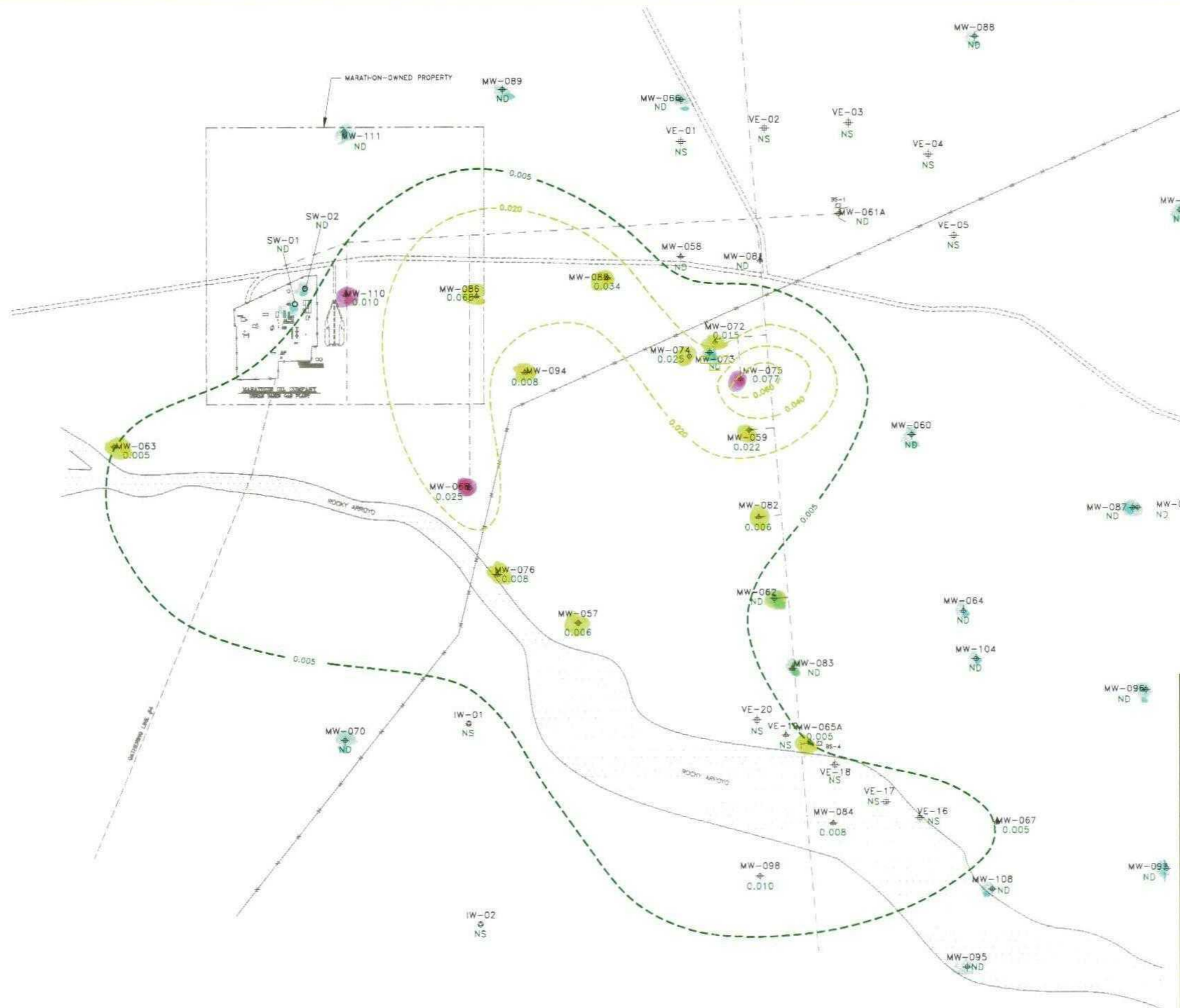
65W 03
410

LEGEND

- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- △ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 870 TDS CONCENTRATION IN mg/L
- NS NOT SAMPLED
- 2000 --- INTERPRETED CONCENTRATION ISOPLETH FOR TDS
- 1000 --- WQCC STANDARD FOR TDS (ISOPLETH INTERPRETED) IN mg/L
- TDS TOTAL DISSOLVED SOLIDS
- BLOWER STATION
- FENCE
- POWER LINES


NOTE:
MW-087A NOT USED FOR CONTOURING

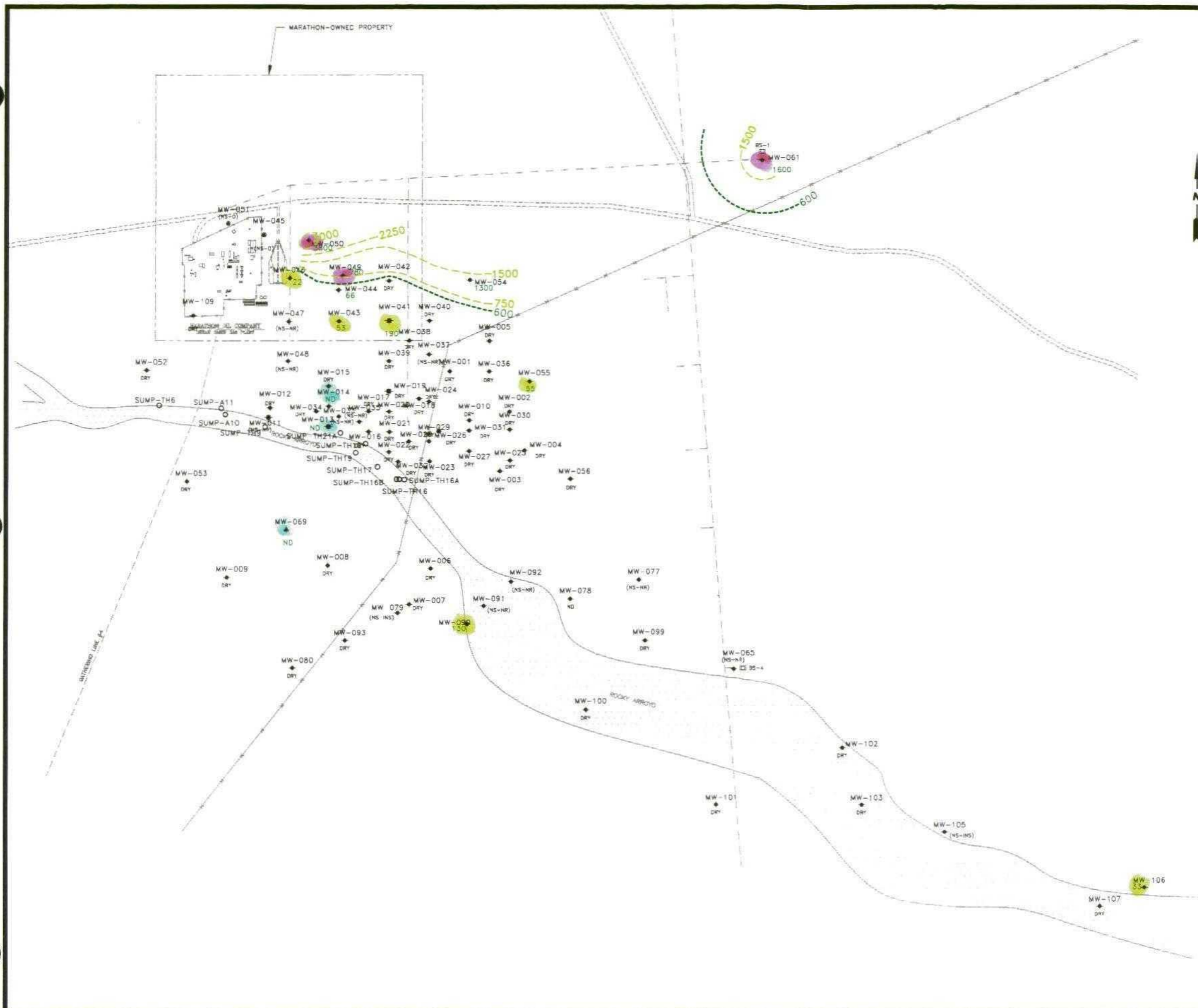
 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN TDS DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: TDS_LQ (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: SWL	DATE: 10/12/98
PM:	PE/RG:	FIGURE: 3-16




LEGEND

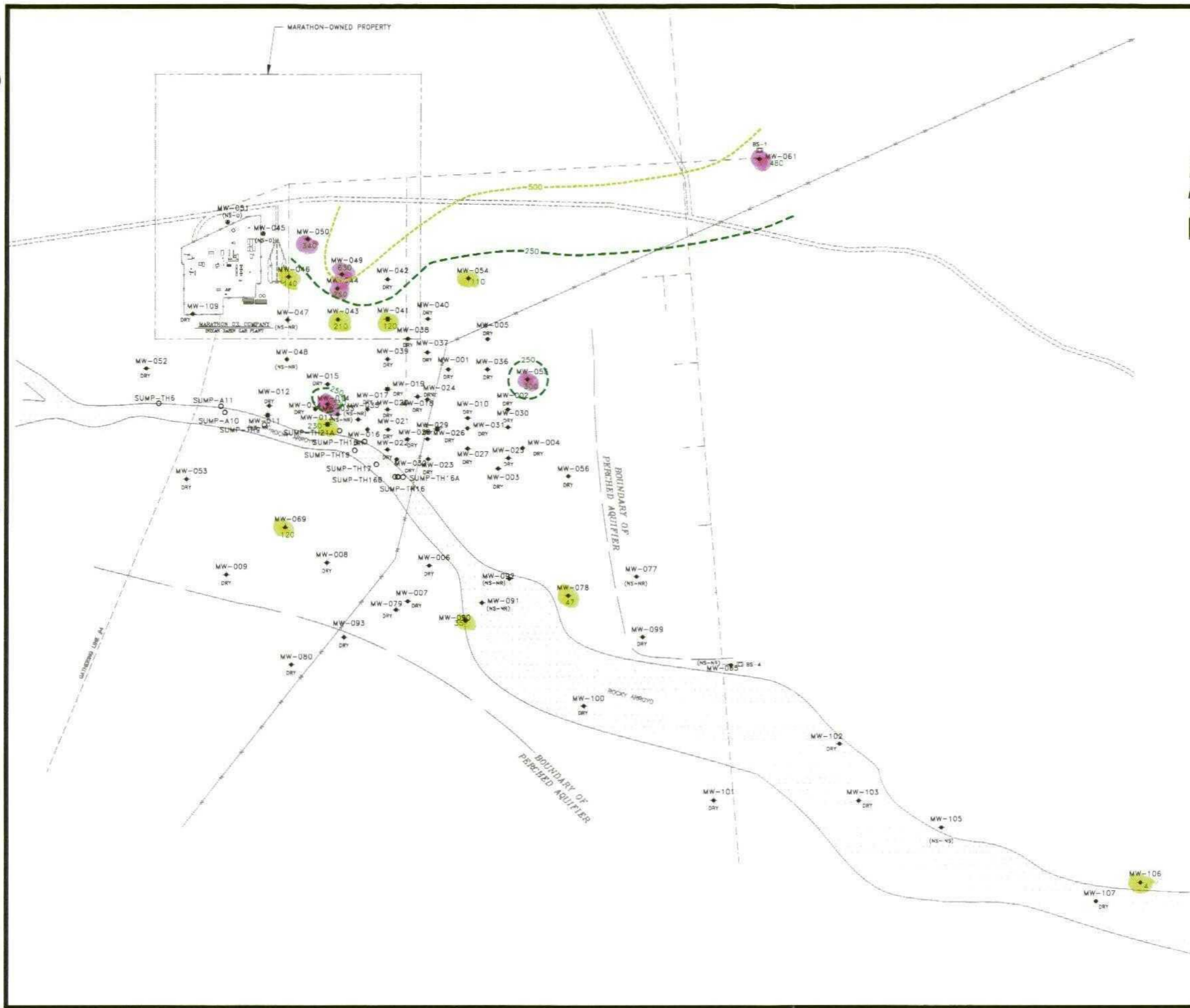
- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊙ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 0.051 TOTAL PHENOLS CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMITS
- NS NOT SAMPLED
- 0.2 --- INTERPRETED CONCENTRATION ISOPLETH FOR PHENOLS
- 0.005 --- WQCC STANDARD FOR TOTAL PHENOLS (ISOPLETH INTERPRETED) IN mg/L
- BLOWER STATION
- FENCE
- POWER LINES

 FLUOR DANIEL GTI	0 FEET 1000 SCALE		
LOWER QUEEN TOTAL PHENOLS DISTRIBUTION MAP JUNE 1998			
CLIENT: MARATHON OIL COMPANY			
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO			
FILE: PHENOL_LQ (1:1000)	PROJECT NO.: 105469		
REV.:			
DES.: ES	DET.: SWL	DATE: 10/1/98	FIGURE: 3-15
PM:	PE/RG:		




- ### LEGEND
- MONITORING WELL (SHALLOW ZONE)
 - INFILTRATION WELL (SHALLOW ZONE)
 - RECOVERY SUMP (SHALLOW ZONE)
 - ▲ RECOVERY WELL (SHALLOW ZONE)
 - VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
 - BLOWER STATION
 - FENCING
 - POWER LINE
 - 1500 INTERPRETED CONCENTRATION ISOPLETH FOR SULFATE
 - 600 WQCC STANDARD FOR SULFATE IN mg/L (ISOPLETH INTERPRETED)
 - 33 SULFATE CONCENTRATION IN mg/L
 - ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
 - DRY WELL DRY
 - NS-O NOT SAMPLED - OBSTRUCTED
 - NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
 - NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING

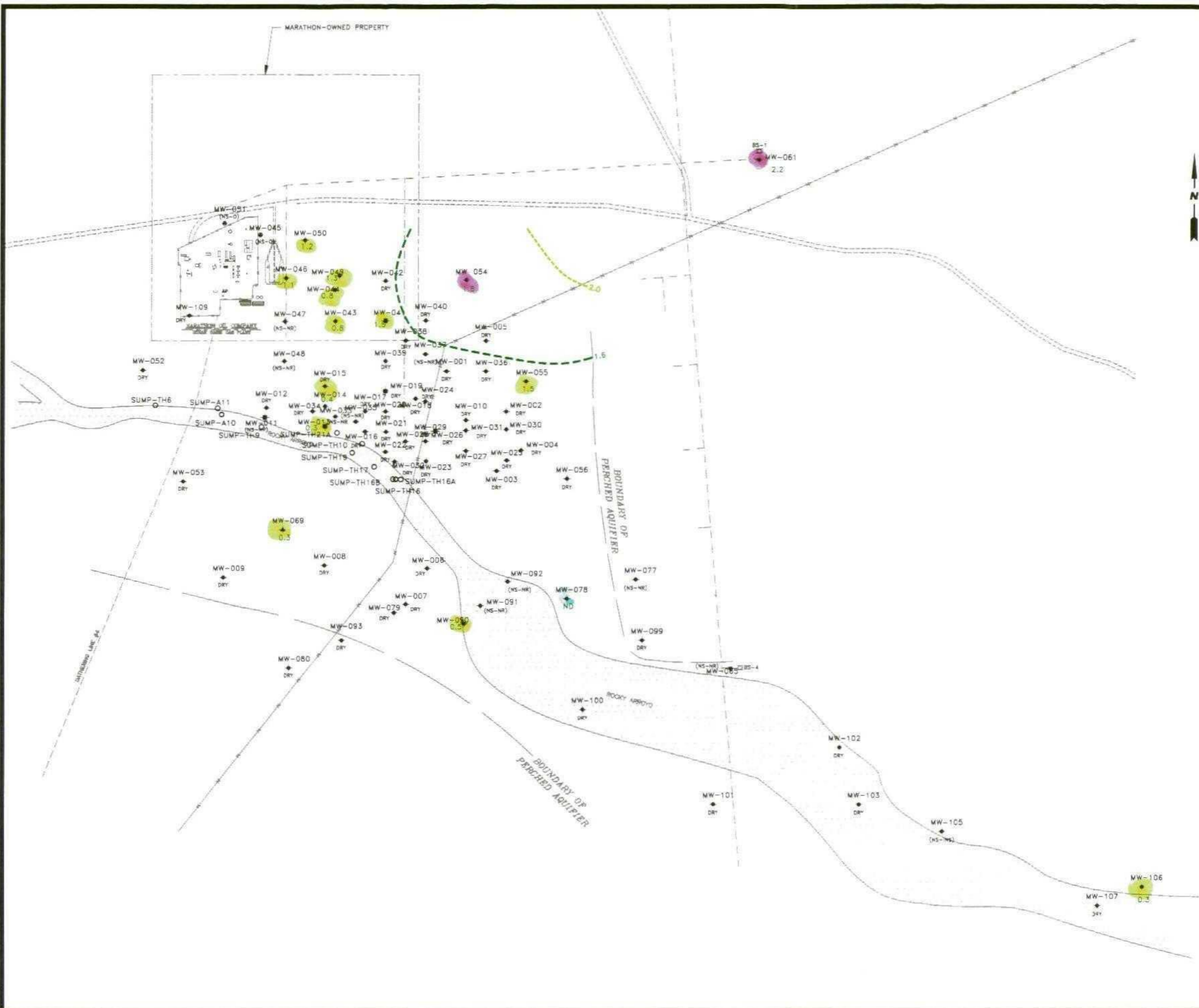
 FLUOR DANIEL GT		0 FEET 1000 SCALE
SHALLOW ZONE SULFATE DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: SULF_SH2 (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: DH	DATE: 11/18/98
PM:	PE/RG:	FIGURE: 3-14



LEGEND


- MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 500 — INTERPRETED CONCENTRATION ISOPLETH FOR CHLORIDE
- 250 — WQCC STANDARD FOR CHLORIDE IN mg/L (ISOPLETH INTERPRETED)
- 0.0004 CHLORIDE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-O NOT SAMPLED - OBSTRUCTED
- NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING

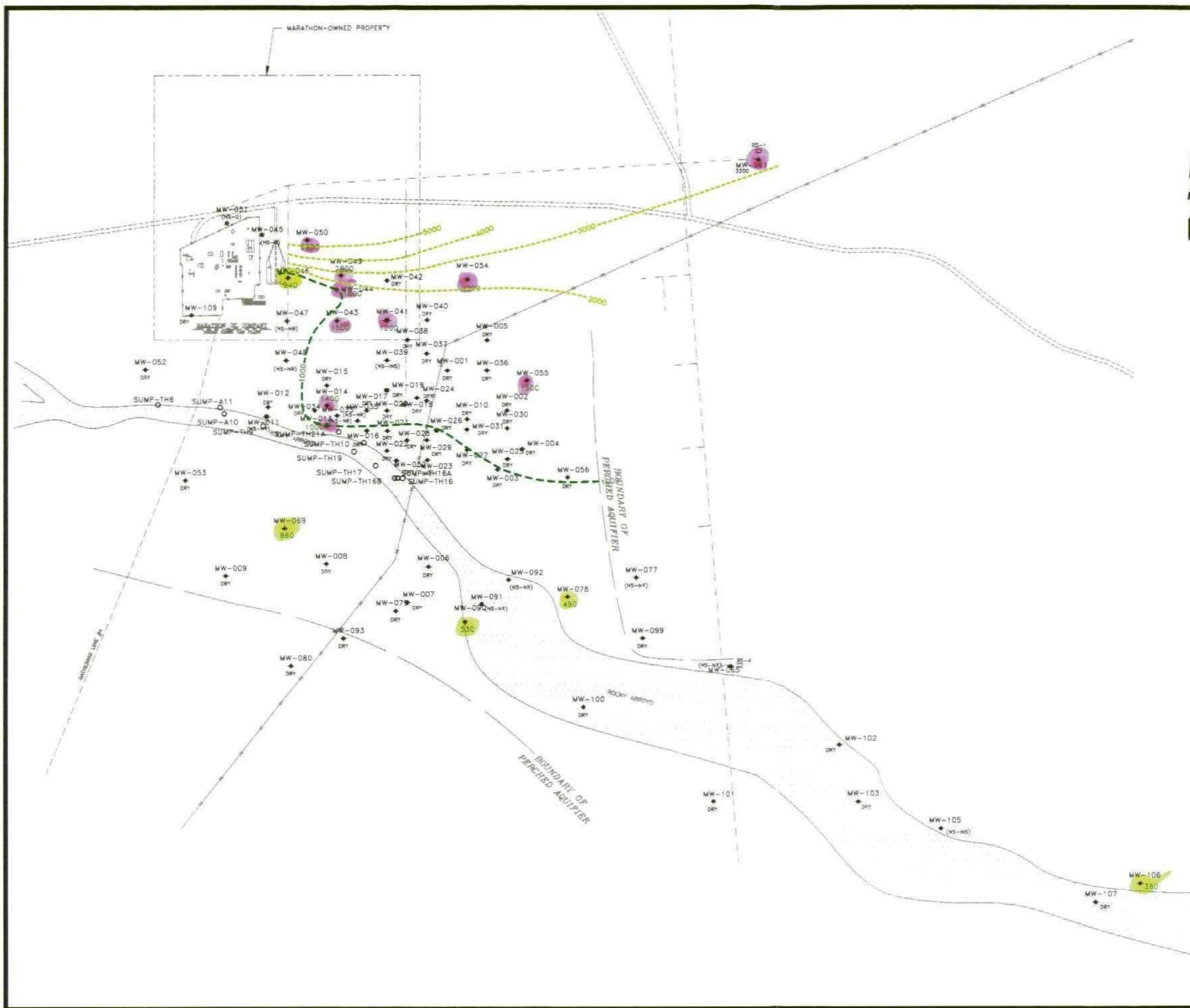
 FLJOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE CHLORIDE DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
CHLOR-SH2 (1:1000)	105469	
REV.:		
DES.:	DET.:	DATE:
CL	DH	11/18/98
PM:	PE/RG:	FIGURE:
		3-13



LEGEND


- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- POWER LINE
- 2.0 INTERPRETED CONCENTRATION ISOPLETH FOR FLUORIDE
- 1.6 WQCC STANDARD FOR FLUORIDE IN mg/L (ISOPLETH INTERPRETED)
- 0.0004 FLUORIDE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-O NOT SAMPLED - OBSTRUCTED
- NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING

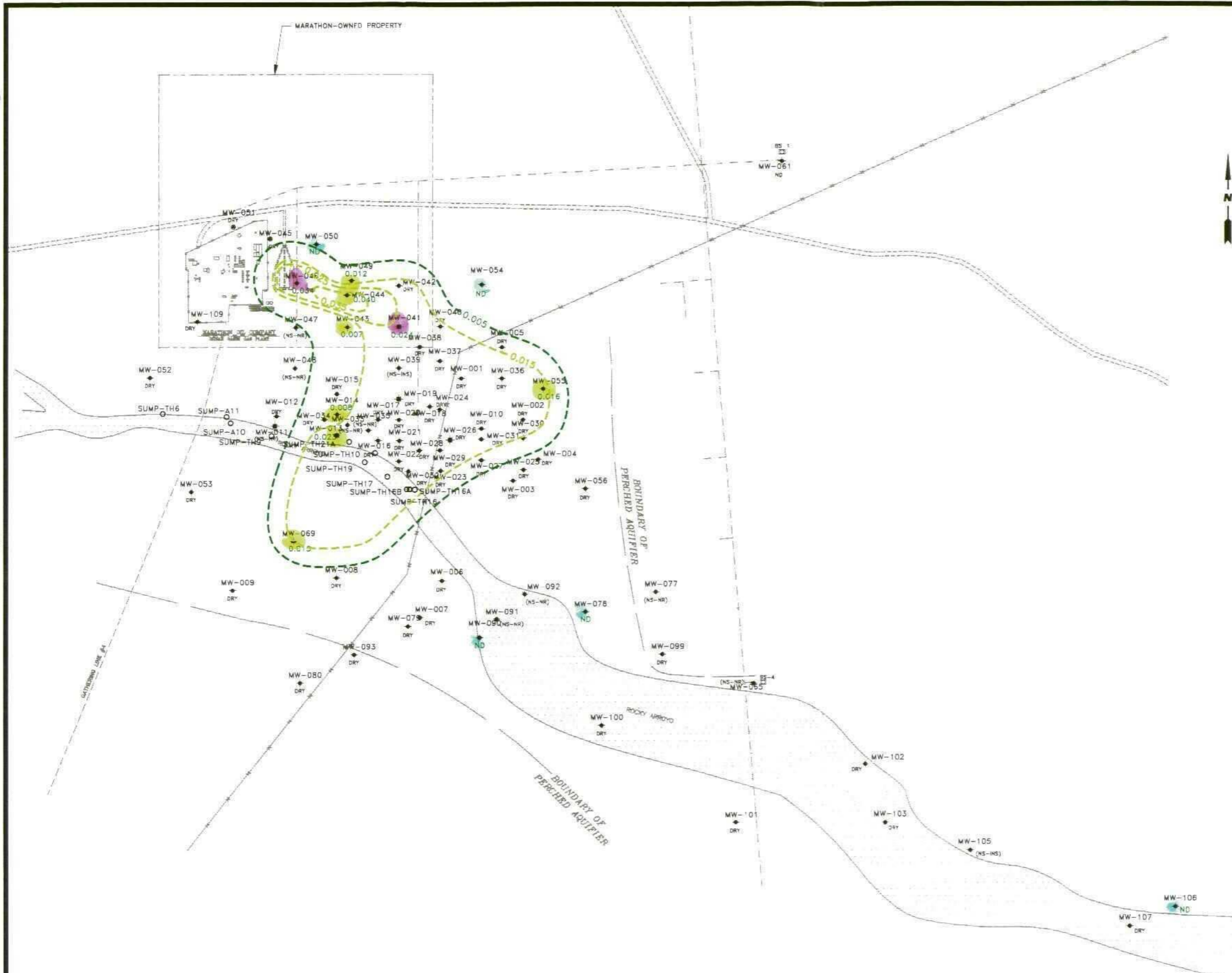
 FLJOR DANIEL GT		0 FEET 1000 SCALE
SHALLOW ZONE FLUORIDE DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: FLUOR_SH2 (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: CL	DET.: DH	DATE: 11/18/98
PM:	PE/RG:	FIGURE: 3-12



LEGEND


- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 2000 --- INTERPRETED CONCENTRATION ISOPLETH FOR TDS
- 1000 --- WQCC STANDARD FOR TDS IN mg/L (ISOPLETH INTERPRETED)
- 1500 TDS CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-0 NOT SAMPLED - OBSTRUCTED
- NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING
- TDS TOTAL DISSOLVED SOLIDS

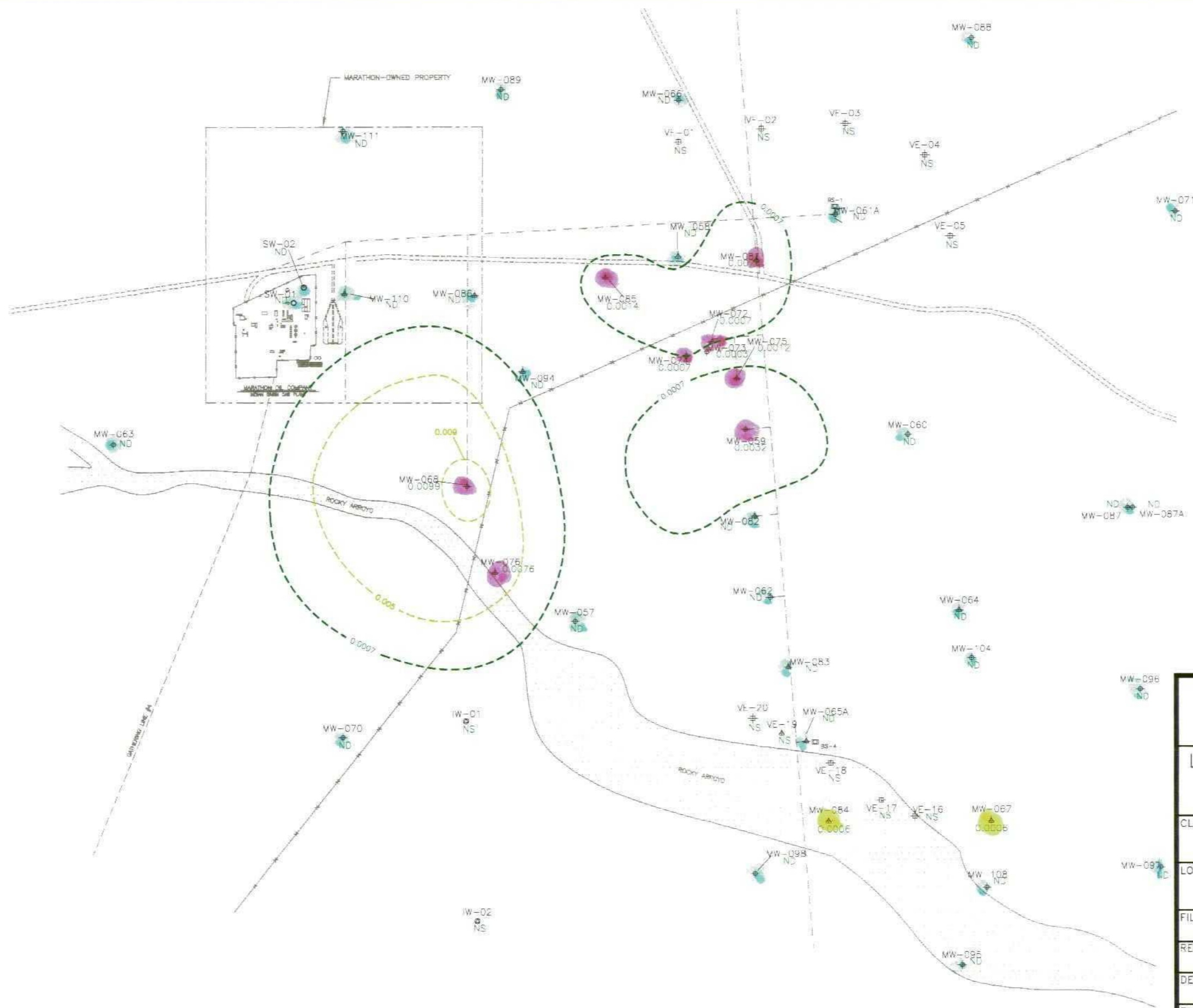
 FLUOR DANIEL GT		0 FEET 1000 SCALE
SHALLOW ZONE TDS DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: TDS_SH2 (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: DH	DATE: 11/18/98
PM:	PE/RG:	FIGURE: 3-11



LEGEND


- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 0.010 — INTERPRETED CONCENTRATION ISOPLETH FOR TOTAL PHENOLS
- 0.005 — WQCC STANDARD FOR TOTAL PHENOLS IN mg/L (ISOPLETH INTERPRETED)
- 0.034 TOTAL PHENOLS CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-O NOT SAMPLED - OBSTRUCTED
- NS-INS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING

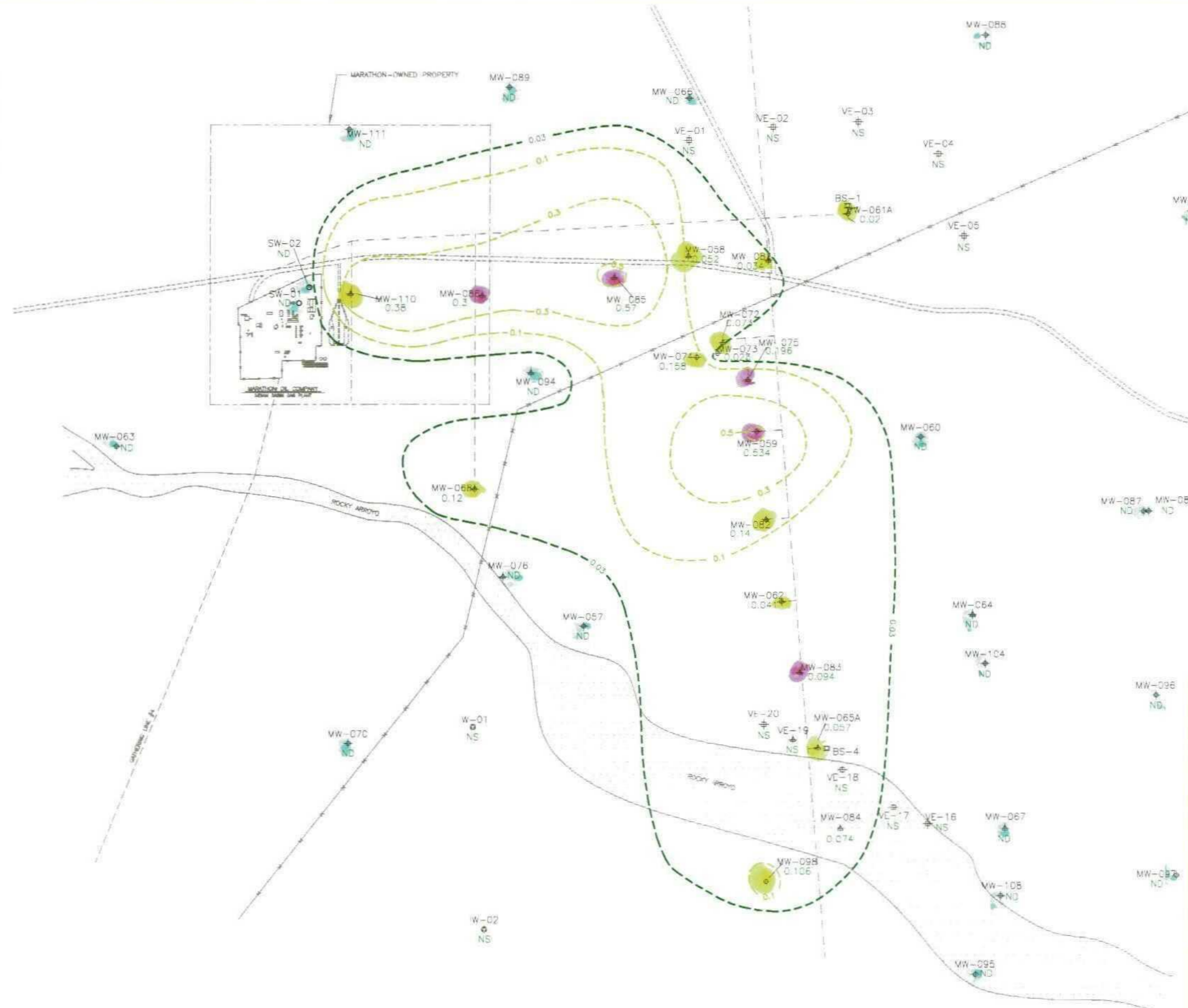
 FLUOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE TOTAL PHENOLS DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: PHEN_SH1 (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: CL	DET.: DH	DATE: 11/18/98
PM:	PE/RG:	FIGURE: 3-10



LEGEND

- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 0.0012 BENZO(a)PYRENE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMITS
- NS NOT SAMPLED
- 0.009 INTERPRETED CONCENTRATION ISOPLETH FOR BENZO(a)PYRENE
- 0.0007 WQCC STANDARD FOR BENZO(a)PYRENE (ISOPLETH INTERPRETED) IN mg/L
- BLOWER STATION
- *—*—*— FENCE
- POWER LINES

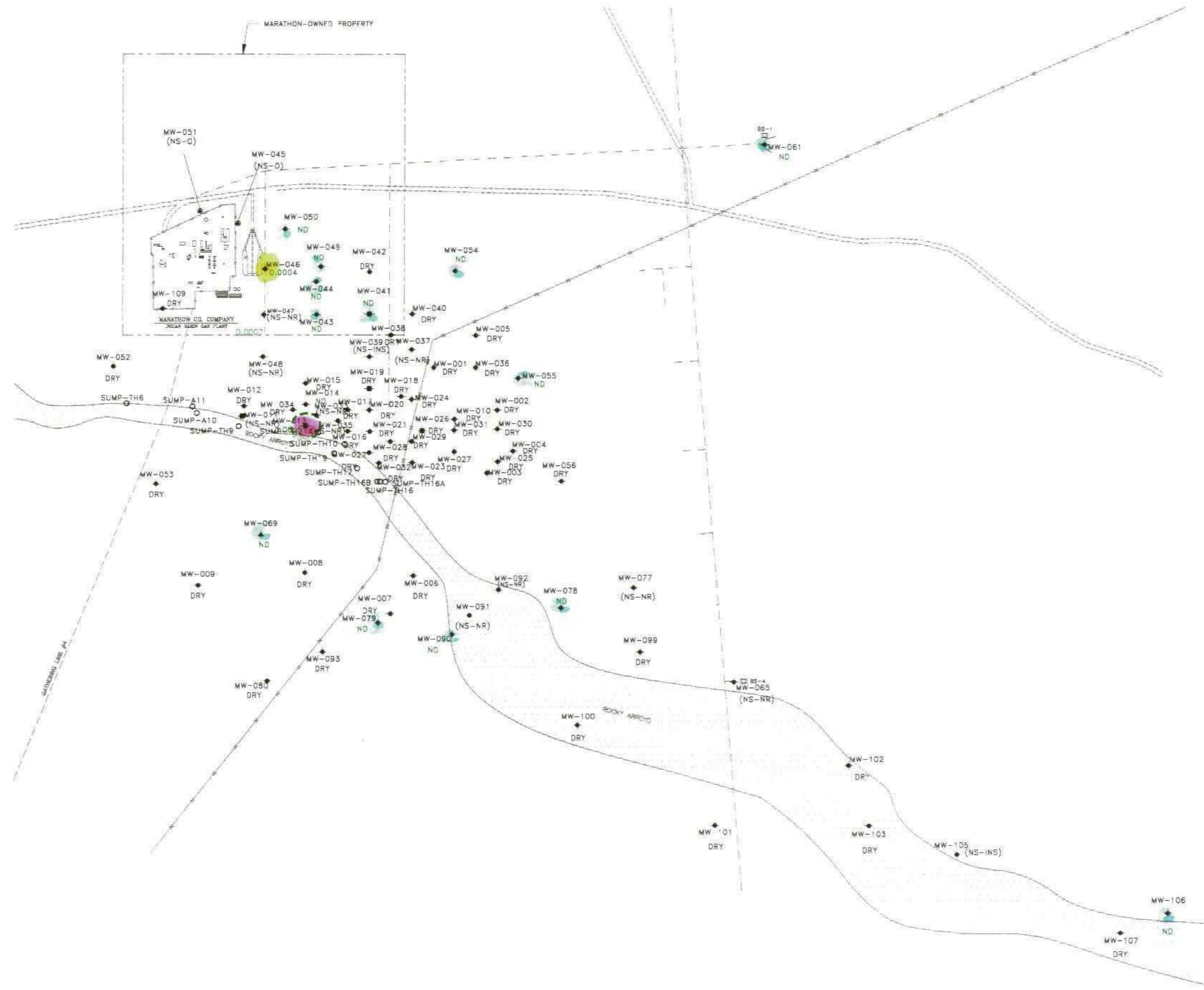
 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN BENZO(a)PYRENE DISTRIBUTION MAP JUNE 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: SVOC_BEN (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: SWL	DATE: 10/12/98
PM:	PE/RG:	FIGURE: 3-9



LEGEND


- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 0.196 TOTAL PAH CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- NS NOT SAMPLED
- 0.1 --- INTERPRETED CONCENTRATION ISOPLETH FOR TOTAL PAH
- 0.03 --- WQCC STANDARD FOR TOTAL PAH (ISOPLETH INTERPRETED) IN mg/L
- PAHS = TOTAL OF NAPHTHALENE, 1-METHYLNAPHTHALENE, AND 2-METHYLNAPHTHALENE
- BLOWER STATION
- FENCE
- POWER LINES

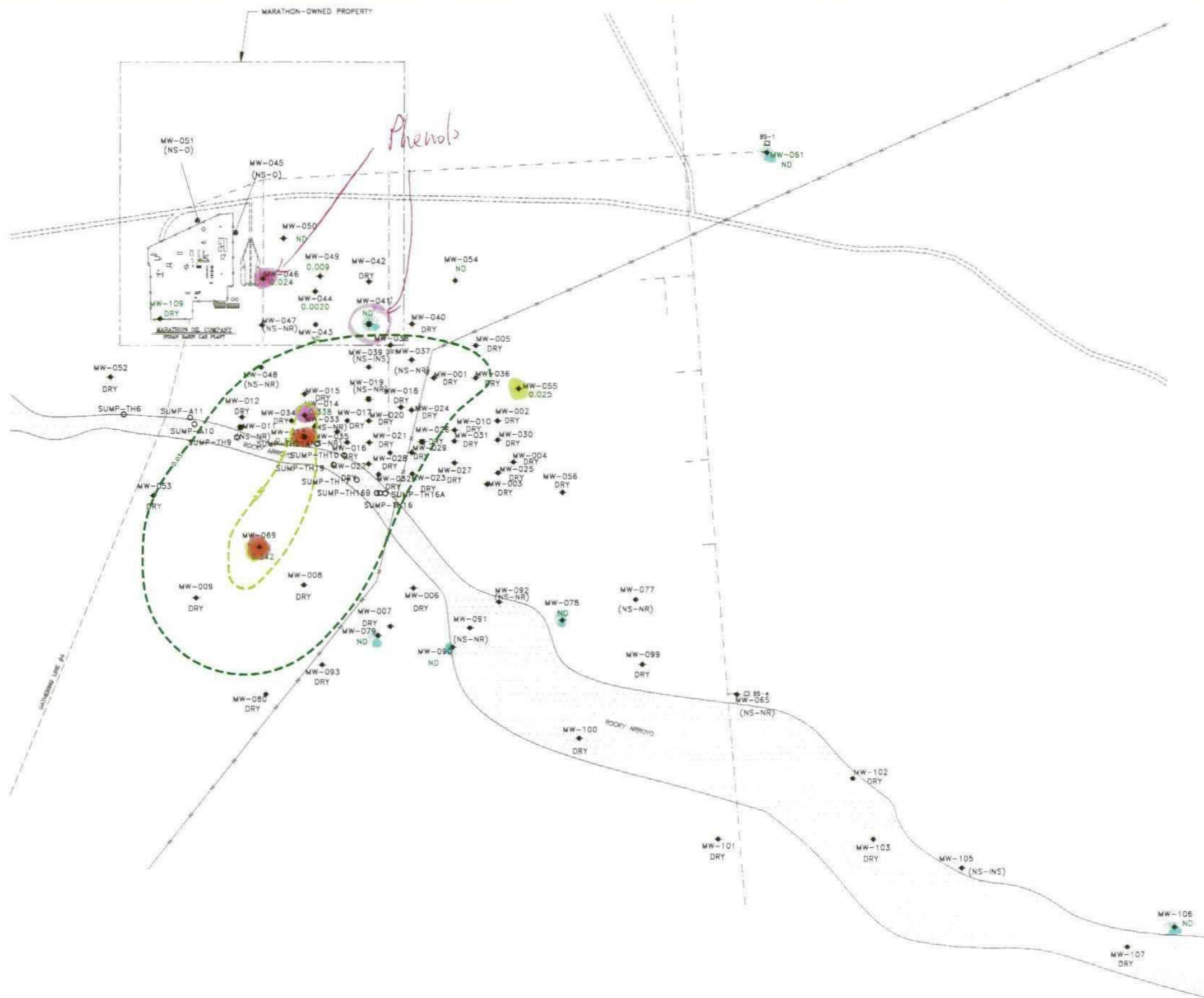
		0 FEET 1000 SCALE	
LOWER QUEEN TOTAL PAH DISTRIBUTION MAP JUNE 1998			
CLIENT: MARATHON OIL COMPANY			
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO			
FILE: SVOC_NAP (1:1000)		PROJECT NO.: 105469	
REV.:			
DES.: ES	DET.: SWL	DATE: 10/12/98	FIGURE: 3-8
PM:		PE/RG:	



LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- ▲ INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- BLOWER STATION
- FENCING
- - - POWER LINE
- 0.0007 WQCC STANDARD FOR BENZO(A)PYRENE IN mg/L (ISOPLETH INTERPRETED)
- 0.0004 BENZO(A)PYRENE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-C NOT SAMPLED - OBSTRUCTED
- NS-NS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING



 FLUOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE BENZO(A)PYRENE DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
BENZ(A)_SH3 (1:1000)	105469	
REV.:		
DES.:	DET.:	DATE:
ES	DH	9/28/98
PM:	PE/RG:	FIGURE:
		3-7

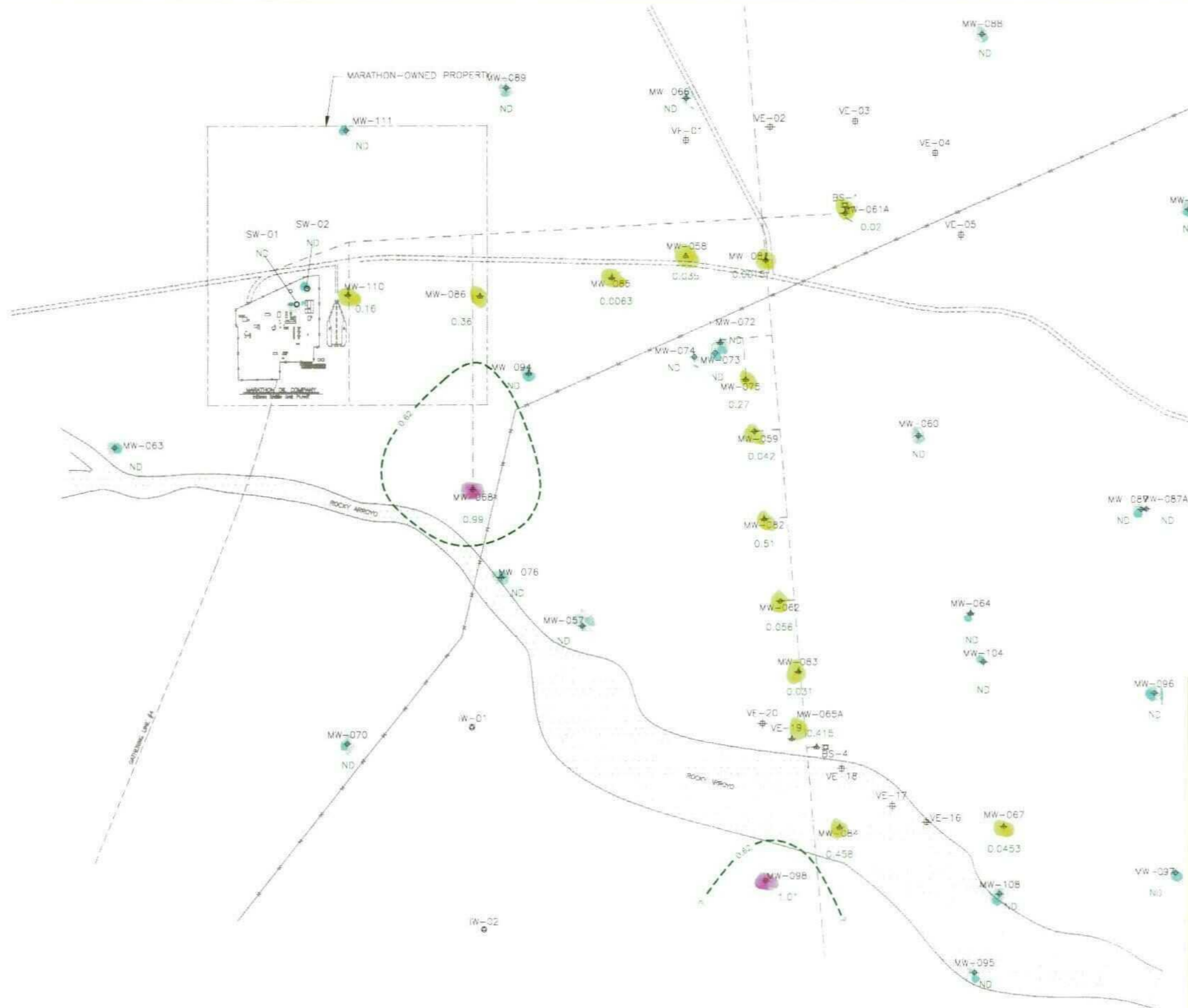


LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- ⊗ INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- ICI BLOWER STATION
- FENCING
- POWER LINE
- 0.374 INTERPRETED CONCENTRATION ISOPLETH FOR TOTAL PAH
- 0.03 WQCC STANDARD FOR TOTAL PAH IN mg/L (ISOPLETH INTERPRETED)
- 0.374 TOTAL PAH CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-O NOT SAMPLED - OBSTRUCTED
- NS-NS NOT SAMPLED - INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED - GROUNDWATER DID NOT RECOVER AFTER PURGING


NOTE:
PAHs = TOTAL OF NAPHTHALENE,
1-METHYLNAPHTHALENE, AND
2-METHYLNAPHTHALENE

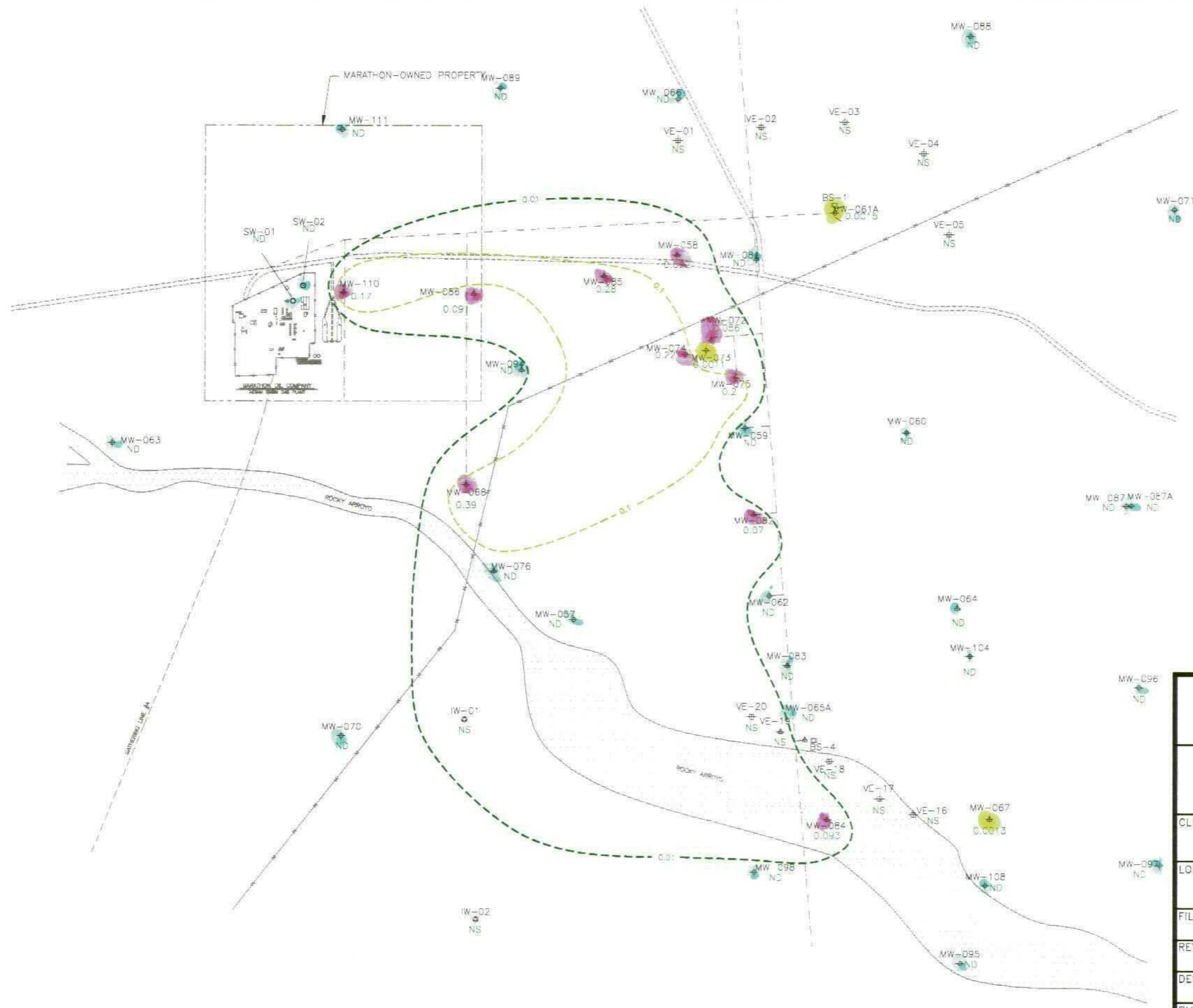
 FLUOR DANIEL GTI		 SCALE	
SHALLOW ZONE TOTAL PAH DISTRIBUTION MAP JUNE 1998			
CLIENT:			
MARATHON OIL COMPANY			
LOCATION:			
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO			
FILE:		PROJECT NO.:	
NAPH-SH3 (1:1000)		105469	
REV.:			
DES.:	DET.:	DATE:	FIGURE:
ES	DH	11/18/98	3-6
PM:		PE/RC:	



LEGEND


- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- - - 0.0012 WQCC STANDARD FOR XYLENES IN mg/L (ISOPLETH INTERPRETED)
- 0.0012 XYLENES CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMITS
- NS NOT SAMPLED
- BLOWER STATION
- FENCE
- - - - - POWER LINES

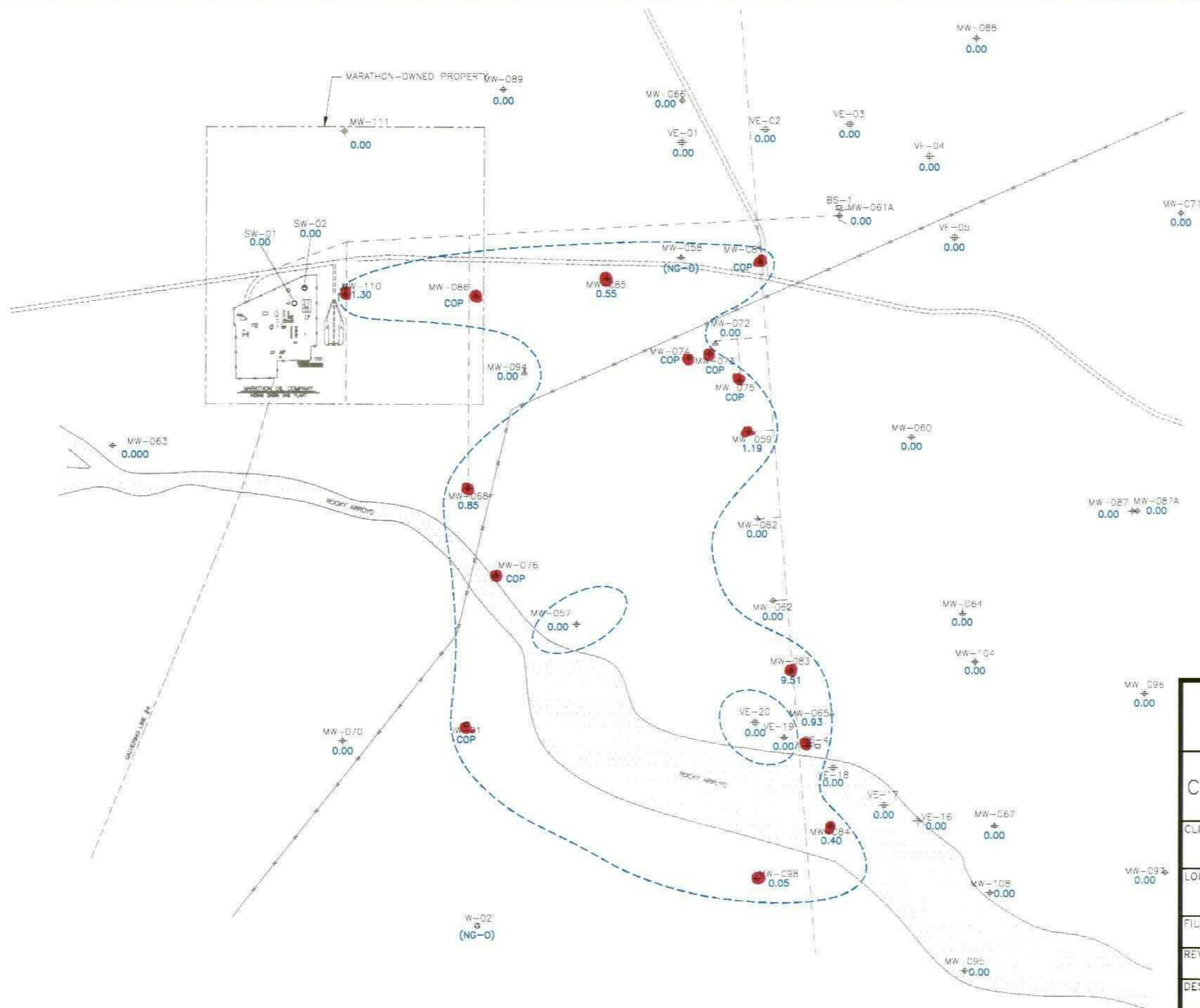
 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN XYLENES DISTRIBUTION MAP JUNE-JULY 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: XLENE_LQ (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: SWL	DATE: 10/12/98
PM:	PE/RG:	FIGURE: 3-5



LEGEND


- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊙ INFILTRATION WELL (LOWER QUEEN)
- ⊕ INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ⊕ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- 0.0012 BENZENE CONCENTRATION IN mg/L
- 0.01- INTERPRETED CONCENTRATION ISOPLETH FOR BENZENE
- 0.01- WQCC STANDARD FOR BENZENE IN mg/L (ISOPLETH INTERPRETED)
- ND NOT DETECTED ABOVE METHOD DETECTION LIMITS
- NS NOT SAMPLED
- ⊠ BLOWER STATION
- FENCE
- - - - POWER LINES

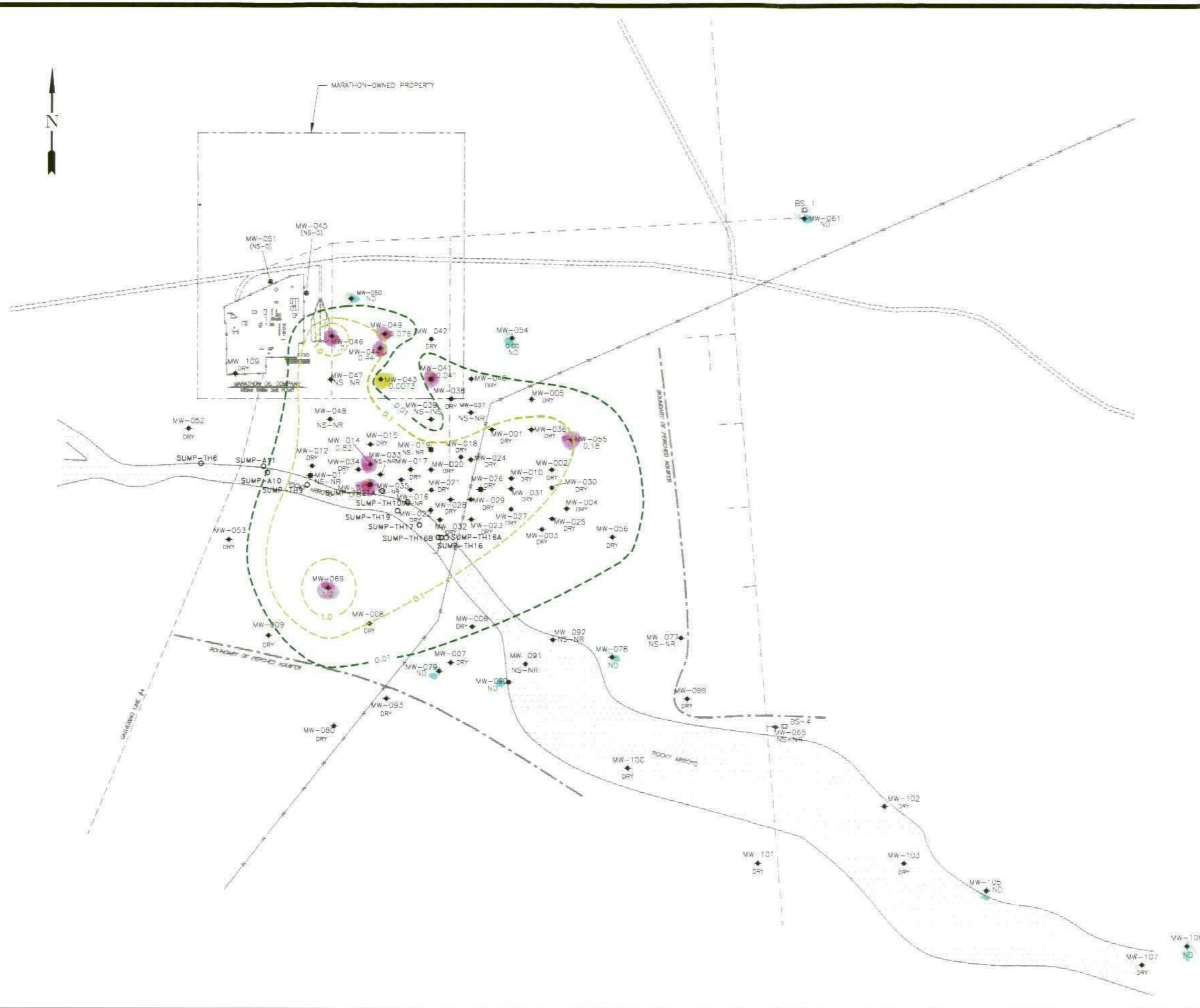
 FLUOR DANIEL GTI		0 FEET 1000 SCALE
LOWER QUEEN BENZENE DISTRIBUTION MAP JUNE-JULY 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: BENZ_LQ (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: SWL	DATE: 10/12/98
PM:	PE/RG:	FIGURE: 3-4



LEGEND


- ⊕ MONITORING WELL (LOWER QUEEN)
- ⊗ INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- △ RECOVERY WELL (LOWER QUEEN)
- ⊕ VAPOR EXTRACTION WELL (LOWER QUEEN)
- - - CONDENSATE PLUME
- 0.051 APPARENT CONDENSATE THICKNESS (FT.)
- COP CONDENSATE ON PROBE
- NG-O NOT GAUGED-OBSTRUCTED
- BLOWER STATION
- FENCE
- - - POWER LINES

 FLUOR DANIEL GT		0 FEET 1000 SCALE
LOWER QUEEN CONDENSATE DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
COND_LQ (1:1000)	105469	
REV.:		
DES.:	DET.:	DATE:
ES	SWL	10/12/98
PM:	PE/RG:	FIGURE:
		3-3



LEGEND

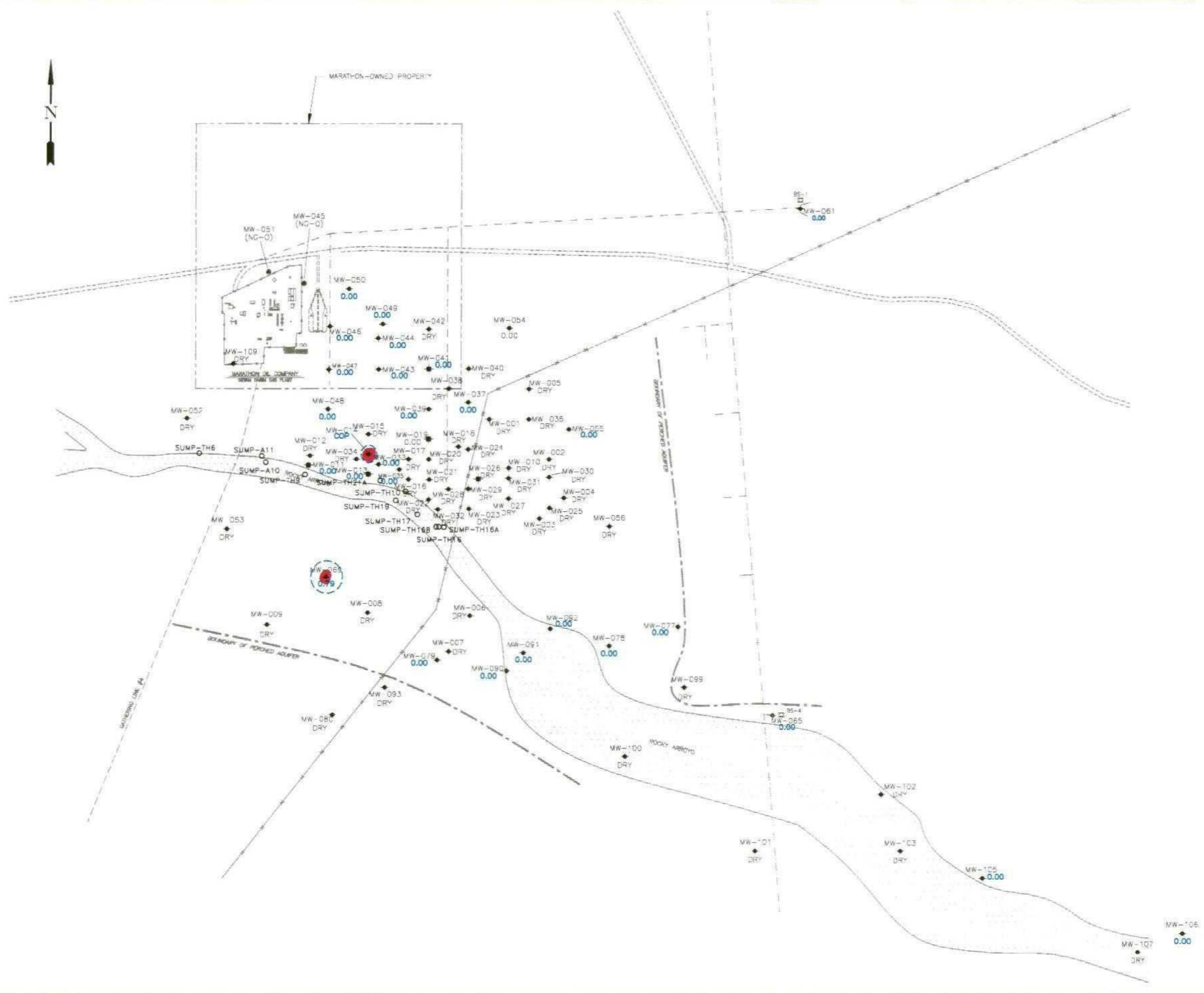
- MONITORING WELL (SHALLOW ZONE)
- ⊙ INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- 1.0 — INTERPRETED CONCENTRATION ISOPLETH FOR BENZENE
- 0.01 — WQCC STANDARD FOR BENZENE IN mg/L (ISOPLETH INTERPRETED)
- 1.2 BENZENE CONCENTRATION IN mg/L
- ND NOT DETECTED ABOVE METHOD DETECTION LIMIT
- DRY WELL DRY
- NS-0 NOT SAMPLED—OBSTRUCTED
- NS-INS NOT SAMPLED—INSUFFICIENT WATER IN WELL
- NS-NR NOT SAMPLED—GROUNDWATER DID NOT RECOVER AFTER PURGING
- BLOWER STATION
- * — * — * — FENCE
- — — — — POWER LINES


 FLUOR DANIEL GTI		0 FEET 1000 SCALE
SHALLOW ZONE BENZENE DISTRIBUTION MAP JUNE-JULY 1998		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: BENZ_SH3 (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: ES	DET.: SWL	DATE: 11/17/98
PM:	PE/RG:	FIGURE: 3-2

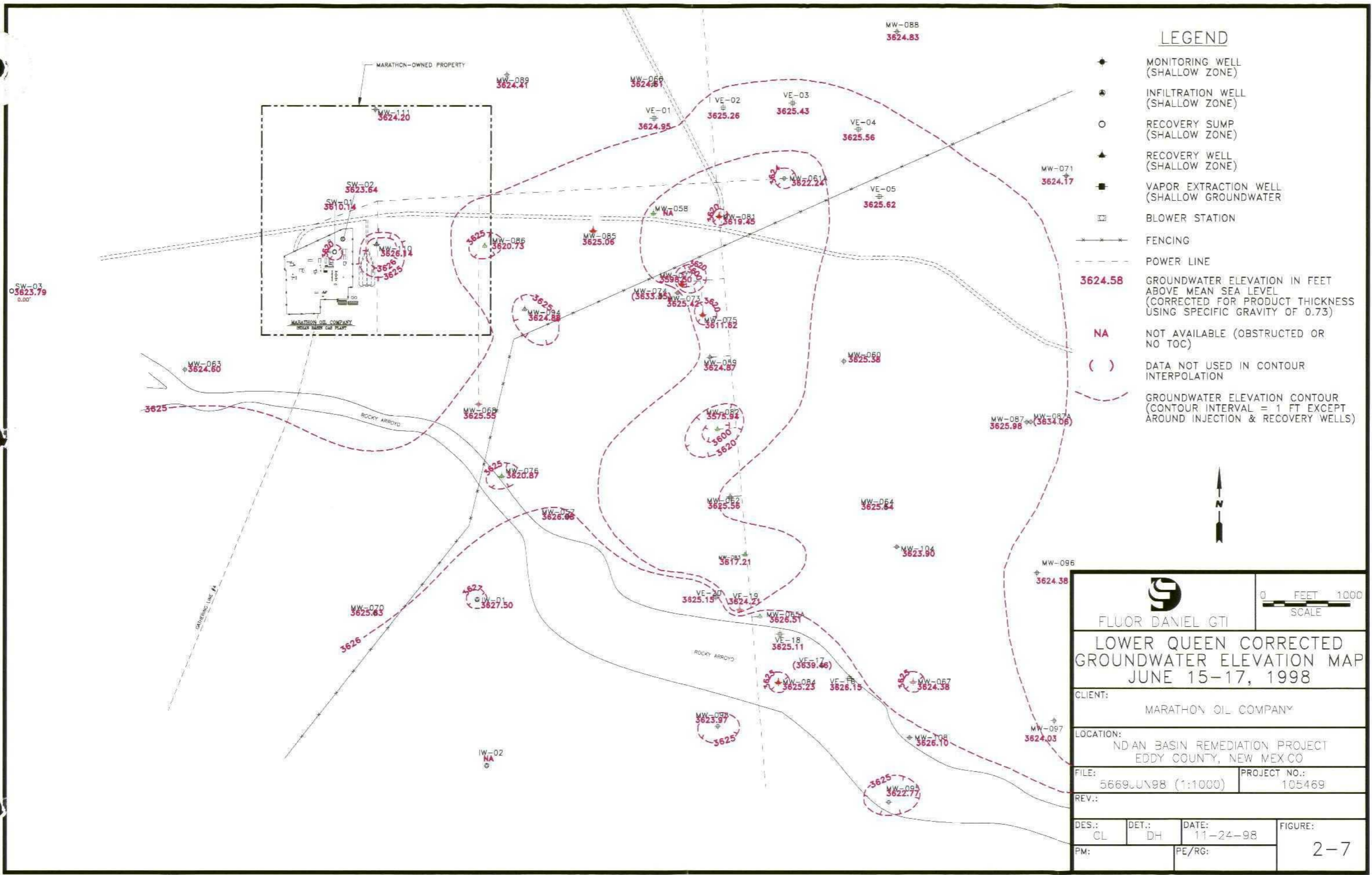


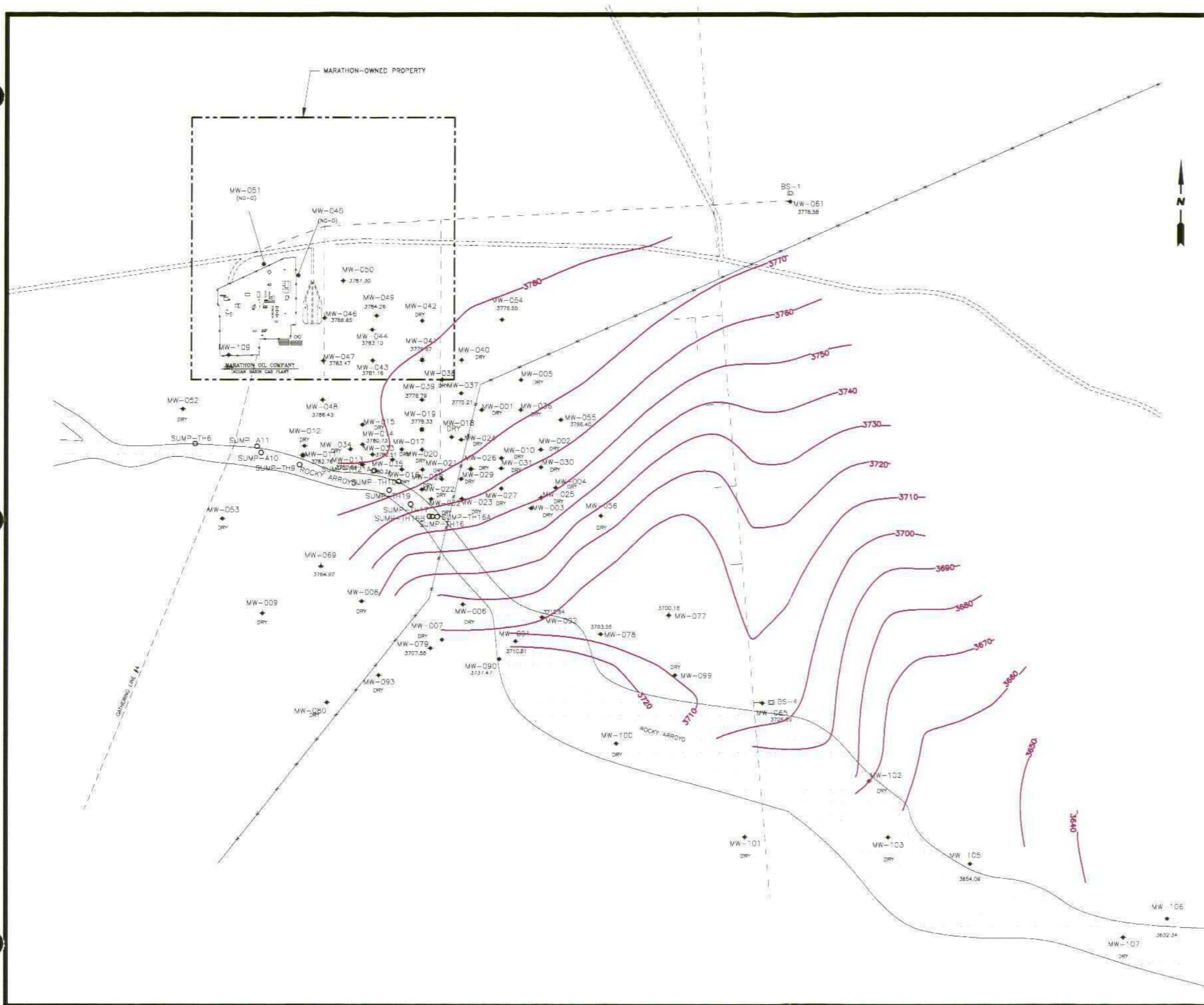
LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ▲ RECOVERY WELL (SHALLOW ZONE)
- VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- CONDENSATE PLUME
- 0.79 APPARENT CONDENSATE THICKNESS (FEET)
- COP CONDENSATE ON PROBE
- NG-O NOT GAUGED-OBSTRUCTED
- DRY WELL DRY
- BLOWER STATION
- FENCE
- - - POWER LINES




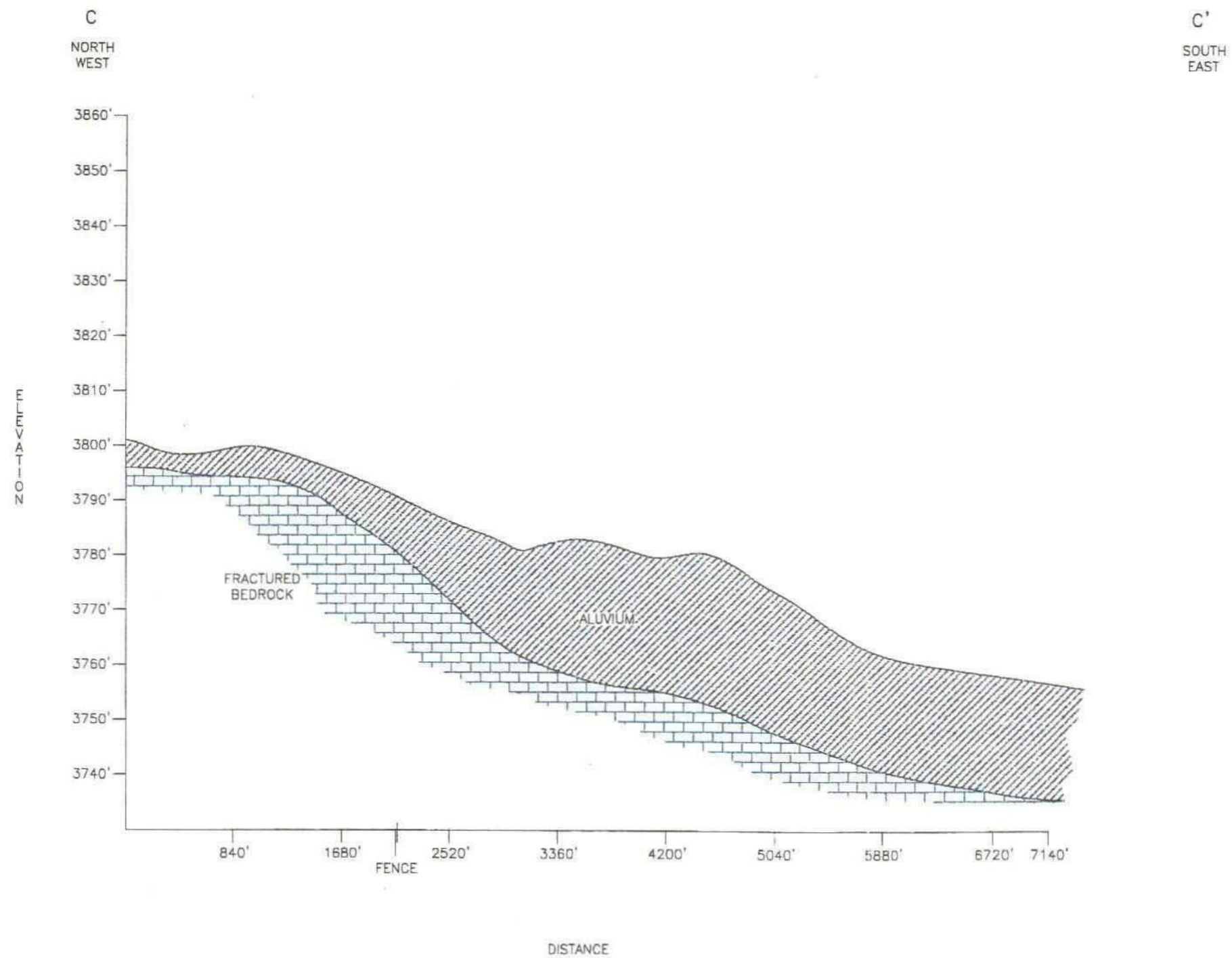
 FLUOR DANIEL OTI		0 FEET 1000 SCALE
SHALLOW ZONE CONDENSATE DISTRIBUTION MAP JUNE 1998		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	PROJECT NO.:	
COND_SH2 (1:1000)	105469	
REV.:		
DES.:	DET.:	DATE:
ES	SWL	11/17/98
PM:	PE/RG:	FIGURE:
		3-1





- ### LEGEND
- ◆ MONITORING WELL (SHALLOW ZONE)
 - INFILTRATION WELL (SHALLOW ZONE)
 - RECOVERY SUMP (SHALLOW ZONE)
 - ▲ RECOVERY WELL (SHALLOW ZONE)
 - VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
 - BLOWER STATION
 - FENCING
 - - - POWER LINE
 - 3654.09 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
 - 3660 — GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 10 FEET)
 - ◆ DRY WELL DRY
 - ◇ NG ○ NOT GAUGED - OBSTRUCTED

 FLUOR DANIEL GTI		0 FEET 1000 SCALE	
SHALLOW ZONE CORRECTED GROUNDWATER ELEVATION MAP JUNE 15-17, 1998			
CLIENT:			
MARATHON OIL COMPANY			
LOCATION:			
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO			
FILE:	5469SGW698 (1:1000)	PROJECT NO.:	105469
REV.:			
DES.:	CL	DET.:	D-
DATE:	11/17/98		FIGURE:
PM:	PE/RG:		2-6



INDIAN BASIN REMEDIATION PROJECT

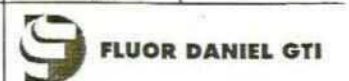
PROJECT NO.: 023350232

LOCATION: EDDY COUNTY, NM

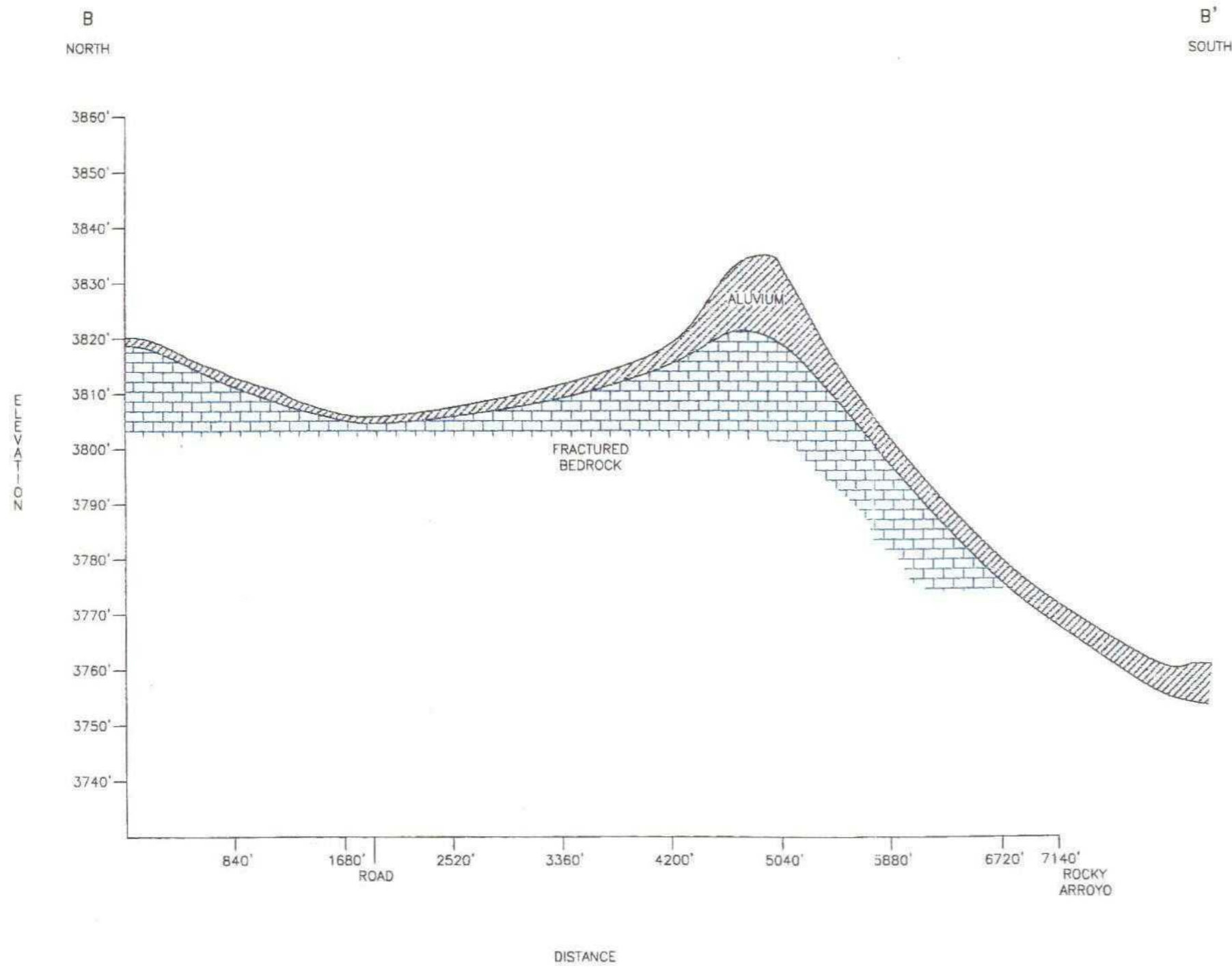
CROSS SECTION C-C'

DRAWN BY: JU	DATE: 7/9/97	CHECKED BY:	DATE:
FOLDER: Marathon Oil		APPROVED BY:	DATE:
FILE: X-sect C-C'			

FIGURE 2-5



0174-CXC



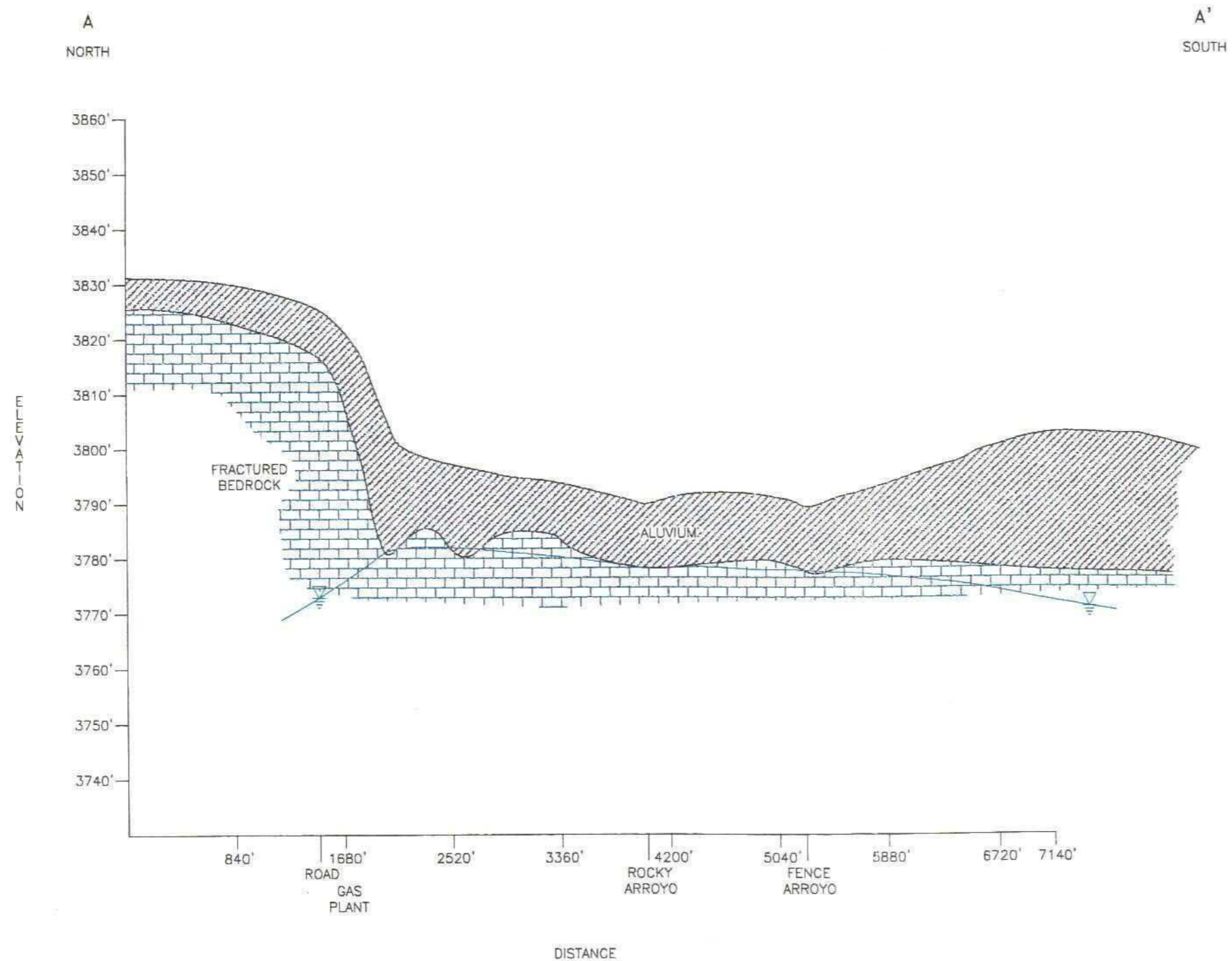
INDIAN BASIN REMEDIATION PROJECT
 PROJECT NO.: 023350232 LOCATION: EDDY COUNTY, NM

CROSS SECTION B-B'

DRAWN BY: JU	DATE: 7/9/97	CHECKED BY:	DATE:
FOLDER: Marathon Oil	FILE: X-sect B-B'	APPROVED BY:	DATE:

FIGURE 2-4 FLUOR DANIEL GTI

0174-CXB

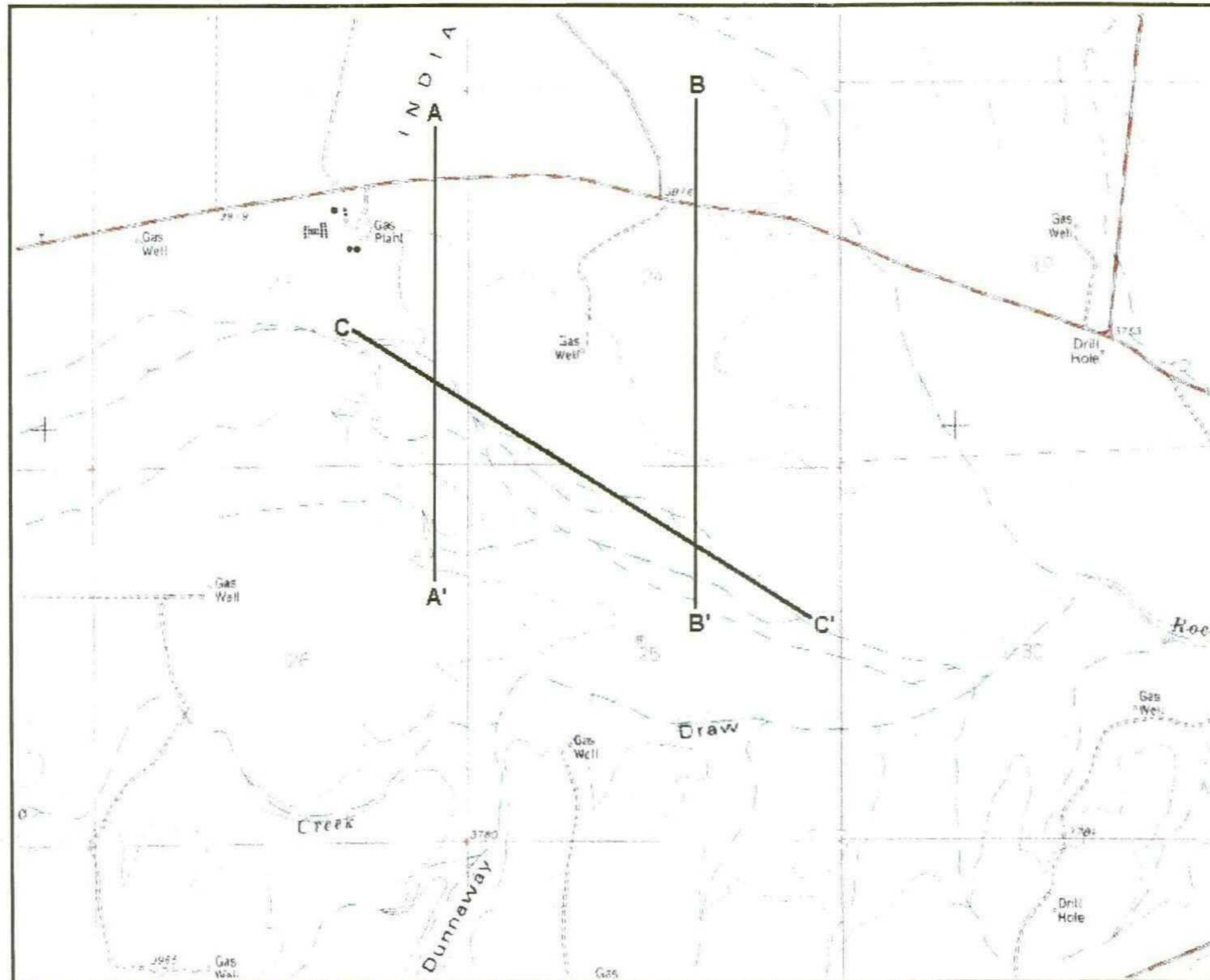


INDIAN BASIN REMEDIATION PROJECT
 PROJECT NO.: 023350232 LOCATION: EDDY COUNTY, NM

CROSS SECTION A-A'

DRAWN BY: JU	DATE: 7/9/97	CHECKED BY:	DATE:
FOLDER: Marathon Oil		APPROVED BY:	DATE:
FILE: X-sect A-A'			

0174-CXA



SOURCE: USGS MARTHA CREEK QUADRANGLE, NEW MEXICO - EDDY CO., 7.5 MINUTE SERIES, 1981.

LEGEND

— LINES OF CROSS SECTION



INDIAN BASIN REMEDIATION PROJECT

PROJECT NO.: 023350232 LOCATION: EDDY COUNTY, NM

**CROSS SECTION
LOCATION MAP**

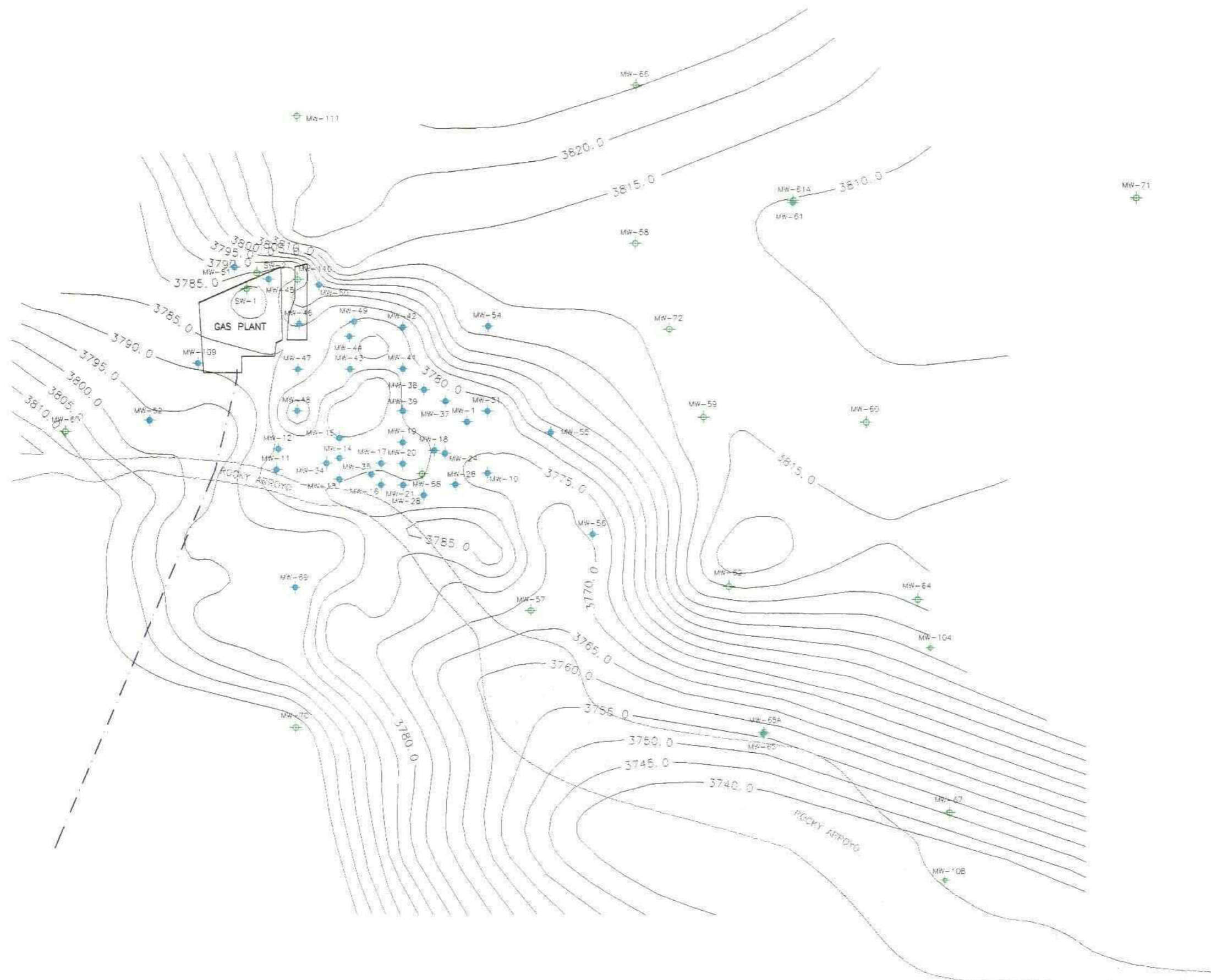
DRAWN BY: JU DATE: 7/9/97 CHECKED BY: DATE:

FOLDER: Marathon Oil APPROVED BY: DATE:
FILE: X-sect

FIGURE 2-2





0174-SLB

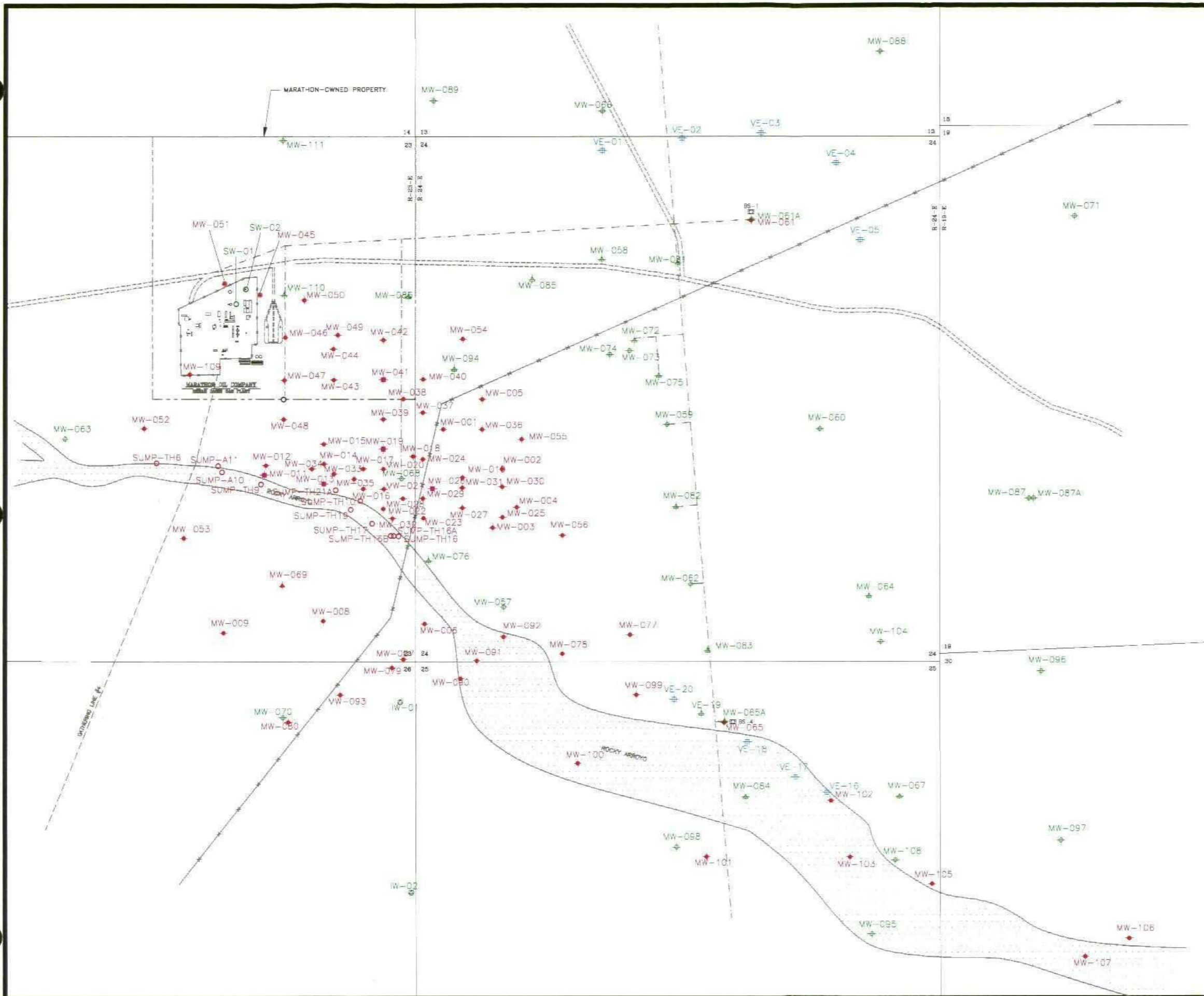


LEGEND

- ◆ MONITORING WELL (SHALLOW ZONE)
- MONITORING WELL (LOWER QUEEN)
- CONDENSATE LINE
- 3800.0 — DOLOMITE CONTOUR (CONTOUR INTERVAL = 5 FT))




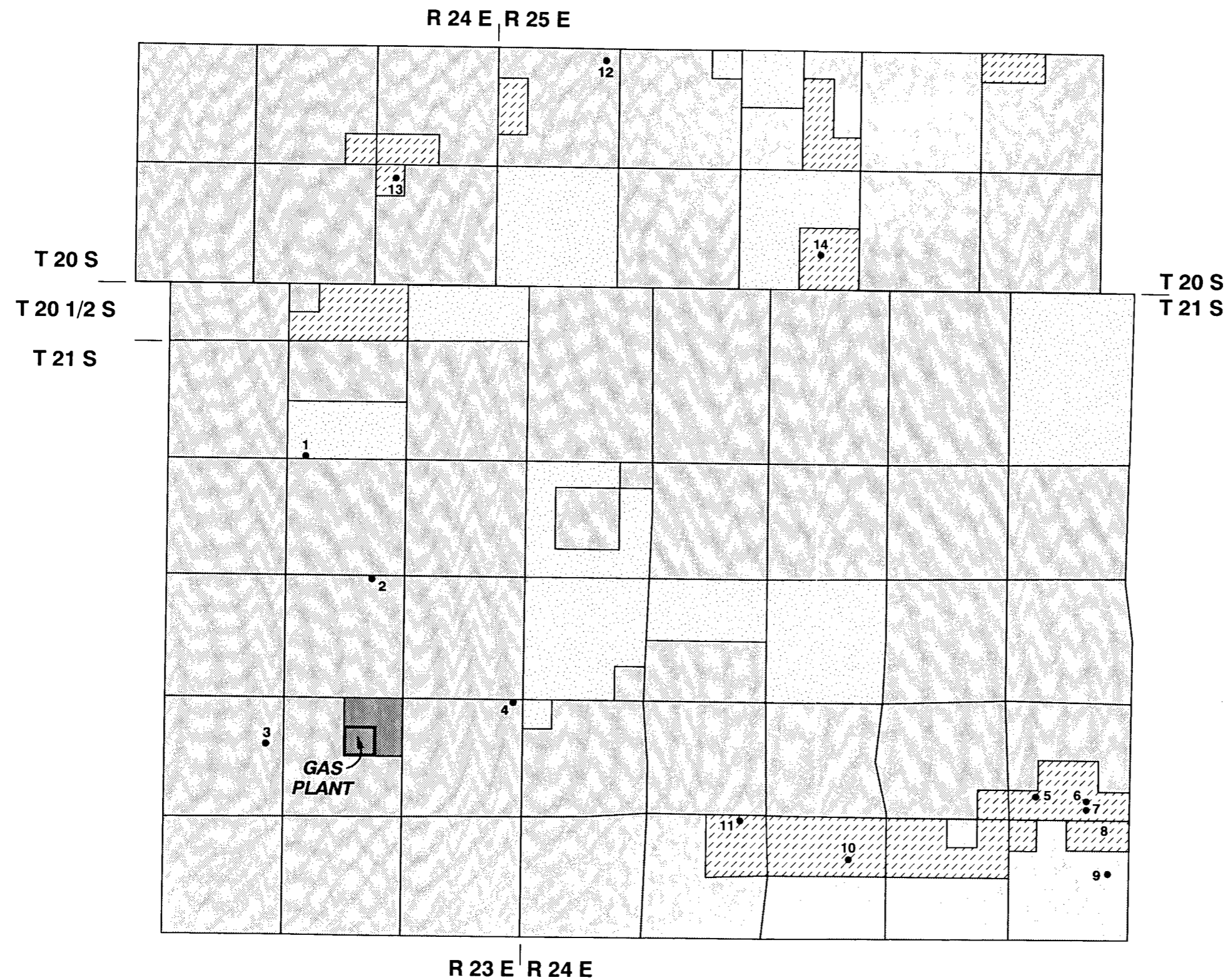
 FLUOR DANIEL GTI		 SCALE
STRUCTURE CONTOUR MAP OF TOP OF BEDROCK		
CLIENT:		
MARATHON OIL COMPANY		
LOCATION:		
INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE:	5469-TOB (1:1000)	PROJECT NO.:
REV.:		105469
DES.:	DET.:	DATE:
CL	DH	11/18/98
PM:	PE/RG:	FIGURE:
		2-1



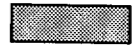



LEGEND

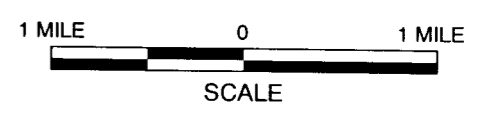
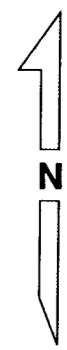
- ◆ MONITORING WELL (SHALLOW ZONE)
- ◆ INFILTRATION WELL (SHALLOW ZONE)
- RECOVERY SUMP (SHALLOW ZONE)
- ◆ RECOVERY WELL (SHALLOW ZONE)
- ◆ VAPOR EXTRACTION WELL (SHALLOW GROUNDWATER)
- ◆ MONITORING WELL (LOWER QUEEN)
- INFILTRATION WELL (LOWER QUEEN)
- INDUSTRIAL SUPPLY WELL (LOWER QUEEN)
- ◆ RECOVERY WELL (LOWER QUEEN)
- ◆ VAPOR EXTRACTION WELL (LOWER QUEEN)
- BLOWER STATION
- FENCING
- POWER LINE


 FLUOR DANIEL GTI		0 FEET 1000 SCALE
WELL LOCATION MAP		
CLIENT: MARATHON OIL COMPANY		
LOCATION: INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		
FILE: 5469-SP (1:1000)	PROJECT NO.: 105469	
REV.:		
DES.: CL	DET.: DH	DATE: 11/17/98
PM:	PE/RG:	FIGURE: 1-3

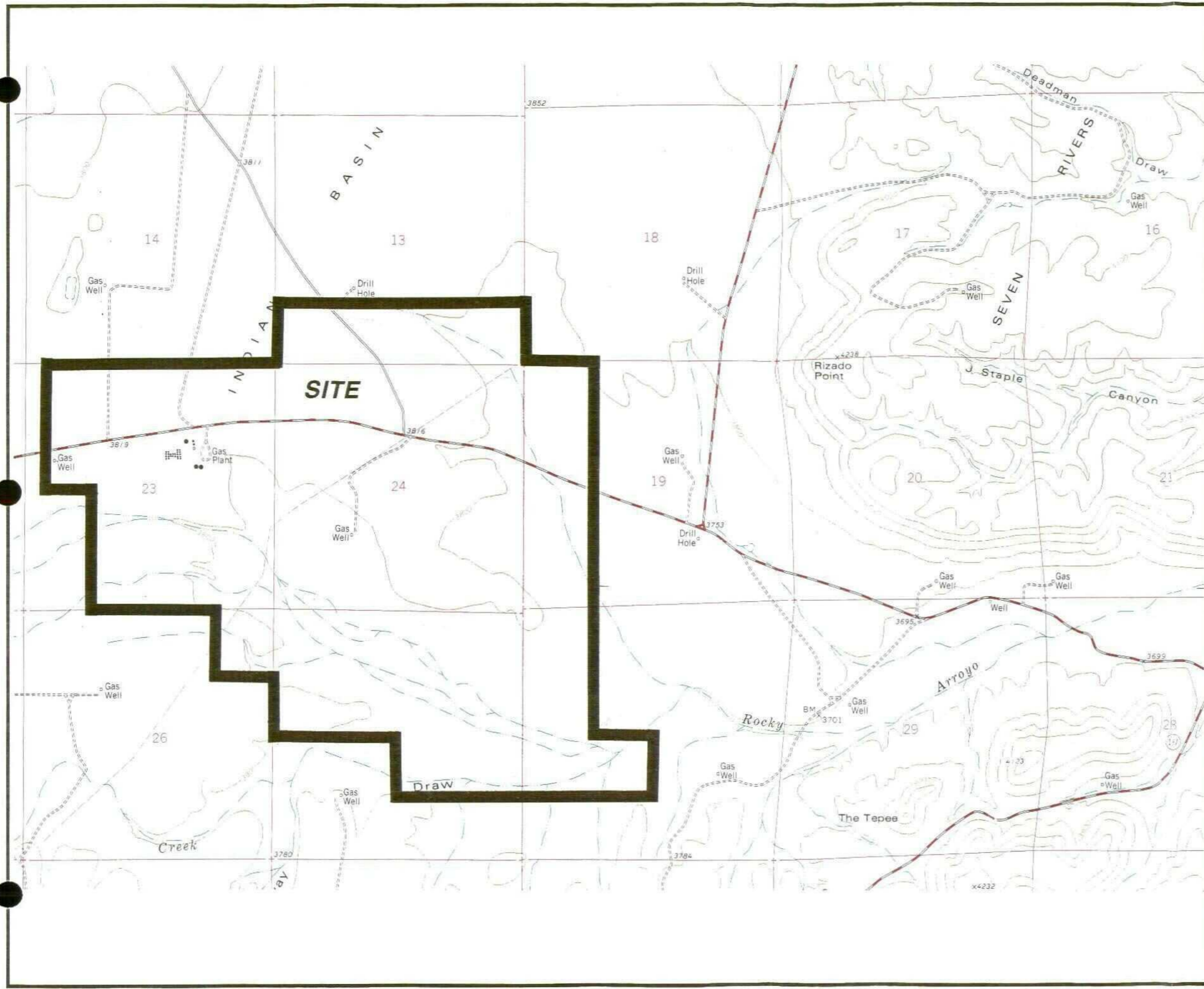


LEGEND

- 1 • WATER SUPPLY WELL LOCATION (SEE TABLE 1-1 FOR DETAILS)
-  MARATHON PROPERTY (INDUSTRIAL)
-  FEE (PRIVATE) LAND (RESIDENTIAL, GRAZING)
-  STATE LAND (RECREATIONAL, INDUSTRIAL, GRAZING)
-  FEDERAL LAND (RECREATIONAL, INDUSTRIAL, GRAZING)



INDIAN BASIN REMEDIATION PROJECT			
PROJECT NO.: 023350232		LOCATION: EDDY COUNTY, NM	
LAND USE AND WATER SUPPLY WELLS IN THE VICINITY OF THE INDIAN BASIN GAS PLANT			
DRAWN BY: JU	DATE: 8/21/97	CHECKED BY:	DATE:
FOLDER: Marathon Oil FILE: Land Use		APPROVED BY:	DATE:
FIGURE 1-2		 FLUOR DANIEL GTI	



LEGEND

 SITE BOUNDARIES



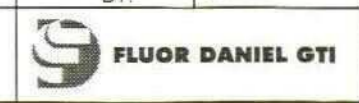
MARTHA CREEK, N. MEX.
NE/4 BANDANNA POINT 15' QUADRANGLE
N3222.5-W10430/7.5
1978
AMS 504R I NE - SERIES V881

INDIAN BASIN REMEDIATION PROJECT
PROJECT NO.: 105469.03 LOC.: 18 MILES NW OF CARLSBAD, NM

**SITE LOCATION/
TOPOGRAPHIC MAP**

DRAWN BY: JU	DATE: 12/14/98	CHECKED BY:	DATE:
FOLDER: Marathon Oil	FILE: TopoSite	APPROVED BY:	DATE:

FIGURE 1-1



**Table 1-1
Water Supply Wells in the Vicinity of the Indian Basin Remediation Project
Carlsbad, New Mexico**

Figure 3 Designation	SEO Location Description	Well Owner	Well Depth (ft)	Use	Formation/Aquifer	Depth-to-water (ft)	Date of Mermt
1	21.23.2.33434	Forrest Lee	NS	Stock	possible Queen	146.8	10/6/87
2	21.23.14.21221	Forrest Lee	25	Stock	alluvial of Roswell Basin*	14.6	1/12/54
3	21.23.22.241444	Dean Lee	256	Stock	lower Queen	213	11/3/92
4	21.23.24.22221	David Bradley	>31	Stock	alluvial of Carlsbad Basin	13	11/3/92
5	21.24.23.332232	Walter Biebelle	145	Stock/Domestic	alluvial of Carlsbad Basin/Seven Rivers	NS	NS
6	21.24.23.43233	William Shafer	300	Domestic	alluvial of Carlsbad Basin/Yates	50	8/17/65
7	21.24.23.43411	Earnest Shafer, Sr.	60	Domestic	alluvial of Carlsbad Basin	54	10/6/87
8	21.24.26.22230	Gerold Elmore	66	Domestic	alluvial of Carlsbad Basin	38	8/17/65
9	21.24.26.24323	William Shafer	69	NS	alluvial of Carlsbad Basin?	40	11/19/92
10	21.24.28.23232	William Shafer	138	Stock	alluvial of Carlsbad Basin/Upper Queen	83	11/4/92
11	21.24.29.22112	Shafer (Biebelle)	70	Commercial OWD/stock/ domestic	alluvial of Carlsbad Basin	37	11/3/92
12	20.24.25.22233	Foster	275	Stock	Queen?*	265	2/11/94
13	20.24.35.11231	Foster	NS	Stock	Unknown	167	1/17/63
14	20.25.32.41	Howell	NS	NS	Unknown	NS	NS

Notes:

Data based on well logs on file at NMSEO, Roswell office (information provided by Marathon)

NS = Not specified

SEO = State Engineer's Office

* = SEO files indicate completion in Grayburg

** = SEO files indicated completion in Artesia Group, but SEO field representative indicates that this formation designation is used when the aquifer is unknown.

TABLE 2-1: WELL COMPLETION DETAILS

SHALLOW ZONE WELLS							
Well ID	Well Type	TOC Elev. (ft AMSL)	Total Depth (ft TOC)	Well Casing ID (in)	Well Screen Slot (in)	Well Screen Interval Top (ft TOC)	Well Screen Interval Bottom (ft TOC)
MW-1	monitoring	3792.50	16.10	2	0.01	10.06	14.66
MW-2	monitoring	3788.72	15.52	2	0.01	5.61	15.24
MW-3	monitoring	3787.50	16.90	2	0.01	6.87	16.61
MW-4	monitoring	3795.88	18.68	2	0.01	8.65	18.39
MW-5	monitoring	3801.69	12.77	2	0.01	7.86	12.77
MW-6	monitoring	3785.17	13.66	2	0.01	8.69	13.66
MW-7	monitoring	3784.46	17.01	2	0.01	7.23	17.01
MW-8	monitoring	3795.04	16.97	2	0.01	7.19	16.97
MW-9	monitoring	3807.85	13.65	2	0.01	8.74	13.31
MW-10	monitoring	3790.78	19.08	4	0.02	8.97	18.43
MW-11	monitoring	3806.96	24.85	4	0.02	14.68	24.16
MW-12	monitoring	3809.86	25.21	2	0.01	15.13	24.91
MW-13	monitoring	3801.58	22.07	2	0.01	11.64	21.42
MW-14	monitoring	3803.51	24.30	4	0.02	14.18	23.63
MW-15	monitoring	3803.59	19.47	2	0.01	9.39	19.17
MW-16	monitoring	3801.04	22.66	4	0.02	12.71	22.23
MW-17	monitoring	3799.55	19.75	2	0.01	9.71	19.47
MW-18	monitoring	3795.82	17.42	4	0.02	7.21	16.84
MW-19	monitoring	3797.21	19.11	4	0.02	8.96	18.53
MW-20	monitoring	3797.59	16.89	2	0.01	6.89	16.69
MW-21	monitoring	3798.21	23.31	2	0.01	12.74	22.88
MW-22	monitoring	3799.20	17.30	2	0.01	7.29	16.80
MW-23	monitoring	3794.48	12.08	2	0.01	7.04	11.64
MW-24	monitoring	3794.09	14.09	2	0.01	9.05	13.67
MW-25	monitoring	3786.97	10.27	2	0.01	4.94	9.80
MW-26	monitoring	3793.01	21.11	2	0.01	11.11	20.56
MW-27	monitoring	3790.93	18.23	2	0.01	13.16	17.79
MW-28	monitoring	3797.03	18.59	2	0.01	8.74	18.26
MW-29	monitoring	3794.06	14.76	2	0.01	9.68	14.37
MW-30	monitoring	3788.30	14.82	2	0.01	7.8	14.82
MW-31	monitoring	3791.15	19.93	4	0.02	7.945	19.93
MW-32	monitoring	3797.47	16.77	2	0.01	11.87	16.56
MW-33	monitoring	3802.51	20.29	4	0.02	10.14	19.70
MW-34	monitoring	3806.00	19.97	2	0.01	10.12	19.64
MW-35	monitoring	3800.81	20.71	4	0.02	15.78	20.33
MW-36	monitoring	3792.94	8.77	2	0.01	6.96	8.61
MW-37	monitoring	3795.03	20.83	4	0.02	10.24	19.90
MW-38	monitoring	3797.32	20.57	4	0.02	10.4	19.98
MW-39	monitoring	3796.20	20.54	4	0.02	10.17	19.74
MW-40	monitoring	3803.12	12.15	2	0.01	7.02	12.07
MW-41	monitoring	3799.04	24.04	4	0.02	13.87	23.43
MW-42	monitoring	3804.73	22.00	2	0.01	11.53	21.56
MW-43	monitoring	3802.05	24.55	4	0.02	14.40	23.95
MW-44	monitoring	3804.14	25.24	4	0.02	15.09	24.64
MW-45	infiltration	3808.68	26.62	2	0.01	11.58	26.13
MW-46	monitoring	3805.54	20.24	4	0.02	9.69	19.24
MW-47	monitoring	3805.09	21.79	2	0.01	11.75	21.29
MW-48	monitoring	3806.18	19.98	2	0.01	9.94	19.49
MW-49	monitoring	3805.61	25.91	2	0.01	15.82	25.45
MW-50	monitoring	3813.35	37.15	2	0.01	22.11	36.66
MW-51	infiltration	3810.86	20.06	2	0.01	10.02	19.57
MW-52	monitoring	3817.49	21.44	2	0.01	11.4	20.95
MW-53	monitoring	3809.92	15.32	2	0.01	8.59	15.14

TABLE 2-1: WELL COMPLETION DETAILS (continued)

SHALLOW ZONE WELLS (continued)							
Well ID	Well Type	TOC Elev. (ft AMSL)	Total Depth (ft TOC)	Well Casing ID (in)	Well Screen Slot (in)	Well Screen Interval Top (ft TOC)	Well Screen Interval Bottom (ft TOC)
MW-54	monitoring	3823.86	78.15	4	0.02	42.92	77.45
MW-55	monitoring	3794.40	66.32	4	0.02	21.43	66.08
MW-56	monitoring	3782.45	43.76	4	0.02	28.79	43.53
MW-61	monitoring	3816.20	57.97	4	0.02	47.83	57.28
MW-65	monitoring	3763.31	57.69	4	0.02	37.58	57.01
MW-69	recovery	3805.11	51.27	4	0.02	16.56	50.49
MW-77	monitoring	3775.48	82.20	7.875	OH	-	-
MW-78	monitoring	3785.82	86.62	7.875	OH	-	-
MW-79	monitoring	3788.39	82.90	7.875	OH	-	-
MW-80	monitoring	3821.64	91.80	7.875	OH	-	-
MW-90	monitoring	3781.73	62.50	4	0.04	12.50	62.50
MW-91	monitoring	3783.07	72.50	4	0.04	12.50	72.50
MW-92	monitoring	3785.29	72.50	4	0.04	12.50	72.50
MW-93	monitoring	3718.50	72.50	4	0.04	12.50	72.50
MW-99	monitoring	3770.05	72.50	4	0.04	12.50	72.50
MW-100	monitoring	3773.31	72.50	4	0.04	12.50	72.50
MW-101	monitoring	3762.71	72.50	4	0.04	12.50	72.50
MW-102	monitoring	3753.69	82.50	4	0.04	12.50	82.50
MW-103	monitoring	3743.14	72.50	4	0.04	12.50	72.50
MW-105	monitoring	3736.93	82.50	4	0.04	12.50	82.50
MW-106	monitoring	3721.97	94.50	4	0.04	12.50	94.5
MW-107	monitoring	3726.27	72.50	4	0.04	12.50	72.50
MW-109	monitoring	3809.53	18.00	4	0.01	8.00	10.00
Sump A10	monitoring	3800.99	13.42	24	-	-	-
Sump 16A	monitoring	3785.14	17.45	24	-	-	-

AMSL = above mean sea level
 TOC = top of casing datum

TABLE 2-1: WELL COMPLETION DETAILS (Completed)

LOWER QUEEN WELLS									
Well	Well Type	TOC Elev. (ft AMSL)	Top of 1.25-inch piezometer piping Elev. (ft AMSL)	Total Depth (ft TOC)	Well Casing ID (in)	Surface Casing Depth (ft TOC)	Well Screen Slot (in)	Well Screen Interval Top (ft TOC)	Well Screen Interval Bottom (ft TOC)
MW-57	monitoring	3787.70		179.30	4	47.00	0.02	157.10	176.54
MW-58	recovery	3825.24		234.10	7.875	**	OH	NA	NA
MW-59	recovery	3819.59		211.29	4	30.18	0.02	182.52	208.30
MW-60	monitoring	3815.28		226.08	4	29.62	0.02	172.86	222.34
MW-61A	recovery	3815.97		214.00	4	69.95	0.02	173.50	213.30
MW-62	recovery	3819.90		224.69	4	30.00	0.02	177.00	222.50
MW-63	monitoring	3826.16		221.68	4	40.00	0.02	175.39	219.79
MW-64	monitoring	3798.57		204.36	4	40.00	0.02	156.68	201.13
MW-65A	recovery	3763.79		168.56	4	70.00	0.02	115.34	166.00
MW-66	monitoring	3828.98		237.86	4	40.00	0.02	184.81	234.52
MW-67	monitoring	3765.87		168.54	4	40.00	0.02	114.78	165.11
MW-68	recovery	3797.83		200.00	4	120.00	0.02	148.38	199.69
MW-70	monitoring	3822.57		228.14	4	112.00	0.02	175.32	224.37
MW-71	monitoring	3778.05		235.41	4	69.20	0.02	167.07	234.75
MW-72	dual recovery	3821.18		236.55	8	39.50	0.02	177.32	235.38
MW-73	monitoring	3820.09		222.5	7.875	10.00	OH	NA	NA
MW-74	monitoring	3820.82		222.5	7.875	10.00	OH	NA	NA
MW-75	dual recovery	3817.44		222.5	7.875	12.25	OH	NA	NA
MW-76	recovery	3796.12		222.5	7.875	9.00	OH	NA	NA
MW-81	dual recovery	3818.14		228.5	7.875	73.50	OH	NA	NA
MW-82	recovery	3825.14		252.5	7.875	68.75	OH	NA	NA
MW-83	recovery	3794.59		205.8	7.875	41.50	OH	NA	NA
MW-84	recovery	3759.88		172.5	7.875	67.50	OH	NA	NA
MW-85	dual recovery	3825.95		237.5	7.875	77.50	OH	NA	NA
MW-86	recovery	3824.16		227.5	7.875	77.50	OH	NA	NA
MW-87	monitoring	3740.50		173.1	4	NA	0.04	148.10	168.10
MW-87A	monitoring	3739.53		132.0	7.875	12.00	OH	NA	NA
MW-88	monitoring	3789.70		177.65	7.875	62.00	0.04	142.00	176.75
MW-89	monitoring	3827.68		232.53	4	NA	0.04	189.75	230.00
MW-94	recovery	-	3821.30	230.1	7.875	67.50	OH	NA	NA
MW-95	monitoring	3746.74		147.5	4	33.50	0.04	111.00	141.00
MW-96	monitoring	3738.30		137.5	4	12.50	0.04	97.50	127.50
MW-97	monitoring	3748.20		150.5	4	12.50	0.04	107.50	137.50
MW-98	monitoring	3767.80		142.5	4	12.50	0.04	128.00	158.00
MW-104	monitoring	3791.71	NA	222.5	8	37.50	OH	NA	NA
MW-108	monitoring	3747.13	NA	172.5	8	42.00	OH	NA	NA
MW-110	monitoring	3812.61	NA	230.0	8	39.50	OH	NA	NA
MW-111	monitoring	3824.44	NA	225.0	4	185.00	0.010	185.00	225.00
IW-1	injection	3808.55		232.5	11	75.50	OH	NA	NA
IW-2	injection	3835.86		302.5	11	161.50	OH	NA	NA
SW-1	recovery	3808.19	NA	255.0	10		OH	NA	NA
SW-2	monitoring	3808.79	NA	292.0	10		OH	163.00	292.00
SW-3	recovery	3842.29		232.7	7.875	84.00	OH	NA	NA
VE-1	vapor extraction	3829.73	NA	214.0	7.875	80.00	OH	NA	NA
VE-2	vapor extraction	3825.93	NA	210.0	7.875	75.00	OH	NA	NA
VE-3	vapor extraction	3816.75	NA	184.0	7.875	72.50	OH	NA	NA
VE-4	vapor extraction	3805.45	NA	183.0	7.875	57.50	OH	NA	NA
VE-5	vapor extraction	3790.10	NA	168.0	7.875	57.50	OH	NA	NA
VE-16	vapor extraction	3750.96	NA	152.5	7.875	45.00	OH	NA	NA
VE-17	vapor extraction	3756.73	NA	132.5	7.875	42.50	OH	NA	NA
VE-18	vapor extraction	3756.82	NA	165.5	7.875	40.00	OH	NA	NA
VE-19	vapor extraction	3761.18	NA	152.5	7.875	40.00	OH	NA	NA
VE-20	vapor extraction	3768.41	NA	162.5	7.875	40.00	OH	NA	NA

*** these wells have not been surveyed.

AMSL = above mean sea level
TOC = top of casing datum

OH = open hole
NA = not applicable

TABLE 2-2
CORRECTED GROUNDWATER ELEVATIONS
SHALLOW ZONE
(06/15/98-06/19/98)

Indian Basin Remediation Project
Eddy County, New Mexico

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to Condensate (Feet)	Condensate Thickness (Feet)	Condensate Density (Feet)	Groundwater Elevation (Feet)	Change in Water Table Elevation
MW-001	06/16/98	3792.50	Dry	--	--	--	NA	NA
MW-002	06/16/98	3788.72	Dry	--	--	--	NA	NA
MW-003	06/16/98	3787.50	Dry	--	--	--	NA	NA
MW-004	06/16/98	3795.88	Dry	--	--	--	NA	NA
MW-005	06/16/98	3801.69	Dry	--	--	--	NA	NA
MW-006	06/15/98	3785.17	Dry	--	--	--	NA	NA
MW-007	06/15/98	3784.46	Dry	--	--	--	NA	NA
MW-008	06/15/98	3795.04	Dry	--	--	--	NA	NA
MW-009	06/15/98	3807.85	Dry	--	--	--	NA	NA
MW-010	06/16/98	3790.78	Dry	--	--	--	NA	NA
MW-011	06/17/98	3806.96	24.20	--	--	--	3782.76	NA
MW-012	06/16/98	3809.86	Dry	--	--	--	NA	NA
MW-013	06/17/98	3801.58	20.74	--	--	--	3780.84	NA
MW-014	06/16/98	3803.51	22.88	--	--	--	3780.63	NA
MW-015	06/16/98	3803.59	Dry	--	--	--	NA	NA
MW-016	06/16/98	3801.04	Dry	--	--	--	NA	NA
MW-017	06/17/98	3799.55	Dry	--	--	--	NA	NA
MW-018	06/16/98	3795.82	Dry	--	--	--	NA	NA
MW-019	06/17/98	3797.21	18.88	--	--	--	3778.33	NA
MW-020	06/17/98	3797.59	Dry	--	--	--	NA	NA
MW-021	06/16/98	3798.21	Dry	--	--	--	NA	NA
MW-022	06/16/98	3799.20	Dry	--	--	--	NA	NA
MW-023	06/16/98	3794.48	Dry	--	--	--	NA	NA
MW-024	06/16/98	3794.09	Dry	--	--	--	NA	NA
MW-025	06/16/98	3786.97	Dry	--	--	--	NA	NA
MW-026	06/17/98	3793.01	Dry	--	--	--	NA	NA
MW-027	06/16/98	3790.93	Dry	--	--	--	NA	NA
MW-028	06/16/98	3797.03	Dry	--	--	--	NA	NA
MW-029	06/16/98	3794.06	Dry	--	--	--	NA	NA
MW-030	06/16/98	3788.30	Dry	--	--	--	NA	NA
MW-031	06/16/98	3791.15	Dry	--	--	--	NA	NA
MW-032	06/16/98	3797.47	Dry	--	--	--	NA	NA
MW-033	06/16/98	3802.51	19.97	--	--	--	3782.54	NA
MW-034	06/16/98	3806.00	Dry	--	--	--	NA	NA
MW-035	06/16/98	3800.81	20.57	--	--	--	3780.24	NA
MW-036	06/16/98	3792.94	Dry	--	--	--	NA	NA
MW-037	06/16/98	3795.03	19.82	--	--	--	3775.21	NA
MW-038	06/16/98	3797.32	Dry	--	--	--	NA	NA
MW-039	06/16/98	3796.30	19.41	--	--	--	3776.89	NA
MW-040	06/16/98	3803.12	Dry	--	--	--	NA	NA
MW-041	06/17/98	3799.04	19.37	--	--	--	3779.67	NA
MW-042	06/16/98	3804.73	Dry	--	--	--	NA	NA

Notes:

1) Groundwater elevations are in feet Above Mean Sea Level (AMSL) based on survey data supplied by Marathon.

NA = Not Available
Obstructed= Well Obstructed
Dry= Well Dry
NM = Not Measured

TABLE 2-2 (continued)
CORRECTED GROUNDWATER ELEVATIONS
SHALLOW ZONE
(06/15/98-06/19/98)

Indian Basin Remediation Project
Eddy County, New Mexico

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to Condensate (Feet)	Condensate Thickness (Feet)	Condensate Density (Feet)	Groundwater Elevation (Feet)	Change in Water Table Elevation
MW-043	06/16/98	3802.05	20.89	--	--	--	3781.16	NA
MW-044	06/16/98	3804.14	21.04	--	--	--	3783.10	NA
MW-045	06/17/98	3808.68	Obstructed	--	--	--	NA	NA
MW-046	06/16/98	3805.54	18.69	--	--	--	3786.85	NA
MW-047	06/16/98	3805.09	21.62	--	--	--	3783.47	NA
MW-048	06/16/98	3806.18	19.75	--	--	--	3786.43	NA
MW-049	06/16/98	3805.61	21.35	--	--	--	3784.26	NA
MW-050	06/16/98	3813.35	26.05	--	--	--	3787.30	NA
MW-051	06/17/98	3810.86	Obstructed	--	--	--	NA	NA
MW-052	06/16/98	3817.49	Dry	--	--	--	NA	NA
MW-053	06/16/98	3809.92	Dry	--	--	--	NA	NA
MW-054	06/16/98	3823.86	47.31	--	--	--	3776.55	NA
MW-055	06/16/98	3794.40	28.00	--	--	--	3766.40	NA
MW-056	06/16/98	3782.45	Dry	--	--	--	NA	NA
MW-061	06/15/98	3816.20	37.62	--	--	--	3778.58	NA
MW-065	06/15/98	3763.31	57.22	--	--	--	3706.09	NA
MW-069	06/15/98	3805.11	40.77	39.98	0.79	0.73	3764.92	NA
MW-077	06/16/98	3775.48	75.30	--	--	--	3700.18	NA
MW-078	06/16/98	3785.82	82.27	--	--	--	3703.55	NA
MW-079	06/15/98	3788.39	80.84	--	--	--	3707.55	NA
MW-080	06/15/98	3821.64	Dry	--	--	--	NA	NA
MW-090	06/15/98	3781.73	44.26	--	--	--	3737.47	NA
MW-091	06/16/98	3783.07	72.26	--	--	--	3710.81	NA
MW-092	06/16/98	3785.29	72.45	--	--	--	3712.84	NA
MW-093	06/15/98	3718.50	Dry	--	--	--	NA	NA
MW-099	06/16/98	3770.05	Dry	--	--	--	NA	NA
MW-100	06/16/98	3773.31	Dry	--	--	--	NA	NA
MW-101	06/16/98	3762.71	Dry	--	--	--	NA	NA
MW-102	06/15/98	3753.69	Dry	--	--	--	NA	NA
MW-103	06/16/98	3743.14	Dry	--	--	--	NA	NA
MW-105	06/15/98	3736.93	82.84	--	--	--	3654.09	NA
MW-106	06/15/98	3721.97	89.63	--	--	--	3632.34	NA
MW-107	06/15/98	3726.27	Dry	--	--	--	NA	NA
MW-109	06/17/98	3809.53	Dry	--	--	--	NA	NA

Notes:

1) Groundwater elevations are in feet Above Mean Sea Level (AMSL) based on survey data supplied by Marathon.

NA = Not Available
Obstructed= Well Obstructed
Dry= Well Dry
NM = Not Measured

TABLE 2-3
CORRECTED GROUNDWATER ELEVATIONS
LOWER QUEEN
(06/15/98-06/19/98)

Indian Basin Remediation Project
Eddy County, New Mexico

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to Condensate (Feet)	Condensate Thickness (Feet)	Condensate Density (Feet)	Groundwater Elevation (Feet)	Change in Water Table Elevation
IW-01	06/15/98	3808.55	181.05	--	--	--	3627.50	NA
IW-02	06/15/98	3835.86	Obstructed	--	--	--	NA	NA
MW-057	06/16/98	3787.70	161.62	--	--	--	3626.08	NA
MW-058	06/15/98	3825.24	Obstructed	--	--	--	NA	NA
MW-059	06/16/98	3819.59	195.59	194.40	1.19	0.73	3624.87	NA
MW-060	06/15/98	3815.28	189.90	--	--	--	3625.38	NA
MW-061A	06/15/98	3815.97	193.73	--	--	--	3622.24	NA
MW-062	06/16/98	3819.90	194.34	--	--	--	3625.56	NA
MW-063	06/16/98	3826.16	201.56	--	--	--	3624.60	NA
MW-064	06/15/98	3798.57	173.03	--	--	--	3625.54	NA
MW-065A	06/15/98	3763.79	137.96	137.03	0.93	0.73	3626.51	NA
MW-066	06/15/98	3828.98	204.37	--	--	--	3624.61	NA
MW-067	06/15/98	3765.87	141.49	--	--	--	3624.38	NA
MW-068	06/17/98	3797.83	172.90	172.05	0.85	0.73	3625.55	NA
MW-070	06/15/98	3822.57	196.74	--	--	--	3625.83	NA
MW-071	06/15/98	3778.05	153.88	--	--	--	3624.17	NA
MW-072	06/16/98	3821.18	222.68	--	--	--	3598.50	NA
MW-073	06/16/98	3820.09	194.67	--	--	--	3625.42	NA
MW-074	06/16/98	3820.82	187.47	--	--	--	3633.35	NA
MW-075	06/16/98	3817.44	205.82	--	--	--	3611.62	NA
MW-076	06/16/98	3796.12	175.25	--	--	--	3620.87	NA
MW-081	06/15/98	3818.14	197.58	--	--	--	3620.56	NA
MW-082	06/16/98	3825.14	249.20	--	--	--	3575.94	NA
MW-083	06/16/98	3794.59	184.32	174.81	9.51	0.73	3617.21	NA
MW-084	06/16/98	3759.88	134.94	134.54	0.40	0.73	3625.23	NA
MW-085	06/16/98	3825.95	201.29	200.74	0.55	0.73	3625.06	NA
MW-086	06/16/98	3824.16	203.43	--	--	--	3620.73	NA
MW-087	06/15/98	3740.50	114.52	--	--	--	3625.98	NA
MW-087A	06/15/98	3739.53	105.47	--	--	--	3634.06	NA
MW-088	06/15/98	3789.70	164.87	--	--	--	3624.83	NA
MW-089	06/15/98	3827.68	203.27	--	--	--	3624.41	NA
MW-094	06/16/98	3821.30	196.42	--	--	--	3624.88	NA
MW-095	06/16/98	3742.74	119.97	--	--	--	3622.77	NA
MW-096	06/15/98	3738.30	113.92	--	--	--	3624.38	NA
MW-097	06/15/98	3748.20	124.17	--	--	--	3624.03	NA
MW-098	06/16/98	3767.80	143.87	143.82	0.05	0.73	3623.97	NA
MW-104	06/15/98	3791.71	167.81	--	--	--	3623.90	NA
MW-108	06/15/98	3747.13	121.03	--	--	--	3626.10	NA
MW-110	06/17/98	3812.61	187.42	186.12	1.30	0.73	3626.14	NA
MW-111	06/19/98	3824.44	200.24	--	--	--	3624.20	NA
SW-01	06/17/98	3808.19	198.05	--	--	--	3610.14	NA
SW-02	06/17/98	3808.79	185.15	--	--	--	3623.64	NA

Notes:

1) Groundwater elevations are in feet Above Mean Sea Level (AMSL) based on survey data supplied by Marathon.

NA = Not Available
Obstructed= Well Obstructed
Dry= Well Dry
NM = Not Measured

TABLE 2-3 (continued)
 CORRECTED GROUNDWATER ELEVATIONS
 LOWER QUEEN
 (06/15/98-06/19/98)

Indian Basin Remediation Project
 Eddy County, New Mexico

Location	Date	Reference Elevation (Feet)	Depth to Water (Feet)	Depth to Condensate (Feet)	Condensate Thickness (Feet)	Condensate Density (Feet)	Groundwater Elevation (Feet)	Change in Water Table Elevation
SW-03	06/15/98	3842.29	218.50	--	--	--	3623.79	NA
VE-01	06/15/98	3829.73	204.78	--	--	--	3624.95	NA
VE-02	06/15/98	3825.93	200.67	--	--	--	3625.26	NA
VE-03	06/15/98	3816.75	191.32	--	--	--	3625.43	NA
VE-04	06/15/98	3805.45	179.89	--	--	--	3625.56	NA
VE-05	06/15/98	3790.10	164.48	--	--	--	3625.62	NA
VE-16	06/15/98	3750.96	124.81	--	--	--	3626.15	NA
VE-17	06/15/98	3756.73	117.27	--	--	--	3639.46	NA
VE-18	06/15/98	3756.82	131.71	--	--	--	3625.11	NA
VE-19	06/16/98	3761.18	136.97	--	--	--	3624.21	NA
VE-20	06/16/98	3768.41	142.26	--	--	--	3626.15	NA

Notes:

1) Groundwater elevations are in feet Above Mean Sea Level (AMSL) based on survey data supplied by Marathon.

NA = Not Available
 Obstructed= Well Obstructed
 Dry= Well Dry
 NM = Not Measured

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dichloro difluoromethane (ug/l)	Chloromethane (ug/l)	Vinyl chloride (ug/l)	Bromomethane (ug/l)	Chloroethane (ug/l)	Trichloro fluoromethane (ug/l)	Acetone (ug/l)	Acrolein (ug/l)
LYMAN	06/29/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-013	06/21/98	--	--	--	--	--	--	--	--
MW-013	07/01/98	<10	<10	<0.5#	<10	<10	<10	<100	<50
MW-014	06/22/98	<10	<10	<5.0#	<10	<10	<10	<100	<50
MW-039	07/01/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-041	06/19/98	--	--	--	--	--	--	--	--
MW-041	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-043	06/22/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	15	<5.0
MW-044	06/22/98	<5.0	<5.0	<2.5#	<5.0	<5.0	<5.0	<50	<25
MW-046	06/21/98	--	--	--	--	--	--	--	--
MW-046	07/01/98	<5.0	<5.0	<0.5#	<5.0	<5.0	<5.0	<50	<25
MW-049	06/21/98	--	--	--	--	--	--	--	--
MW-049	07/01/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-050	06/19/98	--	--	--	--	--	--	--	--
MW-050	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-054	06/25/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-055	06/25/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-061	06/18/98	--	--	--	--	--	--	--	--
MW-061	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-069	06/29/98	<10	<10	<0.5#	<10	<10	<10	<100	<50
MW-078	06/19/98	--	--	--	--	--	--	--	--
MW-078	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-079	06/18/98	--	--	--	--	--	--	--	--
MW-079	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-090	06/17/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-105	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0
MW-106	06/18/98	--	--	--	--	--	--	--	--

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1-Dichloro ethene (ug/l)	Iodomethane (ug/l)	Methylene chloride (ug/l)	Acrylonitrile (ug/l)	cis-1,2-Dichloroethene (ug/l)	Methyl t-butyl ether (MTBE) (ug/l)	1,1,2,1,2,2-Trichloroethane (ug/l)	1,1-Dichloro ethane (ug/l)
LYMAN	06/29/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-013	07/01/98	<10	<10	<10	<50	<10	<10	<10	<10
MW-014	06/22/98	<10	<10	<10	<50	<10	<10	<10	<10
MW-039	07/01/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-041	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-043	06/22/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-044	06/22/98	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-046	07/01/98	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-049	07/01/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-050	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-054	06/25/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-055	06/25/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-061	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-069	06/29/98	<10	<10	<10	<50	<10	<10	<10	<10
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-078	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-079	06/18/98	---	---	---	---	---	---	---	---
MW-079	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-090	06/17/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-105	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-106	06/18/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	trans-1,2-Dichloroethene (ug/l)	2-Butanone (ug/l)	Carbon disulfide (ug/l)	Bromochloro methane (ug/l)	Chloroform (ug/l)	2,2-Dichloro propane (ug/l)	1,2-Dichloro ethane (ug/l)	Vinyl acetate (ug/l)
LYMAN	06/29/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-013	07/01/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-014	06/22/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-039	07/01/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-041	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-043	06/22/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-044	06/22/98	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-046	07/01/98	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-049	07/01/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-050	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-054	06/25/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-055	06/25/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-061	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-069	06/29/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-078	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-079	06/18/98	---	---	---	---	---	---	---	---
MW-079	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-090	06/17/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-105	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-106	06/18/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-1

DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1,1-Trichloro ethane (ug/l)	1,1-Dichloro propene (ug/l)	Carbon tetrachloride (ug/l)	Benzene (ug/l)	1,2-Dichloro propane (ug/l)	Trichloroethene (ug/l)	Bromodichloro methane (ug/l)	2-Chloroethyl vinyl ether (ug/l)
LYMAN	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-013	07/01/98	<10	<10	<10	800	<10	<10	<10	<100
MW-014	06/22/98	<10	<10	<10	820	<10	<10	<10	<100
MW-039	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-041	06/28/98	<1.0	<1.0	<1.0	410	<1.0	<1.0	<1.0	<10
MW-043	06/22/98	<1.0	<1.0	<1.0	7.3	<1.0	<1.0	<1.0	<10
MW-044	06/22/98	<5.0	<5.0	<5.0	440	<5.0	<5.0	<5.0	<50
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-046	07/01/98	<5.0	<5.0	<5.0	1700	<5.0	<5.0	<5.0	<50
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-049	07/01/98	<1.0	<1.0	<1.0	79	<1.0	<1.0	<1.0	<10
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-050	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-054	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-055	06/25/98	<1.0	<1.0	<1.0	180	<1.0	<1.0	<1.0	<10
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-061	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-069	06/29/98	<10	<10	<10	1200	<10	<10	<10	<100
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-078	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-079	06/18/98	---	---	---	---	---	---	---	---
MW-079	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-090	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-105	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-106	06/18/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	cis-1,3-Dichloropropene (ug/l)	Trans-1,3-Dichloropropene (ug/l)	1,1,2-Trichloro ethane (ug/l)	1,3-Dichloro propane (ug/l)	Dibromomethane (ug/l)	Toluene (ug/l)	1,2-Dibromo-Ethane (ug/l)	4-Methyl 2-pentanone (ug/l)
LYMAN	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-013	07/01/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-014	06/22/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-039	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-041	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-043	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-044	06/22/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.01#	<50
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-046	07/01/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.01#	<50
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-049	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-050	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-054	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-055	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-061	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-069	06/29/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-078	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-079	06/18/98	---	---	---	---	---	---	---	---
MW-079	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-090	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-105	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-106	06/18/98	---	---	---	---	---	---	---	---

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= Constituent in more than one test method, highest result reported.

TABLE 3-1

DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Hexanone (ug/l)	Dibromochloro methane (ug/l)	Tetrachloro ethene (PCE) (ug/l)	Chlorobenzene (ug/l)	Ethylbenzene (ug/l)	1,1,1,2-Tetra chloroethane (ug/l)	Xylene (total) (ug/l)	Styrene (ug/l)
LYMAN	06/29/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-013	07/01/98	<100	<10	<0.5#	<10	640	<10	170	<10
MW-014	06/22/98	<100	<10	<5.0#	<10	890	<10	<10	<10
MW-039	07/01/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-041	06/28/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-043	06/22/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-044	06/22/98	<50	<5.0	<2.5#	<5.0	9.2	<5.0	<5.0	<5.0
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-046	07/01/98	<50	<5.0	<0.5#	<5.0	97	<5.0	120	<5.0
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-049	07/01/98	<10	<1.0	<0.5#	<1.0	15	<1.0	<1.0	<1.0
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-050	06/28/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-054	06/25/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-055	06/25/98	<10	<1.0	<0.5#	<1.0	31	<1.0	<1.0	<1.0
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-061	06/28/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-069	06/29/98	<100	<10	<0.5#	<10	520	<10	510	<10
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-078	06/28/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-079	06/18/98	---	---	---	---	---	---	---	---
MW-079	06/28/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-090	06/17/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-105	06/28/98	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-106	06/18/98	---	---	---	---	---	---	---	---

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= Constituent in more than one test method, highest result reported.

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bromoform (ug/l)	1,1,2,2-Tetra chloroethane (ug/l)	1,2,3-Trichloro propane (ug/l)	Isopropyl benzene (ug/l)	Bromobenzene (ug/l)	trans-1,4- Dichloro-2- butene (ug/l)	n-Propyl benzene (ug/l)	2-Chlorotoluene (ug/l)
LYMAN	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-013	06/21/98	--	--	--	--	--	--	--	--
MW-013	07/01/98	<1.0	<1.0	<1.0	71	<1.0	<1.0	78	<1.0
MW-014	06/22/98	<1.0	<1.0	<1.0	100	<1.0	<1.0	110	<1.0
MW-039	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-041	06/19/98	--	--	--	--	--	--	--	--
MW-041	06/28/98	<1.0	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0
MW-043	06/22/98	<1.0	<1.0	<1.0	11	<1.0	<1.0	6.6	<1.0
MW-044	06/22/98	<5.0	<5.0	<5.0	49	<5.0	<5.0	21	<5.0
MW-046	06/21/98	--	--	--	--	--	--	--	--
MW-046	07/01/98	<5.0	<5.0	<5.0	72	<5.0	<5.0	70	<5.0
MW-049	06/21/98	--	--	--	--	--	--	--	--
MW-049	07/01/98	<1.0	<1.0	<1.0	8.2	<1.0	<1.0	8.0	<1.0
MW-050	06/19/98	--	--	--	--	--	--	--	--
MW-050	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-054	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-055	06/25/98	<1.0	<1.0	<1.0	71	<1.0	<1.0	66	<1.0
MW-061	06/18/98	--	--	--	--	--	--	--	--
MW-061	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-069	06/29/98	<1.0	<1.0	<1.0	73	<1.0	<1.0	77	<1.0
MW-078	06/19/98	--	--	--	--	--	--	--	--
MW-078	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-079	06/18/98	--	--	--	--	--	--	--	--
MW-079	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-090	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-105	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-106	06/18/98	--	--	--	--	--	--	--	--

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-1

DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	4-Chlorotoluene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	tert-Butyl benzene (ug/l)	1,2,4-Trimethyl benzene (ug/l)	sec-Butyl benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	p-Isopropyl toluene (ug/l)
LYMAN	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-013	06/21/98	--	--	--	--	--	<0.3	<0.5	--
MW-013	07/01/98	<10	110	<10	380	11	<10	<10	<10
MW-014	06/22/98	<10	<10	<10	<10	15	<0.3#	<0.5#	<10
MW-039	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-041	06/19/98	--	--	--	--	--	<0.3	<0.5	--
MW-041	06/28/98	<1.0	<1.0	1.0	<1.0	2.1	<1.0	<1.0	<1.0
MW-043	06/22/98	<1.0	<1.0	1.2	<1.0	2.6	<0.3#	<0.5#	<1.0
MW-044	06/22/98	<5.0	<5.0	<5.0	<5.0	7.4	<0.3#	<0.5#	<5.0
MW-046	06/21/98	--	--	--	--	--	<0.3	<0.5	--
MW-046	07/01/98	<5.0	<5.0	<5.0	<5.0	7.8	<5.0	<5.0	<5.0
MW-049	06/21/98	--	--	--	--	--	<0.3	<0.5	--
MW-049	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-050	06/19/98	--	--	--	--	--	<0.3	<0.5	--
MW-050	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-054	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-055	06/25/98	<1.0	<1.0	1.6	<1.0	7.5	<0.3#	<0.5#	<1.0
MW-061	06/18/98	--	--	--	--	--	<0.3	<0.5	--
MW-061	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-069	06/29/98	<10	160	<10	610	<10	<2#	<3#	12
MW-078	06/19/98	--	--	--	--	--	<0.3	<0.5	--
MW-078	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-079	06/18/98	--	--	--	--	--	<0.3	<0.5	--
MW-079	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-090	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-105	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-106	06/18/98	--	--	--	--	--	<0.3	<0.5	--

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,2-Dichloro benzene (ug/l)	n-Butylbenzene (ug/l)	1,2-Dibromo-3-chloropropane (ug/l)	1,2,4-Trichloro benzene (ug/l)	Naphthalene (ug/l)	Hexachloro butadiene (ug/l)	1,2,3-Trichloro benzene (ug/l)
LYMAN	06/29/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-013	06/21/98	<0.3	--	--	<0.6	29	<0.5	--
MW-013	07/01/98	<10	12	<10	<10	12	<10	<10
MW-014	06/22/98	<0.3#	10	<10	<0.6#	32	<0.5#	<10
MW-039	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-041	06/19/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-041	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-043	06/22/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-044	06/22/98	<0.3#	<5.0	<5.0	<0.6#	<0.4#	<0.5#	<5.0
MW-046	06/21/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-046	07/01/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-049	06/21/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-049	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-050	06/19/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-050	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-054	06/25/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-055	06/25/98	<0.3#	3.9	<1.0	<0.6#	5.9#	<0.5#	<1.0
MW-061	06/18/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-061	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-069	06/29/98	<2#	17	<10	<3#	13#	<3#	<10
MW-078	06/19/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-078	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-079	06/18/98	<0.3	--	--	<0.6	<0.4	<0.5	--
MW-079	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-090	06/17/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-105	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-106	06/18/98	<0.3	--	--	<0.6	<0.4	<0.5	--

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
 SHALLOW ZONE

Indian Basin Remediation Project
 Eddy County, NM

SITE	DATE	1,1-Dichloro ethene (ug/l)	Iodomethane (ug/l)	Methylene chloride (ug/l)	Acrylonitrile (ug/l)	cis-1,2-Dichloroethene (ug/l)	Methyl t-butyl ether (MTBE) (ug/l)	1,1,2,1,2,2-Trichloro-trifluoroethane (ug/l)	1,1-Dichloro ethane (ug/l)
MW-106	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
UIHS_ARROYO	06/26/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-1
 DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
 SHALLOW ZONE

Indian Basin Remediation Project
 Eddy County, NM

SITE	DATE	trans-1,2-Dichloroethene (ug/l)	2-Butanone (ug/l)	Carbon disulfide (ug/l)	Bromochloro methane (ug/l)	Chloroform (ug/l)	2,2-Dichloro propane (ug/l)	1,2-Dichloro ethane (ug/l)	Vinyl acetate (ug/l)
MW-106	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
UIHS_ARROYO	06/26/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-1
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1,1-Trichloro ethane (ug/l)	1,1-Dichloro propene (ug/l)	Carbon tetrachloride (ug/l)	Benzene (ug/l)	1,2-Dichloro propane (ug/l)	Trichloroethene (ug/l)	Bromodichloro methane (ug/l)	2-Chloroethyl vinyl ether (ug/l)
MW-106	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
UIHS_ARROYO	06/26/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
For RCL 8260_698

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dichloro difluoromethane (ug/l)	Chloromethane (ug/l)	Vinyl chloride (ug/l)	Bromomethane (ug/l)	Chloroethane (ug/l)	Trichloro fluoromethane (ug/l)	Acetone (ug/l)	Acrolein (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<5.0
MW-057	06/25/98	---	---	<0.5	---	---	---	---	---
MW-058	06/22/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	{11}	<5.0
MW-059	06/24/98	<5.0	<5.0	<2.5#	<5.0	<5.0	<5.0	<50	<25
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-060	07/01/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-061A	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-062	06/26/98	<10	<10	<0.5#	<10	<10	<10	<100	<50
MW-063	06/25/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-064	06/23/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	{59}	<5.0
MW-065A	06/25/98	<1.0	<1.0	<2.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-066	06/17/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	{11}	<5.0
MW-067	06/24/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-068	06/26/98	<10	<10	<5.0#	<10	<10	<10	<100	<50
MW-070	06/16/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-071	06/28/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-072	06/30/98	<10	<10	<0.5#	<10	<10	<10	<100	<50
MW-073	06/30/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-074	06/24/98	<10	<10	<2.5#	<10	<10	<10	<100	<50
MW-075	06/30/98	<10	<10	<0.5#	<10	<10	<10	<100	<50
MW-076	06/29/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-081	06/29/98	<1.0	<1.0	<0.5#	<1.0	<1.0	<1.0	<10	<5.0
MW-082	06/25/98	<5.0	<5.0	<2.5#	<5.0	<5.0	<5.0	<50	<25
MW-083	06/25/98	<10	<10	<2.5#	<10	<10	<10	<100	<50
MW-084	06/23/98	<10	<10	<2.5#	<10	<10	<10	<100	<50

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1-Dichloro ethene (ug/l)	Iodomethane (ug/l)	Methylene chloride (ug/l)	Acrylonitrile (ug/l)	cis-1,2-Dichloroethene (ug/l)	Methyl t-butyl ether (MTBE) (ug/l)	1,1,2,1,2,2-Trichlorotrifluoroethane (ug/l)	1,1-Dichloro ethane (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-057	06/25/98	---	---	---	---	---	---	---	---
MW-058	06/22/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-059	06/24/98	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-060	07/01/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-061A	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-062	06/26/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-063	06/25/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-064	06/23/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-065A	06/25/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-066	06/17/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-067	06/24/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-068	06/26/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-070	06/16/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-071	06/28/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-072	06/30/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-073	06/30/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-074	06/24/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-075	06/30/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-076	06/29/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-081	06/29/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-082	06/25/98	<5.0	<5.0	<5.0	<25	<5.0	<5.0	<5.0	<5.0
MW-083	06/25/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0
MW-084	06/23/98	<1.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	trans-1,2-Dichloroethene (ug/l)	2-Butanone (ug/l)	Carbon disulfide (ug/l)	Bromo-chloro methane (ug/l)	Chloroform (ug/l)	2,2-Dichloro propane (ug/l)	1,2-Dichloro ethane (ug/l)	Vinyl acetate (ug/l)
MW-057	06/24/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-057	06/25/98	---	---	---	---	---	---	---	---
MW-058	06/22/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-059	06/24/98	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-060	07/01/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-061A	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-062	06/26/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-063	06/25/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-064	06/23/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-065A	06/25/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-066	06/17/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-067	06/24/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-068	06/26/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-070	06/16/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-071	06/28/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-072	06/30/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-073	06/30/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-074	06/24/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-075	06/30/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-076	06/29/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-081	06/29/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-082	06/25/98	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-083	06/25/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-084	06/23/98	<10	<100	<10	<10	<10	<10	<10	<10

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1,1-Trichloro ethane (ug/l)	1,1-Dichloro propene (ug/l)	Carbon tetrachloride (ug/l)	Benzene (ug/l)	1,2-Dichloro propane (ug/l)	Trichloroethene (ug/l)	Bromodichloro methane (ug/l)	2-Chloroethyl vinyl ether (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-057	06/25/98	---	---	---	---	---	---	---	---
MW-058	06/22/98	<1.0	<1.0	<1.0	22	<1.0	<1.0	<1.0	<10
MW-059	06/24/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-060	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-061A	06/28/98	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<10
MW-062	06/26/98	<10	<10	<10	<10	<10	<10	<10	<100
MW-063	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-064	06/23/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-065A	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-066	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-067	06/24/98	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<10
MW-068	06/26/98	<10	<10	<10	390	<10	<10	<10	<100
MW-070	06/16/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-071	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-072	06/30/98	<10	<10	<10	56	<10	<10	<10	<100
MW-073	06/30/98	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<10
MW-074	06/24/98	<10	<10	<10	220	<10	<10	<10	<100
MW-075	06/30/98	<10	<10	<10	200	<10	<10	<10	<100
MW-076	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-081	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-082	06/25/98	<5.0	<5.0	<5.0	70	<5.0	<5.0	<5.0	<50
MW-083	06/25/98	<10	<10	<10	<10	<10	<10	<10	<100
MW-084	06/23/98	<10	<10	<10	93	<10	<10	<10	<100

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	cis-1,3-Dichloropropene (ug/l)	Trans-1,3-Dichloropropene (ug/l)	1,1,2-Trichloro ethane (ug/l)	1,3-Dichloro propane (ug/l)	Dibromomethane (ug/l)	Toluene (ug/l)	1,2-Dibromo-Ethane (ug/l)	4-Methyl 2-pentanone (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-057	06/25/98	--	--	--	--	--	--	<0.01	--
MW-058	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-059	06/24/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.01#	<50
MW-060	06/21/98	--	--	--	--	--	--	--	--
MW-060	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-061A	06/18/98	--	--	--	--	--	--	--	--
MW-061A	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-062	06/26/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-063	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-064	06/23/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-065A	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-066	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<0.01#	<10
MW-067	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	<0.01#	<10
MW-068	06/26/98	<10	<10	<10	<10	<10	26	<0.01#	<100
MW-070	06/16/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-071	06/19/98	--	--	--	--	--	--	--	--
MW-071	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-072	06/30/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-073	06/30/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-074	06/24/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-075	06/30/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-076	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-081	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-082	06/25/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.01#	<50
MW-083	06/25/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-084	06/23/98	<10	<10	<10	<10	<10	13	<0.01#	<100

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Hexanone (ug/l)	Dibromochloro methane (ug/l)	Tetrachloro ethene (PCE) (ug/l)	Chlorobenzene (ug/l)	Ethylbenzene (ug/l)	1,1,1,2-Tetra chloroethane (ug/l)	Xylene (total) (ug/l)	Styrene (ug/l)
MW-057	06/24/98	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-057	06/25/98	--	--	<0.5	--	--	--	--	--
MW-058	06/22/98	<10	<1.0	<0.5#	<1.0	{28}	<1.0	{35}	<1.0
MW-059	06/24/98	<50	<5.0	<2.5#	<5.0	{79}	<5.0	{42}	<5.0
MW-060	06/21/98	--	--	--	--	--	--	--	--
MW-060	07/01/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-061A	06/18/98	--	--	--	--	--	--	--	--
MW-061A	06/28/98	<10	<1.0	<0.5#	<1.0	{7.9}	<1.0	{20}	<1.0
MW-062	06/26/98	<100	<10	<0.5#	<10	{41}	<10	{96}	<10
MW-063	06/25/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-064	06/23/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-065A	06/25/98	<10	<1.0	<2.5#	<1.0	{16}	<1.0	{415}	<1.0
MW-066	06/17/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-067	06/24/98	<10	<1.0	<0.5#	<1.0	{3.5}	<1.0	{45.3}	<1.0
MW-068	06/26/98	<100	<10	<5.0#	<10	{140}	<10	{990}	<10
MW-070	06/16/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-071	06/19/98	--	--	--	--	--	--	--	--
MW-071	06/28/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-072	06/30/98	<100	<10	<0.5#	<10	{100}	<10	<10	<10
MW-073	06/30/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-074	06/24/98	<100	<10	<2.5#	<10	<10	<10	<10	<10
MW-075	06/30/98	<100	<10	<0.5#	<10	{89}	<10	{270}	<10
MW-076	06/29/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-081	06/29/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	{1.5}	<1.0
MW-082	06/25/98	<50	<5.0	<2.5#	<5.0	{75}	<5.0	{510}	<5.0
MW-083	06/25/98	<100	<10	<2.5#	<10	{16}	<10	{31}	<10
MW-084	06/23/98	<100	<10	<2.5#	<10	{55}	<10	{458}	<10

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TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bromoform (ug/l)	1,1,2,2-Tetra chloroethane (ug/l)	1,2,3-Trichloro propane (ug/l)	Isopropyl- benzene (ug/l)	Bromobenzene (ug/l)	trans-1,4- Dichloro-2- butene (ug/l)	n-Propyl benzene (ug/l)	2-Chlorotoluene (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-057	06/25/98	---	---	---	---	---	---	---	---
MW-058	06/22/98	<1.0	<1.0	<1.0	11	<1.0	<1.0	7.2	<1.0
MW-059	06/24/98	<5.0	<5.0	<5.0	36	<5.0	<5.0	44	<5.0
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-060	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-061A	06/28/98	<1.0	<1.0	<1.0	3.7	<1.0	<1.0	3.2	<1.0
MW-062	06/26/98	<1.0	<1.0	<1.0	20	<1.0	<1.0	20	<1.0
MW-063	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-064	06/23/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-065A	06/25/98	<1.0	<1.0	<1.0	7.9	<1.0	<1.0	5.8	<1.0
MW-066	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-067	06/24/98	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	1.3	<1.0
MW-068	06/26/98	<1.0	<1.0	<1.0	35	<1.0	<1.0	34	<1.0
MW-070	06/16/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-071	06/26/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-072	06/30/98	<1.0	<1.0	<1.0	24	<1.0	<1.0	25	<1.0
MW-073	06/30/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-074	06/24/98	<1.0	<1.0	<1.0	21	<1.0	<1.0	17	<1.0
MW-075	06/30/98	<1.0	<1.0	<1.0	17	<1.0	<1.0	<1.0	<1.0
MW-076	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-081	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-082	06/25/98	<5.0	<5.0	<5.0	18	<5.0	<5.0	17	<5.0
MW-083	06/25/98	<1.0	<1.0	<1.0	31	<1.0	<1.0	17	<1.0
MW-084	06/23/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10	<1.0

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TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	4-Chlorotoluene (ug/l)	1,3-Trimethyl benzene (ug/l)	tert-Butyl benzene (ug/l)	1,2,4-Trimethyl benzene (ug/l)	sec-Butyl benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	p-isopropyl toluene (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-057	06/25/98	---	---	---	---	---	<0.3	<0.5	---
MW-058	06/22/98	<1.0	51	<1.0	130	5.0	<0.3#	<0.5#	4.7
MW-059	06/24/98	<5.0	58	<5.0	320	12	<2#	<3#	10
MW-060	06/21/98	---	---	---	---	---	<0.3	<0.5	---
MW-060	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-061A	06/18/98	---	---	---	---	---	<0.3	<0.5	---
MW-061A	06/28/98	<1.0	36	<1.0	80	2.7	<1.0	<1.0	3.9
MW-062	06/26/98	<1.0	49	<1.0	120	<1.0	<2#	<3#	<1.0
MW-063	06/25/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-064	06/23/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-065A	06/25/98	<1.0	80	<1.0	130	<1.0	<0.3#	<0.5#	3.0
MW-066	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-067	06/24/98	<1.0	9.2	<1.0	14	<1.0	<0.3#	<0.5#	<1.0
MW-068	06/26/98	<1.0	290	<1.0	490	18	<2#	<3#	20
MW-070	06/16/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-071	06/19/98	---	---	---	---	---	<0.3	<0.5	---
MW-071	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-072	06/30/98	<1.0	28	<1.0	120	<1.0	<0.6#	<1#	<1.0
MW-073	06/30/98	<1.0	2.7	<1.0	1.0	<1.0	<0.3#	<0.5#	1.1
MW-074	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<2#	<3#	<1.0
MW-075	06/30/98	<1.0	120	<1.0	350	<1.0	<2#	<3#	<1.0
MW-076	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<2#	<3#	<1.0
MW-081	06/29/98	<1.0	24	<1.0	6.1	1.1	<0.3#	<0.5#	2.5
MW-082	06/25/98	<5.0	110	<5.0	210	5.3	<0.3#	<0.5#	5.3
MW-083	06/25/98	<1.0	57	<1.0	320	13	<0.3#	<0.5#	1.1
MW-084	06/23/98	<1.0	48	<1.0	80	<1.0	<0.3#	<0.5#	<1.0

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TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,2-Dichloro benzene (ug/l)	n-Butylbenzene (ug/l)	1,2-Dibromo-3-chloropropane (ug/l)	1,2,4-Trichloro benzene (ug/l)	Naphthalene (ug/l)	Hexachloro butadiene (ug/l)	1,2,3-Trichloro benzene (ug/l)
MW-057	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-057	06/25/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-058	06/22/98	<0.3#	5.1	<1.0	<0.6#	1.5#	<0.5#	<1.0
MW-059	06/24/98	<2#	13	<5.0	<3#	7.9#	<3#	<5.0
MW-060	06/21/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-060	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-061A	06/18/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-061A	06/28/98	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	<1.0
MW-062	06/26/98	<2#	<1.0	<1.0	<3#	<2#	<3#	<1.0
MW-063	06/25/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-064	06/23/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-065A	06/25/98	<0.3#	4.1	<1.0	<0.6#	3.2#	<0.5#	<1.0
MW-066	06/17/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-067	06/24/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-068	06/26/98	<2#	27	<1.0	<3#	<2#	<3#	<1.0
MW-070	06/16/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-071	06/19/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-071	06/28/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-072	06/30/98	<0.6#	11	<1.0	<1#	5.3#	<1#	<1.0
MW-073	06/30/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-074	06/24/98	<2#	<1.0	<1.0	<3#	<2#	<3#	<1.0
MW-075	06/30/98	<2#	<1.0	<1.0	<3#	12#	<3#	<1.0
MW-076	06/29/98	<2#	<1.0	<1.0	<3#	<2#	<3#	<1.0
MW-081	06/29/98	<0.3#	2.3	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-082	06/25/98	<0.3#	7.2	<5.0	<0.6#	5.1#	<0.5#	<5.0
MW-083	06/25/98	<0.3#	11	<1.0	<0.6#	10#	<0.5#	<1.0
MW-084	06/23/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0

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TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dichloro difluoromethane (ug/l)	Chloromethane (ug/l)	Vinyl chloride (ug/l)	Bromomethane (ug/l)	Chloroethane (ug/l)	Trichloro fluoromethane (ug/l)	Acetone (ug/l)	Acrolein (ug/l)
MW-085	06/23/98	< 5.0	< 5.0	< 2.5#	< 5.0	< 5.0	< 5.0	< 50	< 25
MW-086	06/26/98	< 10	< 10	< 5.0#	< 10	< 10	< 10	< 100	< 50
MW-087	06/19/98	--	--	--	--	--	--	--	--
MW-087	06/27/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-087A	06/19/98	--	--	--	--	--	--	--	--
MW-087A	06/27/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-088	06/18/98	--	--	--	--	--	--	--	--
MW-088	06/27/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-089	06/17/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-094	06/26/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-095	06/22/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-096	06/21/98	--	--	--	--	--	--	--	--
MW-096	07/01/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-097	06/21/98	--	--	--	--	--	--	--	--
MW-097	07/01/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-098	06/29/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-104	06/21/98	--	--	--	--	--	--	--	--
MW-104	07/01/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-108	06/22/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
MW-110	06/30/98	< 10	< 10	< 0.5#	< 10	< 10	< 10	< 100	< 50
MW-111	06/29/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
SW-01	06/30/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
SW-02	06/24/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0
SW-03	06/24/98	< 1.0	< 1.0	< 0.5#	< 1.0	< 1.0	< 1.0	< 10	< 5.0

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= Constituent in more than one test method, highest result reported.

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1-Dichloro ethane (ug/l)	Iodomethane (ug/l)	Methylene chloride (ug/l)	Acrylonitrile (ug/l)	cis-1,2-Dichloroethane (ug/l)	Methyl t-butyl ether (MTBE) (ug/l)	1,1,2,1,2,2-Trichloro-trifluoroethane (ug/l)	1,1-Dichloro ethane (ug/l)
MW-085	06/23/98	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	6.1	< 5.0
MW-086	06/26/98	< 10	< 10	< 10	< 50	< 10	< 10	< 10	< 10
MW-087	06/19/98	--	--	--	--	--	--	--	--
MW-087	06/27/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-087A	06/19/98	--	--	--	--	--	--	--	--
MW-087A	06/27/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-088	06/18/98	--	--	--	--	--	--	--	--
MW-088	06/27/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-089	06/17/98	< 1.0	< 1.0	1.5	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-094	06/26/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-095	06/22/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-096	06/21/98	--	--	--	--	--	--	--	--
MW-096	07/01/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-097	06/21/98	--	--	--	--	--	--	--	--
MW-097	07/01/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-098	06/29/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-104	06/21/98	--	--	--	--	--	--	--	--
MW-104	07/01/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-108	06/22/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-110	06/30/98	< 1.0	< 1.0	< 1.0	< 50	< 10	< 10	< 10	< 10
MW-111	06/29/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
SW-01	06/30/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
SW-02	06/24/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0
SW-03	06/24/98	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0

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DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	trans-1,2-Dichloroethane (ug/l)	2-Butanone (ug/l)	Carbon disulfide (ug/l)	Bromochloro methane (ug/l)	Chloroform (ug/l)	2,2-Dichloro propane (ug/l)	1,2-Dichloro ethane (ug/l)	Vinyl acetate (ug/l)
MW-085	06/23/98	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
MW-086	06/26/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-087	06/19/98	---	---	---	---	---	---	---	---
MW-087	06/27/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-087A	06/19/98	---	---	---	---	---	---	---	---
MW-087A	06/27/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-088	06/18/98	---	---	---	---	---	---	---	---
MW-088	06/27/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-089	06/17/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-094	06/26/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-095	06/22/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-096	06/21/98	---	---	---	---	---	---	---	---
MW-096	07/01/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-097	06/21/98	---	---	---	---	---	---	---	---
MW-097	07/01/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-098	06/29/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-104	06/21/98	---	---	---	---	---	---	---	---
MW-104	07/01/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-108	06/22/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-110	06/30/98	<10	<100	<10	<10	<10	<10	<10	<10
MW-111	06/29/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SW-01	06/30/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SW-02	06/24/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SW-03	06/24/98	<1.0	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,1,1-Trichloro ethane (ug/l)	1,1-Dichloro propene (ug/l)	Carbon tetrachloride (ug/l)	Benzene (ug/l)	1,2-Dichloro propane (ug/l)	Trichloroethene (ug/l)	Bromodichloro methane (ug/l)	2-Chloroethyl vinyl ether (ug/l)
MW-085	06/23/98	<5.0	<5.0	<5.0	280	<5.0	<5.0	<5.0	<50
MW-086	06/26/98	<10	<10	<10	91	<10	<10	<10	<100
MW-087	06/19/98	--	--	--	--	--	--	--	--
MW-087	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-087A	06/19/98	--	--	--	--	--	--	--	--
MW-087A	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-088	06/18/98	--	--	--	--	--	--	--	--
MW-088	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-089	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-094	06/26/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-095	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-096	06/21/98	--	--	--	--	--	--	--	--
MW-096	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-097	06/21/98	--	--	--	--	--	--	--	--
MW-097	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-098	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-104	06/21/98	--	--	--	--	--	--	--	--
MW-104	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-108	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
MW-110	06/30/98	<10	<10	<10	170	<10	<10	<10	<100
MW-111	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
SW-01	06/30/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
SW-02	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10
SW-03	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	cis-1,3-Dichloropropene (ug/l)	Trans-1,3-Dichloropropene (ug/l)	1,1,2-Trichloro ethane (ug/l)	1,3-Dichloro propane (ug/l)	Dibromomethane (ug/l)	Toluene (ug/l)	1,2-Dibromo-Ethane (ug/l)	4-Methyl 2-pentanone (ug/l)
MW-085	06/23/98	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<0.01#	<50
MW-086	06/26/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-087	06/19/98	--	--	--	--	--	--	--	--
MW-087	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-087A	06/19/98	--	--	--	--	--	--	--	--
MW-087A	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-088	06/18/98	--	--	--	--	--	--	--	--
MW-088	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-089	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-094	06/26/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-095	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-096	06/21/98	--	--	--	--	--	--	--	--
MW-096	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-097	06/21/98	--	--	--	--	--	--	--	--
MW-097	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-098	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	7.1	<0.01#	<10
MW-104	06/21/98	--	--	--	--	--	--	--	--
MW-104	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-108	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
MW-110	06/30/98	<10	<10	<10	<10	<10	<10	<0.01#	<100
MW-111	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
SW-01	06/30/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
SW-02	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10
SW-03	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01#	<10

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= Constituent in more than one test method, highest result reported.

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Hexanone (ug/l)	Dibromochloro methane (ug/l)	Tetrachloro ethylene (PCE) (ug/l)	Chlorobenzene (ug/l)	Ethylbenzene (ug/l)	1,1,1,2-Tetra chloroethane (ug/l)	Xylene (total) (ug/l)	Styrene (ug/l)
MW-085	06/23/98	<50	<5.0	<2.5#	<5.0	120	<5.0	6.3	<5.0
MW-086	06/26/98	<100	<10	<5.0#	<10	28	<10	360	<10
MW-087	06/19/98	---	---	---	---	---	---	---	---
MW-087	06/27/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-087A	06/19/98	---	---	---	---	---	---	---	---
MW-087A	06/27/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-088	06/18/98	---	---	---	---	---	---	---	---
MW-088	06/27/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-089	06/17/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-094	06/26/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-095	06/22/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-096	06/21/98	---	---	---	---	---	---	---	---
MW-096	07/01/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-097	06/21/98	---	---	---	---	---	---	---	---
MW-097	07/01/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-098	06/29/98	<10	<1.0	<0.5#	<1.0	20	<1.0	1010	<1.0
MW-104	06/21/98	---	---	---	---	---	---	---	---
MW-104	07/01/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-108	06/22/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
MW-110	06/30/98	<100	<10	<0.5#	<10	150	<10	160	<10
MW-111	06/29/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
SW-01	06/30/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
SW-02	06/24/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0
SW-03	06/24/98	<10	<1.0	<0.5#	<1.0	<1.0	<1.0	<1.0	<1.0

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= Constituent in more than one test method, highest result reported.

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bromoform (ug/l)	1,1,2,2-Tetra chloroethane (ug/l)	1,2,3-Trichloro propane (ug/l)	Isopropyl- benzene (ug/l)	Bromobenzene (ug/l)	trans-1,4- Dichloro-2- butene (ug/l)	n-Propyl benzene (ug/l)	2-Chlorotoluene (ug/l)
MW-085	06/23/98	< 5.0	< 5.0	< 5.0	21	< 5.0	< 5.0	13	< 5.0
MW-086	06/26/98	< 10	< 10	< 10	23	< 10	< 10	21	< 10
MW-087	06/19/98	--	--	--	--	--	--	--	--
MW-087	06/27/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-087A	06/19/98	--	--	--	--	--	--	--	--
MW-087A	06/27/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-088	06/18/98	--	--	--	--	--	--	--	--
MW-088	06/27/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-089	06/17/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-094	06/26/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-095	06/22/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-096	06/21/98	--	--	--	--	--	--	--	--
MW-096	07/01/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-097	06/21/98	--	--	--	--	--	--	--	--
MW-097	07/01/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-098	06/29/98	< 1.0	< 1.0	< 1.0	11	< 1.0	< 1.0	13	< 1.0
MW-104	06/21/98	--	--	--	--	--	--	--	--
MW-104	07/01/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-108	06/22/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MW-110	06/30/98	< 10	< 10	< 10	36	< 10	< 10	51	< 10
MW-111	06/29/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SW-01	06/30/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SW-02	06/24/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SW-03	06/24/98	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-2
DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	4-Chlorotoluene (ug/l)	1,3,5-Trimethyl benzene (ug/l)	tert-Butyl benzene (ug/l)	1,2,4-Trimethyl benzene (ug/l)	sec-Butyl benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	p-isopropyl toluene (ug/l)
MW-085	06/23/98	<5.0	25	<5.0	130	5.6	<0.3#	<0.5#	<5.0
MW-086	06/26/98	<10	140	<10	190	15	<2#	<3#	12
MW-087	06/19/98	--	--	--	--	--	<0.3	<0.5	--
MW-087	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-087A	06/19/98	--	--	--	--	--	<0.3	<0.5	--
MW-087A	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-088	06/18/98	--	--	--	--	--	<0.3	<0.5	--
MW-088	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-089	06/17/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-094	06/26/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-095	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-096	06/21/98	--	--	--	--	--	<0.3	<0.5	--
MW-096	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-097	06/21/98	--	--	--	--	--	<0.3	<0.5	--
MW-097	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-098	06/29/98	<1.0	170	<1.0	290	<1.0	<2#	<3#	7.4
MW-104	06/21/98	--	--	--	--	--	<0.3	<0.5	--
MW-104	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-108	06/22/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
MW-110	06/30/98	<1.0	88	<1.0	440	13	<2#	<3#	13
MW-111	06/29/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
SW-01	06/30/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
SW-02	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0
SW-03	06/24/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3#	<0.5#	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-2

DISSOLVED-PHASE VOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	1,2-Dichloro benzene (ug/l)	n-Butylbenzene (ug/l)	1,2-Dibromo-3-chloropropane (ug/l)	1,2,4-Trichloro benzene (ug/l)	Naphthalene (ug/l)	Hexachloro butadiene (ug/l)	1,2,3-Trichloro benzene (ug/l)
MW-085	06/23/98	<0.3#	<5.0	<5.0	<0.6#	1#	<0.5#	<5.0
MW-086	06/26/98	<2#	17	<10	<3#	15#	<3#	<10
MW-087	06/19/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-087	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-087A	06/19/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-087A	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-088	06/18/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-088	06/27/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-089	06/17/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-094	06/26/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-095	06/22/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-096	06/21/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-096	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-097	06/21/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-097	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-098	06/29/98	<2#	9.7	<1.0	<3#	6.9#	<3#	<1.0
MW-104	06/21/98	<0.3	---	---	<0.6	<0.4	<0.5	---
MW-104	07/01/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-108	06/22/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
MW-110	06/30/98	<2#	18	<1.0	<3#	8.3#	<3#	<1.0
MW-111	06/29/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
SW-01	06/30/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
SW-02	06/24/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0
SW-03	06/24/98	<0.3#	<1.0	<1.0	<0.6#	<0.4#	<0.5#	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzonic acid (ug/l)	4-Chloro-3- methylphenol (ug/l)	2-Chlorophenol (ug/l)	2,4-Dichloro phenol (ug/l)	2,6-Dichloro phenol (ug/l)	2,4-Dimethyl phenol (ug/l)	4,6-Dinitro- 2-methylphenol (ug/l)	2,4-Dinitro phenol (ug/l)
LYMAN	06/29/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-013	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-013	07/01/98	---	---	---	---	---	---	---	---
MW-014	06/22/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-039	07/01/98	---	---	---	---	---	---	---	---
MW-041	06/19/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-041	06/28/98	---	---	---	---	---	---	---	---
MW-043	06/22/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-044	06/22/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-046	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-046	07/01/98	---	---	---	---	---	---	---	---
MW-049	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-049	07/01/98	---	---	---	---	---	---	---	---
MW-050	06/19/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-050	06/28/98	---	---	---	---	---	---	---	---
MW-054	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-055	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-061	06/18/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-061	06/28/98	---	---	---	---	---	---	---	---
MW-069	06/29/98	<8.5	<2	<3	<20	<0.5	<3	<8	<17
MW-078	06/19/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-078	06/28/98	---	---	---	---	---	---	---	---
MW-079	06/18/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-079	06/28/98	---	---	---	---	---	---	---	---
MW-090	06/17/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-105	06/28/98	---	---	---	---	---	---	---	---
MW-106	06/18/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Methylphenol (ug/l)	4-Methylphenol (ug/l)	2-Nitrophenol (ug/l)	4-Nitrophenol (ug/l)	Pentachloro phenol (ug/l)	Phenol (ug/l)	2,3,4,6-Tetra chlorophenol (ug/l)	2,4,5-Trichloro phenol (ug/l)
LYMAN	06/29/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-012	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-013	07/01/98	--	--	--	--	--	--	--	--
MW-014	06/22/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-039	07/01/98	--	--	--	--	--	--	--	--
MW-041	06/19/98	<0.3	<0.5	<0.4	<0.7	<0.7	16	<0.6	<3.0
MW-041	06/28/98	--	--	--	--	--	--	--	--
MW-043	06/22/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-044	06/22/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-046	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	8.2	<0.6	<3.0
MW-046	07/01/98	--	--	--	--	--	--	--	--
MW-049	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-049	07/01/98	--	--	--	--	--	--	--	--
MW-050	06/19/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-050	06/28/98	--	--	--	--	--	--	--	--
MW-054	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-055	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-061	06/18/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-061	06/28/98	--	--	--	--	--	--	--	--
MW-069	06/29/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-078	06/19/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-078	06/28/98	--	--	--	--	--	--	--	--
MW-079	06/18/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-079	06/28/98	--	--	--	--	--	--	--	--
MW-090	06/17/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-105	06/28/98	--	--	--	--	--	--	--	--
MW-106	06/18/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2,4,6-Trichloro phenol (ug/l)	Acenaphthene (ug/l)	Acenaphthylene (ug/l)	Acetophenone (ug/l)	4-Aminobiphenyl (ug/l)	Aniline (ug/l)	Anthracene (ug/l)	Benzidine (ug/l)
LYMAN	06/29/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-013	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-013	07/01/98	---	---	---	---	---	---	---	---
MW-014	06/22/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-039	07/01/98	---	---	---	---	---	---	---	---
MW-041	06/19/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-041	06/28/98	---	---	---	---	---	---	---	---
MW-043	06/22/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-044	06/22/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-046	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-046	07/01/98	---	---	---	---	---	---	---	---
MW-049	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-049	07/01/98	---	---	---	---	---	---	---	---
MW-050	06/19/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-050	06/28/98	---	---	---	---	---	---	---	---
MW-054	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-055	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-061	06/18/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-061	06/28/98	---	---	---	---	---	---	---	---
MW-069	06/29/98	<2	<2	<2	<2	<4	<3	<2	<14
MW-078	06/19/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-078	06/28/98	---	---	---	---	---	---	---	---
MW-079	06/18/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-079	06/28/98	---	---	---	---	---	---	---	---
MW-090	06/17/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-105	06/28/98	---	---	---	---	---	---	---	---
MW-106	06/18/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzo(a) anthracene (ug/l)	Benzo(a)pyrene (ug/l)	Benzo(b) fluoranthene (ug/l)	Benzo(g,h,i) perylene (ug/l)	Benzo(k)fluor anthene (ug/l)	Benzyl alcohol (ug/l)	bis(2-Chlor ethoxy)methane (ug/l)	Bis(2-chloro ethyl)ether (ug/l)
LYMAN	06/29/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-013	06/21/98	<0.5	1.5#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-013	07/01/98	--	--	--	--	--	--	--	--
MW-014	06/22/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-039	07/01/98	--	--	--	--	--	--	--	--
MW-041	06/19/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-041	06/28/98	--	--	--	--	--	--	--	--
MW-043	06/22/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-044	06/22/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-046	06/21/98	<0.5	0.4#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-046	07/01/98	--	--	--	--	--	--	--	--
MW-049	06/21/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-049	07/01/98	--	--	--	--	--	--	--	--
MW-050	06/19/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-050	06/28/98	--	--	--	--	--	--	--	--
MW-054	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-055	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-061	06/18/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-061	06/28/98	--	--	--	--	--	--	--	--
MW-069	06/29/98	<3	<1#	<3	<2	<4	<3	<2	<3
MW-078	06/19/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-078	06/28/98	--	--	--	--	--	--	--	--
MW-079	06/18/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-079	06/28/98	--	--	--	--	--	--	--	--
MW-090	06/17/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-105	06/28/98	--	--	--	--	--	--	--	--
MW-106	06/18/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bis(2-chloroiso propyl)ether (ug/l)	Bis(2-Ethyl hexyl) phthalate (ug/l)	4-Bromophenyl ether (ug/l)	Butyl benzyl phthalate (ug/l)	4-Chloroaniline (ug/l)	1-Chloro naphthalene (ug/l)	2-Chloro naphthalene (ug/l)	4-Chlorophenyl ether (ug/l)
LYMAN	06/29/98	<1.9	1.4	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-013	06/21/98	<1.9	64	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-013	07/01/98	--	--	--	--	--	--	--	--
MW-014	06/22/98	<1.9	110	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-039	07/01/98	--	--	--	--	--	--	--	--
MW-041	06/19/98	<1.9	2.7	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-041	06/28/98	--	--	--	--	--	--	--	--
MW-043	06/22/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-044	06/22/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-046	06/21/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-046	07/01/98	--	--	--	--	--	--	--	--
MW-049	06/21/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-049	07/01/98	--	--	--	--	--	--	--	--
MW-050	06/19/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-050	06/28/98	--	--	--	--	--	--	--	--
MW-054	06/25/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-055	06/25/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-061	06/18/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-061	06/28/98	--	--	--	--	--	--	--	--
MW-069	06/29/98	<9.5	9.2	<2	<3	<2	<3	<2	<3
MW-078	06/19/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-078	06/28/98	--	--	--	--	--	--	--	--
MW-079	06/18/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-079	06/28/98	--	--	--	--	--	--	--	--
MW-090	06/17/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-105	06/28/98	--	--	--	--	--	--	--	--
MW-106	06/18/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chrysene (ug/l)	Dibenz(a,j) acridine (ug/l)	Dibenzof(a,h) anthracene (ug/l)	Dibenzofuran (ug/l)	1,2-Dichloro benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	3,3'-Dichloro benzidine (ug/l)
LYMAN	06/29/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-013	06/21/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-013	07/01/98	---	---	---	---	<10	<10	<10	---
MW-014	06/22/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-039	07/01/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-041	06/19/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-041	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-043	06/22/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-044	06/22/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-046	06/21/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-046	07/01/98	---	---	---	---	<5.0	<5.0	<5.0	---
MW-049	06/21/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-049	07/01/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-050	06/19/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-050	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-054	06/25/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-055	06/25/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-061	06/18/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-061	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-069	06/29/98	<4	<3	<2	<2	<2#	<2#	<3#	<2
MW-078	06/19/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-078	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-079	06/18/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-079	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-090	06/17/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-105	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
MW-106	06/18/98	<0.7	<0.5	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Diethyl phthalate (ug/l)	p-Dimethyl anilino azobenzene (ug/l)	7,12-Dimethyl benz(a) anthracene (ug/l)	alpha, alpha-Dimethylphen ethylamine (ug/l)	Dimethyl phthalate (ug/l)	Di-n-butyl-phthalate (ug/l)	2,4-Dinitro toluene (ug/l)	2,6-Dinitro toluene (ug/l)
LYMAN	06/29/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-013	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-013	07/01/98	---	---	---	---	---	---	---	---
MW-014	06/22/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-039	07/01/98	---	---	---	---	---	---	---	---
MW-041	06/19/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-041	06/28/98	---	---	---	---	---	---	---	---
MW-043	06/22/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-044	06/22/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-046	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-046	07/01/98	---	---	---	---	---	---	---	---
MW-049	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-049	07/01/98	---	---	---	---	---	---	---	---
MW-050	06/19/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-050	06/28/98	---	---	---	---	---	---	---	---
MW-054	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-055	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-061	06/18/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-061	06/28/98	---	---	---	---	---	---	---	---
MW-069	06/29/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-078	06/19/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-078	06/28/98	---	---	---	---	---	---	---	---
MW-079	06/18/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-079	06/28/98	---	---	---	---	---	---	---	---
MW-090	06/17/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-105	06/28/98	---	---	---	---	---	---	---	---
MW-106	06/18/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Di-n-octyl phthalate (ug/l)	Diphenylamine (ug/l)	1,2-Diphenyl hydrazine (ug/l)	Fluoranthene (ug/l)	Fluorene (ug/l)	Hexachloro benzene (ug/l)	Hexachloro butadiene (ug/l)	Hexachloro cyclopentadiene (ug/l)
LYMAN	06/29/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-013	06/21/98	<0.7	<0.5	<0.3	<0.5	8.1	<0.5	<0.5	<0.6
MW-013	07/01/98	---	---	---	---	---	---	<10	---
MW-014	06/22/98	<0.7	<0.5	<0.3	<0.5	6.8	<0.5	<0.5#	<0.6
MW-039	07/01/98	---	---	---	---	---	---	<1.0	---
MW-041	06/19/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-041	06/28/98	---	---	---	---	---	---	<1.0	---
MW-043	06/22/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-044	06/22/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-046	06/21/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-046	07/01/98	---	---	---	---	---	---	<5.0	---
MW-049	06/21/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-049	07/01/98	---	---	---	---	---	---	<1.0	---
MW-050	06/19/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-050	06/28/98	---	---	---	---	---	---	<1.0	---
MW-054	06/25/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-055	06/25/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-061	06/18/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-061	06/28/98	---	---	---	---	---	---	<1.0	---
MW-069	06/29/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-078	06/19/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-078	06/28/98	---	---	---	---	---	---	<1.0	---
MW-079	06/18/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-079	06/28/98	---	---	---	---	---	---	<1.0	---
MW-090	06/17/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-105	06/28/98	---	---	---	---	---	---	<1.0	---
MW-106	06/18/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6

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DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Hexachloro ethane (ug/l)	Indeno (1,2,3-cd) pyrene (ug/l)	Isophorone (ug/l)	3-Methyl cholanthrene (ug/l)	2-Methyl naphthalene (ug/l)	Naphthalene (ug/l)	1-Naphthylamine (ug/l)	2-Naphthylamine (ug/l)
LYMAN	06/29/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-013	06/21/98	<0.6	<0.5	<0.4	<0.4	85	29	<1.5	<1.0
MW-013	07/01/98	---	---	---	---	---	12	---	---
MW-014	06/22/98	<0.6	<0.5	<0.4	<0.4	56	32#	<1.5	<1.0
MW-039	07/01/98	---	---	---	---	---	<1.0	---	---
MW-041	06/19/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-041	06/28/98	---	---	---	---	---	<1.0	---	---
MW-043	06/22/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-044	06/22/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-046	06/21/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-046	07/01/98	---	---	---	---	---	<5.0	---	---
MW-049	06/21/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-049	07/01/98	---	---	---	---	---	<1.0	---	---
MW-050	06/19/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-050	06/28/98	---	---	---	---	---	<1.0	---	---
MW-054	06/25/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-055	06/25/98	<0.6	<0.5	<0.4	<0.4	4.7	5.9#	<1.5	<1.0
MW-061	06/18/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-061	06/28/98	---	---	---	---	---	<1.0	---	---
MW-069	06/29/98	<3	<3	<2	<2	30	13#	<7.5	<5
MW-078	06/19/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-078	06/28/98	---	---	---	---	---	<1.0	---	---
MW-079	06/18/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-079	06/28/98	---	---	---	---	---	<1.0	---	---
MW-090	06/17/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-105	06/28/98	---	---	---	---	---	<1.0	---	---
MW-106	06/18/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-3

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONEPage: 1J of 2L
Date: 10/19/98Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Nitroaniline (ug/l)	3-Nitroaniline (ug/l)	4-Nitroaniline (ug/l)	Nitrobenzene (ug/l)	N-Nitroso dimethylamine (ug/l)	N-Nitroso-di-n- butylamine (ug/l)	n-Nitro sodiethylamine (ug/l)	N-Nitroso diphenylamine (ug/l)
LYMAN	06/29/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-013	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-013	07/01/98	--	--	--	--	--	--	--	--
MW-014	06/22/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-039	07/01/98	--	--	--	--	--	--	--	--
MW-041	06/19/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-041	06/28/98	--	--	--	--	--	--	--	--
MW-043	06/22/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-044	06/22/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-046	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-046	07/01/98	--	--	--	--	--	--	--	--
MW-049	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-049	07/01/98	--	--	--	--	--	--	--	--
MW-050	06/19/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-050	06/28/98	--	--	--	--	--	--	--	--
MW-054	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-055	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-061	06/18/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-061	06/28/98	--	--	--	--	--	--	--	--
MW-069	06/29/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-078	06/19/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-078	06/28/98	--	--	--	--	--	--	--	--
MW-079	06/18/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-079	06/28/98	--	--	--	--	--	--	--	--
MW-090	06/17/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-105	06/28/98	--	--	--	--	--	--	--	--
MW-106	06/18/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	N-Nitroso-di-n-propylamine (ug/l)	N-Nitroso piperidine (ug/l)	N-Nitroso pyrrolidine (ug/l)	Pentachloro benzene (ug/l)	Pentachloro nitrobenzene (ug/l)	Phenacofin (ug/l)	Phenanthrene (ug/l)	2-Picoline (ug/l)
LYMAN	06/29/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-013	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	4.0	<7.7
MW-013	07/01/98	---	---	---	---	---	---	---	---
MW-014	06/22/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	3.8	<7.7
MW-039	07/01/98	---	---	---	---	---	---	---	---
MW-041	06/19/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-041	06/28/98	---	---	---	---	---	---	---	---
MW-043	06/22/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-044	06/22/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-046	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-046	07/01/98	---	---	---	---	---	---	---	---
MW-049	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-049	07/01/98	---	---	---	---	---	---	---	---
MW-050	06/19/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-050	06/28/98	---	---	---	---	---	---	---	---
MW-054	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-055	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-061	06/18/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-061	06/28/98	---	---	---	---	---	---	---	---
MW-069	06/29/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-078	06/19/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-078	06/28/98	---	---	---	---	---	---	---	---
MW-079	06/18/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-079	06/28/98	---	---	---	---	---	---	---	---
MW-090	06/17/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-105	06/28/98	---	---	---	---	---	---	---	---
MW-106	06/18/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7

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DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Pronamide (ug/l)	Pyrene (ug/l)	1,2,4,5-Tetra chlorobenzene (ug/l)	1,2,4-Trichloro benzene (ug/l)
LYMAN	06/29/98	<0.4	<0.5	<0.4	<0.6#
MW-013	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-013	07/01/98	--	--	--	<10
MW-014	06/22/98	<0.4	<0.5	<0.4	<0.6#
MW-039	07/01/98	--	--	--	<1.0
MW-041	06/19/98	<0.4	<0.5	<0.4	<0.6
MW-041	06/28/98	--	--	--	<1.0
MW-043	06/22/98	<0.4	<0.5	<0.4	<0.6#
MW-044	06/22/98	<0.4	<0.5	<0.4	<0.6#
MW-046	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-046	07/01/98	--	--	--	<5.0
MW-049	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-049	07/01/98	--	--	--	<1.0
MW-050	06/19/98	<0.4	<0.5	<0.4	<0.6
MW-050	06/28/98	--	--	--	<1.0
MW-054	06/25/98	<0.4	<0.5	<0.4	<0.6#
MW-055	06/25/98	<0.4	<0.5	<0.4	<0.6#
MW-061	06/18/98	<0.4	<0.5	<0.4	<0.6
MW-061	06/28/98	--	--	--	<1.0
MW-069	06/29/98	<2	<3	<2	<3#
MW-078	06/19/98	<0.4	<0.5	<0.4	<0.6
MW-078	06/28/98	--	--	--	<1.0
MW-079	06/18/98	<0.4	<0.5	<0.4	<0.6
MW-079	06/28/98	--	--	--	<1.0
MW-090	06/17/98	<0.4	<0.5	<0.4	<0.6#
MW-105	06/28/98	--	--	--	<1.0
MW-106	06/18/98	<0.4	<0.5	<0.4	<0.6

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= Constituent in more than one test method, highest result reported.

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzoic acid (ug/l)	4-Chloro-3- methylphenol (ug/l)	2-Chlorophenol (ug/l)	2,4-Dichloro phenol (ug/l)	2,6-Dichloro phenol (ug/l)	2,4-Dimethyl phenol (ug/l)	4,6-Dinitro- 2-methylphenol (ug/l)	2,4-Dinitro phenol (ug/l)
MW-106	06/28/98	---	---	---	---	---	---	---	---
UIHS_ARROYO	06/26/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Methylphenol (ug/l)	4-Methylphenol (ug/l)	2-Nitrophenol (ug/l)	4-Nitrophenol (ug/l)	Pentachloro phenol (ug/l)	Phenol (ug/l)	2,3,4,6-Tetra chlorophenol (ug/l)	2,4,5-Trichloro phenol (ug/l)
MW-106	06/26/98	--	--	--	--	--	--	--	--
UIHS_ARROYO	06/26/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2,4,6-Trichloro phenol (ug/l)	Acenaphthene (ug/l)	Acenaphthylene (ug/l)	Acetophenone (ug/l)	4-Aminobiphenyl (ug/l)	Aniline (ug/l)	Anthracene (ug/l)	Benzidine (ug/l)
MW-106	06/28/98	---	---	---	---	---	---	---	---
UIHS_ARROYO	06/26/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzo(a) anthracene (ug/l)	Benzo(a)pyrene (ug/l)	Benzo(b) fluoranthene (ug/l)	Benzo(g,h,i) perylene (ug/l)	Benzo(k)fluor anthene (ug/l)	Benzyl alcohol (ug/l)	bis(2-Chlor ethoxy)methane (ug/l)	Bis(2-chloro ethyl)ether (ug/l)
MW-106	06/28/98	---	---	---	---	---	---	---	---
UIHS_ARROYO	06/26/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bis(2-chloroiso propyl)ether (ug/l)	Bis(2-Ethyl hexyl) pthalate (ug/l)	4-Bromophenyl phenyl ether (ug/l)	Butyl benzyl phthalate (ug/l)	4-Chloroaniline (ug/l)	1-Chloro naphthalene (ug/l)	2-Chloro naphthalene (ug/l)	4-Chlorophenyl phenyl ether (ug/l)
MW-106	06/28/98	---	---	---	---	---	---	---	---
UHS_ARROYO	06/26/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chrysene (ug/l)	Dibenz(a,h) acridine (ug/l)	Dibenz(a,h) anthracene (ug/l)	Dibenzofuran (ug/l)	1,2-Dichloro benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	3,3'-Dichloro benzidine (ug/l)
MW-106	06/28/98	---	---	---	---	<1.0	<1.0	<1.0	---
UIHS_ARROYO	06/26/98	<0.7	<0.5	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.
For RCL 8270_698

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Diethyl phthalate (ug/l)	p-Dimethyl amino azobenzene (ug/l)	7,12-Dimethyl benz(s) anthracene (ug/l)	alpha, alpha-Dimethylphen ethylamine (ug/l)	Dimethyl phthalate (ug/l)	Di-n-butyl-phthalate (ug/l)	2,4-Dinitro toluene (ug/l)	2,6-Dinitro toluene (ug/l)
MW-106	06/28/98	---	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
UIHS_ARROYO	06/26/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Di-n-octyl phthalate (ug/l)	Diphenylamine (ug/l)	1,2-Diphenyl hydrazine (ug/l)	Fluoranthene (ug/l)	Fluorene (ug/l)	Hexachloro benzene (ug/l)	Hexachloro butadiene (ug/l)	Hexachloro cyclopentadiene (ug/l)
MW-106	06/28/98	--	--	--	--	--	--	<1.0	---
UIHS_ARROYO	06/26/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.
For RCL 8270_698

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Nitroaniline (ug/l)	3-Nitroaniline (ug/l)	4-Nitroaniline (ug/l)	Nitrobenzene (ug/l)	N-Nitroso dimethylamine (ug/l)	N-Nitroso-di-n- butylamine (ug/l)	n-Nitro sodethylamine (ug/l)	N-Nitroso diphenylamine (ug/l)
MW-106	06/28/98	--	--	--	--	--	--	--	--
UIHS_ARROYO	06/26/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	N-Nitroso-di-n-propylamine (ug/l)	N-Nitroso piperidine (ug/l)	N-Nitroso pyrrolidine (ug/l)	Pentachloro benzene (ug/l)	Pentachloro nitrobenzene (ug/l)	Phenacetin (ug/l)	Phenanthrene (ug/l)	2-Picolinic (ug/l)
MW-106	06/28/98	--	--	--	--	--	--	--	--
UIHS_ARROYO	06/26/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-3
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Pronamide (ug/l)	Pyrene (ug/l)	1,2,4,5-Tetra chlorobenzene (ug/l)	1,2,4-Trichloro benzene (ug/l)
MW-106	06/28/98	--	--	--	<1.0
UIHS_ARROYO	06/26/98	<0.4	<0.5	<0.4	<0.6#

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.
For RCL 8270_698

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzoic acid (ug/l)	4-Chloro-3- methylphenol (ug/l)	2-Chlorophenol (ug/l)	2,4-Dichloro phenol (ug/l)	2,6-Dichloro phenol (ug/l)	2,4-Dimethyl phenol (ug/l)	4,6-Dinitro- 2-methylphenol (ug/l)	2,4-Dinitro phenol (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-058	06/22/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-059	06/24/98	<8.5	<2	<3	<20	<0.5	<3	<8	<17
MW-060	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-061A	06/28/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<8.5	<2	<3	<20	<0.5	<3	<8	<17
MW-063	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-064	06/23/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-065A	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	3.1	<1.6	<3.3
MW-066	06/17/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-067	06/24/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-068	06/26/98	<8.5	<2	<3	<20	<0.5	<3	<8	<17
MW-070	06/16/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-071	06/19/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<3.4	<0.8	<1	<7.8	<0.2	<1	<3.2	<6.6
MW-073	06/30/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-074	06/24/98	<8.5	<2	<3	<20	<0.5	<3	<8	<17
MW-075	06/30/98	<8.5	<2	<3	<20	<0.5	10	<8	<17
MW-076	06/29/98	<8.5	<2	<3	<20	<0.5	<3	<8	<17
MW-081	06/29/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-082	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-083	06/25/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-084	06/23/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEENPage: 1B of 2L
Date: 10/19/98Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Methylphenol (ug/l)	4-Methylphenol (ug/l)	2-Nitrophenol (ug/l)	4-Nitrophenol (ug/l)	Pentachloro phenol (ug/l)	Phenol (ug/l)	2,3,4,6-Tetra chlorophenol (ug/l)	2,4,5-Trichloro phenol (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-058	06/22/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-059	06/24/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-060	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-061A	06/23/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-063	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-064	06/23/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-065A	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-066	06/17/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-067	06/24/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-068	06/26/98	<2	<3	<2	<4	<4	16	<3	<15
MW-070	06/16/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-071	06/19/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<0.6	<1	<0.8	<1	<1	<1	<1	<6
MW-073	06/30/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-074	06/24/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-075	06/30/98	<2	<3	<2	<4	<4	51	<3	<15
MW-076	06/29/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-081	06/29/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-082	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-083	06/25/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-084	06/23/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL 8270_698

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2,4,6-Trichloro											
		phenol (ug/l)	Acenaphthene (ug/l)	Acenaphthylene (ug/l)	Acetophenone (ug/l)	4-Aminobiphenyl (ug/l)	Aniline (ug/l)	Anthracene (ug/l)	Benzidine (ug/l)				
MW-057	06/24/98	--	--	--	--	--	--	--	--	--	--	--	--
MW-057	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-058	06/22/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-059	06/24/98	<2	<2	<2	<2	<2	<2	<4	<3	<2	<2	<14	<14
MW-060	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-060	07/01/98	--	--	--	--	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-061A	06/28/98	--	--	--	--	--	--	--	--	--	--	--	--
MW-062	06/26/98	<2	<2	<2	<2	<2	<2	<4	<3	<2	<2	<14	<14
MW-063	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-064	06/23/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-065A	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-066	06/17/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-067	06/24/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-068	06/26/98	<2	<2	<2	<2	<2	<2	<4	<3	<2	<2	<14	<14
MW-070	06/16/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-071	06/19/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-071	06/28/98	--	--	--	--	--	--	--	--	--	--	--	--
MW-072	06/30/98	<0.6	<0.8	<0.8	<0.8	<0.8	<0.8	<1	<1	<0.8	<0.8	<5.4	<5.4
MW-073	06/30/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-074	06/24/98	<2	<2	<2	<2	<2	<2	<4	<3	<2	<2	<14	<14
MW-075	06/30/98	<2	<2	<2	<2	<2	<2	<4	<3	<2	<2	<14	<14
MW-076	06/29/98	<2	<2	<2	<2	<2	<2	<4	<3	<2	<2	<14	<14
MW-081	06/29/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-082	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-083	06/25/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7
MW-084	06/23/98	<0.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<0.4	<2.7	<2.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzol(e) anthracene (ug/l)	Benzol(a)pyrene (ug/l)	Benzol(b) fluoranthene (ug/l)	Benzol(g,h,i) perylene (ug/l)	Benzol(k)fluor anthene (ug/l)	Benzyl alcohol (ug/l)	bis(2-Chlor ethoxy)methane (ug/l)	Bis(2-chloro ethyl)ether (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-058	06/22/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-059	06/24/98	<3	0.2#	<3	<2	<4	<3	<2	<3
MW-060	06/21/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-061A	06/28/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<3	<1#	<3	<2	<4	<3	<2	<3
MW-063	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-064	06/23/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-065A	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-066	06/17/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-067	06/24/98	<0.5	0.6#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-068	06/26/98	<3	0.9#	<3	<2	<4	<3	<2	<3
MW-070	06/16/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-071	06/19/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<1	0.7#	<1	<0.6	<1	<1	<0.8	<1
MW-073	06/30/98	<0.5	0.3#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-074	06/24/98	<3	0.7#	<3	<2	<4	<3	<2	<3
MW-075	06/30/98	<3	1.2#	<3	<2	<4	<3	<2	<3
MW-076	06/29/98	<3	7.6#	<3	<2	<4	<3	<2	<3
MW-081	06/29/98	<0.5	2.6#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-082	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-083	06/25/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-084	06/23/98	<0.5	0.6#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bis(2-chloroiso propyl)ether (ug/l)	bis(2-Ethyl hexyl) phthalate (ug/l)	4-Bromophenyl phenyl ether (ug/l)	Butyl benzyl phthalate (ug/l)	4-Chloroaniline (ug/l)	1-Chloro naphthalene (ug/l)	2-Chloro naphthalene (ug/l)	4-Chlorophenyl phenyl ether (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-058	06/22/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-059	06/24/98	<9.5	54	<2	<3	<2	<3	<2	<3
MW-060	06/21/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<1.9	14	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-061A	06/28/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<9.5	<3	<2	<3	<2	<3	<2	<3
MW-063	06/25/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-064	06/23/98	<1.9	4.4	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-065A	06/25/98	<1.9	0.8	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-066	06/17/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-067	06/24/98	<1.9	41	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-068	06/26/98	<9.5	140	<2	<3	<2	<3	<2	<3
MW-070	06/16/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-071	06/19/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<3.8	11	<0.8	<1	<0.8	<1	<0.8	<1
MW-073	06/30/98	<1.9	1.7	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-074	06/24/98	<9.5	<3	<2	<3	<2	<3	<2	<3
MW-075	06/30/98	<9.5	26	<2	<3	<2	<3	<2	<3
MW-076	06/29/98	<9.5	<3	<2	<3	<2	<3	<2	<3
MW-081	06/29/98	<1.9	62	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-082	06/25/98	<1.9	0.7	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-083	06/25/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-084	06/23/98	<1.9	6.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chrysene (ug/l)	Dibenz(a,h) acridine (ug/l)	Dibenzofuran (ug/l)	1,2-Dichloro benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	3,3'-Dichloro benzidine (ug/l)
MW-057	06/24/98	--	--	--	<1.0	<1.0	<1.0	--
MW-057	06/25/98	<0.7	<0.5	<0.4	<0.3	<0.3	<0.5	<0.4
MW-058	06/22/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-059	06/24/98	<4	<3	<2	<2#	<2#	<3#	<2
MW-060	06/21/98	<0.7	<0.5	<0.4	<0.3	<0.3	<0.5	<0.4
MW-060	07/01/98	--	--	--	<1.0	<1.0	<1.0	--
MW-061A	06/18/98	<0.7	<0.5	<0.4	<0.3	<0.3	<0.5	<0.4
MW-061A	06/28/98	--	--	--	<1.0	<1.0	<1.0	--
MW-062	06/26/98	<4	<3	<2	<2#	<2#	<3#	<2
MW-063	06/25/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-064	06/23/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-065A	06/25/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-066	06/17/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-067	06/24/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-068	06/26/98	<4	<3	<2	<2#	<2#	<3#	<2
MW-070	06/16/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-071	06/19/98	<0.7	<0.5	<0.4	<0.3	<0.3	<0.5	<0.4
MW-071	06/28/98	--	--	--	<1.0	<1.0	<1.0	--
MW-072	06/30/98	<1	<1	<0.8	<0.6#	<0.6#	<1#	<0.8
MW-073	06/30/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-074	06/24/98	<4	<3	<2	<2#	<2#	<3#	<2
MW-075	06/30/98	<4	<3	<2	<2#	<2#	<3#	<2
MW-076	06/29/98	<4	<3	<2	<2#	<2#	<3#	<2
MW-081	06/29/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-082	06/25/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-083	06/25/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-084	06/23/98	<0.7	<0.5	<0.4	<0.3#	<0.3#	<0.5#	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Diethyl phthalate (ug/l)	p-Dimethyl amino azobenzene (ug/l)	7,12-Dimethyl benz(a) anthracene (ug/l)	alpha, alpha-Dimethylpien ethylamine (ug/l)	Dimethyl phthalate (ug/l)	Di-n-butyl-phthalate (ug/l)	2,4-Dinitro toluene (ug/l)	2,6-Dinitro toluene (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-058	06/22/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-059	06/24/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-060	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-061A	06/28/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-063	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-064	06/23/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-065A	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-066	06/17/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-067	06/24/98	<0.4	<0.4	<1.8	<0.1	16	<0.4	<0.5	<0.5
MW-068	06/26/98	<2	<2	<9	<0.5	80	<2	<3	<3
MW-070	06/16/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-071	06/19/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<0.8	<0.8	<3.6	<0.2	3.2	<0.8	<1	<1
MW-073	06/30/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-074	06/24/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-075	06/30/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-076	06/29/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-081	06/29/98	<0.4	<0.4	<1.8	<0.1	1.2	<0.4	<0.5	<0.5
MW-082	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-083	06/25/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-084	06/23/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Di-n-octyl phthalate (ug/l)	Diphenylamine (ug/l)	1,2-Diphenylhydrazine (ug/l)	Fluoranthene (ug/l)	Fluorene (ug/l)	Hexachloro benzene (ug/l)	Hexachloro butadiene (ug/l)	Hexachloro cyclopentadiene (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	<1.0	--
MW-057	06/25/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-058	06/22/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-059	06/24/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-060	06/21/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-060	07/01/98	--	--	--	--	--	--	<1.0	--
MW-061A	06/18/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-061A	06/28/98	--	--	--	--	--	--	<1.0	--
MW-062	06/26/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-063	06/25/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-064	06/23/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-065A	06/25/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-066	06/17/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-067	06/24/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-068	06/26/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-070	06/16/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-071	06/19/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-071	06/28/98	--	--	--	--	--	--	<1.0	--
MW-072	06/30/98	<1	<1	<0.6	<1	<1	<1	<1#	<1
MW-073	06/30/98	<0.7	<0.5	<0.3	<0.5	2.8	<0.5	<0.5#	<0.6
MW-074	06/24/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-075	06/30/98	<4	<3	<2	<3	3.0	<3	<3#	<3
MW-076	06/29/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-081	06/29/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-082	06/25/98	<0.7	<0.5	<0.3	<0.5	1.8	<0.5	<0.5#	<0.6
MW-083	06/25/98	<0.7	<0.5	<0.3	<0.5	3.8	<0.5	<0.5#	<0.6
MW-084	06/23/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Hexachloro ethane (ug/l)	Indeno (1,2,3-cd) pyrene (ug/l)	Isophorone (ug/l)	3-Methyl cholanthrene (ug/l)	2-Methyl naphthalene (ug/l)	Naphthalene (ug/l)	1-Naphthylamine (ug/l)	2-Naphthylamine (ug/l)
MW-057	06/24/98	--	--	--	--	--	<1.0	--	--
MW-057	06/25/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-058	06/22/98	<0.6	<0.5	<0.4	<0.4	4.7	1.5#	<1.5	<1.0
MW-059	06/24/98	<3	<3	<2	<2	26	7.9#	<7.5	<5
MW-060	06/21/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-060	07/01/98	--	--	--	--	--	<1.0	--	--
MW-061A	06/18/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-061A	06/28/98	--	--	--	--	--	<1.0	--	--
MW-062	06/26/98	<3	<3	<2	<2	<3	<2#	<7.5	<5
MW-063	06/25/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-064	06/23/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-065A	06/25/98	<0.6	<0.5	<0.4	<0.4	7.2	3.2#	<1.5	<1.0
MW-066	06/17/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-067	06/24/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-068	06/26/98	<3	<3	<2	<2	<3	<2#	<7.5	<5
MW-070	06/16/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-071	06/19/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-071	06/28/98	--	--	--	--	--	<1.0	--	--
MW-072	06/30/98	<1	<1	<0.8	<0.8	11	5.3#	<3	<2
MW-073	06/30/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-074	06/24/98	<3	<3	<2	<2	18	<2#	<7.5	<5
MW-075	06/30/98	<3	<3	<2	<2	34	12#	<7.5	<5
MW-076	06/29/98	<3	<3	<2	<2	<3	<2#	<7.5	<5
MW-081	06/29/98	<0.6	<0.5	<0.4	<0.4	1.9	<0.4#	<1.5	<1.0
MW-082	06/25/98	<0.6	<0.5	<0.4	<0.4	16	5.1#	<1.5	<1.0
MW-083	06/25/98	<0.6	<0.5	<0.4	<0.4	34	10#	<1.5	<1.0
MW-084	06/23/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0

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= Constituent in more than one test method, highest result reported.

For RCL 8270_698

TABLE 3-4

Page: 1J of 2L
Date: 10/19/98DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Nitroaniline (ug/l)	3-Nitroaniline (ug/l)	4-Nitroaniline (ug/l)	Nitrobenzene (ug/l)	N-Nitroso dimethylamine (ug/l)	N-Nitroso-di-n- butylamine (ug/l)	n-Nitro sodiethylamine (ug/l)	N-Nitroso diphenylamine (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-058	06/22/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-059	06/24/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-060	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-061A	06/28/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-063	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-064	06/23/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-065A	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-066	06/17/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-067	06/24/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-068	06/26/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-070	06/16/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-071	06/19/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<0.8	<2	<2	<1	<2.4	<2.2	<20	<0.8
MW-073	06/30/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-074	06/24/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-075	06/30/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-076	06/29/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-081	06/29/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-082	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-083	06/25/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-084	06/23/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	N-Nitroso-di-n-propylamine (ug/l)	N-Nitroso piperidine (ug/l)	N-Nitroso pyrrolidine (ug/l)	Pentachloro benzene (ug/l)	Pentachloro nitrobenzene (ug/l)	Phenacetin (ug/l)	Phenanthrene (ug/l)	2-Picoline (ug/l)
MW-057	06/24/98	--	--	--	--	--	--	--	--
MW-057	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-058	06/22/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-059	06/24/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-060	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-060	07/01/98	--	--	--	--	--	--	--	--
MW-061A	06/18/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-061A	06/28/98	--	--	--	--	--	--	--	--
MW-062	06/26/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-063	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-064	06/23/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-065A	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-066	06/17/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-067	06/24/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-068	06/26/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-070	06/16/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-071	06/19/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-071	06/28/98	--	--	--	--	--	--	--	--
MW-072	06/30/98	<0.8	<2	<20	<0.8	<10	<0.8	<0.8	<15
MW-073	06/30/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<1.3	<7.7
MW-074	06/24/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-075	06/30/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-076	06/29/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-081	06/29/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	0.74	<7.7
MW-082	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	1.0	<7.7
MW-083	06/25/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	1.9	<7.7
MW-084	06/23/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4
 DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
 LOWER QUEEN

Indian Basin Remediation Project
 Eddy County, NM

SITE	DATE	Promamide (ug/l)	Pyrene (ug/l)	1,2,4,5-Tetra chlorobenzene (ug/l)	1,2,4-Trichloro benzene (ug/l)
MW-057	06/24/98	---	---	---	<1.0
MW-057	06/25/98	<0.4	<0.5	<0.4	<0.6
MW-058	06/22/98	<0.4	<0.5	<0.4	<0.6#
MW-059	06/24/98	<2	<3	<2	<3#
MW-060	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-060	07/01/98	---	---	---	<1.0
MW-061A	06/18/98	<0.4	<0.5	<0.4	<0.6
MW-061A	06/28/98	---	---	---	<1.0
MW-062	06/26/98	<2	<3	<2	<3#
MW-063	06/25/98	<0.4	<0.5	<0.4	<0.6#
MW-064	06/23/98	<0.4	<0.5	<0.4	<0.6#
MW-065A	06/25/98	<0.4	<0.5	<0.4	<0.6#
MW-066	06/17/98	<0.4	<0.5	<0.4	<0.6#
MW-067	06/24/98	<0.4	<0.5	<0.4	<0.6#
MW-068	06/26/98	<2	<3	<2	<3#
MW-070	06/16/98	<0.4	<0.5	<0.4	<0.6#
MW-071	06/19/98	<0.4	<0.5	<0.4	<0.6
MW-071	06/28/98	---	---	---	<1.0
MW-072	06/30/98	<0.8	<1	<0.8	<1#
MW-073	06/30/98	<0.4	<0.5	<0.4	<0.6#
MW-074	06/24/98	<2	<3	<2	<3#
MW-075	06/30/98	<2	<3	<2	<3#
MW-076	06/29/98	<2	<3	<2	<3#
MW-081	06/29/98	<0.4	<0.5	<0.4	<0.6#
MW-082	06/25/98	<0.4	<0.5	<0.4	<0.6#
MW-083	06/25/98	<0.4	<0.5	<0.4	<0.6#
MW-084	06/23/98	<0.4	<0.5	<0.4	<0.6#

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
 # = Constituent in more than one test method, highest result reported.

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benzoic acid (ug/l)	4-Chloro-3- methylphenol (ug/l)	2-Chlorophenol (ug/l)	2,4-Dichloro phenol (ug/l)	2,6-Dichloro phenol (ug/l)	2,4-Dimethyl phenol (ug/l)	4,6-Dinitro- 2-methylphenol (ug/l)	2,4-Dinitro phenol (ug/l)
MW-085	06/23/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-086	06/26/98	<8.5	<2	<3	<20	<0.5	57	<8	<17
MW-087	06/19/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-087	06/27/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-087A	06/27/98	---	---	---	---	---	---	---	---
MW-088	06/18/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-088	06/27/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-094	06/26/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-095	06/22/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-096	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-096	07/01/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-097	07/01/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	<8.5	<2	<3	<20	<0.5	<3	<8.0	<17
MW-104	06/21/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-104	07/01/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
MW-110	06/30/98	<8.5	<2	<3	<20	<0.5	<3	<8.0	<17
MW-111	06/29/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
SW-01	06/30/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
SW-02	06/24/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3
SW-03	06/24/98	<1.7	<0.4	<0.5	<3.9	<0.1	<0.5	<1.6	<3.3

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DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Methylphenol (ug/l)	4-Methylphenol (ug/l)	2-Nitrophenol (ug/l)	4-Nitrophenol (ug/l)	Pentachloro phenol (ug/l)	Phenol (ug/l)	2,3,4,6-Tetra chlorophenol (ug/l)	2,4,5-Trichloro phenol (ug/l)
MW-085	06/23/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-086	06/26/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-087	06/19/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-087	06/27/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-087A	06/27/98	---	---	---	---	---	---	---	---
MW-088	06/18/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-088	06/27/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-094	06/26/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-095	06/22/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-096	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-096	07/01/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-097	07/01/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	<2	<3	<2	<4	<4	<3	<3	<15
MW-104	06/21/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-104	07/01/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
MW-110	06/30/98	<2	<3	<2	<4	<4	8.9	<3	<15
MW-111	06/29/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
SW-01	06/30/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
SW-02	06/24/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0
SW-03	06/24/98	<0.3	<0.5	<0.4	<0.7	<0.7	<0.5	<0.6	<3.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	2,4,6-Trichloro phenol (ug/l)	Acenaphthene (ug/l)	Acenaphthylene (ug/l)	Acetophenone (ug/l)	4-Aminobiphenyl (ug/l)	Aniline (ug/l)	Anthracene (ug/l)	Benzidine (ug/l)
MW-085	06/23/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-086	06/26/98	<2	<2	<2	<2	<4	<3	<2	<14
MW-087	06/19/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-087	06/27/98	--	--	--	--	--	--	--	--
MW-087A	06/19/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-087A	06/27/98	--	--	--	--	--	--	--	--
MW-088	06/18/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-088	06/27/98	--	--	--	--	--	--	--	--
MW-089	06/17/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-094	06/26/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-095	06/22/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-096	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-096	07/01/98	--	--	--	--	--	--	--	--
MW-097	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-097	07/01/98	--	--	--	--	--	--	--	--
MW-098	06/29/98	<2	<2	<2	<2	<4	<3	<2	<14
MW-104	06/21/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-104	07/01/98	--	--	--	--	--	--	--	--
MW-108	06/22/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
MW-110	06/30/98	<2	<2	<2	<2	<4	<3	<2	<14
MW-111	06/29/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
SW-01	06/30/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
SW-02	06/24/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7
SW-03	06/24/98	<0.3	<0.4	<0.4	<0.4	<0.7	<0.5	<0.4	<2.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Benz(a) anthracene (ug/l)	Benzo(a)pyrene (ug/l)	Benzo(b) fluoranthene (ug/l)	Benzo(g,h,i) perylene (ug/l)	Benzofl(uor) anthene (ug/l)	Benzyl alcohol (ug/l)	bis(2-Chloro ethoxy)methane (ug/l)	Bis(2-chloro ethyl)ether (ug/l)
MW-085	06/23/98	<0.5	0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-086	06/26/98	<3	<1#	<3	<2	<4	<3	<2	<3
MW-087	06/19/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-087	06/27/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-087A	06/27/98	---	---	---	---	---	---	---	---
MW-088	06/18/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-088	06/27/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-094	06/26/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-095	06/22/98	<0.5	<0.2	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-096	06/21/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-096	07/01/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-097	07/01/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	<3	<1#	<3	<2	<4	<3	<2	<3
MW-104	06/21/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-104	07/01/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
MW-110	06/30/98	<3	<1#	<3	<2	<4	<3	<2	<3
MW-111	06/29/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
SW-01	06/30/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
SW-02	06/24/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5
SW-03	06/24/98	<0.5	<0.2#	<0.5	<0.3	<0.7	<0.5	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Bis(2-chloroiso propyl)ether (ug/l)	Bis(2-Ethyl hexyl) phthalate (ug/l)	4-Bromophenyl phenyl ether (ug/l)	Butyl benzyl phthalate (ug/l)	4-Chloroaniline (ug/l)	1-Chloro naphthalene (ug/l)	2-Chloro naphthalene (ug/l)	4-Chlorophenyl phenyl ether (ug/l)
MW-085	06/23/98	<1.9	11	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-086	06/26/98	<9.5	<3	<2	<3	<2	<3	<2	<3
MW-087	06/19/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-087A	06/27/98	--	--	--	--	--	--	--	--
MW-087A	06/19/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-088	06/27/98	--	--	--	--	--	--	--	--
MW-088	06/18/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-088	06/27/98	--	--	--	--	--	--	--	--
MW-089	06/17/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-094	06/26/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-095	06/22/98	<1.9	3.5	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-096	06/21/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-096	07/01/98	--	--	--	--	--	--	--	--
MW-097	06/21/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-097	07/01/98	--	--	--	--	--	--	--	--
MW-098	06/29/98	<9.5	<3	<2	<3	<2	<3	<2	<3
MW-104	06/21/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-104	07/01/98	--	--	--	--	--	--	--	--
MW-108	06/22/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
MW-110	06/30/98	<9.5	4.5	<2	<3	<2	<3	<2	<3
MW-111	06/29/98	<1.9	0.71	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
SW-01	06/30/98	<1.9	0.93	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
SW-02	06/24/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5
SW-03	06/24/98	<1.9	<0.6	<0.4	<0.5	<0.4	<0.6	<0.4	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chrysene (ug/l)	Dibenz(a,h) acridine (ug/l)	Dibenzofuran (ug/l)	1,2-Dichloro benzene (ug/l)	1,3-Dichloro benzene (ug/l)	1,4-Dichloro benzene (ug/l)	3,3'-Dichloro benzidine (ug/l)
MW-085	06/23/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-086	06/26/98	<4	<2	<2	<2#	<2#	<3#	<2
MW-087	06/19/98	<0.7	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-087A	06/27/98	--	--	--	<1.0	<1.0	<1.0	--
MW-087A	06/19/98	<0.7	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-088	06/27/98	--	--	--	<1.0	<1.0	<1.0	--
MW-088	06/18/98	<0.7	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-088	06/27/98	--	--	--	<1.0	<1.0	<1.0	--
MW-089	06/17/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-094	06/26/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-095	06/22/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-096	06/21/98	<0.7	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-096	07/01/98	--	--	--	<1.0	<1.0	<1.0	--
MW-097	06/21/98	<0.7	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-097	07/01/98	--	--	--	<1.0	<1.0	<1.0	--
MW-098	06/29/98	<4	<2	<2	<2#	<2#	<3#	<2
MW-104	06/21/98	<0.7	<0.3	<0.4	<0.3	<0.3	<0.5	<0.4
MW-104	07/01/98	--	--	--	<1.0	<1.0	<1.0	--
MW-108	06/22/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
MW-110	06/30/98	<4	<2	<2	<2#	<2#	<3#	<2
MW-111	06/29/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
SW-01	06/30/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
SW-02	06/24/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4
SW-03	06/24/98	<0.7	<0.3	<0.4	<0.3#	<0.3#	<0.5#	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed
= Constituent in more than one test method, highest result reported.

DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Diethyl phthalate (ug/l)	p-Dimethyl amino azobenzene (ug/l)	7,12-Dimethyl benz(a) anthracene (ug/l)	alpha, alpha-Dimethylpihen ethylamine (ug/l)	Dimethyl phthalate (ug/l)	Di-n-butyl-phthalate (ug/l)	2,4-Dinitro toluene (ug/l)	2,6-Dinitro toluene (ug/l)
MW-085	06/23/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-086	06/26/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-087	06/19/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-087	06/27/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-087A	06/27/98	---	---	---	---	---	---	---	---
MW-088	06/18/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-088	06/27/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-094	06/26/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-095	06/22/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-096	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-096	07/01/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-097	07/01/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	<2	<2	<9	<0.5	<2	<2	<3	<3
MW-104	06/21/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-104	07/01/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
MW-110	06/30/98	<2	<2	<9	<0.5	5.4	<2	<3	<3
MW-111	06/29/98	<0.4	<0.4	<1.8	<0.1	1.8	1.8	<0.5	<0.5
SW-01	06/30/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
SW-02	06/24/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5
SW-03	06/24/98	<0.4	<0.4	<1.8	<0.1	<0.4	<0.4	<0.5	<0.5

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Di-n-octyl phthalate (ug/l)	Diphenylamine (ug/l)	1,2-Diphenyl hydrazine (ug/l)	Fluoranthene (ug/l)	Fluorene (ug/l)	Hexachloro benzene (ug/l)	Hexachloro butadiene (ug/l)	Hexachloro cyclopentadiene (ug/l)
MW-085	06/23/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-086	06/26/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-087	06/19/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-087	06/27/98	--	--	--	--	--	--	<1.0	--
MW-087A	06/19/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-087A	06/27/98	--	--	--	--	--	--	<1.0	--
MW-088	06/18/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-088	06/27/98	--	--	--	--	--	--	<1.0	--
MW-089	06/17/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-094	06/26/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-095	06/22/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-096	06/21/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-096	07/01/98	--	--	--	--	--	--	<1.0	--
MW-097	06/21/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-097	07/01/98	--	--	--	--	--	--	<1.0	--
MW-098	06/29/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-104	06/21/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5	<0.6
MW-104	07/01/98	--	--	--	--	--	--	<1.0	--
MW-108	06/22/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
MW-110	06/30/98	<4	<3	<2	<3	<3	<3	<3#	<3
MW-111	06/29/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
SW-01	06/30/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
SW-02	06/24/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6
SW-03	06/24/98	<0.7	<0.5	<0.3	<0.5	<0.6	<0.5	<0.5#	<0.6

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DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Hexachloro ethane (ug/l)	Indeno (1,2,3-cd) pyrene (ug/l)	Isophorone (ug/l)	3-Methyl cholanthrene (ug/l)	2-Methyl naphthalene (ug/l)	Naphthalene (ug/l)	1-Naphthylamine (ug/l)	2-Naphthylamine (ug/l)
MW-085	06/23/98	<0.6	<0.5	<0.4	<0.4	273	117	<1.5	<1.0
MW-086	06/26/98	<3	<3	<2	<2	23	15#	<7.5	<5
MW-087	06/19/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-087	06/27/98	--	--	--	--	--	<1.0	--	--
MW-087A	06/19/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-087A	06/27/98	--	--	--	--	--	<1.0	--	--
MW-088	06/18/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-088	06/27/98	--	--	--	--	--	<1.0	--	--
MW-089	06/17/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-094	06/26/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-095	06/22/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-096	06/21/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-096	07/01/98	--	--	--	--	--	<1.0	--	--
MW-097	06/21/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-097	07/01/98	--	--	--	--	--	<1.0	--	--
MW-098	06/29/98	<3	<3	<2	<2	16	6.9#	<7.5	<5
MW-104	06/21/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4	<1.5	<1.0
MW-104	07/01/98	--	--	--	--	--	<1.0	--	--
MW-108	06/22/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
MW-110	06/30/98	<3	<3	<2	<2	15	8.3#	<7.5	<5
MW-111	06/29/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
SW-01	06/30/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
SW-02	06/24/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0
SW-03	06/24/98	<0.6	<0.5	<0.4	<0.4	<0.5	<0.4#	<1.5	<1.0

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DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	2-Nitroaniline (ug/l)	3-Nitroaniline (ug/l)	4-Nitroaniline (ug/l)	Nitrobenzene (ug/l)	N-Nitroso dimethylamine (ug/l)	N-Nitroso-di-n- butylamine (ug/l)	n-Nitro sodiethylamine (ug/l)	N-Nitroso diphenylamine (ug/l)
MW-085	06/23/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-086	06/26/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-087	06/19/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-087	06/27/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-087A	06/27/98	---	---	---	---	---	---	---	---
MW-088	06/18/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-088	06/27/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-094	06/26/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-095	06/22/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-096	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-096	07/01/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-097	07/01/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-104	06/21/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-104	07/01/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
MW-110	06/30/98	<2	<5	<4	<3	<6	<5.5	<50	<2
MW-111	06/29/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
SW-01	06/30/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
SW-02	06/24/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4
SW-03	06/24/98	<0.4	<0.9	<0.8	<0.5	<1.2	<1.1	<10	<0.4

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4

Page: 2K of 2L
Date: 10/19/98DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	N-Nitroso-di-n-propylamine (ug/l)	N-Nitroso piperidine (ug/l)	N-Nitroso pyrrolidine (ug/l)	Pentachloro benzene (ug/l)	Pentachloro nitrobenzene (ug/l)	Phenacetin (ug/l)	Phenanthrene (ug/l)	2-Picoline (ug/l)
MW-085	06/23/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-086	06/26/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-087	06/19/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-087	06/27/98	--	--	--	--	--	--	--	--
MW-087A	06/19/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-087A	06/27/98	--	--	--	--	--	--	--	--
MW-088	06/18/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-088	06/27/98	--	--	--	--	--	--	--	--
MW-089	06/17/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-094	06/26/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-095	06/22/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-096	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-096	07/01/98	--	--	--	--	--	--	--	--
MW-097	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-097	07/01/98	--	--	--	--	--	--	--	--
MW-098	06/29/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-104	06/21/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-104	07/01/98	--	--	--	--	--	--	--	--
MW-108	06/22/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
MW-110	06/30/98	<2	<4	<50	<2	<25	<2	<2	<39
MW-111	06/29/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
SW-01	06/30/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
SW-02	06/24/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7
SW-03	06/24/98	<0.4	<0.8	<10	<0.4	<5.0	<0.4	<0.4	<7.7

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-4
DISSOLVED-PHASE SVOC CONCENTRATIONS (JUNE - JULY 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Pronamide (ug/l)	Pyrene (ug/l)	1,2,4,5-Tetra chlorobenzene (ug/l)	1,2,4-Trichloro benzene (ug/l)
MW-085	06/23/98	<0.4	<0.5	<0.4	<0.6#
MW-086	06/26/98	<2	<3	<2	<3#
MW-087	06/19/98	<0.4	<0.5	<0.4	<0.6
MW-087	06/27/98	--	--	--	<1.0
MW-087A	06/19/98	<0.4	<0.5	<0.4	<0.6
MW-087A	06/27/98	--	--	--	<1.0
MW-088	06/18/98	<0.4	<0.5	<0.4	<0.6
MW-088	06/27/98	--	--	--	<1.0
MW-089	06/17/98	<0.4	<0.5	<0.4	<0.6#
MW-094	06/26/98	<0.4	<0.5	<0.4	<0.6#
MW-095	06/22/98	<0.4	<0.5	<0.4	<0.6#
MW-096	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-096	07/01/98	--	--	--	<1.0
MW-097	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-097	07/01/98	--	--	--	<1.0
MW-098	06/29/98	<2	<3	<2	<3#
MW-104	06/21/98	<0.4	<0.5	<0.4	<0.6
MW-104	07/01/98	--	--	--	<1.0
MW-108	06/22/98	<0.4	<0.5	<0.4	<0.6#
MW-110	06/30/98	<2	<3	<2	<3#
MW-111	06/29/98	<0.4	<0.5	<0.4	<0.6#
SW-01	06/30/98	<0.4	<0.5	<0.4	<0.6#
SW-02	06/24/98	<0.4	<0.5	<0.4	<0.6#
SW-03	06/24/98	<0.4	<0.5	<0.4	<0.6#

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
= Constituent in more than one test method, highest result reported.

TABLE 3-5
DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chloride (mg/l)	Cyanide (mg/l)	Fluoride (mg/l)	Nitrate/Nitrite		pH (mg/l)	Phenols, total (mg/l)
					NITRATE NITROGEN (mg/l)	NITRITE NITROGEN (mg/l)		
LYMAN	06/29/98	13	<0.005	0.6	<0.1	0.6	7.4	<0.005
MW-013	06/21/98	230	<0.005	0.3	<0.1	0.1	7.0	0.023
MW-014	06/22/98	330	<0.005	0.4	<0.1	0.1	7.0	0.008
MW-041	06/19/98	120	<0.005	1.5	<0.1	<0.1	7.5	0.024
MW-043	06/22/98	210	<0.005	0.8	<0.1	<0.1	7.3	0.007
MW-044	06/22/98	250	<0.005	0.8	<0.1	<0.1	7.2	0.040
MW-046	06/21/98	140	<0.005	1.1	<0.1	<0.1	7.2	0.034
MW-049	06/21/98	630	0.050	1.3	<0.1	<0.1	7.0	0.012
MW-050	06/19/98	340	<0.005	1.2	<0.1	0.5	8.2	<0.005
MW-054	06/25/98	110	<0.005	1.8	<0.1	<0.1	7.1	<0.005
MW-055	06/25/98	300	<0.005	1.5	<0.1	0.1	7.0	0.016
MW-061	06/18/98	480	<0.005	2.2	<0.1	<0.1	6.9	<0.005
MW-069	06/29/98	120	<0.005	0.3	<0.1	<0.1	6.9	0.015
MW-078	06/19/98	47	<0.005	<0.2	<0.1	<0.1	7.1	<0.005
MW-090	06/17/98	35	<0.005	0.5	<0.1	7.1	7.5	<0.005
MW-106	06/18/98	4	<0.005	0.3	<0.1	1.9	7.3	<0.005
UIHS_ARROYO	06/26/98	13	<0.005	0.7	<0.1	<0.1	7.2	0.006

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL INORGANICS

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Sulfate (mg/l)	Total dissolved solids (TDS) (mg/l)
LYMAN	06/29/98	670	1000
MW-013	06/21/98	< 5	1000
MW-014	06/22/98	< 5	1400
MW-041	06/19/98	190	1200
MW-043	06/22/98	53	1500
MW-044	06/22/98	66	1000
MW-046	06/21/98	22	940
MW-049	06/21/98	780	2800
MW-050	06/19/98	3800	5900
MW-054	06/25/98	1300	2200
MW-055	06/25/98	55	1500
MW-061	06/18/98	1600	3200
MW-069	06/29/98	< 5	860
MW-078	06/19/98	< 5	490
MW-090	06/17/98	130	530
MW-106	06/18/98	33	380
UIHS_ARROYO	06/26/98	590	940

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL INORGANICS

TABLE 3-6
DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chloride (mg/l)	Cyanide (mg/l)	Fluoride (mg/l)	Nitrate/Nitrite		pH (mg/l)	Phenols, total (mg/l)
					NITRITE NITROGEN (mg/l)	NITRATE NITROGEN (mg/l)		
MW-057	06/25/98	50	<0.005	0.5	<0.1	<0.1	7.3	0.006
MW-058	06/22/98	42	<0.005	0.9	<0.1	<0.1	7.4	<0.005
MW-059	06/24/98	560	<0.005	0.6	<0.1	0.1	7.5	0.022
MW-060	06/21/98	12	<0.005	1.4	<0.1	0.3	7.3	<0.005
MW-061A	06/18/98	4	0.025	0.8	<0.1	<0.1	7.3	<0.005
MW-062	06/26/98	91	<0.005	0.8	<0.1	<0.1	7.1	<0.005
MW-063	06/25/98	10	<0.005	0.4	<0.1	7.1	7.4	0.005
MW-064	06/23/98	15	<0.005	0.7	<0.1	0.7	7.3	<0.005
MW-065A	06/25/98	24	<0.005	0.7	<0.1	<0.1	7.2	0.005
MW-066	06/17/98	13	0.75	0.8	<0.1	0.3	7.2	<0.005
MW-067	06/24/98	11	<0.005	0.7	<0.1	<0.1	7.3	0.005
MW-068	06/26/98	29	<0.005	0.6	<0.1	1.7	7.3	0.025
MW-070	06/16/98	12	<0.005	0.6	<0.1	2.7	7.5	<0.005
MW-071	06/19/98	4	<0.005	2.2	<0.1	<0.1	7.2	<0.005
MW-072	06/30/98	49	<0.005	0.8	<0.1	<0.1	6.9	0.015
MW-073	06/30/98	320	<0.005	1.3	<0.1	<0.1	6.9	<0.005
MW-074	06/24/98	340	<0.005	1.1	<0.1	<0.1	7.0	0.025
MW-075	06/30/98	54	<0.005	1.2	<0.1	0.1	7.3	0.077
MW-076	06/29/98	23	<0.005	0.5	<0.1	1.3	7.3	0.008
MW-081	06/29/98	16	<0.005	0.7	<0.1	<0.1	7.4	<0.005
MW-082	06/25/98	72	<0.005	0.7	<0.1	0.14	7.1	0.006
MW-083	06/25/98	49	<0.005	0.7	<0.1	<0.1	7.2	<0.005
MW-084	06/23/98	7	<0.005	0.5	<0.1	<0.1	7.5	0.008
MW-085	06/23/98	120	<0.005	1.3	<0.1	0.1	7.5	0.034
MW-086	06/26/98	330	<0.005	1.1	<0.1	0.1	7.0	0.068
MW-087	06/19/98	13	<0.005	0.9	<0.1	0.8	7.4	<0.005
MW-087A	06/19/98	160	<0.005	2.4	<0.1	<0.1	7.7	<0.005

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL INORGANICS

TABLE 3-6
DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Sulfate (mg/l)	Total dissolved solids (TDS) (mg/l)
MW-057	06/25/98	110	490
MW-058	06/22/98	<5	760
MW-059	06/24/98	2300	4100
MW-060	06/21/98	390	720
MW-061A	06/18/98	300	690
MW-062	06/26/98	140	650
MW-063	06/25/98	39	370
MW-064	06/23/98	<5	600
MW-065A	06/25/98	250	550
MW-066	06/17/98	430	760
MW-067	06/24/98	140	480
MW-068	06/26/98	100	480
MW-070	06/16/98	80	370
MW-071	06/19/98	650	1100
MW-072	06/30/98	530	890
MW-073	06/30/98	2800	8700
MW-074	06/24/98	13	1500
MW-075	06/30/98	390	870
MW-076	06/29/98	51	400
MW-081	06/29/98	450	800
MW-082	06/25/98	390	730
MW-083	06/25/98	270	640
MW-084	06/23/98	<5	370
MW-085	06/23/98	<5	2190
MW-086	06/26/98	29	41500
MW-087	06/19/98	360	710
MW-087A	06/19/98	2200	5100

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL INORGANICS

TABLE 3-6
DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chloride (mg/l)	Cyanide (mg/l)	Fluoride (mg/l)	Nitrate/Nitrite		pH (mg/l)	Phenols, total (mg/l)
					NITRITE NITROGEN (mg/l)	NITRATE NITROGEN (mg/l)		
MW-088	06/18/98	22	<0.005	1.1	<0.1	<0.1	7.2	<0.005
MW-089	06/17/98	61	0.247	0.7	<0.1	<0.1	7.1	<0.005
MW-094	06/26/98	24	<0.005	0.7	<0.1	2.5	7.3	0.008
MW-095	06/22/98	5	<0.005	0.4	<0.1	3.2	7.5	<0.005
MW-096	06/21/98	14	<0.005	0.4	<0.1	0.5	7.2	<0.005
MW-097	06/21/98	8	<0.005	0.7	<0.1	1.6	7.2	<0.005
MW-098	06/29/98	14	<0.005	0.3	<0.1	2.5	7.6	0.010
MW-104	06/21/98	14	<0.005	1.4	<0.1	0.5	7.3	<0.005
MW-108	06/22/98	5	<0.005	0.4	<0.1	2.4	7.4	<0.005
MW-110	06/30/98	54	<0.005	0.7	<0.1	1.4	7.2	0.010
MW-111	06/29/98	100	<0.005	0.7	<0.1	0.4	7.2	<0.005
SW-01	06/30/98	23	<0.005	0.6	<0.1	2.5	7.3	<0.005
SW-02	06/24/98	150	<0.005	0.5	<0.1	0.9	7.2	<0.005
SW-03	06/24/98	9	<0.005	0.7	<0.1	5.9	7.5	<0.005

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL INORGANICS

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Sulfate (mg/l)	Total dissolved solids (TDS) (mg/l)
MW-088	06/18/98	450	840
MW-089	06/17/98	340	780
MW-094	06/26/98	240	600
MW-095	06/22/98	21	360
MW-096	06/21/98	210	560
MW-097	06/21/98	190	520
MW-098	06/29/98	32	310
MW-104	06/21/98	230	560
MW-108	06/22/98	35	340
MW-110	06/30/98	130	600
MW-111	06/29/98	310	900
SW-01	06/30/98	230	550
SW-02	06/24/98	120	730
SW-03	06/24/98	110	410

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL INORGANICS

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Aluminum (mg/l)	Arsenic (mg/l)	Barium (mg/l)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l)	Chromium (mg/l)	Cobalt (mg/l)
LYMAN	06/29/98	---	---	---	---	---	---	---	---
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-014	06/22/98	---	---	---	---	---	---	---	---
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-043	06/22/98	---	---	---	---	---	---	---	---
MW-044	06/22/98	---	---	---	---	---	---	---	---
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-054	06/25/98	---	---	---	---	---	---	---	---
MW-055	06/25/98	---	---	---	---	---	---	---	---
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-069	06/29/98	---	---	---	---	---	---	---	---
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-090	06/17/98	---	---	---	---	---	---	---	---
MW-106	06/18/98	---	---	---	---	---	---	---	---
UIHS_ARROYO	06/26/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-7
DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Copper (mg/l)	Iron (mg/l)	Lead (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Mercury (mg/l)	Molybdenum (mg/l)	Nickel (mg/l)
LYMAN	06/29/98	---	---	---	---	---	---	---	---
MW-013	06/21/98	---	---	---	---	---	---	---	---
MW-014	06/22/98	---	---	---	---	---	---	---	---
MW-041	06/19/98	---	---	---	---	---	---	---	---
MW-043	06/22/98	---	---	---	---	---	---	---	---
MW-044	06/22/98	---	---	---	---	---	---	---	---
MW-046	06/21/98	---	---	---	---	---	---	---	---
MW-049	06/21/98	---	---	---	---	---	---	---	---
MW-050	06/19/98	---	---	---	---	---	---	---	---
MW-054	06/25/98	---	---	---	---	---	---	---	---
MW-055	06/25/98	---	---	---	---	---	---	---	---
MW-061	06/18/98	---	---	---	---	---	---	---	---
MW-069	06/29/98	---	---	---	---	---	---	---	---
MW-078	06/19/98	---	---	---	---	---	---	---	---
MW-090	06/17/98	---	---	---	---	---	---	---	---
MW-106	06/18/98	---	---	---	---	---	---	---	---
UIHS_ARROYO	06/26/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Potassium (mg/l)	Radium 226,228 (pCi/l)	Selenium (mg/l)	Silicon (mg/l)	Silver (mg/l)	Sodf (mg/l)	Uranium (pCi/l)	Zinc (mg/l)
LYMAN	06/29/98	---	3.50	---	---	---	---	No convert	---
MW-013	06/21/98	---	0.87	---	---	---	---	No convert	---
MW-014	06/22/98	---	13.72	---	---	---	---	< No convert	---
MW-041	06/19/98	---	6.24	---	---	---	---	No convert	---
MW-043	06/22/98	---	5.90	---	---	---	---	No convert	---
MW-044	06/22/98	---	0.63	---	---	---	---	< No convert	---
MW-046	06/21/98	---	13.60	---	---	---	---	No convert	---
MW-049	06/21/98	---	11.76	---	---	---	---	No convert	---
MW-050	06/19/98	---	10.46	---	---	---	---	No convert	---
MW-054	06/25/98	---	17.05	---	---	---	---	No convert	---
MW-055	06/25/98	---	9.95	---	---	---	---	No convert	---
MW-061	06/18/98	---	7.4	---	---	---	---	< No convert	---
MW-069	06/29/98	---	1.03	---	---	---	---	< No convert	---
MW-078	06/19/98	---	15.61	---	---	---	---	No convert	---
MW-090	06/17/98	---	3.60	---	---	---	---	No convert	---
MW-106	06/18/98	---	5.63	---	---	---	---	No convert	---
UIHS_ARROYO	06/26/98	---	2.82	---	---	---	---	< No convert	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONEPage: 1D of 1F
Date: 10/19/98Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Aluminum (mg/l)	Dissolved Arsenic (mg/l)	Dissolved Barium (mg/l)	Dissolved Boron (mg/l)	Dissolved Cadmium (mg/l)	Dissolved Chromium (mg/l)	Dissolved Cobalt (mg/l)	Dissolved Copper (mg/l)
LYMAN	06/29/98	<0.026	<0.0018	0.018	0.090	0.0003	<0.0008	<0.0003	<0.0018
MW-013	06/21/98	<0.026	0.015	0.52	0.22	0.0004	<0.0008	0.0005	<0.0018
MW-014	06/22/98	<0.026	0.0062	0.56	0.31	0.0005	0.0009	<0.0003	<0.0018
MW-041	06/19/98	0.030	0.011	0.36	0.27	<0.0002	0.0038	0.0026	<0.0018
MW-043	06/22/98	<0.026	0.0052	0.28	0.30	0.0003	<0.0008	0.0082	<0.0018
MW-044	06/22/98	<0.026	<0.0018	0.23	0.33	<0.0002	<0.0008	<0.0003	<0.0018
MW-046	06/21/98	<0.026	0.0033	0.32	0.20	<0.0002	0.0016	<0.0003	<0.0018
MW-049	06/21/98	<0.026	<0.0018	0.048	0.054	<0.0002	0.0038	<0.0003	<0.0018
MW-050	06/19/98	<0.026	0.0052	0.028	0.48	<0.0002	0.0009	<0.0003	<0.0018
MW-054	06/25/98	<0.026	<0.0018	0.015	0.29	<0.0002	0.0008	0.0003	<0.0018
MW-055	06/25/98	<0.026	0.0094	0.40	0.34	0.0004	0.0013	0.0012	<0.0018
MW-061	06/18/98	0.090	0.0024	0.025	0.068	<0.0002	<0.0008	<0.0003	<0.0018
MW-069	06/29/98	<0.026	0.0062	0.025	0.16	0.0005	0.0010	0.0005	<0.0018
MW-078	06/19/98	<0.026	0.0097	0.93	0.10	0.0003	0.0031	0.0013	<0.0018
MW-090	06/17/98	<0.026	0.0044	0.14	0.11	<0.0002	0.0010	<0.0003	<0.0018
MW-106	06/18/98	<0.026	0.0035	0.22	0.074	<0.0002	<0.0008	<0.0003	0.0033
UIHS_ARROYO	06/26/98	<0.026	<0.0018	0.044	0.078	<0.0002	<0.0008	0.0004	<0.0018

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-7
DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Iron (mg/l)	Dissolved Manganese (mg/l)	Dissolved Mercury (mg/l)	Dissolved Molybdenum (mg/l)	Dissolved Nickel (mg/l)	Dissolved Lead (mg/l)	Dissolved Selenium (mg/l)	Dissolved Silicon (mg/l)
LYMAN	06/29/98	0.035	<0.0002	<0.0001	0.0034	<0.0009	<0.0022	<0.0023	---
MW-013	06/21/98	3.41	0.22	<0.0001	0.0031	0.014	<0.0022	<0.0023	---
MW-014	06/22/98	4.74	0.24	<0.0001	0.0039	0.0025	<0.0022	<0.0023	---
MW-041	06/19/98	0.93	0.20	<0.0001	0.0090	0.0054	<0.0022	<0.0023	---
MW-043	06/22/98	2.65	0.20	<0.0001	0.054	0.039	<0.0022	<0.0023	---
MW-044	06/22/98	<0.013	0.043	<0.0001	0.0007	<0.0009	<0.0022	<0.0023	---
MW-046	06/21/98	0.014	0.090	<0.0001	0.0007	0.0036	<0.0022	<0.0023	---
MW-049	06/21/98	0.055	0.079	<0.0001	0.0050	<0.0009	<0.0022	<0.0023	---
MW-050	06/19/98	<0.013	0.035	<0.0001	0.0055	0.0053	<0.0022	0.0037	---
MW-054	06/25/98	<0.013	0.0050	<0.0001	0.0026	<0.0009	<0.0022	<0.0005	---
MW-055	06/25/98	2.22	0.12	<0.0001	0.0031	<0.0009	<0.0022	<0.0005	---
MW-061	06/18/98	0.032	0.0010	0.0010	0.0011	<0.0009	<0.0022	<0.0023	---
MW-069	06/29/98	2.77	0.59	<0.0001	0.0033	<0.0009	<0.0022	<0.0005	---
MW-078	06/19/98	1.05	0.82	<0.0001	0.0034	0.0065	<0.0022	0.0035	---
MW-090	06/17/98	<0.013	<0.0002	<0.0001	0.0025	0.0021	<0.0022	<0.0023	---
MW-106	06/18/98	<0.013	0.0066	0.0005	0.0019	<0.0009	<0.0022	<0.0023	---
UIHS_ARROYO	06/26/98	0.015	0.012	<0.0001	0.0021	<0.0009	<0.0022	<0.0005	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Silver (mg/l)	Dissolved Zinc (mg/l)
LYMAN	06/29/98	<0.0007	<0.014
MW-013	06/21/98	<0.0007	0.037
MW-014	06/22/98	<0.0007	<0.014
MW-041	06/19/98	<0.0007	0.037
MW-043	06/22/98	<0.0007	<0.014
MW-044	06/22/98	<0.0007	<0.014
MW-046	06/21/98	<0.0007	<0.014
MW-049	06/21/98	0.022	<0.014
MW-050	06/19/98	0.0075	0.039
MW-054	06/25/98	<0.0007	0.015
MW-055	06/25/98	<0.0007	<0.014
MW-061	06/18/98	0.0025	0.054
MW-069	06/29/98	<0.0007	0.024
MW-078	06/19/98	<0.0007	0.087
MW-090	06/17/98	<0.0007	0.018
MW-106	06/18/98	<0.0007	0.046
UIHS_ARROYO	06/26/98	<0.0007	0.024

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8
DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Aluminum (mg/l)	Arsenic (mg/l)	Barium (mg/l)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l)	Chromium (mg/l)	Cobalt (mg/l)
MW-057	06/25/98	---	---	---	---	---	---	---	---
MW-058	06/22/98	---	---	---	---	---	---	---	---
MW-059	06/24/98	---	---	---	---	---	---	---	---
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-062	06/26/98	---	---	---	---	---	---	---	---
MW-063	06/25/98	---	---	---	---	---	---	---	---
MW-064	06/23/98	---	---	---	---	---	---	---	---
MW-065A	06/25/98	---	---	---	---	---	---	---	---
MW-066	06/17/98	---	---	---	---	---	---	---	---
MW-067	06/24/98	---	---	---	---	---	---	---	---
MW-068	06/26/98	---	---	---	---	---	---	---	---
MW-070	06/16/98	---	---	---	---	---	---	---	---
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-072	06/30/98	---	---	---	---	---	---	---	---
MW-073	06/30/98	---	---	---	---	---	---	---	---
MW-074	06/24/98	---	---	---	---	---	---	---	---
MW-075	06/30/98	---	---	---	---	---	---	---	---
MW-076	06/29/98	---	---	---	---	---	---	---	---
MW-081	06/29/98	---	---	---	---	---	---	---	---
MW-082	06/25/98	---	---	---	---	---	---	---	---
MW-083	06/25/98	---	---	---	---	---	---	---	---
MW-084	06/23/98	---	---	---	---	---	---	---	---
MW-085	06/23/98	---	---	---	---	---	---	---	---
MW-086	06/26/98	---	---	---	---	---	---	---	---
MW-087	06/19/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8
DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Copper (mg/l)	Iron (mg/l)	Lead (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Mercury (mg/l)	Molybdenum (mg/l)	Nickel (mg/l)
MW-057	06/25/98	---	---	---	---	---	---	---	---
MW-058	06/22/98	---	---	---	---	---	---	---	---
MW-059	06/24/98	---	---	---	---	---	---	---	---
MW-060	06/21/98	---	---	---	---	---	---	---	---
MW-061A	06/18/98	---	---	---	---	---	---	---	---
MW-062	06/26/98	---	---	---	---	---	---	---	---
MW-063	06/25/98	---	---	---	---	---	---	---	---
MW-064	06/23/98	---	---	---	---	---	---	---	---
MW-065A	06/25/98	---	---	---	---	---	---	---	---
MW-066	06/17/98	---	---	---	---	---	---	---	---
MW-067	06/24/98	---	---	---	---	---	---	---	---
MW-068	06/26/98	---	---	---	---	---	---	---	---
MW-070	06/16/98	---	---	---	---	---	---	---	---
MW-071	06/19/98	---	---	---	---	---	---	---	---
MW-072	06/30/98	---	---	---	---	---	---	---	---
MW-073	06/30/98	---	---	---	---	---	---	---	---
MW-074	06/24/98	---	---	---	---	---	---	---	---
MW-075	06/30/98	---	---	---	---	---	---	---	---
MW-076	06/29/98	---	---	---	---	---	---	---	---
MW-081	06/29/98	---	---	---	---	---	---	---	---
MW-082	06/25/98	---	---	---	---	---	---	---	---
MW-083	06/25/98	---	---	---	---	---	---	---	---
MW-084	06/23/98	---	---	---	---	---	---	---	---
MW-085	06/23/98	---	---	---	---	---	---	---	---
MW-086	06/26/98	---	---	---	---	---	---	---	---
MW-087	06/19/98	---	---	---	---	---	---	---	---
MW-087A	06/19/98	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8
DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Potassium (mg/l)	Radium 226,228 (pCi/l)	Selenium (mg/l)	Silicon (mg/l)	Silver (mg/l)	Sodi (mg/l)	Uranium (pCi/l)	Zinc (mg/l)
MW-057	06/25/98	---	3.06	---	---	---	---	< No convert	---
MW-058	06/22/98	---	4.14	---	---	---	---	< No convert	---
MW-059	06/24/98	---	1.36	---	---	---	---	No convert	---
MW-060	06/21/98	---	5.16	---	---	---	---	No convert	---
MW-061A	06/18/98	---	6.06	---	---	---	---	< No convert	---
MW-062	06/26/98	---	3.7	---	---	---	---	< No convert	---
MW-063	06/25/98	---	0.40	---	---	---	---	No convert	---
MW-064	06/23/98	---	4.47	---	---	---	---	No convert	---
MW-065A	06/25/98	---	0.67	---	---	---	---	< No convert	---
MW-066	06/17/98	---	0.47	---	---	---	---	No convert	---
MW-067	06/24/98	---	2.98	---	---	---	---	< No convert	---
MW-068	06/26/98	---	3.7	---	---	---	---	< No convert	---
MW-070	06/16/98	---	2.8	---	---	---	---	No convert	---
MW-071	06/19/98	---	0.79	---	---	---	---	No convert	---
MW-072	06/30/98	---	3.9	---	---	---	---	No convert	---
MW-073	06/30/98	---	13.25	---	---	---	---	No convert	---
MW-074	06/24/98	---	18.2	---	---	---	---	< No convert	---
MW-075	06/30/98	---	3.50	---	---	---	---	No convert	---
MW-076	06/29/98	---	5.46	---	---	---	---	No convert	---
MW-081	06/29/98	---	3.32	---	---	---	---	< No convert	---
MW-082	06/25/98	---	0.30	---	---	---	---	No convert	---
MW-083	06/25/98	---	0.25	---	---	---	---	No convert	---
MW-084	06/23/98	---	3.4	---	---	---	---	No convert	---
MW-085	06/23/98	---	12.2	---	---	---	---	< No convert	---
MW-086	06/26/98	---	1.75	---	---	---	---	No convert	---
MW-087	06/19/98	---	1.02	---	---	---	---	No convert	---
MW-087A	06/19/98	---	1.94	---	---	---	---	No convert	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8
DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Aluminum (mg/l)	Dissolved Arsenic (mg/l)	Dissolved Barium (mg/l)	Dissolved Boron (mg/l)	Dissolved Cadmium (mg/l)	Dissolved Chromium (mg/l)	Dissolved Cobalt (mg/l)	Dissolved Copper (mg/l)
MW-057	06/25/98	<0.026	0.0018	0.42	0.075	0.0002	0.0008	0.0005	<0.0018
MW-058	06/22/98	0.088	0.019	0.062	0.12	<0.0002	<0.0008	<0.0003	<0.0018
MW-059	06/24/98	<0.026	0.026	0.24	0.23	<0.0002	0.038	0.0008	<0.0018
MW-060	06/21/98	<0.026	<0.0018	0.016	0.057	<0.0002	<0.0008	<0.0003	<0.0018
MW-061A	06/18/98	0.25	0.0047	0.054	0.073	<0.0002	<0.0008	<0.0003	<0.0018
MW-062	06/26/98	<0.026	0.0093	0.36	0.12	0.0002	0.0024	0.0006	<0.0018
MW-063	06/25/98	<0.026	0.0028	0.32	0.064	<0.0002	0.0012	0.0005	<0.0018
MW-064	06/23/98	0.066	(0.0015)	0.035	0.071	<0.0002	0.0008	<0.0003	<0.0018
MW-065A	06/25/98	<0.026	0.0087	0.095	0.066	0.0002	0.0008	0.0052	<0.0018
MW-066	06/17/98	0.048	0.0024	0.014	0.085	<0.0002	0.0022	<0.0003	0.0024
MW-067	06/24/98	<0.026	<0.0018	0.29	0.054	<0.0002	<0.0008	0.0027	<0.0018
MW-068	06/26/98	<0.026	0.0085	0.15	0.10	0.0002	0.0014	0.0019	<0.0018
MW-070	06/16/98	0.036	<0.0018	0.057	0.073	<0.0002	<0.0008	<0.0003	<0.0018
MW-071	06/19/98	<0.026	<0.0018	0.013	0.24	<0.0002	<0.0008	<0.0003	<0.0018
MW-072	06/30/98	<0.026	0.0027	0.14	0.086	0.0002	0.0077	0.0004	<0.0018
MW-073	06/30/98	<0.026	0.0032	0.034	0.31	<0.0002	0.0084	<0.0003	<0.0018
MW-074	06/24/98	<0.026	0.011	0.57	0.28	<0.0002	<0.0008	0.0024	<0.0018
MW-075	06/30/98	0.033	0.0045	0.082	0.11	<0.0002	0.0068	<0.0003	<0.0018
MW-076	06/29/98	<0.026	0.0031	0.27	0.066	<0.0002	0.0010	<0.0003	<0.0018
MW-081	06/29/98	<0.026	0.011	0.054	0.087	0.0002	0.0010	<0.0003	<0.0018
MW-082	06/25/98	<0.026	0.010	0.063	0.11	0.0002	0.0009	0.0009	<0.0018
MW-083	06/25/98	<0.026	0.024	0.11	0.083	0.0002	0.0026	0.0013	<0.0018
MW-084	06/23/98	<0.026	0.019	0.25	0.062	<0.0002	<0.0008	0.0003	<0.0018
MW-085	06/23/98	<0.026	0.012	0.26	0.22	<0.0002	<0.0008	<0.0003	0.0018
MW-086	06/26/98	<0.026	0.0030	0.66	0.28	0.0002	0.0017	0.0020	<0.0018
MW-087	06/19/98	<0.026	<0.0018	0.016	0.060	<0.0002	<0.0008	<0.0003	<0.0018
MW-087A	06/19/98	<0.026	0.0036	0.024	0.40	<0.0002	0.0013	0.0009	<0.0018

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed
() = Less than Reporting Limit
For RCL METALS

TABLE 3-8
DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Iron (mg/l)	Dissolved Manganese (mg/l)	Dissolved Mercury (mg/l)	Dissolved Molybdenum (mg/l)	Dissolved Nickel (mg/l)	Dissolved Lead (mg/l)	Dissolved Selenium (mg/l)	Dissolved Silicon (mg/l)
MW-057	06/25/98	0.09	0.20	<0.0001	0.0017	<0.0009	<0.0022	<0.005	---
MW-058	06/22/98	0.29	0.25	<0.0001	0.0057	0.0015	<0.0022	<0.0023	---
MW-059	06/24/98	0.053	0.15	<0.0001	0.0074	0.074	<0.0022	<0.0023	---
MW-060	06/21/98	<0.013	0.0004	0.0003	0.0024	<0.0009	<0.0022	<0.0023	---
MW-061A	06/18/98	0.061	0.11	<0.0001	0.0013	0.0048	<0.0022	<0.0023	---
MW-062	06/26/98	0.25	0.39	0.0001	0.0040	<0.0009	<0.0022	<0.005	---
MW-063	06/25/98	<0.013	0.0015	<0.0001	0.0008	<0.0009	<0.0022	<0.005	---
MW-064	06/23/98	0.021	0.026	<0.0001	0.036	0.0028	<0.0022	<0.0023	---
MW-065A	06/25/98	0.59	0.44	<0.0001	0.0049	0.024	<0.0022	<0.005	---
MW-066	06/17/98	<0.013	0.0008	0.0005	0.0040	<0.0009	<0.0022	<0.0023	---
MW-067	06/24/98	0.017	0.02	<0.0001	0.0093	0.090	<0.0022	<0.0023	---
MW-068	06/26/98	0.080	0.10	0.0002	0.0046	<0.0009	<0.0022	<0.005	---
MW-070	06/16/98	<0.013	0.0026	0.0003	0.0023	<0.0009	<0.0022	<0.0023	---
MW-071	06/19/98	<0.013	0.0027	<0.0001	0.0005	<0.0009	<0.0022	<0.0023	---
MW-072	06/30/98	0.89	0.62	<0.0001	0.0035	0.0014	<0.0022	<0.0023	---
MW-073	06/30/98	0.26	0.065	<0.0001	0.0028	0.0015	<0.0022	<0.0023	---
MW-074	06/24/98	0.18	0.33	<0.0001	0.0033	0.0037	<0.0022	<0.0023	---
MW-075	06/30/98	0.18	0.26	<0.0001	0.0023	0.0039	<0.0022	<0.0023	---
MW-076	06/29/98	0.031	0.15	0.0003	0.0042	<0.0009	<0.0022	<0.005	---
MW-081	06/29/98	0.99	0.20	<0.0001	<0.0003	<0.0009	<0.0022	<0.005	---
MW-082	06/25/98	0.44	0.18	<0.0001	0.0040	0.0027	<0.0022	<0.005	---
MW-083	06/25/98	0.81	0.54	<0.0001	0.0045	0.0047	<0.0022	<0.005	---
MW-084	06/23/98	0.86	0.25	<0.0001	0.0043	0.0020	<0.0022	<0.0023	---
MW-085	06/23/98	1.01	0.19	<0.0001	0.0020	0.0020	<0.0022	<0.0023	---
MW-086	06/26/98	0.53	0.17	0.0001	0.0012	<0.0009	<0.0022	<0.005	---
MW-087	06/19/98	<0.013	0.0012	<0.0001	0.0025	<0.0009	<0.0022	<0.0023	---
MW-087A	06/19/98	0.24	0.012	<0.0001	0.0053	0.0099	<0.0022	0.0025	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Silver (mg/l)	Dissolved Zinc (mg/l)
MW-057	06/25/98	<0.0007	0.020
MW-058	06/22/98	0.0007	0.091
MW-059	06/24/98	<0.0007	0.028
MW-060	06/21/98	<0.0007	0.026
MW-061A	06/18/98	0.0007	0.17
MW-062	06/26/98	<0.0007	0.015
MW-063	06/25/98	<0.0007	0.042
MW-064	06/23/98	0.0013	0.086
MW-065A	06/25/98	<0.0007	0.030
MW-066	06/17/98	<0.0007	0.045
MW-067	06/24/98	<0.0007	0.026
MW-068	06/26/98	<0.0007	0.10
MW-070	06/16/98	<0.0007	0.051
MW-071	06/19/98	0.0011	<0.014
MW-072	06/30/98	<0.0007	<0.014
MW-073	06/30/98	0.008	0.052
MW-074	06/24/98	<0.0007	0.037
MW-075	06/30/98	<0.0007	0.041
MW-076	06/29/98	<0.0007	0.041
MW-081	06/29/98	<0.0007	<0.014
MW-082	06/25/98	<0.0007	<0.014
MW-083	06/25/98	<0.0007	<0.014
MW-084	06/23/98	<0.0007	0.014
MW-085	06/23/98	<0.0007	0.067
MW-086	06/26/98	<0.0007	0.039
MW-087	06/19/98	<0.0007	0.014
MW-087A	06/19/98	0.0030	0.014

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8
DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Potassium (mg/l)	Radium 226,228 (pCi/l)	Selenium (mg/l)	Silicon (mg/l)	Silver (mg/l)	Sodi (mg/l)	Uranium (pCi/l)	Zinc (mg/l)
MW-088	06/18/98	--	1.07	--	--	--	--	< No convert	--
MW-089	06/17/98	--	0.19	--	--	--	--	No convert	--
MW-094	06/26/98	--	4.8	--	--	--	--	No convert	--
MW-095	06/22/98	--	8.73	--	--	--	--	No convert	--
MW-096	06/21/98	--	10.95	--	--	--	--	No convert	--
MW-097	06/21/98	--	3.21	--	--	--	--	No convert	--
MW-098	06/29/98	--	2.43	--	--	--	--	No convert	--
MW-104	06/21/98	--	0.13	--	--	--	--	No convert	--
MW-108	06/22/98	--	0.21	--	--	--	--	< No convert	--
MW-110	06/30/98	--	0.76	--	--	--	--	No convert	--
MW-111	06/29/98	--	4.45	--	--	--	--	No convert	--
SW-01	06/30/98	--	0.17	--	--	--	--	No convert	--
SW-02	06/24/98	--	ND	--	--	--	--	< No convert	--
SW-03	06/24/98	--	3.06	--	--	--	--	No convert	--

Values represent total concentrations unless noted < = Not detected at indicated reporting limit -- = Not analyzed
ND = Not Detected
For RCL METALS

TABLE 3-8

Page: 2D of 2F
Date: 10/19/98DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Aluminum (mg/l)	Dissolved Arsenic (mg/l)	Dissolved Barium (mg/l)	Dissolved Boron (mg/l)	Dissolved Cadmium (mg/l)	Dissolved Chromium (mg/l)	Dissolved Cobalt (mg/l)	Dissolved Copper (mg/l)
MW-088	06/18/98	0.055	<0.0018	0.016	0.11	<0.0002	<0.0008	<0.0003	<0.0018
MW-089	06/17/98	<0.026	<0.0018	0.018	0.074	<0.0002	<0.0008	<0.0003	<0.0018
MW-094	06/26/98	<0.026	<0.0018	0.040	0.058	<0.0002	0.0066	<0.0003	<0.0018
MW-095	06/22/98	<0.026	<0.0018	0.28	0.049	<0.0002	<0.0008	<0.0003	<0.0018
MW-096	06/21/98	<0.026	<0.0018	0.015	0.064	<0.0002	0.0016	<0.0003	<0.0018
MW-097	06/21/98	<0.026	<0.0018	0.054	0.056	<0.0002	0.0009	<0.0003	<0.0018
MW-098	06/29/98	<0.026	0.0047	0.20	0.055	0.0003	0.0010	<0.0003	<0.0018
MW-104	06/21/98	<0.026	<0.0018	0.017	0.066	<0.0002	<0.0008	<0.0003	<0.0018
MW-108	06/22/98	<0.026	0.0019	0.11	0.046	<0.0002	<0.0008	<0.0003	<0.0018
MW-110	06/30/98	<0.026	0.0046	0.18	0.071	<0.0002	0.0010	<0.0003	<0.0018
MW-111	06/29/98	<0.026	<0.0018	0.035	0.13	<0.0002	0.0010	<0.0003	<0.0018
SW-01	06/30/98	<0.026	<0.0018	0.027	0.056	<0.0002	0.0011	<0.0003	<0.0018
SW-02	06/24/98	<0.026	<0.0018	0.072	0.084	<0.0002	<0.0008	<0.0003	<0.0018
SW-03	06/24/98	<0.026	0.0022	0.044	0.11	0.0003	0.0010	0.0004	<0.0018

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Iron (mg/l)	Dissolved Manganese (mg/l)	Dissolved Mercury (mg/l)	Dissolved Molybdenum (mg/l)	Dissolved Nickel (mg/l)	Dissolved Lead (mg/l)	Dissolved Selenium (mg/l)	Dissolved Silicon (mg/l)
MW-088	06/18/98	0.064	0.0062	<0.0001	0.0041	<0.0009	<0.0022	<0.0023	---
MW-089	06/17/98	0.014	0.046	0.0003	0.0033	0.0040	<0.0022	<0.0023	---
MW-094	06/26/98	<0.013	0.0023	0.0001	0.0023	<0.0009	<0.0022	<0.0005	---
MW-095	06/22/98	<0.013	0.019	<0.0001	0.0025	<0.0009	<0.0022	<0.0023	---
MW-096	06/21/98	<0.013	0.0071	0.0003	0.0026	<0.0009	<0.0022	<0.0023	---
MW-097	06/21/98	<0.013	<0.0002	<0.0001	0.0021	0.0009	<0.0022	0.0026	---
MW-098	06/29/98	0.034	<0.0002	<0.0001	0.0034	<0.0009	<0.0022	<0.0005	---
MW-104	06/21/98	<0.013	<0.0002	<0.0001	0.0034	<0.0009	<0.0022	<0.0023	---
MW-108	06/22/98	<0.013	0.0004	<0.0001	0.0028	<0.0009	<0.0022	<0.0023	---
MW-110	06/30/98	0.043	0.065	<0.0001	0.0038	<0.0009	<0.0022	<0.0023	---
MW-111	06/29/98	0.092	0.027	<0.0001	0.0044	<0.0009	<0.0022	<0.0005	---
SW-01	06/30/98	0.060	0.0032	<0.0001	0.0019	<0.0009	0.0031	<0.0023	---
SW-02	06/24/98	<0.013	0.060	<0.0001	0.0020	<0.0009	0.018	<0.0023	---
SW-03	06/24/98	0.015	0.0015	<0.0001	0.0024	<0.0009	<0.0022	<0.0005	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEENPage: 2F of 2F
Date: 10/19/98Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Silver (mg/l)	Dissolved Zinc (mg/l)
MW-088	06/18/98	0.0007	0.055
MW-089	06/17/98	0.0009	0.026
MW-094	06/26/98	<0.0007	0.022
MW-095	06/22/98	<0.0007	0.017
MW-096	06/21/98	<0.0007	<0.014
MW-097	06/21/98	<0.0007	<0.014
MW-098	06/29/98	<0.0007	0.022
MW-104	06/21/98	<0.0007	0.022
MW-108	06/22/98	<0.0007	<0.014
MW-110	06/30/98	<0.0007	0.024
MW-111	06/29/98	<0.0007	<0.014
SW-01	06/30/98	<0.0007	0.090
SW-02	06/24/98	<0.0007	0.028
SW-03	06/24/98	<0.0007	0.048

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL METALS

TABLE 3-9

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Aldrin (ug/l)	alpha-BHC (ug/l)	beta-BHC (ug/l)	delta-BHC (ug/l)	gamma-BHC (Lindane) (ug/l)	4,4'-DDD (ug/l)	4,4'-DDE (ug/l)	4,4'-DDT (ug/l)
LYMAN	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-013	06/21/98	0.14	0.43	0.47	0.22	<0.02	0.22	<0.02	<0.02
MW-014	06/22/98	<0.1	<0.1	<0.1	0.17	<0.1	<0.1	<0.1	<0.1
MW-041	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-043	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-044	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-046	06/21/98	<0.02	<0.02	<0.02	<0.02	0.06	<0.02	<0.02	<0.02
MW-049	06/21/98	<0.1	0.06	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-050	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-054	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-055	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-061	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-069	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-078	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-090	06/17/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-106	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
UHS_ARROYO	06/26/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
() = Less than Reporting Limit

TABLE 3-9
DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dieldrin (ug/l)	Endosulfan I (ug/l)	Endosulfan II (ug/l)	Endosulfan sulfate (ug/l)	Endrin (ug/l)	Endrin aldehyde (ug/l)	Heptachlor (ug/l)	Heptachlor epoxide (ug/l)
LYMAN	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-013	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-014	06/22/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-041	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-043	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-044	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-046	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-049	06/21/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-050	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-054	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-055	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-061	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-069	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-078	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-090	06/17/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-106	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
UHS_ARROYO	06/26/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-9

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
SHALLOW ZONEPage: 1C of 1D
Date: 10/19/98Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Methoxychlor (ug/l)	Chlordane (ug/l)	Toxaphene (ug/l)	PCB-1016 (ug/l)	PCB-1221 (ug/l)	PCB-1232 (ug/l)	PCB-1242 (ug/l)	PCB-1248 (ug/l)
LYMAN	06/29/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-013	06/21/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-014	06/22/98	<0.1	<0.05	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2
MW-041	06/19/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-043	06/22/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-044	06/22/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-046	06/21/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-049	06/21/98	<0.1	<0.05	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2
MW-050	06/19/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-054	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-055	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-061	06/18/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-069	06/29/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-078	06/19/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-090	06/17/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-106	06/18/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
UHS_ARROYO	06/26/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL 8080_698

TABLE 3-9

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	PCB-1254 (ug/l)	PCB-1260 (ug/l)
LYMAN	06/29/98	<0.04	<0.04
MW-013	06/21/98	<0.04	<0.04
MW-014	06/22/98	<0.2	<0.2
MW-041	06/19/98	<0.04	<0.04
MW-043	06/22/98	<0.04	<0.04
MW-044	06/22/98	<0.04	<0.04
MW-046	06/21/98	<0.04	<0.04
MW-049	06/21/98	<0.2	<0.2
MW-050	06/19/98	<0.04	<0.04
MW-054	06/25/98	<0.04	<0.04
MW-055	06/25/98	<0.04	<0.04
MW-061	06/18/98	<0.04	<0.04
MW-069	06/29/98	<0.04	<0.04
MW-078	06/19/98	<0.04	<0.04
MW-090	06/17/98	<0.04	<0.04
MW-106	06/18/98	<0.04	<0.04
UIHS_ARROYO	06/26/98	<0.04	<0.04

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Aldrin (ug/l)	alpha-BHC (ug/l)	beta-BHC (ug/l)	delta-BHC (ug/l)	gamma-BHC (Lindane) (ug/l)	4,4'-DDD (ug/l)	4,4'-DDE (ug/l)	4,4'-DDT (ug/l)
MW-057	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-058	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-059	06/24/98	<1	<1	<1	<1	<1	<1	<1	<1
MW-060	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-061A	06/18/98	<0.02	<0.02	<0.02	<0.02	0.11	<0.02	<0.02	<0.02
MW-062	06/26/98	<0.02	<0.02	0.08	<0.02	<0.02	<0.02	<0.02	<0.02
MW-063	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-064	06/23/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-065A	06/25/98	<0.02	<0.02	0.36	0.04	0.10	<0.02	<0.02	<0.02
MW-066	06/17/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-067	06/24/98	<0.02	<0.02	0.03	<0.02	0.04	<0.02	<0.02	<0.02
MW-068	06/26/98	<0.1	0.18	1.29	0.26	0.43	<0.1	<0.1	<0.1
MW-070	06/16/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-071	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-072	06/30/98	<0.1	<0.1	0.29	0.10	<0.1	<0.1	<0.1	<0.1
MW-073	06/30/98	<0.02	<0.02	0.17	0.06	0.32	<0.02	<0.02	<0.02
MW-074	06/24/98	<0.2	<0.2	0.32	<0.2	<0.2	<0.2	<0.2	<0.2
MW-075	06/30/98	<0.1	<0.1	0.26	0.10	<0.1	<0.1	<0.1	<0.1
MW-076	06/29/98	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
MW-081	06/29/98	<0.2	<0.2	0.51	<0.2	<0.2	<0.2	<0.2	<0.2
MW-082	06/25/98	<0.02	<0.02	0.22	0.04	0.21	<0.02	<0.02	<0.02
MW-083	06/25/98	<0.02	<0.02	0.18	0.04	0.22	<0.02	<0.02	<0.02
MW-084	06/23/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-085	06/23/98	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
MW-086	06/26/98	0.16	0.46	0.31	0.14	0.59	<0.02	<0.02	<0.02
MW-087	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-087A	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-10
DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dieldrin (ug/l)	Endosulfan I (ug/l)	Endosulfan II (ug/l)	Endosulfan sulfate (ug/l)	Endrin (ug/l)	Endrin aldehyde (ug/l)	Heptachlor (ug/l)	Heptachlor epoxide (ug/l)
MW-057	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-058	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-059	06/24/98	<1	<1	<1	<1	<1	<1	<1	<1
MW-060	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-061A	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-062	06/26/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-063	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-064	06/23/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-065A	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-066	06/17/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-067	06/24/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-068	06/26/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-070	06/16/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-071	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-072	06/30/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-073	06/30/98	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-074	06/24/98	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-075	06/30/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-076	06/29/98	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
MW-081	06/29/98	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-082	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-083	06/25/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-084	06/23/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-085	06/23/98	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
MW-086	06/26/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-087	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-087A	06/19/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-10

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Methoxychlor (ug/l)	Chlordane (ug/l)	Toxaphene (ug/l)	PCB-1016 (ug/l)	PCB-1221 (ug/l)	PCB-1232 (ug/l)	PCB-1242 (ug/l)	PCB-1248 (ug/l)
MW-057	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-058	06/22/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-059	06/24/98	<1	<0.5	<6	<2	<2	<2	<2	<2
MW-060	06/21/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-061A	06/18/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-062	06/26/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-063	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-064	06/23/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-065A	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-066	06/17/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-067	06/24/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-068	06/26/98	<0.1	<0.05	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2
MW-070	06/16/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-071	06/19/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-072	06/30/98	<0.1	<0.05	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2
MW-073	06/30/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-074	06/24/98	<0.2	<0.1	<1.2	<0.4	<0.4	<0.4	<0.4	<0.4
MW-075	06/30/98	<0.1	<0.05	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2
MW-076	06/29/98	<0.4	<0.2	<2.4	<0.8	<0.8	<0.8	<0.8	<0.8
MW-081	06/29/98	<0.2	<0.1	<1.2	<0.4	<0.4	<0.4	<0.4	<0.4
MW-082	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-083	06/25/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-084	06/23/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-085	06/23/98	<0.4	<0.2	<2.4	<0.8	<0.8	<0.8	<0.8	<0.8
MW-086	06/26/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-087	06/19/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-087A	06/19/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEENIndian Basin Remediation Project
Eddy County, NM

SITE	DATE	PCB-1254 (ug/l)	PCB-1260 (ug/l)
MW-057	06/25/98	< 0.04	< 0.04
MW-058	06/22/98	< 0.04	< 0.04
MW-059	06/24/98	< 2	< 2
MW-060	06/21/98	< 0.04	< 0.04
MW-061A	06/18/98	< 0.04	< 0.04
MW-062	06/26/98	< 0.04	< 0.04
MW-063	06/25/98	< 0.04	< 0.04
MW-064	06/23/98	< 0.04	< 0.04
MW-065A	06/25/98	< 0.04	< 0.04
MW-066	06/17/98	< 0.04	< 0.04
MW-067	06/24/98	< 0.04	< 0.04
MW-068	06/26/98	< 0.2	< 0.2
MW-070	06/16/98	< 0.04	< 0.04
MW-071	06/19/98	< 0.04	< 0.04
MW-072	06/30/98	< 0.2	< 0.2
MW-073	06/30/98	< 0.04	< 0.04
MW-074	06/24/98	< 0.4	< 0.4
MW-075	06/30/98	< 0.2	< 0.2
MW-076	06/29/98	< 0.8	< 0.8
MW-081	06/29/98	< 0.4	< 0.4
MW-082	06/25/98	< 0.04	< 0.04
MW-083	06/25/98	< 0.04	< 0.04
MW-084	06/23/98	< 0.04	< 0.04
MW-085	06/23/98	< 0.8	< 0.8
MW-086	06/26/98	< 0.04	< 0.04
MW-087	06/19/98	< 0.04	< 0.04
MW-087A	06/19/98	< 0.04	< 0.04

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Aldrin (ug/l)	alpha-BHC (ug/l)	beta-BHC (ug/l)	delta-BHC (ug/l)	gamma-BHC (Lindane) (ug/l)	4,4'-DDD (ug/l)	4,4'-DDE (ug/l)	4,4'-DDT (ug/l)
MW-088	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-089	06/17/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-094	06/26/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-095	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-096	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-097	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-098	06/29/98	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02
MW-104	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-108	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-110	06/30/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-111	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW-01	06/30/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW-02	06/24/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW-03	06/24/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-10

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dieldrin (ug/l)	Endosulfan I (ug/l)	Endosulfan II (ug/l)	Endosulfan sulfate (ug/l)	Endrin (ug/l)	Endrin aldehyde (ug/l)	Heptachlor (ug/l)	Heptachlor epoxide (ug/l)
MW-088	06/18/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-089	06/17/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-094	06/26/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-095	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-096	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-097	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-098	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-104	06/21/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-108	06/22/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW-110	06/30/98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MW-111	06/29/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW-01	06/30/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW-02	06/24/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW-03	06/24/98	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

TABLE 3-10

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEENPage: 2C of 2D
Date: 10/19/98Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Methoxychlor (ug/l)	Chlordane (ug/l)	Toxaphene (ug/l)	PCB-1016 (ug/l)	PCB-1221 (ug/l)	PCB-1232 (ug/l)	PCB-1242 (ug/l)	PCB-1248 (ug/l)
MW-088	06/18/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-089	06/17/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-094	06/26/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-095	06/22/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-096	06/21/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-097	06/21/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-098	06/29/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-104	06/21/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-108	06/22/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
MW-110	06/30/98	<0.1	<0.05	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2
MW-111	06/29/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
SW-01	06/30/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
SW-02	06/24/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04
SW-03	06/24/98	<0.02	<0.01	<0.12	<0.04	<0.04	<0.04	<0.04	<0.04

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL 8080_698

TABLE 3-10

DISSOLVED-PHASE PESTICIDES AND PCB (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	PCB-1254 (ug/l)	PCB-1260 (ug/l)
MW-088	06/18/98	<0.04	<0.04
MW-089	06/17/98	<0.04	<0.04
MW-094	06/26/98	<0.04	<0.04
MW-095	06/22/98	<0.04	<0.04
MW-096	06/21/98	<0.04	<0.04
MW-097	06/21/98	<0.04	<0.04
MW-098	06/29/98	<0.04	<0.04
MW-104	06/21/98	<0.04	<0.04
MW-108	06/22/98	<0.04	<0.04
MW-110	06/30/98	<0.2	<0.2
MW-111	06/29/98	<0.04	<0.04
SW-01	06/30/98	<0.04	<0.04
SW-02	06/24/98	<0.04	<0.04
SW-03	06/24/98	<0.04	<0.04

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

RADIUM CONCENTRATIONS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	RESULT TYPE	Radium		
			226 (pCi/l)	228 (pCi/l)	226,228 (pCi/l)
LYMAN	06/29/98	Prim	0.25	3.25	3.50
MW-013	06/21/98	Prim	0.87	(1.65)	0.87
MW-014	06/22/98	Prim	0.47	13.25	13.72
MW-041	06/19/98	Prim	0.99	5.25	6.24
MW-043	06/22/98	Prim	2.36	3.54	5.90
MW-044	06/22/98	Prim	0.63	(1.20)	0.63
MW-046	06/21/98	Prim	0.79	12.81	13.60
MW-049	06/21/98	Prim	3.53	8.23	11.76
MW-050	06/19/98	Prim	4.79	5.67	10.46
MW-054	06/25/98	Prim	10.45	6.60	17.05
MW-054	06/25/98	Dup 1	8.89	7.29	16.18
MW-055	06/25/98	Prim	6.74	3.21	9.95
MW-061	06/18/98	Prim	3.79	3.60	7.4
MW-061	06/18/98	Dup 1	4.01	4.94	8.95
MW-069	06/29/98	Prim	1.03	(1.36)	1.03
MW-078	06/19/98	Prim	11.16	4.45	15.61
MW-090	06/17/98	Prim	0.48	3.12	3.60
MW-106	06/18/98	Prim	1.96	3.67	5.63
UIHS_ARROYO	06/26/98	Prim	0.25	2.57	2.82

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
 () = Less than Reporting Limit
 For RCL RAD_NUCL

TABLE 3-12
RADIUM CONCENTRATIONS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	RESULT TYPE	Radium 226 (pCi/l)	Radium 228 (pCi/l)	Radium 226,228 (pCi/l)
MW-057	06/25/98	Prim	0.52	2.54	3.06
MW-058	06/22/98	Prim	0.49	3.65	4.14
MW-059	06/24/98	Prim	1.36	(1.42)	1.36
MW-060	06/21/98	Prim	0.54	4.62	5.16
MW-061A	06/18/98	Prim	0.38	5.68	6.06
MW-062	06/26/98	Prim	0.91	2.80	3.7
MW-063	06/25/98	Prim	0.40	(1.28)	0.40
MW-064	06/23/98	Prim	0.51	3.96	4.47
MW-065A	06/25/98	Prim	0.67	(0.71)	0.67
MW-066	06/17/98	Prim	0.47	(2.34)	0.47
MW-067	06/24/98	Prim	1.09	1.89	2.98
MW-068	06/26/98	Prim	0.30	3.35	3.7
MW-070	06/16/98	Prim	0.20	2.55	2.8
MW-071	06/19/98	Prim	0.79	(1.63)	0.79
MW-072	06/30/98	Prim	0.70	3.22	3.9
MW-073	06/30/98	Prim	7.26	5.99	13.25
MW-074	06/24/98	Prim	1.20	16.96	18.2
MW-075	06/30/98	Prim	1.28	2.22	3.50
MW-076	06/29/98	Prim	1.14	4.32	5.46
MW-081	06/29/98	Prim	0.54	2.78	3.32
MW-082	06/25/98	Prim	0.30	(-4.38)	0.30
MW-083	06/25/98	Prim	0.25	(0.89)	0.25
MW-084	06/23/98	Prim	1.10	2.28	3.4
MW-085	06/23/98	Prim	6.40	5.81	12.2
MW-086	06/26/98	Prim	1.75	(0.82)	1.75
MW-087	06/19/98	Prim	0.18	(0.84)	1.02
MW-087A	06/19/98	Prim	1.94	(0.15)	1.94

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
 () = Less than Reporting Limit
 For RCL RAD_NUCL

RADIUM CONCENTRATIONS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	RESULT TYPE	Radium 226 (pCi/l)	Radium 228 (pCi/l)	Radium 226,228 (pCi/l)
MW-088	06/18/98	Prim	1.07	(1.82)	1.07
MW-089	06/17/98	Prim	0.19	(0.67)	0.19
MW-094	06/26/98	Prim	0.30	4.52	4.8
MW-095	06/22/98	Prim	0.88	7.85	8.73
MW-096	06/21/98	Prim	2.34	8.61	10.95
MW-097	06/21/98	Prim	0.69	2.52	3.21
MW-098	06/29/98	Prim	0.86	1.57	2.43
MW-104	06/21/98	Prim	0.13	(1.46)	0.13
MW-108	06/22/98	Prim	0.21	(1.44)	0.21
MW-108	06/22/98	Dup 1	0.26	(-3.92)	0.26
MW-110	06/30/98	Prim	0.76	(-2.68)	0.76
MW-111	06/29/98	Prim	1.22	3.23	4.45
SW-01	06/30/98	Prim	0.17	(-1.28)	0.17
SW-01	06/30/98	Dup 1	0.26	(-1.49)	0.26
SW-02	06/24/98	Prim	(-0.87)	(0.35)	ND
SW-03	06/24/98	Prim	0.23	2.83	3.06

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
 () = Less than Reporting Limit ND = Not Detected
 For RCL RAD_NUCL

TABLE 4-1: GROUNDWATER MONITORING PLAN MODIFICATION

SHALLOW ZONE WELLS										
Well ID	Well Type	Sampling Frequency	Gauge Frequency	TOC Elev. (ft AMSL)	Total Depth (ft TOC)	Well Casing ID (in)	Well Screen Slot (in)	Well Screen Interval Top (ft TOC)	Well Screen Interval Bottom (ft TOC)	Laboratory Program
MW-1	monitoring	NS	NG	3792.50	16.10	2	0.01	10.06	14.66	
MW-2	monitoring	NS	NG	3788.72	15.52	2	0.01	5.61	15.24	
MW-3	monitoring	NS	NG	3787.50	16.90	2	0.01	6.87	16.61	
MW-4	monitoring	NS	NG	3795.880	18.68	2	0.01	8.65	18.39	
MW-5	monitoring	NS	NG	3801.69	12.77	2	0.01	7.86	12.77	
MW-6	monitoring	NS	NG	3785.17	13.66	2	0.01	8.69	13.66	
MW-7	monitoring	NS	NG	3784.46	17.01	2	0.01	7.23	17.01	
MW-8	monitoring	NS	NG	3795.04	16.97	2	0.01	7.19	16.97	
MW-9	monitoring	NS	NG	3807.85	13.65	2	0.01	8.74	13.31	
MW-10	monitoring	annually	semiannually	3790.78	19.08	4	0.02	8.97	18.43	BTEX
MW-11	monitoring	NS	NG	3806.96	24.85	4	0.02	14.68	24.16	
MW-12	monitoring	NS	NG	3809.86	25.21	2	0.01	15.13	24.91	
MW-13	monitoring	NS	NG	3801.58	22.07	2	0.01	11.64	21.42	
MW-14	monitoring	NS	NG	3803.51	24.30	4	0.02	14.18	23.63	
MW-15	monitoring	NS	NG	3803.59	19.47	2	0.01	9.39	19.17	
MW-16	monitoring	NS	NG	3801.04	22.66	4	0.02	12.71	22.23	
MW-17	monitoring	NS	NG	3799.55	19.75	2	0.01	9.71	19.47	
MW-18	monitoring	NS	NG	3795.82	17.42	4	0.02	7.21	16.84	
MW-19	monitoring	NS	NG	3797.21	19.11	4	0.02	8.96	18.53	
MW-20	monitoring	NS	NG	3797.59	16.89	2	0.01	6.89	16.69	
MW-21	monitoring	NS	NG	3798.21	23.31	2	0.01	12.74	22.88	
MW-22	monitoring	NS	NG	3799.20	17.30	2	0.01	7.29	16.80	
MW-23	monitoring	NS	NG	3794.48	12.08	2	0.01	7.04	11.64	
MW-24	monitoring	NS	NG	3794.09	14.09	2	0.01	9.05	13.67	
MW-25	monitoring	NS	NG	3786.97	10.27	2	0.01	4.94	9.80	
MW-26	monitoring	NS	NG	3793.01	21.11	2	0.01	11.11	20.56	
MW-27	monitoring	NS	NG	3790.93	18.23	2	0.01	13.16	17.79	
MW-28	monitoring	NS	NG	3797.03	18.59	2	0.01	8.74	18.26	
MW-29	monitoring	NS	NG	3794.06	14.76	2	0.01	9.68	14.37	
MW-30	monitoring	NS	NG	3788.30	14.82	2	0.01	7.8	14.82	
MW-31	monitoring	NS	NG	3791.15	19.93	4	0.02	7.945	19.93	
MW-32	monitoring	NS	NG	3797.47	16.77	2	0.01	11.87	16.56	
MW-33	monitoring	NS	NG	3802.51	20.29	4	0.02	10.14	19.70	
MW-34	monitoring	NS	NG	3806.00	19.97	2	0.01	10.12	19.64	
MW-35	monitoring	NS	NG	3800.81	20.71	4	0.02	15.78	20.33	
MW-36	monitoring	NS	NG	3792.94	8.77	2	0.01	6.96	8.61	
MW-37	monitoring	NS	NG	3795.03	20.83	4	0.02	10.24	19.90	
MW-38	monitoring	annually	semiannually	3797.32	20.57	4	0.02	10.4	19.98	BTEX

TABLE 4-1: GROUNDWATER MONITORING PLAN MODIFICATION (Continued)

Well ID	Well Type	Sampling Frequency	Gauge Frequency	TOC Elev. (ft. AMSL)	Total Depth (ft. TOC)	Well Casing ID (in)	Well Screen Slot (in)	Well Screen Interval Top (ft. TOC)	Well Screen Interval Bottom (ft. TOC)	Laboratory Program
MW-39	monitoring	annually	semiannually	3796.20	20.54	4	0.02	10.17	19.74	BTEX
MW-40	monitoring	NS	NG	3803.12	12.15	2	0.01	7.02	12.07	
MW-41	monitoring	annually	semiannually	3799.04	24.04	4	0.02	13.87	23.43	BTEX
MW-42	monitoring	NS	NG	3804.73	22.00	2	0.01	11.53	21.56	
MW-43	monitoring	annually	semiannually	3802.05	24.55	4	0.02	14.40	23.95	BTEX
MW-44	monitoring	annually	semiannually	3804.14	25.24	4	0.02	15.09	24.64	BTEX
MW-45	infiltration	NS	NG	3808.68	26.62	2	0.01	11.58	26.13	
MW-46	monitoring	annually	semiannually	3805.54	20.24	4	0.02	9.69	19.24	BTEX
MW-47	monitoring	annually	semiannually	3805.09	21.79	2	0.01	11.75	21.29	BTEX
MW-48	monitoring	annually	semiannually	3806.18	19.98	2	0.01	9.94	19.49	BTEX
MW-49	monitoring	annually	semiannually	3805.61	25.91	2	0.01	15.82	25.45	BTEX
MW-50	monitoring	annually	semiannually	3813.35	37.15	2	0.01	22.11	36.66	BTEX
MW-51	infiltration	NS	NG	3810.86	20.06	2	0.01	10.02	19.57	
MW-52	monitoring	annually	semiannually	3817.49	21.44	2	0.01	11.4	20.95	BTEX
MW-53	monitoring	NS	NG	3809.92	15.32	2	0.01	8.59	15.14	
MW-54	monitoring	annually	semiannually	3823.86	78.15	4	0.02	42.92	77.45	BTEX
MW-55	monitoring	annually	semiannually	3794.40	66.32	4	0.02	21.43	66.08	BTEX
MW-56	monitoring	NS	NG	3782.45	43.76	4	0.02	28.79	43.53	
MW-61	monitoring	annually	semiannually	3816.20	57.97	4	0.02	47.83	57.28	BTEX
MW-65	monitoring	annually	semiannually	3763.31	57.69	4	0.02	37.58	57.01	BTEX
MW-69	recovery	annually	semiannually	3805.11	51.27	4	0.02	16.56	50.49	BTEX
MW-77	monitoring	NS	semiannually	3775.48	82.20	7.875	OH	-	-	
MW-78	monitoring	semiannually	semiannually	3785.82	86.62	7.875	OH	-	-	BTEX
MW-79	monitoring	semiannually	semiannually	3788.39	82.90	7.875	OH	-	-	BTEX
MW-80	monitoring	NS	semiannually	3821.64	91.80	7.875	OH	-	-	
MW-90	monitoring	semiannually	semiannually	3781.73	62.50	4	0.04	12.50	62.50	BTEX
MW-91	monitoring	semiannually	semiannually	3783.07	72.50	4	0.04	12.50	72.50	BTEX
MW-92	monitoring	NS	NG	3785.29	72.50	4	0.04	12.50	72.50	
MW-93	monitoring	NS	NG	3718.50	72.50	4	0.04	12.50	72.50	
MW-99	monitoring	semiannually	semiannually	3770.05	72.50	4	0.04	12.50	72.50	BTEX
MW-100	monitoring	NS	NG	3773.31	72.50	4	0.04	12.50	72.50	
MW-101	monitoring	NS	NG	3762.71	72.50	4	0.04	12.50	72.50	
MW-102	monitoring	NS	NG	3753.69	82.50	4	0.04	12.50	82.50	
MW-103	monitoring	NS	NG	3743.14	72.50	4	0.04	12.50	72.50	
MW-105	monitoring	NS	NG	3736.93	82.50	4	0.04	12.50	82.50	
MW-106	monitoring	semiannually	semiannually	3721.97	94.50	4	0.04	12.50	94.5	BTEX
MW-107	monitoring	NS	NG	3726.27	72.50	4	0.04	12.50	72.50	
MW-109	monitoring	NS	NG	3809.53	18.00	4	0.01	8.00	18.00	
Sump A10	monitoring	NS	NG	3800.99	13.42	24	-	-	-	
Sump 16A	monitoring	NS	NG	3785.14	17.45	24	-	-	-	

TABLE 4-1: GROUNDWATER MONITORING PLAN MODIFICATION (Continued)

LOWER QUEEN WELLS												
Well	Well Type	Sampling Frequency	Gauge Frequency	TOC Elev. (ft AMSL)	Top of 1.25-inch piezometer piping Elev. (ft AMSL)	Total Depth (ft TOC)	Well Casing ID (in)	Surface Casing Depth (ft TOC)	Well Screen Slot (in)	Well Screen Interval Top (ft TOC)	Well Screen Interval Bottom (ft TOC)	Laboratory Program
MW-57	monitoring	semiannually	semiannually	3787.70		179.30	4	47.00	0.02	157.10	176.54	BTEX
MW-58	recovery	NS	semiannually*	3825.24		234.10	7.875	?	OH	NA	NA	
MW-59	monitoring	semiannually	semiannually	3819.59		211.29	4	30.18	0.02	182.52	208.30	BTEX
MW-60	monitoring	semiannually	semiannually	3815.28		226.08	4	29.62	0.02	172.86	222.34	BTEX
MW-61A	monitoring	semiannually	semiannually	3815.97		214.00	4	69.95	0.02	173.50	213.30	BTEX
MW-62	monitoring	semiannually	semiannually	3819.90		224.69	4	30.00	0.02	177.00	222.50	BTEX
MW-63	monitoring	semiannually	semiannually	3626.16		221.68	4	40.00	0.02	175.39	219.79	BTEX
MW-64	monitoring	semiannually	semiannually	3798.57		204.36	4	40.00	0.02	156.68	201.13	BTEX
MW-65A	recovery	NS	NG	3763.79		168.56	4	70.00	0.02	115.34	166.00	
MW-66	monitoring	semiannually	semiannually	3828.98		237.86	4	40.00	0.02	184.81	234.52	BTEX
MW-67	monitoring	semiannually	semiannually	3765.87		168.54	4	40.00	0.02	114.78	165.11	BTEX
MW-68	recovery	NS	NG	3797.83		200.00	4	120.00	0.02	148.38	199.69	
MW-70	monitoring	annually	semiannually	3822.57		228.14	4	112.00	0.02	175.32	224.37	BTEX
MW-71	monitoring	semiannually	semiannually*	3778.05		235.41	4	69.20	0.02	167.07	234.75	BTEX
MW-72	dual recovery	NS	semiannually*	3821.18		236.55	8	39.50	0.02	177.32	235.38	
MW-73	monitoring	NS	semiannually	3820.09		222.5	7.875	10.00	OH	NA	NA	
MW-74	monitoring	NS	semiannually	3820.82		225	7.875	10.00	OH	NA	NA	
MW-75	dual recovery	NS	semiannually*	3817.44		222.5	7.875	12.25	OH	NA	NA	
MW-76	monitoring	NS	semiannually*	3796.12		222.5	7.875	9.00	OH	NA	NA	
MW-81	dual recovery	NS	semiannually*	3818.14		228.5	7.875	73.50	OH	NA	NA	
MW-82	recovery	NS	semiannually*	3825.14		252.5	7.875	68.75	OH	NA	NA	
MW-83	recovery	NS	semiannually*	3794.59		205.8	7.875	41.50	OH	NA	NA	
MW-84	recovery	NS	semiannually*	3759.88		172.5	7.875	67.50	OH	NA	NA	
MW-85	dual recovery	NS	semiannually*	3825.95		237.5	7.875	77.50	OH	NA	NA	
MW-86	recovery	NS	semiannually*	3824.16		227.5	7.875	77.50	OH	NA	NA	
MW-87	monitoring	semiannually	semiannually	3740.50		173.1	4	NA	0.04	148.10	168.10	BTEX
MW-87A	monitoring	semiannually	semiannually	3739.53		132.0	7.875	12.00	OH	NA	NA	BTEX
MW-88	monitoring	semiannually	semiannually	3789.70		177.65	7.875	62.00	0.04	142.00	176.75	BTEX
MW-89	monitoring	semiannually	semiannually	3827.68		232.53	4	NA	0.04	189.75	230.00	BTEX
MW-94	recovery	NS	semiannually*		3821.30	230.1	7.875	67.50	OH	NA	NA	
MW-95	monitoring	annually	semiannually	3746.74		147.5	4	33.50	0.04	111.00	141.00	BTEX
MW-96	monitoring	semiannually	semiannually	3739.30		137.5	4	12.50	0.04	97.50	127.50	BTEX
MW-97	monitoring	semiannually	semiannually	3748.20		150.5	4	12.50	0.04	107.50	137.50	BTEX
MW-98	monitoring	annually	semiannually	3767.80		142.5	4	12.50	0.04	128.00	158.00	BTEX
MW-104	monitoring*	NS	semiannually	3791.71	NA	222.5	8	37.50	OH	NA	NA	
MW-108	monitoring*	NS	semiannually	3747.13	NA	172.5	8	42.00	OH	NA	NA	
MW-110	monitoring	NS	semiannually	3812.61	NA	230.0	8	39.50	OH	NA	NA	
MW-111	monitoring	semiannually	semiannually	3824.44	NA	225.0	4	185.00	0.01	185.00	225.00	BTEX

TABLE 4-1: GROUNDWATER MONITORING PLAN MODIFICATION (Continued)

LOWER QUEEN WELLS (completed)												
Well	Well Type	Sampling Frequency	Gauge Frequency	TOC Elev. (ft AMSL)	Top of 1.25-inch piezometer piping Elev. (ft AMSL)	Total Depth (ft TOC)	Well Casing ID (in)	Surface Casing Depth (ft TOC)	Well Screen Slot (in)	Well Screen Interval Top (ft TOC)	Well Screen Interval Bottom (ft TOC)	Laboratory Program
IW-1	recovery	NS	semiannually*	3808.55		232.5	11	75.50	OH	NA	NA	
IW-2	infiltration	NS	semiannually*	3835.86		302.5	11	161.50	OH	NA	NA	
SW-1	recovery	annually	NG	3808.19	NA	255.0	10		OH	NA	NA	BTEX
SW-2	monitoring	annually	semiannually	3808.79	NA	292.0	10		OH	163.00	292.00	BTEX
SW-3	recovery	annually	semiannually*	3842.29		232.7	7.875	84.00	OH	NA	NA	BTEX
VE-1	vapor extraction	NS	NG	3829.73	NA	214.0	7.875	80.00	OH	NA	NA	
VE-2	vapor extraction	NS	NG	3825.93	NA	210.0	7.875	75.00	OH	NA	NA	
VE-3	vapor extraction	NS	NG	3816.75	NA	184.0	7.875	72.50	OH	NA	NA	
VE-4	vapor extraction	NS	NG	3805.45	NA	183.0	7.875	57.50	OH	NA	NA	
VE-5	vapor extraction	NS	NG	3790.10	NA	188.0	7.875	57.50	OH	NA	NA	
VE-16	vapor extraction	NS	NG	3750.96	NA	152.5	7.875	45.00	OH	NA	NA	
VE-17	vapor extraction	NS	NG	3756.73	NA	132.5	7.875	42.50	OH	NA	NA	
VE-18	vapor extraction	NS	NG	3756.82	NA	165.5	7.875	40.00	OH	NA	NA	
VE-19	vapor extraction	NS	NG	3761.18	NA	152.5	7.875	40.00	OH	NA	NA	
VE-20	vapor extraction	NS	NG	3768.41	NA	162.5	7.875	40.00	OH	NA	NA	

* may change to recovery
 AMSL=above mean sea level
 TOC= top of casing datum
 OH=open hole
 NA=not applicable
 NS=not sampled
 NG=not gauged

APPENDIX A

Lithologic and Well Completion Logs



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 230 ft. Diameter 20/17.5/11 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia Open Hole Length _____ Type/Size _____
 Casing: Dia 18/12 in. Length 17.5/73 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air/Mud Rotary
 Driller Ronnie Kieth Log By Kevin Spencer Date 6/4/96 Permit # RA-9140
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

06/13/96 start well over, drilling with mud.
Estimated flow rate during drilling: 180' - 195' - 4 gpm 210' - 10 gpm 230' - 25 gpm

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0		0				20-inch borehole with 18-inch casing from 0 to 17.5 ft. 0-5 Ft: Grayish brown (2.5y 5/2) and light brownish gray (2.5y 6/2) DOLOMITE, conchoidal fractures, dense, and white (2.5y 8/2) LIMESTONE, hard, COBBLES, cemented with calcite cement, minor amount of chert.
2						5-10 Ft: Same as above
4						
6		0				
8						
10		0				10-15 Ft: Same as above
12						
14						
16						15-17.5 Ft: Same as above
18		0	6			17.5-inch borehole with 12-inch casing from 17.5 to 73 ft 17.5-20 Ft: Light yellowish brown (10 yr 6/4) and yellowish brown (10 yr 5/6) DOLOMITE, very hard, microcrystalline, conchoidal fractures.
20		0	8			20-25 Ft: Same as above (minor dark gray (10 yr 4/1) sandy dolomite, fine-grained, well cemented, hard).
22						
24						



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PIG (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0	8			25-30 Ft: Same as above
26						30
36		0	6			30-35 Ft: Very pale brown (10 yr 7/3) and light brownish gray (10 yr 6/2) DOLOMITE microcrystalline, very hard, conchoidal fractures.
38		8.5	13			40-45 Ft: Grayish brown (10 yr 5/2) and very pale brown (10 yr 7/4) sandy dolomitic LIMESTONE , very fine- to fine-grained, slight reaction with HCl, moderately to well cemented.
40		2.7	25			45-50 Ft: Light brownish gray (10 yr 6/2) light reddish brown (5 yr 6/3) DOLOMITE microcrystalline, hard and brownish yellow (10 yr 6/6) LIMESTONE , argillaceous, medium hard.
42		5.6	23			50-55 Ft: Light brownish gray (10 yr 6/2) and light reddish brown (5 yr 6/3), DOLOMITE microcrystalline, moderately hard.
44		2.7	25			55-80 Ft: Light grayish brown (10 yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, and grayish brown (2.5y 5/2) and light yellowish brown (2.5y 5/2) sandy DOLOMITE , fine-grained hard.
46						
48						
50						
52						
54						
56						



Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
56							
58		0	23				80-85 Ft: Grayish brown (2.5y 5/2) and dark gray (5y 4/1) sandy DOLOMITE , very fine grained, moderately hard to soft.
60							
62		0	18				85-70 Ft: Brown (10 yr 5/3) DOLOMITE , microcrystalline, conchoidal fractures, hard, and gray (10 yr 4/1) sandy DOLOMITE , very fine-grained, moderately cemented, moderately hard.
64							
66							
68		2.7	23				70-73 Ft: Same as above
70							
72		2.7	60				11-inch open borehole from 73 to 230 ft.
74		0	8				73-80 Ft: Very dark gray (10 yr 3/1); grayish brown (10 yr 5/2), and brownish yellow (10 yr 6/6) sandy yellow DOLOMITE hard, very fine- to fine-grained, well cemented.
76							
78	5.9	13					
80						80-88 Ft: Same as above	
82							
84	12.1	13					
86						88-90 Ft: Very pale brown (10 yr 7/4) sandy DOLOMITE , and light brownish gray (10 yr 6/2) DOLOMITE , microcrystalline, conchoidal fractures, trace of green sand (possibly glauconite).	
88	5.9	38					



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
88		5.9	38					
90							90-95 Ft: Light brownish gray (10 yr 6/2) sandy DOLOMITE, very fine-grained, trace of green sand (possibly glauconite), minor limestone.	
92		0	75					
94								
96								95-100 Ft: Light brownish gray (10 yr 6/2) SANDSTONE, very fine-grained, well sorted, subangular, poorly cemented, soft. Minor amount of sandy dolomite as above.
98		0	75					
100								100-105 Ft: Light brownish gray (10 yr 6/2) sandy DOLOMITE, very fine-grained, trace green sand (possibly glauconite).
102		0	50					
104								105-110 Ft: Same as above
106								
108		0	27					
110								110-115 Ft: Same as above
112								
114	0	38						
116						115-120 Ft: Same as above		
118	0	43						
120								



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
120		0	50			120-125 Ft: Same as above. Samples are more pulverized.					
122						125-130 Ft: Same as above					
124											
126											
128											
130						130-135 Ft: Same as above. Color changes to pale yellow (2.5y 7/4).					
132											
134											
136							0	60			135-140 Ft: Yellow (10 yr 7/6) SANDSTONE, very fine-grained, well sorted, poorly cemented, subrounded; and pale yellow (2.5y 7/4) sandy DOLOMITE, fine-grained, trace green sand (pos. glauconite).
138											140-145 Ft: Same as above
140											
142											
144	145-150 Ft: Same as above										
146											
148											
150											
152						150-155 Ft: Same as above					



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152	[Well Completion Diagram]	0	21	[Graphic Log]		Start mist pump
154						
156						
158						
160						
162						
164						
166						
168						
170						
172						
174						
176						
178						
180						
182						
184						



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PTD (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
184	[Well Completion Diagram]	0	100	[Graphic Log Pattern]		185-190 Ft: Same as above		
186								
188								
190						0	75	190-195 Ft: Same as above (slightly higher sand content).
192								
194								
196								
198						0	50	195-200 Ft: Same as above
200								
202						0	50	200-205 Ft: Same as above
204								
206								
208	0	27	205-210 Ft: Same as above (harder)					
210								
212	0	60	210-215 Ft: Light brownish gray (10 yr 6/2) SANDSTONE, very fine- to fine-grained, moderately sorted, poorly cemented, subrounded; and light brownish gray (10 yr 6/2) sandy DOLOMITE, fine-grained.					
214								
216								
						215-220 Ft: Same as above		



Drilling Log

Injection Well IW-01

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-216	[]			NNNNNN			
-218		0	60				
-220							220-225 Ft: Pale brown (10 yr 6/3) SANDSTONE, very fine- to fine-grained, moderately sorted, poorly cemented, subrounded.
-222		0	75				225-230 Ft: Same as above
-224							
-226							
-228		0	75				
-230						TD at 230 ft.	
-232							
-234							
-236							
-238							
-240							
-242							
-244							
-246							
-248							



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 300 ft. Diameter 17.5/11 in.
 Top of Casing _____ Water Level Initial 225 ft. Static _____
 Screen: Dia Open Hole Length _____ Type/Size _____
 Casing: Dia 12 in. Length 159 ft. Type Steel
 F# Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Kevin Spencer Date 7/23/96 Permit # RA-9149-S
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Estimated water level 225-230 Ft.
Estimated flow rate: 75-100 gpm during drilling.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						
2						
4		0	20			17.5-inch borehole with 12-inch casing 0 to 159 Ft. 0-5 Ft: Yellowish brown (10 yr 5/6) and light brown (7.5yr 6/4) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry.
6						
8		0	20			5-10 Ft: Light yellowish brown (10 yr 6/4) and l. grayish brown (10 yr 6/2) DOLOMITE , microcrystalline, conchoidal fractures, dry
10						
12		0	27			10-15 Ft: Brownish yellow (10 yr 6/3) SANDSTONE , fine- to very-fine grained, moderately sorted, poorly cemented, slightly moist.
14						
16						
18		0	23			15-20 Ft: Brownish yellow (10 yr 6/8) and gray (10 yr 5/1) SANDSTONE , very fine- to fine-grained, moderately sorted, poorly to moderately cemented, slightly moist.
20						
22		0	14			20-25 Ft: Pale brown (10 yr 7/4), light yellowish brown (10 yr 6/4), and light brown (7.5 yr 6/4)sandy DOLOMITE , fine- grained sand in dolomitic matrix, moderately hard, dry.
24						



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26		0	27			25-30 Ft: Brownish yellow (10 yr 6/6) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry.
28						
30						30-35 Ft: Same as above
32		0	12			
34						
36						35-40 Ft: Brownish yellow (10 yr 6/6) and pale brown (10 yr 6/3) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry. (occasional green, possibly glauconite, sand layers).
38		0	13			
40						40-45 Ft: Same as above
42						
44		0	13			
46						45-50 Ft: Grayish brown (2.5y 5/2) and light yellowish brown (10 yr 6/4) SANDSTONE , very fine- to fine-grained, moderately sorted, subrounded, moderately cemented. (trace green, glauconite sand).
48		16	16			
50						50-55 Ft: SANDSTONE (same as above) Dolomite reddish brown (7.5 yr 6/6), microcrystalline, mod. hard, conchoidal fractures, dry.
52		1	19			
54						
56						55-60 Ft: Light brown (7.5 yr 6/4), reddish yellow (7.5 yr 6/6), and dark brown (7.5 yr 3/2) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry.



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58		0	12			
60						60-85 Ft: Light yellowish brown (10 yr 6/4) and pale brown (10 yr 6/3) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry, (minor beds of glauconite sand).
62		0	17			
64						
66						65-70 Ft: Gray (5y 5/1) SANDSTONE , very fine- to fine-grained, moderately sorted, well cemented, hard, subrounded, dry, (trace glauconite).
68		0	13			
70						70-75 Ft: Pale brown (10 yr 6/3) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry; and yellow (10 yr 7/6) sandy DOLOMITE , hard, very fine-grained, dry.
72		1	12			
74						
76						75-80 Ft: Very dark gray (10 yr 3/1) SANDSTONE , very fine-grained, well sorted, moderately cemented, subrounded, dry.
78		2	21			
80						80-85 Ft: Brown (10 yr 5/3) sandy DOLOMITE , fine-grained, hard, conchoidal fractures, dry.
82		0	7			
84						
86						85-90 Ft: Sandy DOLOMITE (as above) and pale brown (10 yr 6/3) and brownish yellow (10 yr 6/6) SANDSTONE , very fine- to fine-grained, moderately sorted, well cemented, hard, subrounded.
88		23	12			



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90						
92		5	11			90-95 Ft: Pale brown (10 yr 6/3) and brownish yellow (10 yr 6/6) sandy DOLOMITE , v. fine-grained, hard, conchoidal fractures, dry.
94						
96						95-100 Ft: Same as above
98		1	13			
100						100-105 Ft: Same as above
102		0	13			
104						105-110 Ft: Same as above
106						
108		0	15			
110						110-115 Ft: Very pale brown (10 yr 7/4) silty SAND , very fine- to medium-grained, poorly sorted, subangular to subrounded, poorly cemented, dry.
112		0	30			
114						
116						115-120 Ft: Pale brown (10y 6/3) sandy DOLOMITE , fine-grained, hard, conchoidal fractures, dry.
118		0	12			
120						



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120						120-125 Ft: Sandy DOLOMITE (as above) and pale brown (10 yr 6/3) DOLOMITE, microcrystalline, hard, conchoidal fractures, dry.
122		0	9			
124						
126						125-130 Ft: Pale brown (10 yr 6/3) sandy-DOLOMITE, fine-grained, dry, (trace glauconite).
128		0	14			
130						130-135 Ft: Pale brown (10 yr 6/3) and yellow (10 yr 8/6) sandy DOLOMITE, fine-grained, hard (fractured encrustations on fracture face).
132		0	13			
134						
136						135-140 Ft: Same as above (trace of glauconite sand).
138		0	13			
140						140-145 Ft: Brownish yellow (10 yr 6/6) SANDSTONE, very fine- to fine-grained, subangular to subrounded, moderately cemented, moderately sorted.
142		0	17			
144						
146						145-150 Ft: Same as above (trace glauconite).
148		0	25			
150						150-155 Ft: Same as above
152						

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152						
154		0	30			
156						155-180 Ft: SANDSTONE (as above) and brownish yellow (10 yr 6/8) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry.
158		0	19			
160						11-inch open borehole from 159 to 300 Ft.
162						180-185 Ft: Yellow (10 yr 7/6) SANDSTONE , very fine- to medium-grained, poorly sorted, subangular, moderately cemented, very slightly moist.
164		0	20			
166						185-170 Ft: Yellow (10 yr 7/6) SANDSTONE , very fine- to fine-grained, subrounded, moderately sorted, poorly cemented, very slightly moist.
168		0	23			
170						170-175 Ft: Same as above
172		0	21			
174						175-180 Ft: Same as above (moist)
176						
178		0	43			
180						180-185 Ft: Same as above
182		0	75			
184						



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
184	[Empty Box]			[Dotted Pattern]		185-190 Ft: Same as above	
186							
188		0	38				
190							190-195 Ft: Same as above
192							
194		0	38				
196							195-200 Ft: Same as above
198							
200		0	50				
202							200-205 Ft: Same as above
204							
206							205-210 Ft: Very pale brown (10 yr 7/4) SANDSTONE, very fine- to fine-grained, moderately sorted, subrounded, poorly cemented, moist, (trace glauconite).
208		0	27				
210							210-215 Ft: Same as above
212							
214	0	30					
216					215-220 Ft: Same as above (more moist)		



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-216	[Empty Box]						
-218		0	33	[Dotted Pattern]			
-220							220-225 Ft: Same as above (start mist pump)
-222		0	43				
-224							Groundwater encountered at 225'-230' (estimate)
-226		0	38		[Horizontal Line Pattern]		225-230 Ft: Pale brown (10 yr 6/3) clayey SAND, very fine-grained, subrounded, interbedded with pale brown (10 yr 6/3) sandy DOLOMITE, hard, fine-grained, very moist, detect groundwater at this interval.
-228							
-230							230-235 Ft: Same as above
-232		0	75		[Horizontal Line Pattern]		
-234							
-236						235-240 Ft: Light yellowish brown (2.5y 6/6) SANDSTONE, fine-grained, well sorted, moderately cemented, subrounded, (trace glauconite sand).	
-238	0	27		[Dotted Pattern]			
-240						240-245 Ft: Same as above	
-242	0	38		[Dotted Pattern]			
-244						Lost circulation to 260'	
-246						245-260 Ft: SANDSTONE (as above) and light yellowish brown (2.5y 6/4) sandy DOLOMITE, fine-grained.	
-248							



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-248		0	36			
-250						
-252						
-254						
-256						
-258						
-260		0	30			260-270 Ft: Grayish brown (2.5y 5/2) and red (10r 5/6) SANDSTONE , fine-grained, well sorted, subrounded, moderately cemented.
-262						
-264						
-266						
-268						
-270						270-275 Ft: Pale brown (10 yr 6/3) SANDSTONE , very fine- to fine-grained, moderately cemented, subrounded, moderately sorted.
-272						
-274						
-276						275-280 Ft: SANDSTONE (as above) and yellowish brown (10 yr 5/6) DOLOMITE , microcrystalline, hard, conchoidal fractures.
-278						
-280						



Drilling Log

Injection Well IW-02

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-280	[Empty Box]	0	33	[Dotted Pattern]		280-285 Ft: Light gray (10 yr 7/2) SANDSTONE , very fine-grained, well sorted, subrounded, slightly silty, moderately cemented.
-282						
-284						
-286						
-288						
-290	0	21	33	[Dotted Pattern]		285-290 Ft: Light reddish brown (5 yr 6/4) SANDSTONE , very fine-grained, well sorted, subrounded, moderately cemented.
-292						
-294						
-296	0	20	21	[Dotted Pattern]		290-295 Ft: Same as above (sandstone is light reddish brown and pale brown (10 yr 6/3).
-298						
-300						
-302						295-300 Ft: Reddish brown (2.5 yr 4/4) and light reddish brown (2.5 yr 6/4) SANDSTONE , very fine- to fine-grained, moderately sorted, subrounded, moderately cemented.
-304						
-306						
-308						
-310						
-312						
						TD at 1830 hrs. on 7/24/96

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3791.4					
	0	CLAYEY SILT: BROWN, 7.5YR5/2, DRY FROM 0.0 TO 9.0', LOW TO MEDIUM PLASTICITY, VERY FINE QUARTZ, 60% SILT, 40% CLAY	ML		1 NS		1.00
	5				2 1.1 NR NS		5.90
	10	MOIST BELOW 9.0' SATURATED BELOW 11.26'			3 0.8 NR NS		7.90 8.96
	15	SANDY GRAVEL: DARK GRAY, 10 YR 5/1, COARSE GRAVEL, FINE GRAIN SAND, SATURATED, QUARTZ, ROUNDED TO ROUNDED SUBANGULAR, POORLY SORTED, STRONG ODOR DOLOMITE: LIGHT GRAYISH BROWN, 10 YR 5/2, MASSIVE AUGER REFUSAL AT 15.1'	GM DOLOMITE		6 1.5 NR		13.56 13.8 15.00
	20						
	25						
	30						
	35						

- | | |
|---------------------------|------------------------------------|
| SPLIT-SPOON SAMPLER | WATER TABLE (TIME OF BORING) |
| STANDARD PENETRATION TEST | LABORATORY TEST LOCATION |
| UNDISTURBED SAMPLE | PENETROMETER (TONS/SO. FT.) |
| WATER TABLE (24 HOURS) | NR: NO RECOVERY
NS: NOT SAMPLED |

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-1 (BH-14)**

DATE DRILLED 4/25/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

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ROBERTS/SCHORNICK
& ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS
3700 W. ROBINSON
NORMAN, OKLAHOMA 73072
(405) 321-3895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3786.9					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3788.72 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX SODIUM BENTONITE PELLETS 2" PVC RISER .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0 - 4.0	CLAYEY SILT: 10% CLAY, 90% SILT, LOW PLASTICITY, 7.5 YR 6/4, LIGHT BROWN, DRY, MASSIVE	ML	NS	1 1.2'		
	4.0 - 5.0	SANDY CLAYEY SILT: 10% SAND, 10% CLAY, 80% SILT, VERY FINE GRAIN SILICA SAND, LOW PLASTICITY, 7.5 YR 7/2, PINKISH GRAY, DRY	ML	NS	2 1.4'		
	5.0 - 7.3	COBBLE SILT: ABUNDANT DOLOMITE COBBLES, MINOR SUBROUNDED DOLOMITE GRAVEL, UNCONSOLIDATED, DRY, 5 YR 7/1, LIGHT GRAY	GM	NS	3 0.3'		
	7.3 - 10.0			NS	4 0.9'		
	10.0 - 13.9			NS	5 0.8'		
	13.9 - 15.0	AUGER REFUSAL 13.9'		NS			
	15.0 - 20.0	NO GROUNDWATER WHILE DRILLING					
	20.0 - 25.0						
	25.0 - 30.0						
	30.0 - 35.0						

<ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) 	<ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED
--	--

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-2 (BH-23)**

DATE DRILLED 5/2/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3785.4					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3787.50 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0	SANDY CLAYEY SILT: 10% SAND, 10% CLAY, 80% SILT, VERY FINE GRAIN SAND, MINOR DOLOMITE GRAVEL, 10 YR 6/4, LIGHT YELLOWISH BROWN, DRY, UNCONSOLIDATED	ML		NS		
	1.5				1 1.5		
	2.0				NS		
	2.0				2 1.0		
	3.0				NR		
	3.0				NS		
	4.0				3 1.1		
	5.0				NR		
	5.0				NS		
	10.8				4 0.8		
	10.8	COBBLE SILT: 10 YR 7/3, VERY PALE BROWN, DOLOMITE COBBLES, DRY, UNCONSOLIDATED, MINOR DOLOMITE GRAVEL > 0.1" DIAMETER	GM		NR		
	15.3				NS		
	15.3	SANDY DOLOMITE: VERY FINE GRAIN SAND, 10 YR 6/3, PALE BROWN, VERY HARD, DRY	DOLOMITE		5 0.8		
	15.3	AUGER REFUSAL 15.3'			NR		
	15.3	NO GROUNDWATER WHILE DRILLING			6 1.0		
	15.3	BOREHOLE OVM: 0.0 PPM			NR		

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-3 (BH-24)**

DATE DRILLED 5/2/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3784.1					
	0	SANDY CLAYEY SILT: VERY FINE GRAIN SAND, 10% SAND, 10% CLAY, 80% SILT, LOW PLASTICITY, 10 YR 6/4, LIGHT YELLOWISH BROWN, DRY, UNCONSOLIDATED, MINOR SUBROUNDED DOLOMITE GRAVEL	ML	NS	1 0.9		0
	2.0	COBBLE SILT: DOLOMITE, COBBLES, 10 YR 7/2, LIGHT GRAY, DRY, UNCONSOLIDATED, ABUNDANT GRAVEL TO 0.15' IN DIAMETER	GM	NR	2 1.5		2.00
	5			NS	3 1.0		5
	10			NR	4 0.8		10
	15			NR	5 0.6		15
	16.8	SANDSTONE: VERY FINE GRAIN QUARTZ, 10 YR 7/2, LIGHT GRAY, DRY, HARD, WEAK CEMENTATION, FRIABLE	SANDSTONE	NS			16.87
	16.9	AUGER REFUSAL AT 16.9' NO GROUNDWATER ENCOUNTERED WHILE DRILLING BOREHOLE OVM: 0.0 PPM		NR			16.90
	20			NR			20
	25			NR			25
	30			NR			30
	35			NR			35

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-4 (BH-26)**

DATE DRILLED 5/3/91 - 5/4/91

DRILLING METHOD HSA

DRILLED BY SBH

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3799.8					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3801.7 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0	SANDY SILT: 20% VERY FINE GRAIN SAND, 80% SILT, NO PLASTICITY, 10 YR 7/3, VERY PALE BROWN, DRY, UNCONSOLIDATED	SM		NS		
	3.7	SILTY SANDSTONE: VERY FINE GRAIN QUARTZ, 10 YR 8/2, WHITE, DRY, WEAKLY CEMENTED, FRIABLE	SILTY SANDSTONE		NR	1.2	
	5				NS	1.0	
		MOIST AT 8.0', 2.5 Y 7/4, PALE YELLOW.			NS	0.6	
	10	VERY MOIST AT 9.0'			NS	0.3	
	11.2	AFTER 11.0', VERY HARD			NS	0.2	
		AUGER REFUSAL 11.2' NO GROUNDWATER ENCOUNTERED WHILE DRILLING BOREHOLE OVM: 8.0 PPM					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/90129**

BORING NUMBER **MW-5 (BH-28)**

DATE DRILLED 5/5/91

DRILLING METHOD HSA

DRILLED BY SBH

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3783.2					
	0	COBBLE SILT: DOLOMITE COBBLES TO 1.5' IN DIAMETER, 10 YR 5/3, BROWN, DRY, UNCONSOLIDATED	GM	0.0-0.0	NS		
	1	AFTER 0.9', 10 YR 8/2, WHITE, ABUNDANT SUBGROUND DOLOMITE GRAVEL		0.0-0.0	NR 1.1		
	2			0.0-0.0	NS 0.7		
	3			0.0-0.0	NS 1.2		
	4			0.0-0.0	NS 0.6		
	5			0.0-0.0	NS		
	6.00			0.0-0.0			
	6.72			0.0-0.0			
	10			0.0-0.0			
	12.3	AUGER REFUSAL 12.3'					
	12.3	NO GROUNDWATER ENCOUNTERED WHILE DRILLING					
	15						
	20						
	25						
	30						
	35						

- | | |
|---------------------------|------------------------------|
| SPLIT-SPOON SAMPLER | WATER TABLE (TIME OF BORING) |
| STANDARD PENETRATION TEST | LABORATORY TEST LOCATION |
| UNDISTURBED SAMPLE | PENETROMETER (TONS/SQ. FT.) |
| WATER TABLE (24 HOURS) | NR: NO RECOVERY |
| | NS: NOT SAMPLED |

JOB NAME/NUMBER **MARATHON/90129**

BORING NUMBER **MW-6 (BH-29)**

DATE DRILLED 5/5/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MEP

CHECKED BY BJJ

DRAWN BY: SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3783.5					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3784.56 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0	GRAVELLY BOULDERY COBBLEY SILT: BROWN, 7.5YR5/6, DRY, UNCONSOLIDATED, COBBLES AND BOULDERS FROM 5 CM TO 1 M, VERY FINE QUARTZ, WELL ROUNDED GRAVEL	GM	0.0-0.0	1 GC NS		
				0.0-0.0	2 1.5		
				0.0-0.0	3		
	5			0.0-0.0	NS		
				0.0-0.0	NR 0.0		
				0.0-0.0	NR 0.4		
				0.0-0.0	NS		
				0.0-0.0	5 0.6		
				0.0-0.0	NR		
	13.5	SILTY CLAY: BROWN, 10 YR 5/6, VERY FINE QUARTZ, LOW PLASTICITY, DRY, MEDIUM COMPACTION, ABUNDANT CALICHE AND ROOT CHANNELS, 60% CLAY, 40% SILT, WEATHERED AT CONTACT, CALICHE CEMENTED	CL	0.0-0.0	6 1.5		
	15			0.0-0.0	NS		
	15.5	DOLOMITE: LIGHT GRAYISH BROWN, 10 YR 5/2, VERY HARD, SANDY, MASSIVE	DOLOMITE	0.0-0.0	NR		
	16.3	AUGER REFUSAL AT 16.3'					
		GROUNDWATER NOT OBSERVED DURING DRILLING					
	20						
	25						
	30						
	35						

- SPOUT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-7 (BH-30)**

DATE DRILLED 5/6/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY VJL

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL			
		GROUND SURFACE: 3792.8								
	0	BOULDERY COBBLEY GRAVELLY SILT: BROWN. 10YR 5/6, DRY, VERY LOW PLASTICITY. UNCONSOLIDATED, COBBLES AND BOULDERS FROM 5CM TO 1M, ROUNDED	GM		1	1.0		0		
					NS				1.00	
					2	0.8			3.00	
					NR				4.25	
	5				3	1.1			4.95	5
					NR					
					NS					
					4	0.8				
		NR								
		NS								
	10					10				
	15					15				
	15.3					15				
		AUGER REFUSAL AT 15.5'								
		GROUNDWATER NOT ENCOUNTERED WHILE DRILLING								
	20					20				
	25					25				
	30					30				
	35					35				

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-8 (BH-31)**

DATE DRILLED 5/6/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY V.J.

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3805.6					
	0	CLAYEY SILT: DARK BROWN, 7.5 YR 4/2, VERY FINE QUARTZ, DRY, VERY LOW PLASTICITY, GRAVELLY, 60% SILT, 40% CLAY, CALICHE DEPOSITS	ML		1 GC NS		
	5	BOULDERY COBBLE GRAVELLY SILT: BROWN, 7.5 YR 5/2, DRY, UNCONSOLIDATED, COBBLES AND BOULDER FROM 5 CM TO 50 CM, ROUNDED	GM		2 NR 0.6 3 NR 0.3 NR 0.5		
	10	SANDSTONE: QUARTZ, GRAYISH YELLOW TO YELLOWISH GRAY, 5 Y 8/4 TO 7/2, FINE GRAIN, WELL SORTED, POORLY CEMENTED, FRIABLE	SANDSTONE		4 NR 0.1 NS		
	12.0	AUGER REFUSAL AT 12.0' GROUNDWATER NOT ENCOUNTERED WHILE DRILLING			5 NR 0.6 NS		

SPLIT-SPOON SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	PENETROMETER (TONS/SQ. FT.)
WATER TABLE (24 HOURS)	NR: NO RECOVERY
	NS: NOT SAMPLED
	GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-9 (BH-32)**

DATE DRILLED 5/7/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY V.L.

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3788.7 CLAYEY SILT: YELLOWISH BROWN, 10 YR 5/4, DRY, VERY LOW PLASTICITY, VERY FINE QUARTZ, CALICHE DEPOSITS, 60% SILT, 40% CLAY	ML	NS	GC		<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3790.78 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS .020 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 10-5/8"</p>
	5.5	SILTY CLAY: DARK BROWN, 10 YR 4/3, VERY FINE QUARTZ, LOW PLASTICITY, MODERATELY COMPACTED	CL	NR	NS		
	10	MOIST BELOW 9.5', LOW PLASTICITY		NR	NS		
	12.6	BOULDERY COBBLE GRAVEL: LIGHT GRAYISH BROWN, 10 YR 5/2 TO 6/2, ROUNDED, CALICHE CEMENTED, HARD	GM	NR	NS		
	13.5	CLAYEY SAND TO SANDY CLAY: BROWN, 10YR5/3, QUARTZ, FINE GRAIN, WELL SORTED, SATURATED, MEDIUM PLASTICITY, STRONG HYDROCARBON ODOR	SM	NR	NS		
	15			NR	NS		
	16.6	AUGER REFUSAL AT 16.5'		NR	NS		
	16.6	NOTE: BOREHOLE REEMED 10 INCHES TO A DEPTH OF 17.01', 5/8/91		NR	NS		
	20			NR	NS		
	25			NR	NS		
	30			NR	NS		
	35			NR	NS		

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-10 (BH-33)**

DATE DRILLED 5/8/91
 DRILLING METHOD HSA
 DRILLED BY SHB
 LOGGED BY VJL
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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3804.8					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3806.96 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS .020 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP</p> <p>1.00 8.10 10.30 12.52 22.00 22.69</p> <p>10-5/8"</p>
	0	CLAYEY SILT: YELLOWISH BROWN, 10 YR 5/4, DRY, UNCONSOLIDATED, VERY LOW PLASTICITY, VERY FINE GRAIN QUARTZ, 70% SILT, 30% CLAY	ML		1 GC		
					NS		
					2 1.1		
					NR		
	4.5	GRAVELLY COBBLE SILT: GRAYISH BROWN, 10 YR 5/2, VERY FINE QUARTZ, POORLY SORTED, UNCONSOLIDATED, COBBLES AND PEBBLES FROM 3 TO 10CM, ROUNDED, DOLOMITE	SM		3 NS		
					NR		
					4 1.1		
	7.5	SILTY SAND: YELLOWISH BROWN, 10YR5/4, QUARTZ, VERY FINE TO MEDIUM GRAIN, POORLY SORTED, ANGULAR, ABUNDANT K-FELDSPAR AND BIOTITE, MODERATELY COMPACTED, STRUCTURELESS	SM		5 NS		
					NR		
					6 1.5		
					NS		
					NR		
					NS		
	10	COBBLE BOULDERY SILT: GRAYISH BROWN, 10YR 5/2, POORLY SORTED, COBBLES AND BOULDERS FROM 5 CM TO 1 M, ROUNDED DOLOMITE	SM		7 NS		
					NR		
					8 1.2		
					NR		
					NS		
	15	HYDROCARBON ODOR BELOW 18.01', MOIST			9 2.5		
					NS		
					NR		
					NS		
	20	HYDROCARBON SATURATED AT CONTACT					
	22.2	SANDSTONE: LIGHT OLIVE GRAY, 5 Y 6/2, QUARTZOSE, FINE GRAIN, WELL SORTED, MICACEOUS, FRIABLE, NONCALCAREOUS	SANDSTONE				
	22.5	AUGER REFUSAL AT 22.5'					

<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> SPUT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) </td> <td style="width: 50%; border: none;"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE </td> </tr> </table>	SPUT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS)	WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE	<p>JOB NAME/NUMBER <u>MARATHON/91029</u></p> <p>BORING NUMBER <u>MW-11 (BH-34)</u></p> <p>DATE DRILLED <u>5/9/91</u></p> <p>DRILLING METHOD <u>HSA</u></p> <p>DRILLED BY <u>SHB</u></p> <p>LOGGED BY <u>WJL</u></p> <p>CHECKED BY <u>BJS</u></p> <p>DRAWN BY: <u>SAR</u></p>
SPUT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS)	WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE		

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3807.9					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3809.86 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0 - 4.0	CLAYEY SILT: LIGHT YELLOWISH BROWN, 10 YR 6/4, DRY, VERY FINE GRAIN QUARTZ, UNCONSOLIDATED, 60% SILT, 40% CLAY, CALICHE DEPOSITS	ML		1 GC 2 1.5 3 NR 4 1.5 5 1.0 6 0.5 7 0.8 8 1.5 9 0.7 10 0.5		
	4.0 - 5.0	BOULDERY COBBLE GRAVELLY SILT: LIGHT GRAYISH BROWN, 10YR 6/2, POORLY SORTED, COBBLES AND BOULDERS FROM 5 CM TO 1 M, ROUNDED	GM				
	5.0 - 10.0						
	10.0 - 15.0						
	15.0 - 20.0						
	20.0 - 23.0	CLAYEY BELOW 19.5', SANDY, QUARTZ, MEDIUM GRAIN, MOIST, MEDIUM PLASTICITY, STRONG HYDROCARBON ODOR					
	23.0 - 23.2	SANDSTONE: LIGHT OLIVE GRAY, 5 Y 6/2, QUARTZOSE, FINE GRAIN, POORLY CEMENTED, NONCALCAREOUS, FRIABLE, MICACEOUS	SANDSTONE				
	23.2 - 25.0	BORING TERMINATED 23.2'					
	25.0 - 35.0	GROUNDWATER NOT OBSERVED DURING DRILLING					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-12 (BH-35)**

DATE DRILLED 5/10/91

DRILLING METHOD MSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3799.5					
	0 - 7.2	CLAYEY SILT: YELLOWISH BROWN, 10 YR 5/4, VERY FINE GRAIN QUARTZ, DRY, VERY LOW PLASTICITY, 70% SILT, 30% CLAY	ML		1 GC NS 2 1.0 NR 3 0.5 NR NS		1.00 4.56
	7.2 - 9.56	BOULDERY COBBLE GRAVELLY SILT: LIGHT GRAYISH BROWN, 10 YR 6/2, POORLY SORTED, COBBLES AND BOULDERS FROM 5 CM TO 1 M, ROUNDED	GM		4 0.4 NR 5 1.1 NR NS		7.85 9.56
	9.56 - 12.5	SANDY GRAVELLY CLAY: BROWN, 7.5 YR 5/4, MOIST, MEDIUM PLASTICITY, FINE GRAIN QUARTZ, FIRM, OCCASIONAL LARGE PEICES OF GRAVEL, 60% CLAY, 40% SAND, CALICHE DEPOSITS	CL		6 1.5 NR NS		.010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK
	12.5 - 15	BOULDERY COBBLE GRAVELLY SILT: LIGHT GRAYISH BROWN, 10 YR 6/2, POORLY SORTED, COBBLES AND BOULDERS FROM 5 CM TO 1 M, ROUNDED	GM		7 0.4 NR NS		15
	15 - 17.5	GRAVEL: GRAY, 10 YR 5/1, MODERATELY WELL SORTED, ANGULAR, GRAVEL 5 TO 10 MM, HYDROCARBON SATURATED	GP		8 1.0 NR NS		19.34 19.99
	17.5 - 19.7	SANDSTONE: PALE OLIVE, 5 Y 6/4, FINE GRAIN, WELL SORTED, POORLY CEMENTED, FRIABLE, NONCALCAREOUS, MICACIOUS	SANDSTONE		9 0.7 NR NS		SUMP 7-3/8"
	19.7	BORING TERMINATED AT 19.7'					
	20 - 35						

- SPUT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-19 (BH-36)**

DATE DRILLED 5/10/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY M.J.

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL	
		GROUND SURFACE: 3801.6						
	0	CLAYEY SILT: BROWN, 7.5 YR 5.4, DRY, VERY LOW PLASTICITY, CALICHE DEPOSITS, VERY FINE QUARTZ, 70% SILT, 30% CLAY	ML		1	GC	VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3803.61 WEEP HOLE 3801.40 CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER	
	1.00				2	1.3	NS	
	5				3	1.1	NR	
	7.3				4	0.4	NR	
	7.3	BOULDER COBBLE GRAVELLY SILT: LIGHT BROWNISH GRAY, 10 YR 6/2, GRAVELLY, POORLY SORTED, COBBLES AND BOULDERS FROM 5 TO 50CM, ROUNDED	GM		5	0.7	SODIUM BENTONITE PELLETS .020 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK	
	10				6	1.0	NS	
	15				7	0.5	NS	
	15	ABUNDANT GRAVEL FROM 12.0-14.0', FROM 1.0 CM TO 3.0 CM						
	15	CLAYEY FROM 14.0-14.5', SANDY, MOIST, MEDIUM GRAIN QUARTZ, MEDIUM PLASTICITY BOULDERS > 1M BELOW 14.5'						
	17.2	GRAVEL: GRAY TO GRAYISH BROWN, 10 YR 5/1 TO 5/2, MODERATELY SORTED, VERY COARSE GRAIN QUARTZ, GRAVEL 0.5 TO 1.0 CM, ROUND TO SUBROUND, COBBLE, HYDROCARBON SATURATED CLAYEY BELOW 17.0'	GP		8	0.8	SUMP 10-5/8"	
	20				9	0.5	NS	
	20.5				10	0.5	NS	
	20.5	SANDSTONE: BROWN, 10 YR 5.3, FINE GRAIN, QUARTZOSE, WELL SORT, POORLY CEMENTED, FRIABLE	SANDSTONE					
	22.0	BORING TERMINATED AT 22.0' BOREHOLE REEMED TO 10" DIAMETER HOLE						
	25							

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-14 (BH-37)**

DATE DRILLED 5/11/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

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WELL COMPLETION RECORD

LITHOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIT CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3801.5					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3803.59 WEEP HOLE 3801.50 CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP</p>
	0	CLAYEY SILT: LIGHT YELLOWISH BROWN, 10 YR 6/4. VERY FINE GRAIN QUARTZ. DRY, VERY LOW PLASTICITY, CALICHE DEPOSITS, 70% SILT, 30% CLAY		0.00	1 GC		
	1.00			0.00	NS		
	2.00			1.1	2		
	3.00			1.1	3		
	5	BOULDERY COBBLE GRAVELLY SILT: LIGHT GRAYISH BROWN TO YELLOWISH BROWN, 10 YR 6/2 TO 6/4. POORLY SORTED. COBBLES AND BOULDERS FROM 3 TO 50CM. ROUNDED TO SUBROUNDED		0.00	4		
	6.5			0.00	NS		
	7.5			0.4	5		
	8.5			0.00	NR		
	10	CLAYEY FROM 9.0' TO 9.8'; SANDY, FINE TO MEDIUM GRAIN QUARTZ, FIRM, MODERATE TO LOW PLASTICITY		0.00	6		
	11			0.00	NS		
	12			0.4	7		
	13			0.00	NR		
	15			0.00	8		
	17.08			0.00	NR		
	17.38	AUGER REFUSAL AT 17.38'					
	20	GROUNDWATER NOT ENCOUNTERED WHILE DRILLING.					

<ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED 	<p>JOB NAME/NUMBER MARATHON/91029</p> <p>BORING NUMBER MW-15 (BH-38)</p> <p>DATE DRILLED <u>5/11/91 & 5/12/91</u></p> <p>DRILLING METHOD <u>HSA</u></p> <p>DRILLED BY <u>SHB</u></p> <p>LOGGED BY <u>MJL</u></p> <p>CHECKED BY <u>BJS</u></p> <p>DRAWN BY: <u>SAR</u> PAGE 1 OF 1</p>
<p>ROBERTS/SCHORNICK & ASSOCIATES, INC.</p> <p>ENVIRONMENTAL CONSULTANTS 3700 W. ROBINSON NORMAN, OKLAHOMA 73072 (405) 321-3895</p>	

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	'N' VALUE	WELL COMPLETION DETAIL		
		GROUND SURFACE: 3798.4							
	0	CLAYEY SILT: VERY PALE BROWN TO LIGHT YELLOWISH BROWN, 10 YR 7/4 TO 6/4, DRY, VERY LOW PLASTICITY, GRAVELLY BELOW 3.0', GRAVEL TO 1CM, ROUNDED, VERY FINE QUARTZ MATRIX, 65% SILT, 35% CLAY, 5% GRAVEL GRAVELLY BOULDERY COBBLE SILT: LIGHT BROWNISH GRAY, 10 YR 6/2, POORLY SORTED, COBBLES AND BOULDERS FROM 4CM TO 1M, ROUNDED CLAYEY FROM 4.5' TO 5.0'	ML		1	GC	VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3801.04 WEEP HOLE CONCRETE PAD		
	3.5				2	NS	0.9		0.5
	5				3	NR	1.0		CEMENT BENTONITE GROUT MIX
					4	NS	0.8		4" PVC RISER
					5	NR	0.8		6.5
					6	NS	0.8		SODIUM BENTONITE PELLETS
					7	NR	1.1		8.5
					8	NS	0.8		10.07
					9	NR	0.9		.020 SLOT PVC SCREEN
					10	NR	0.9		8 - 20 SILICA SAND PACK
	20	SANDSTONE: LIGHT OLIVE GRAY, 5Y 6/2, QUARTZOSE, FINE GRAIN, WELL SORTED, POORLY CEMENTED, FRIABLE, MICACEOUS, NON-CALCAREOUS	SANDSTONE		10	GC	19.59 20.2 21.0 SUMP		
	20.5								7-3/8"
	21.0	BORING TERMINATED AT 21.0'							
	25	GROUNDWATER NOT OBSERVED DURING DRILLING.							
	30								
	35								

- | | |
|---------------------------|------------------------------|
| SPLIT-SPOON SAMPLER | WATER TABLE (TIME OF BORING) |
| STANDARD PENETRATION TEST | LABORATORY TEST LOCATION |
| UNDISTURBED SAMPLE | PENETROMETER (TONS/SQ. FT.) |
| WATER TABLE (24 HOURS) | NR: NO RECOVERY |
| | NS: NOT SAMPLED |
| | GC: GRAB COMPOSITE |

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-16 (BH-39)**

DATE DRILLED 5/12/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3797.5					
	0	CLAYEY SANDY SILT: VERY FINE GRAINED SAND, 10% CLAY, 10% SAND, 80% SILT, UNCONSOLIDATED, DRY, 7.5 YR 7/4 PINK	ML	1	0.9		
	5	ABUNDANT COBBLES AFTER 6.0'		2	0.4		
	9.4			3	1.1		
	10	COBBLEY SILTY SAND: 10% COBBLES, 20% SILT, 70% SAND, VERY FINE GRAINED SILICA SAND, SLIGHTLY MOIST, 7.5 YR 7/4 PINK, UNCONSOLIDATED, DOLOMITE COBBLES	GM	4	0.5		
	14.0			5	0.1		
	15	COBBLEY SANDY SILT: VERY FINE GRAINED SAND, SLIGHTLY MOIST, 7.5 YR 7/4 PINK, UNCONSOLIDATED, DOLOMITE COBBLES	ML	6	0.3		
	17.7	AUGER REFUSAL AT 17.7'		7	0.5		
	20	GROUNDWATER NOT ENCOUNTERED DURING DRILLING.		8	0.1		
	25	BOREHOLE OVM READING: 19.0 PPM		9	0.1		
	30						
	35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MW-17 (BH-40)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/13/91 & 5/14/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3793.5					
	0	CLAYEY SILT: 10% CLAY, 90% SILT, LOW PLASTICITY, 10 YR 6/3 PALE BROWN, UNCONSOLIDATED, DRY	SC	/ / / / /	NS		
	1.2				1	1.2	
	1.2 - 2.0				NR		
	2.0				NS		
	2.0 - 4.0				2	1.1	
	4.0				NR		
	4.0 - 9.0				NS		
	9.0				3	1.0	
	9.0 - 10.0				NR		
	10.0				NS		
	10.0 - 13.4				4	1.0	
	13.4				NR		
	13.4 - 15.2				NS		
	15.2				5	0.5	
	15.2 - 15.1				NR		
	15.1				6	0.1	
	15.1 - 15.2				NS		
	15.2	AUGER REFUSAL AT 15.2'					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-18 (BH-41)**

DATE DRILLED 5/14/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3795.4					<p style="font-size: small;">VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3797.21 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .020 SLOT PVC SCREEN SUMP 10-5/8"</p>
	0	CLAYEY SILT: 10% CLAY, 90% SILT, 10 YR 6/3 PALE BROWN, DRY, UNCONSOLIDATED	ML	NS	1 98		0
	5	SLIGHTLY MOIST AFTER 5.0'			NR		
	6.0	COBBLE CLAYEY SILT: 10% COBBLES, 10% CLAY, 80% SILT, 10 YR 6/3, PALE BROWN, SLIGHTLY MOIST, UNCONSOLIDATED	GM	NS	2 1.3		5
	10	COBBLE SANDY SILT: VERY FINE GRAINED SAND, DOLOMITE COBBLES, 10 YR 7/1 LIGHT GRAY, DRY, UNCONSOLIDATED	GM	NR	3 1.0		10
	12.3	COBBLE CLAYEY SILT: 10 YR 7/1 LIGHT GRAY, DOLOMITE COBBLES, 10 YR 5/4 YELLOW BROWN, SILTY CLAY MATRIX, MOIST, MODERATELY CONSOLIDATED	GM	NR	4 0.9		
	14.6	COBBLE SANDY SILT: VERY FINE GRAIN SAND, DOLOMITE COBBLES, 10 YR 7/1 LIGHT GRAY, SATURATED, STRONG CONDENSATE ODOR AT 17.0', SATURATED WITH 5 YR 3/1 VERY DARK GRAY VISCOUS MATERIAL, STRONG CONDENSATE ODOR	GM	NR	5 1.1		15
	15	AUGER REFUSAL AT 17.3'			6 1.0		
	17.3	GROUNDWATER ENCOUNTERED AT 14.8'			7 0.3		20
	20	HEAVING SANDS AT T.D. 17.3'					
	25						25
	30						30
	35						35

<p> SPLIT-SPOON SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY NS: NOT SAMPLED</p>
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JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-19 (BH-42)**

DATE DRILLED 5/16/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3794.8					
	0 - 6.0	CLAYEY SILT: 10% CLAY, 90% SILT, 10 YR 6/3 PALE BROWN, DRY TO SLIGHTLY MOIST, NO PLASTICITY	ML	NS	1 0.9	1.00	
	6.0 - 9.0	COBBLE SANDY SILT: 10 YR 7/3 VERY PALE BROWN, SLIGHTLY MOIST TO DRY, UNCONSOLIDATED, DOLOMITE COBBLES TO APPROXIMATE 0.5 FEET DIAMETER AFTER 6.0', CLAYEY SILT MATRIX, SLIGHTLY MOIST	GM	NR	2 0.4	1.50	
	9.0 - 10.0			NR	3 0.3	3.50	
	10.0 - 14.1	COBBLE SANDY SILT: VERY FINE GRAIN SAND, 10 YR 8/2 WHITE, DRY, UNCONSOLIDATED, DOLOMITE COBBLES, MINOR DOLOMITE GRAVEL MINOR CLAYEY SILT MATRIX AFTER 12.0', SLIGHTLY MOIST	GM	NS	4 0.9	4.10	
	14.1 - 15.0	AUGER REFUSAL AT 14.1'		NR	5 0.1	13.9	
	15.0 - 35.0	GROUNDWATER NOT ENCOUNTERED DURING BORING.				14.1	

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-20 (BH-43)**

DATE DRILLED 5/16/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"U" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3796.1					<p style="font-size: small;">VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3798.21 WEEP HOLE 3796.10 CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8-20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8"</p>
	0 - 6.5	SANDY CLAYEY SILT VERY FINE GRAIN SAND, 10% SAND, 10% CLAY, 80% SILT, NO PLASTICITY, 7.5 YR 7/2 PINK GRAY, DRY, MINOR CALICHE, UNCONSOLIDATED	ML	0.0-0.5 0.5-1.0 1.0-1.5 1.5-2.0 2.0-2.5 2.5-3.0 3.0-3.5 3.5-4.0 4.0-4.5 4.5-5.0 5.0-5.5 5.5-6.0 6.0-6.5	NS 1 1.3 NR NS 2 1.1 NR NS 3 0.7		1.00
	6.5 - 18.0	COBBLEY GRAVELLY SANDY SILT: VERY FINE GRAIN SAND, 10 YR 7/2 LIGHT GRAY, DOLOMITE COBBLES AND GRAVEL, DRY, UNCONSOLIDATED AFTER 12.0' CALICHE CEMENTATION, MINOR SLIGHTLY MOIST, 7.5 YR 6/4 LIGHT BROWN, CLAY MATRIX SLIGHTLY MOIST AFTER 14.0'	GM	0.0-0.5 0.5-1.0 1.0-1.5 1.5-2.0 2.0-2.5 2.5-3.0 3.0-3.5 3.5-4.0 4.0-4.5 4.5-5.0 5.0-5.5 5.5-6.0 6.0-6.5 6.5-7.0 7.0-7.5 7.5-8.0 8.0-8.5 8.5-9.0 9.0-9.5 9.5-10.0 10.0-10.5 10.5-11.0 11.0-11.5 11.5-12.0 12.0-12.5 12.5-13.0 13.0-13.5 13.5-14.0 14.0-14.5 14.5-15.0 15.0-15.5 15.5-16.0 16.0-16.5 16.5-17.0 17.0-17.5 17.5-18.0	NS NS 4 0.1 NS 5 0.4 NS 6 0.9 NR NS 7 1.5 NS 8 1.1 NR 9 0.1 NR		7.00 9.00 10.63
	18.0 - 21.20	SANDSTONE: VERY FINE GRAIN SILICA HIGHLY WEATHERED AND FRACTURED, 2.5 YR 7/4 PALE YELLOW, FRACTURE IN FILLING WITH MOTTLED 7.5 YR 5/4 BROWN SILTY CLAY, SLIGHTLY MOIST IN FRACTURE, MOIST IN SANDSTONE, HIGHLY FRIABLE AND MOIST AFTER 20.0', AFTER 20.6' VERY HARD SANDSTONE	SANDSTONE	0.0-0.5 0.5-1.0 1.0-1.5 1.5-2.0 2.0-2.5 2.5-3.0 3.0-3.5 3.5-4.0 4.0-4.5 4.5-5.0 5.0-5.5 5.5-6.0 6.0-6.5 6.5-7.0 7.0-7.5 7.5-8.0 8.0-8.5 8.5-9.0 9.0-9.5 9.5-10.0 10.0-10.5 10.5-11.0 11.0-11.5 11.5-12.0 12.0-12.5 12.5-13.0 13.0-13.5 13.5-14.0 14.0-14.5 14.5-15.0 15.0-15.5 15.5-16.0 16.0-16.5 16.5-17.0 17.0-17.5 17.5-18.0 18.0-18.5 18.5-19.0 19.0-19.5 19.5-20.0 20.0-20.5 20.5-21.0 21.0-21.5 21.5-22.0 22.0-22.5 22.5-23.0 23.0-23.5 23.5-24.0 24.0-24.5 24.5-25.0 25.0-25.5 25.5-26.0 26.0-26.5 26.5-27.0 27.0-27.5 27.5-28.0 28.0-28.5 28.5-29.0 29.0-29.5 29.5-30.0 30.0-30.5 30.5-31.0 31.0-31.5 31.5-32.0 32.0-32.5 32.5-33.0 33.0-33.5 33.5-34.0 34.0-34.5 34.5-35.0	NS NS NR NS 7 1.5 NS 8 1.1 NR 9 0.1 NR		20.77 21.20
	21.20 - 25	AUGER REFUSAL AT 21.20' GROUNDWATER NOT ENCOUNTERED DURING DRILLING.					
	25 - 35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SO FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-21 (BH-44)**

DATE DRILLED 5/16/91

DRILLING METHOD HSA

DRILLED BY GHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

LOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3797.5					
	0 - 4.0	COBBLE SANDY SILT: VERY FINE GRAIN SAND, 10 YR 6/3 PALE BROWN, DRY, UNCONSOLIDATED, DOLOMITE COBBLES AND GRAVEL, AFTER 3.0' 10 YR 7/2 LIGHT GRAY, CALICHE CEMENTATION 2'-3'	GM	NS	1-0.7		
	4.0 - 5.0	COBBLE SILTY SAND: 10% COBBLES, 30% SILT, 60% SAND, VERY FINE TO FINE SAND, 10 YR 8/3 VERY PALE BROWN, DRY, DENSE	GM	NR	2-1.2		
	5.0 - 8.0	COBBLE SANDY SILT: VERY FINE GRAIN SAND, 10 YR 7/4 VERY PALE BROWN, SLIGHTLY MOIST, UNCONSOLIDATED, DOLOMITE COBBLES	GM	NS	3-0.5		
	8.0 - 10.0	COBBLE SANDY SILT: VERY FINE GRAIN SAND, 10 YR 7/4 VERY PALE BROWN, SLIGHTLY MOIST, UNCONSOLIDATED, DOLOMITE COBBLES	GM	NS	4-1.1		
	10.0 - 14.5	AFTER 12.0' MINOR 7.5 YR 6/4 LIGHT BROWN, MOIST CLAYEY SAND BINDER	GM	NR	5-0.7		
	14.5 - 15.3	SILTY CLAY: 40% SILT, 60% CLAY, LOW PLASTICITY, STIFF, 10 YR 5/4 YELLOW BROWN, MOIST, MINOR SUBROUNDED DOLOMITE GRAVEL	CL	NS	6-1.1		
	15.3 - 15.6	DOLOMITE: VERY HARD, MICROCRYSTALLINE, 10 YR 6/1 LIGHT GRAY TO GRAY, DRY	DOLO.	NS			
	15.6 - 20.0	AUGER REFUSAL AT 15.6'					
	20.0 - 35.0	GROUNDWATER NOT OBSERVED DURING BORING NO GROUNDWATER AFTER 24 HOURS					

<p> SPLIT-SPOON SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY NS: NOT SAMPLED</p>
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JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-22 (BH-45)**

DATE DRILLED 5/17/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3792.4					
	0	CLAYEY SILT: 10% CLAY, 90% SILT, 10 YR 7/4 VERY PALE BROWN, DRY TO SLIGHTLY MOIST, UNCONSOLIDATED, NO PLASTICITY	ML		NS	1	
	4.5	GRAVELLY SILT: 10 YR 8/3, VERY PALE BROWN, DRY TO SLIGHTLY MOIST, SUB-ROUNDED DOLOMITE GRAVEL TO 0.08" IN DIAMETER	GM		NS	2	
	6.0	COBBLE SANDY SILT: VERY FINE GRAIN SAND, 10 YR 8/3 VERY PALE BROWN, DRY SLIGHTLY MOIST, UNCONSOLIDATED, DOLOMITE COBBLES, MINOR CALICHE CEMENTATION	GM		NS	3	
	10.8	SANDY DOLOMITE: VERY FINE GRAIN SAND, 10 YR 7/2 LIGHT GRAY, VERY HARD, DRY	DOLO.		NS	NS	
	10.9	AUGER REFUSAL AT 10.9'					
	15	GROUNDWATER NOT ENCOUNTERED DURING DRILLING NO GROUNDWATER OBSERVED AFTER 24 HOURS					
	20						
	25						
	30						
	35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-23 (BH-46)**

DATE DRILLED 5/18/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	'N' VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3791.0					
	0	CLAYEY SILT: 10% CLAY, 90% SILT, 10 YR 7/4 VERY PALE BROWN, NO PLASTICITY, DRY, UNCONSOLIDATED	ML		NS		
	5	SLIGHTLY MOIST AFTER 6.0'			1 1.0 NR NS		
	6.5	COBBLE SANDY SILT: VERY FINE GRAIN SAND, 10 YR 8/2 WHITE, DRY, SUB-ROUNDED DOLOMITE COBBLES AND MINOR GRAVEL, UNCONSOLIDATED CALICHE CEMENTATION AFTER 8.5'	GM		2 1.1 NR NS		
	9.5	COBBLE SILTY CLAY: 10% COBBLES, 30% SILT, 60% CLAY, MINOR CALICHE CEMENTATION, 10 YR 5/4 YELLOW BROWN, MOIST, DOLOMITE COBBLES, UNCONSOLIDATED	CL		3 1.5 NR NS		
	10.9	SANDY DOLOMITE: VERY FINE GRAIN SILICA, 10 YR 7/1 LIGHT GRAY, DRY	DOLO.		4 1.0 NS		
	11.0	AUGER REFUSAL AT 11.0'			5 0.1 NS		
	15	GROUNDWATER NOT ENCOUNTERED DURING DRILLING					
	20						
	25						
	30						
	35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- R: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-24 (BH-47)**

DATE DRILLED 5/18/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR

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 (405) 321-3854

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3784.7					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3786.97 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8"</p>
	0	CLAYEY SILT: 10% CLAY, 90% SILT, 10 YR 7/3 VERY PALE BROWN, DRY, UNCONSOLIDATED	ML	X	NS		
	1.0	GRAVELLY SANDY SILT: 10 YR 8/3 VERY PALE BROWN, DRY, UNCONSOLIDATED	GM	O	1 1.1		
				O	NR		
	5			O	NS	2 1.0	
				O	NR		
		SLIGHTLY MOIST AFTER 7.0'		O	3 0.9		
	8.2			O	NS		
	8.3	SANDY DOLOMITE: VERY FINE GRAIN SAND, 10 YR 7/1 LIGHT GRAY, DRY, VERY HARD	DGLO.	X	4 0.1		
	10	AUGER REFUSAL AT 8.3'					
		GROUNDWATER NOT ENCOUNTERED DURING DRILLING					
		NO GROUNDWATER OBSERVED AFTER 24 HOURS					
	15						
	20						
	25						
	30						
	35						

- SPUT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-25 (BH-48)**

DATE DRILLED 5/18/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3791.0					
	0	CLAYEY SANDY SILT: VERY FINE GRAIN SILICA SAND, 10% CLAY, 10% SAND, 80% SILT, 10 YR 8/4 VERY PALE BROWN, DRY, NO PLASTICITY, UNCONSOLIDATED, MINOR CALICHE	ML	NS	1 1.5		VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3793.01 WEEP HOLE 3791.00 CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8"
	4.0	COBBLELY GRAVELLY SANDY SILT: VERY FINE GRAIN SILICA SAND, 10YR8/3 VERY PALE BROWN, CALICHE CEMENTATION, DRY TO SLIGHTLY MOIST, ABUNDANT SUBROUNDED DOLOMITE GRAVEL		NS	2 1.1		5.50
	5			NS	3 1.0		7.50
	10			NS	4 1.0		9.10
	15			NS	5 1.0		10.00
	17.66	AFTER 12.0', MINOR MOIST 7.5 YR 5/4 BROWN, SILTY CLAY MATRIX	GM	NS	6 1.0		11.00
	19.4	SATURATION AFTER 17.0', STRONG CONDENSATE ODOR		NR	7 0.9		12.00
	19.5			NR	8 0.1		13.00
	20	SANDSTONE: VERY FINE GRAIN SILICA SAND, 2.5 YR 7/2 LIGHT GRAY WITH 2.5 YR 5/0 GRAY BANDS, VERY HARD	SS	NS	8 0.1		18.55 19.10 19.50
	25	AUGER REFUSAL AT 19.5'					
	30	GROUNDWATER ENCOUNTERED DURING DRILLING AT 17.66'					
	35						

<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) </td> <td style="width: 50%; border: none;"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED </td> </tr> </table>	SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS)	WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED	
SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS)	WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED		

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-26 (BH-49)**

DATE DRILLED 5/19/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3788.00					<p style="font-size: small;"> VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3790.93 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8" </p>
	0	SANDY SILT: VERY FINE GRAIN SAND, 10 YR 6/4 LIGHT YELLOW BROWN, DRY, UNCONSOLIDATED	SM	1 0.0	NS		
	2.8	COBBLEY SANDY SILT: VERY FINE GRAIN SILICA SAND, 10 YR 8/2 WHITE, DRY, UNCONSOLIDATED, ABUNDANT DOLOMITE GRAVEL	GM	2 0.6	NR		
	4.5			3 0.6	NS		
	5	SILTY SAND: VERY FINE TO FINE GRAIN SILICA SAND, 20% SILT, 80% SAND, 10 YR 6/4, LIGHT YELLOW BROWN, SLIGHTLY MOIST, UNCONSOLIDATED	SM	4 0.0	NS		
	8.3	COBBLEY SANDY SILT: VERY FINE GRAIN SAND, 10 YR 7/3 VERY PALE BROWN, DRY, UNCONSOLIDATED, DOLOMITE COBBLES AND MINOR SUBROUNDED GRAVEL CALICHE CEMENTATION AFTER 12.5' AFTER 15.5', SLIGHTLY MOIST 5 YR 5/4 RED BROWN, SILTY CLAY MATRIX	GM	5 0.2	NR		
	10			6 0.8	NS		
	15			7 0.3	NS		
	16.0			8 0.0	NS		
		AUGER REFUSAL AT 16.0'					
		GROUNDWATER NOT ENCOUNTERED DURING DRILLING.					

- | | |
|--|--|
| <ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) | <ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED |
|--|--|

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-27 (BH-50)**

DATE DRILLED 5/19/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL	
	0	GROUND SURFACE: 3794.9						
	0 - 1.0	CLAYEY SILT: LIGHT YELLOWISH BROWN, 10 YR 6/4, DRY, VERY LOW PLASTICITY, CALICHE DEPOSITS, 70% SILT, 30% CLAY	ML	[Diagonal hatching]	1	GC		
	1.0 - 2.0				2	1.0		NS
	2.0 - 3.0				3	1.0		NR
	3.0 - 6.0	BOULDERY GRAVELLY COBBLEY SILT: LIGHT YELLOWISH BROWN TO LIGHT BROWNISH GRAY, 10YR 6/2 TO 6/4, POORLY SORTED, DOLOMITE COBBLES AND BOULDERS FROM 3 CM TO 0.5M, ROUNDED	GM	[Dotted pattern]	4	0.4		NS
	6.0 - 6.81				5	0.4		NS
	6.81 - 10.0				6	0.2		NR
	10.0 - 12.5	CLAYEY GRAVELLY SAND: BROWN, 7.5 YR 7/2, MOIST, VERY FINE TO FINE GRAIN QUARTZ, MANGANESE NODULES, LOW PLASTICITY, DOLOMITE PEBBLES FROM 0.5 TO 1CM ROUND, 70% SAND, 20% CLAY, 10% GRAVEL	SC	[Stippled pattern]	7	1.0	NS	
	12.5 - 15.0				NR			
	15.0 - 17.0				NR			
	17.0	AUGER REFUSAL AT 17.0'						
	17.0	GROUNDWATER NOT ENCOUNTERED DURING DRILLING.						
	20							
	25							
	30							
	35							

- | | |
|--|--|
| <ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) | <ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE |
|--|--|

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-28 (BH-52)**

DATE DRILLED 5/20/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEP. (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3792.0					
	0	SANDY CLAYEY SILT: BROWN, 10 YR 5/5, DRY, VERY LOW PLASTICITY, VERY FINE QUARTZ 70% SILT, 10% CLAY, 20% SAND	ML	/ / / / /	1 GC		
	3.0	BOULDERY COBBLEY SILT: BROWN TO LIGHT BROWNISH GRAY, 10 YR 5/3 TO 6/2, GRAVELLY, POORLY SORTED, COBBLES AND BOULDERS FROM 5 CM TO 0.5 M, ROUNDED TO SUBROUNDED, DOLOMITE	GM	o o o o o	2 NS		
	5			o o o o o	3 NS		
	10			o o o o o	4 NS		
	12.7	CLAYEY FROM 9.0' TO 10.0', SANDY AND GRAVELLY, BROWN TO STRONG BROWN, 10 YR 5/4 TO 5/6, MOIST, LOW PLASTICITY, FINE TO VERY FINE QUARTZ		o o o o o	5 NS		
	15	AUGER REFUSAL AT 12.7'		o o o o o	NR		
	15	GROUNDWATER NOT ENCOUNTERED DURING DRILLING.		o o o o o	NR		
	20			o o o o o			
	25			o o o o o			
	30			o o o o o			
	35			o o o o o			

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-29 (BH-53)**

DATE DRILLED 5/20/91
 DRILLING METHOD HSA
 DRILLED BY SHB
 LOGGED BY MJL
 CHECKED BY BJS
 DRAWN BY: SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3786.0					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3788.30 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8"</p>
	0	CLAYEY SILT: BROWN TO BROWNISH YELLOW, 10 YR 5/3 TO 5/4, DRY, VERY LOW PLASTICITY, CALICHE DEPOSITS, 70% SILT, 30% CLAY, VERY FINE QUARTZ	ML	[Diagonal hatching]	1		
	1.00				NS		
	2				NR	1.1	
	3				NR	1.0	
	5	COBBLEY GRAVELLY SILT: BROWN TO LIGHT GRAYISH BROWN, 10 YR 5/2 TO 5/2, MODERATELY WELL SORTED, COBBLES FROM 4 TO 10 CM, GRAVEL, ROUNDED TO SUBROUNDED	GM	[Circular patterns]	4	0.7	
	7.5				NS		
	10				NR		
	10.5				NR		
	12.5	DOLOMITE: LIGHT GRAYISH BROWN, 10 YR 6/2, MASSIVE, HARD	DOLOMITE	[Horizontal lines]	NS		
	12.5	BORING TERMINATED AT 12.5'			NR		
	15	GROUNDWATER NOT ENCOUNTERED DURING DRILLING					
	20						
	25						
	30						
	35						

<table border="0"> <tr> <td></td> <td>SPLIT-SPOON SAMPLER</td> <td></td> <td>WATER TABLE (TIME OF BORING)</td> </tr> <tr> <td></td> <td>STANDARD PENETRATION TEST</td> <td></td> <td>LABORATORY TEST LOCATION</td> </tr> <tr> <td></td> <td>UNDISTURBED SAMPLE</td> <td></td> <td>PENETROMETER (TONS/SQ. FT.)</td> </tr> <tr> <td></td> <td>WATER TABLE (24 HOURS)</td> <td>NR:</td> <td>NO RECOVERY</td> </tr> <tr> <td></td> <td></td> <td>NS:</td> <td>NOT SAMPLED</td> </tr> <tr> <td></td> <td></td> <td>GC:</td> <td>GRAB COMPOSITE</td> </tr> </table>		SPLIT-SPOON SAMPLER		WATER TABLE (TIME OF BORING)		STANDARD PENETRATION TEST		LABORATORY TEST LOCATION		UNDISTURBED SAMPLE		PENETROMETER (TONS/SQ. FT.)		WATER TABLE (24 HOURS)	NR:	NO RECOVERY			NS:	NOT SAMPLED			GC:	GRAB COMPOSITE	<p>JOB NAME/NUMBER MARATHON/91029</p> <p>BORING NUMBER MW-30 (BH-54)</p> <p>DATE DRILLED <u>5/21/91</u></p> <p>DRILLING METHOD <u>HSA</u></p> <p>DRILLED BY <u>SHB</u></p> <p>LOGGED BY <u>MJL</u></p> <p>CHECKED BY <u>BJS</u></p> <p>DRAWN BY: <u>SAR</u></p>
	SPLIT-SPOON SAMPLER		WATER TABLE (TIME OF BORING)																						
	STANDARD PENETRATION TEST		LABORATORY TEST LOCATION																						
	UNDISTURBED SAMPLE		PENETROMETER (TONS/SQ. FT.)																						
	WATER TABLE (24 HOURS)	NR:	NO RECOVERY																						
		NS:	NOT SAMPLED																						
		GC:	GRAB COMPOSITE																						

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3788.7					
	0 - 5	CLAYEY SILT: BROWN TO VERY PALE BROWN, 10 YR 5/3 TO 7/4, DRY VERY LOW PLASTICITY, CALICHE DEPOSITS, 70% SILT, 30% CLAY, VERY FINE GRAIN QUARTZ	ML		1 GC NS 2 1.1 NR 3 1.1 NR 4 1.1 NR 5 0.7 NR 6 0.5 NR 7 0.5 NR 8 0.4		
	5 - 9.5	SLIGHTLY MOIST BELOW 7.0' MOIST FROM 9.0' TO 9.5', GRAVELLY, DARK BROWN, 10 YR 4/3					
	9.5 - 10	BOULDERY GRAVELLY COBBLEY SILT: DARK BROWN TO LIGHT GRAYISH BROWN, 10YR4/3 TO 6/2, POORLY SORTED, COBBLES/BOULDERS FROM 3.0 CM TO >20 CM, ROUNDED TO SUBROUNDED	GM				
	10 - 15	CLAYEY FROM 12.0' TO 12.5', MOIST VERY HARD FROM 13.0' TO 14.0', CLAYEY FROM 14.0' TO 14.5', MOIST					
	15 - 17.4	CLAYEY FROM 17.0 TO 17.4' SATURATED AT 16.96'					
	17.4	AUGER REFUSAL AT 17.4'					
	17.4 - 35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-31 (BH-55)**

DATE DRILLED 5/22/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL	
		GROUND SURFACE: 3795.2						
	0	CONGLOMERATE: VERY PALE BROWN TO LIGHT GRAYISH BROWN, 10 YR 7/3 TO 6/2, LIMESTONE/DOLOMITE GRAVEL, COBBLES AND BOULDERS FROM 5 CM TO 2 M, ROUNDED TO SUBROUNDED, CARBONATE CEMENT, WEATHERED AT SURFACE, HARD	CONGLOMERATE		NS			0
	5				NR	0.4		5
	8.5				NR	0.2		7.50
	10				NR	1.0		9.60
	10	BOULDERY COBBLE GRAVELLY SILT: BROWN TO LIGHT GRAYISH BROWN, 10YR5/3 TO 6/2, POORLY SORTED, COBBLES AND BOULDERS FROM 4 CM TO 20 CM, ROUNDED TO SUBROUNDED, VERY FINE GRAIN QUARTZ	GM		NS			10
	14.5	NR				14.29		
	15	NR				14.50		
	15	AUGER REFUSAL AT 14.5'						
	15	GROUNDWATER NOT OBSERVED DURING DRILLING.						
	20							
	25							
	30							
	35							

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-32 (BH-66)**

DATE DRILLED 5/22/91
 DRILLING METHOD HSA
 DRILLED BY SHB
 LOGGED BY MJL
 CHECKED BY BJS
 DRAWN BY: SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3800.9					
	0	CLAYEY SILT: LIGHT BROWN, 7.5 YR 6/4, DRY, VERY LOW PLASTICITY, VERY FINE GRAIN QUARTZ, CALICHE DEPOSITS, 70% SILT, 30% CLAY	ML	NS	2	1.1	1.00
	4.5	BOULDERY COBBLEY GRAVELLY SILT: LIGHT BROWN TO LIGHT BROWNISH GRAY, 7.5YR6/4 TO 10 YR 6/2, POORLY SORTED, COBBLES AND BOULDERY FROM 2 CM TO >15 CM, ROUNDED TO SUBROUND	GM	NR	3	0.8	3.00
	5			NS	4	1.5	6.45
	10			NR	5	0.5	8.56
	15			NS	6	1.0	18.12
	18.0			NR	8	0.8	18.71
	18.5	DOLOMITE: LIGHT GRAYISH BROWN, 10 YR 6/2, MASSIVE, HARD	DOLOMITE	NR	9	1.5	SUMP
	18.65	AUGER REFUSAL AT 18.65'					7-3/8"

- | | |
|--|--|
| <ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) | <ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE |
|--|--|

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-33 (BH-57)**

DATE DRILLED 5/23/91 & 5/24/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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 (405) 321-1895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3803.7					
	0	CLAYEY SILT: PALE BROWN TO BROWN, 10 YR 5/3 TO 6/3, DRY, VERY LOW PLASTICITY, VERY FINE GRAIN QUARTZ, CALICHE DEPOSITS, 70% SILT, 30% CLAY	CL	0.0-0.5	1 NS		
	2.7	BOULDERY COBBLELY GRAVELLY SILT: BROWN TO LIGHT GRAYISH BROWN, 10YR5/3 TO 6/4, POORLY SORTED, COBBLES AND BOULDERS FROM 5 CM TO > 50 CM, ROUNDED TO SUBROUNDED, DOLOMITE WITH CALICHE WEATHERING, HYDROCARBON ODOR FROM 9.0' TO 9.9', DRY STRONG HYDROCARBON ODOR BELOW 14.0', VERY MOIST, SANDY, COARSE GRAIN QUARTZ	GM	0.5-1.0	2 NR	0.6	
	5			1.0-1.5	3 NR	0.5	
				1.5-2.0	4 NS	0.9	
				2.0-2.5	5 NR	1.0	
				2.5-3.0	6 NS	0.5	
	10			3.0-3.5	7 NR	0.8	
	15			3.5-4.0	NS		
	18.6	AUGER REFUSAL AT 18.6'					
	20	GROUNDWATER NOT OBSERVED DURING DRILLING.					

- ONE CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (10NS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-34 (BH-58)**

DATE DRILLED 5/24/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY M.J.

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3799.0					
	0	CLAYEY SILT: YELLOWISH GRAY, 5Y7/2, LOOSE, DRY, NONPLASTIC. CALICHE DEPOSITS TO 2.9'; 10% CLAY, CALICHE 60%	ML	/ / / / /	1 GC		0
	2.9	CLAYEY SILT: DUSKY YELLOW 5YR6/4, DRY, LOOSE, VERY LOW PLASTICITY, 10% CLAY	ML	/ / / / /	2 1.0		1.00
	4.0	CLAYEY SILT: LIGHT BROWN 5YR6/4 LOW PLASTICITY, 30% CLAY, CALICHE DEPOSITS 25%, 45% SILT, DRY	ML	/ / / / /	3 1.1		5
	5				4 1.5		7.80
	8.0	CLAYEY SILT: LIGHT BROWN 7.5 YR 6/4, FIRM, 30% CLAY, LOW PLASTICITY, FRIABLE, DRY	ML	/ / / / /	5 0.9		10
	10				6 0.9		11.15
	11.0	GRAVEL AND COBBLES IN CLAYEY SILT: 50% COARSE, 50% FINE, GRAVEL FINE TO COARSE, 5 TO 75MM, SEGMENTS OF COBBLES SIZE UNKNOWN, CLAYEY SILT, PINKISH GRAY 7.5 YR 7/2, LOOSE, DRY, VERY LOW PLASTICITY, DOLOMITIC GRAY LIMESTONE COBBLES AND GRAVEL WELL ROUNDED, POORLY SORTED.	GM	o o o o o	7 0.7		13.97
	14.5				8 0.5		15
	15	GRAVEL AND COBBLES: COARSE GRAVEL 25-75MM, COBBLES POSSIBLY TO BOULDER SIZE, DECREASING CLAYEY SILT TO 20% LIMESTONE FACTION TYPICALLY LIGHT BROWNISH GRAY (2.5 YR 6/2), FAIR ODOR OF HYDROCARBON AT 14.5', VERY SLIGHTLY MOIST, 30% COARSE GRAVEL, 50% COBBLES, SATURATED WITH HYDROCARBONS	GM	o o o o o	NR		18.52 18.90
	17.37	--- WATER TABLE (24 HOURS)					10 5/8"
	18.9	AUGER REFUSAL AT 18.9'					20
	20	DOLOMITIC LIMESTON: LIGHT BROWNISH, 10YR6/2, GRAY, DENSE					25
	25	LOST SPLIT SPOON SAMPLER WHEN DRIVING 12.5 TO 14.0', SAMPLE INTERVAL COULD NOT RETRIEVE. WILL GROUT UP HOLE. MOVE RIG 10.0' EAST AND REDRILL					30
	30	FLUID LEVEL 16.54' (CONDENSATE) WATER LEVEL 17.37' 3 HOURS AFTER DRILLING					35

- | | |
|------------------------------|------------------------------|
| CME CONTINUOUS AUGER SAMPLER | WATER TABLE (TIME OF BORING) |
| STANDARD PENETRATION TEST | LABORATORY TEST LOCATION |
| UNDISTURBED SAMPLE | PENETROMETER (TONS/SQ. FT.) |
| WATER TABLE (24 HOURS) | NR: NO RECOVERY |
| | NS: NOT SAMPLED |
| | GC: GRAB COMPOSITE |

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-35 (BH-59)**

DATE DRILLED 5/25/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY GHR

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE III III I' VAI	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3791.4					
	0	GRAVELLY SILT: GRAVEL TO 0.5" DIAMETER 10% GRAVEL, 90% SILT, 10 YR 6/3, PALE BROWN TO 0.6', TO YR 8/2, WHITE AFTER 0.6', DRY	GM	NS	1	2	
	5.1	AUGER REFUSAL AT 5.1'					5
	10						10
	15	<p>• MONITOR WELL MW-36 INSTALLED APPROXIMATELY 30.0' FROM BOREHOLE 21</p> <p>THE BOREHOLE MONITOR WELL MW-36 WAS INSTALLED IN WAS NOT LOGGED. AUGER REFUSAL OCCURED AT 7.25'</p>					15
	20						20
	25						25
	30						30
	35						35

- CME CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

• NEAR
BORING NUMBER **MW-36 (BH-21)**

DATE DRILLED 4/30/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3795.5					<p style="font-size: small;"> VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3795.01 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .020 SLOT PVC SCREEN SUMP 10-5/8" </p>
	0 - 2.7	SILT: BROWN 7.5 YR 5/3, LOOSE NO PLASTICITY, DRY	ML		1 GC NS		
	2.7 - 5	CLAYEY SILT: LIGHT BROWN 7.5 YR 6/4 SLIGHTLY PLASTIC, DRY, 10% CLAY, SOME CALICHE DEPOSITS (10%), SOFT LOOSE	ML		2 1.5 NR 3 1.5		
	5 - 7.8	CLAYEY SILT: LIGHT BROWN, 7.5 YR 6/4 AND PINK 7.5 YR 7/3, SLIGHTLY PLASTIC, FIRM, DRY, 25% CLAY, 20% CALICHE DEPOSITS	ML		4 1.5 NS		
	7.8 - 9.3	SILTY CLAY: BROWN 7.5 YR 5/3, 20% SILT, 5% CALICHE DEPOSITS, SLIGHT PLASTICITY, HARD, DRY, SLIGHTLY MOIST AT 12.5' TO 12.9', NO ODOR	CL		5 1.3 NR NS		
	9.3 - 12.9	SILTY GRAVEL: BROWN 7.5, YR 6/4, GRAVELS COARSE WITH SOME FINE 5 MM TO 30 MM, SLIGHTLY MOIST, WELL GRADED, HYDROCARBON SATURATION BELOW 13.4'	GM		6 0.9 NR		
	12.9 - 14.0	SANDY GRAVEL: DARK GRAY 7.5 YR 4/0, SATURATED, SAND 10%, COARSE GRAINED, SUBANGULAR, GRAVEL FINE TO COARSE 10 TO 50 MM, STRONG HYDROCARBON ODOR, WELL GRADED, LARGER GRAVEL WELL ROUNDED	GP		7 0.5 NR NS		
	14.0 - 15				8 1.0 NS		
	15 - 18.37				9 0.3 NS		
	18.37 - 19.3	BEDROCK, LIMESTONE, BROWN, DOLOMITIC, DENSE, HARD, WEATHERED GRAY OF SURFACES	DOLOMITE				
	19.3	AUGER REFUSAL AT 19.3'					
		BOREHOLE OVM READING 32.3 PPM					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-37 (BH-60)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/26/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY GHR

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3795.5					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3797.32 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .020 SLOT PVC SCREEN SUMP 10-5/8"</p>
	0	SILT: BROWN 7.5 YR 5/3, LOOSE, NO PLASTICITY, DRY	ML		1 GC		
	3.2	CLAYEY SILT: BROWN 7.5 YR 5/4, CLAY 20%, CALICHE DEPOSITS 10%, FIRM, FRIABLE, DRY	CL		2 NR		
	4.6	CLAYEY SILT: LIGHT BROWN 7.5 YR 6/4, 30% CLAY, 20% CALICHE DEPOSITS, LOW PLASTICITY, FIRM FRIABLE, DRY	ML		3 NR		
	5				4 NS		
	10				5 NR		
	12.0	SILTY GRAVEL: LIGHT REDDISH BROWN 5 YR 6/3, SILT 30%, GRAVEL COARSE UP TO 50MM AND FINE TO 5MM, POORLY SORTED, DRY, GRAVEL DOLOMITIC LIMESTONE, LIGHT GRAY 7.5 YR 7/0, DENSE, DRY	GM	0.00 0.00 0.00 0.00	6 NR		
	14.2	DOLOMITIC LIMESTONE: WEATHERED, FRACTURES, DENSE IN PART, LIGHT GRAY 7.5 YR 7/0, SATURATED	DOLOMITE		7 NR		
	15				8 NR		
	18.3	SANDSTONE: GRAY 7.5 YR N5/0, POORLY CEMENTED, FRIABLE, STRONG HYDRO-CARBON ODOR, VERY FINE TO FINE GRAINED, SATURATED	SANDSTONE		NR		
	18.8	REFUSAL REFUSAL AT 18.8					

SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS)	WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE
--	---

JOB NAME/NUMBER **MW-38 (BH-61)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/27/91
 DRILLING METHOD HSA
 DRILLED BY SHB
 LOGGED BY GHR
 CHECKED BY BJS
 DRAWN BY: SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3795.5					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3796.30 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .020 SLOT PVC SCREEN SUMP 10-5/8"</p>
	0	SILT: BROWN 7.5 YR 5/3, LOOSE, NO PLASTICITY, DRY	ML		1 GC		
	3.6	CLAYEY SILT: PALE RED 10 R 6/3, 10% CLAY, 20% CALICHE DEPOSITS, FIRM, FRIABLE, DRY, GRADING TO PINKISH WHITE 5 YR 8/2 BELOW 4.0'	ML		2 NS	1.5	
	5				3 NR	0.4	
	7.5	SILTY GRAVELLY SAND: PINKISH WHITE 5 YR 8/2, LOOSE, ANGULAR, FINE GRAINED, DRY, 30% SILT, 15% GRAVEL	GM		4 NR	0.8	
	9.5	CLAYEY SILT: BROWN 7.5 YR 5/4, 25% CLAY, TRACE CALICHE DEPOSITS, SOFT, LOOSE, DRY	ML		5 NR	0.9	
	10				NS		
	12.5	CLAYEY GRAVEL AND POSS. COBBLES: LIGHT BROWN 7.5 YR 6/4, CLAY 25%, VERY SLIGHT PLASTICITY, MOIST, NO ODOR, GRAVEL 50%, GRAY 7.5 YR N 5/0, COARSE AND FINE, 5-40 MM	GC		6 NR	1.5	
	14.3				7 NR	0.8	
	15	SILTY GRAVEL AND COBBLES: SILT 10%, GRAVEL 50%, COBBLES 40%, WELL ROUNDED, SOME GREASY DARK GRAY SUBSTANCE, ON GRAVEL SURFACES, 7.5 YR N 4/0, STRONG HYDROCARBON ODOR, WET	GP		NR		
	17.8	WEATHERED SANDSTONE: LIGHT BROWN 7.5 YR 6/3, VERY FINE GRAINED, POORLY CEMENTED, FRIABLE, HYDROCARBON ODOR, WET, SOME SILT 20%	SANDSTONE		8 NR	0.5	
	19.2	SILTY SANDSTONE: LIGHT GRAY, 2.5 YR N 6/0, CALCAREOUS CEMENT, VERY FINE GRAINED, WET, SOFT, POORLY CEMENT, FRIABLE	SANDSTONE		9 NR		
	19.5						
	20	HSA REFUSAL AT 19.5'					
	25						
	30						
	35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-39 (BH-62)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/28/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY GHR

CHECKED BY BJS

DRAWN BY: SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3801.2					<p style="font-size: small;"> VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3803.12 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX SODIUM BENTONITE PELLETS 2" PVC RISER 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8" </p>
	0	SILT: PINKISH GRAY 7.5 YR 7/2, LOOSE, DRY	ML		1 GC		
	3.0	CLAYEY SILT: LIGHT BROWN 7.5 YR 6/4 20% CLAY, 10% CALICHE DEPOSITS, VERY LOW PLASTICITY, FRIABLE TO LOOSE, GRADING TO PINKISH WHITE 7.5 YR 8/2 AT 7.0', DRY	ML		2 NS		
	5				3 NR		
	9.2				4 NS		
	10	SANDSTONE: VERY PALE BROWN 10 YR 8/3, VERY FINE GRAINED, SILTY, CALCAREOUS CEMENT, MODERATELY CEMENTED, FRIABLE, DRY	SANDSTONE		5 0.2		
	12.1	DOLOMITE: LIGHT BROWNISH GRAY 10 YR 6/2, DENSE, HARD, DRY	DOLOMITE		6 NS		
	12.1	AUGER REFUSAL AT 12.1'			6 0.1		
	15	GROUNDWATER NOT ENCOUNTERED WHILE DRILLING					
	20						
	25						
	30						
	35						

JOB NAME/NUMBER *MW-40 (BH-63)*
BORING NUMBER *MARATHON/91029*
DATE DRILLED *5/29/91*
DRILLING METHOD *HSA*
DRILLED BY *SHB*
LOGGED BY *GHR*
CHECKED BY *BJS*
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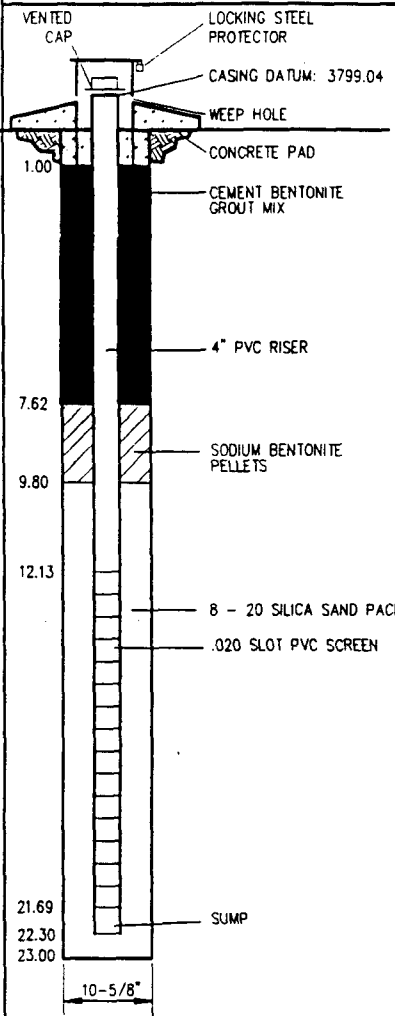
SPLIT-SPOON SAMPLER
 STANDARD PENETRATION TEST
 UNDISTURBED SAMPLE
 WATER TABLE (24 HOURS)

WATER TABLE (TIME OF BORING)
 LABORATORY TEST LOCATION
 PENETROMETER (TONS/SQ. FT.)
 NR: NO RECOVERY
 NS: NOT SAMPLED
 GC: GRAB COMPOSITE

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3797.3					
	0	SILT: WEAK RED 2.5 YR 5/2. LOOSE, DRY	ML		1 GC		0
	2.8	SILTY CLAY: REDDISH BROWN 5 YR 5/3, 25% SILT, 15% CALICHE DEPOSITS, FIRM, FRIABLE, DRY	CL		2 NS		1.00
	4.7	SILTY CLAY: PINK 7.5 YR 7/3, 20% SILT, 30% CALICHE DEPOSITS, FIRM, FRIABLE, DRY	CL		3 NR		5
	5				4 NS		7.62
	8.5				5 NS		9.80
	10	CLAYEY GRAVEL AND COBBLES: GRAVEL IS DOLOMITIC LIMESTONE, GRAY 5 YR 5/1, DENSE, 60% GRAVEL, 10% COBBLES, 30% CLAY, CLAY IS LIGHT BROWN 9.5 YR 6/3, DRY	GC		6 NR		12.13
	14.5				7 NR		15
	15	CLAYEY GRAVEL AND COBBLES: AS ABOVE BUT SATURATED BELOW 14.5' WITH STRONG HYDROCARBON ODOR	GC		8 NR		20
	18.0				9 NS		21.69
	20	SILTY SANDSTONE: OLIVE GRAY 5 YR 5/2, VERY SOFT, VERY FINE GRAINED, VERY POORLY CEMENTED, VERY FINELY BEDDED, SATURATED, STRONG HYDRO-CARBON ODOR	SILTY SAND STONE		10 NS		22.30
	22.5				11 NS		23.00
	23.0	POSSIBLY DOLOMITE BELOW 22.8'; VERY HARD	DOLOMITE				10-5/8"
	25	AUGER REFUSAL AT 23.0'					25
	30						30
	35						35



- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-41 (BH-64)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/30/91

DRILLING METHOD HSA/SS

DRILLED BY SHB

LOGGED BY GHR

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	'N' VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3802.7					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3804.73 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8"</p>
	0	SILT: BROWN 7.5 YR 5/4, LOOSE, DRY	ML		1 GC		
	2.8	CLAYEY SILT: PINK 7.5 YR 7/3, 25% CLAY, SLIGHTLY LOOSE, DRY, VERY LOW PLASTICITY	ML		2 NS	1.5	
	4.8	CLAYEY SILT: PINKISH WHITE 5 YR 8/2, LOOSE, DRY, 25% CLAY, CONTAINS TRACE OF GRAVEL	ML		3 NR	1.0	
	5				NS		
	7.5	SANDSTONE: PINKISH GRAY 7.5 YR 7/2, POORLY CEMENTED, CALCAREOUS CEMENT FRIABLE, DRY, VERY FINE GRAINED, SILTY	SILTY SANDSTONE		4 NS	0.2	
	9.0				5 NS	0.3	
	10	SANDSTONE: VERY SILTY, LIGHT GRAY 5 YR 7/1, HARD, FRIABLE, VERY FINE GRAINED, FAIRLY WELL CEMENTED, CALCAREOUS, DRY, VERY FINELY BEDDED	SILTY SANDSTONE		6 NS	0.3	
	14.0				7 NS	0.1	
	15	SANDSTONE: BROWN 7.5 YR 5/2, SLIGHTLY DOLOMITIC, CALCAREOUS CEMENT, FAIRLY WELL CEMENTED, HARD, VERY SLIGHTLY FRIABLE, DRY	SANDSTONE		8 NS	0.2	
	20				9 NS	0.1	
	22.0				10 NS	0.1	
	22.0	AUGER REFUSAL AT 22.0'					
	25	GROUNDWATER NOT ENCOUNTERED WHILE DRILLING					
	30						
	35						

<p> SPLIT-SPOON SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY</p> <p>NS: NOT SAMPLED</p> <p>GC: GRAB COMPOSITE</p>
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JOB NAME/NUMBER **MW-42 (BH-65)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/30/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY GHR

CHECKED BY BJS

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 (405) 321-3825

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3800.1					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3802.05 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .020 SLOT PVC SCREEN SUMP 10-5/8"</p>
	0	SILT, LOOSE BROWN 7.5 YR 6/4, LOOSE, DRY	ML		1 GC		
	3.0	CLAYEY SILT, BROWN 7.5 YR 5/4, FIRM, FRIABLE, 20% CLAY, 10% CALICHE DEPOSITS, DRY, NO PLASTICITY	ML		2 NS 3 1.0		
	6.0	SILT, GRAVEL AND COBBLES: 20% SILT, 60% GRAVEL, COARSE TO FINE 10-40MM, TRACE POSSIBLE COBBLES, DRY, LOOSE, GRAVEL SLIGHTLY DOLOMITIC LIMESTONE AND CHESTNUT LIMESTONE, VUGULAR IN PART, SILT PINKISH WHITE 5 YR 8/2			4 NS 5 NR 6 0.2 7 1.0		
	10	15% CLAY IN MATRIX AT 14.5'-18.5'			8 NS 9 NR 10 0.6		
	15	WET AT 17.7'					
	17.7	STRONG HYDROCARBON ODOR AND DARK COLOR (BLACK) AT 17.7'-19.4'					
	19.4	SANDSTONE, 2.5 Y 5/4, LIGHT OLIVE BROWN, VERY FINE GRAIN, MODERATELY HARD, HYDROCARBON ODOR	SANDSTONE				
	22.6	AUGER REFUSAL AT 22.4'					
	25	BOREHOLE CVM READING: 1.0PPM					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-43 (BH-66)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 5/31/91
 DRILLING METHOD HSA/SS
 DRILLED BY SHB
 LOGGED BY JMB
 CHECKED BY BJS
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 NORMAN, OKLAHOMA 73072
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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3801.1					
	0	SILT: LIGHT BROWN 7.5 YR 6/4, SOFT, DRY, LOOSE	ML		1 GC		
	3.3	CLAYEY SILT: 7.5 YR 5/4, BROWN, FIRM, CALICHE NODULES, DRY, FRIABLE, 15% CLAY, 10% CALICHE, 75% SILT	ML	[Hatched pattern]	2 NS		
	5				3 NR		
					4 NS		
	9.0	SILT, GRAVEL & COBBLES: 2.5 YR 6/2, LIGHT BROWNISH GRAY AND 7.5 YR 7/2 PINKISH GRAY, LIGHTLY CEMENTED, HARD, DRY, VERY SILTY DOLOMITIC LIMESTONE GRAVEL, WET AT 14.3'	GM	[Circular pattern]	5 NR		
	10				6 NS		
					7 NR		
	15	CLAYEY SILT: 10 YR 4/4, DARK YELLOWISH BROWN, SOFT, WET, LOW PLASTICITY, STRONG HYDROCARBON ODOR, 30% CLAY, 70% SILT (LENS) AT 14.4-15.0	ML	[Hatched pattern]	8 NS		
	20				9 NR		
					10 NS		
	22.1 22.3	SANDSTONE: 2.5 YR 5/4, LIGHT OLIVE BROWN, FINE GRAINED, SILTY, HARD, STRONG HYDROCARBON ODOR	SANDSTONE		10 D		
	25	AUGER REFUSAL AT 22.3' BOREHOLE OVM READING: 35.0 PPM					
	35						

- | | |
|---------------------------|------------------------------|
| SPUT-SPOON SAMPLER | WATER TABLE (TIME OF BORING) |
| STANDARD PENETRATION TEST | LABORATORY TEST LOCATION |
| UNDISTURBED SAMPLE | PENETROMETER (TONS/SQ. FT.) |
| WATER TABLE (24 HOURS) | NR: NO RECOVERY |
| | NS: NOT SAMPLED |
| | GC: GRAB COMPOSITE |

JOB NAME/NUMBER **MW-44 (BH-67)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/1/91

DRILLING METHOD HSA

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3806.6					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3808.68 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP</p> <p>1.00 6.0 8.3 9.5 24.05 24.54</p> <p>7-3/8"</p>
	0	SILT: 7.5 YR 6/4, LIGHT BROWN. LOOSE, SOFT, DRY	ML		1 GC		
	2.7	CLAYEY SILT: 7.5 YR 5/4. BROWN. NON-PLASTIC, DRY, FRIABLE. CALICHE NODULES, 15% CLAY, 10% CALICHE. 75% SILT	ML	[Hatched pattern]	2 1.5		
	5				3 1.5		
	9.3				4 0.5		
	10	SANDSTONE: 2.5 YR 8/4. PALE YELLOW. MODERATELY HARD, SLIGHTLY CEMENTED. FINE GRAINED, SILTY	GM	[Vertical lines]	5 0.9		
	15	COLOR CHANGES TO 2.5 Y 5/6 LIGHT OLIVE BROWN WITH INCREASED MOISTURE			6 0.2		
	18.5'	2.5 Y 4/4. OLIVE BROWN AND 2.5 Y 5/6 LIGHT OLIVE BROWN AT 17.5'. CEMENTED, HARD AT 18.0, WET AT 18.5'			7 0.6		
	20				8 0.6		
	24.5	AUGER REFUSAL AT 24.5'			9 0.4		
	25				NS		
	30						
	35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-45 (BH-68)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/2/91

DRILLING METHOD HSA

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3803.5					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3805.54 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .020 SLOT PVC SCREEN SUMP 7-3/8"</p>
	0	SILT: 7.5 YR 6/4, LIGHT BROWN, LOOSE, SOFT, DRY	ML		1 GC		
	3.2	CLAYEY SILT: 7.5 YR 5/4, BROWN, DRY, FRIABLE, CALICHE NODULES AND PRECIPITATIONS, 15% CLAY, 10% CALICHE, 75% SILT	ML		2 NS		
	4.0				NR	1.0	
	5	SILT, GRAVEL AND COBBLES: 7.5 YR 7/2 PINKISH GRAY, GRAVEL FINE TO COARSE, DRY, DOLOMITIC LIMESTONE AND CHERTY GRAVELS AND COBBLES WET AT 12.5' DARK GRAY SLUDGE AT 11.0'	GM		3 NR	1.1	
					4 NS		
					5 NR	0.4	
					6 NR	0.5	
	10				7 NS		
					8 NR	0.8	
					9 NR	1.0	
					NS		
	17.9	SANDSTONE: 2.5 YR 5/4, LIGHT OLIVE BROWN, FINE GRAINED, HARD AUGER REFUSAL AT 18.2'	SANDSTONE		9		
	20	BOREHOLE OVM READING: 80 PPM					
	25						
	30						
	35						

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-46 (BH-69)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/3/91
 DRILLING METHOD HSA
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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3803.0					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3805.09 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP 7-3/8"</p>
	0	SILT: 7.5 YR 6/4, LIGHT BROWN, LOOSE, SOFT, DRY	ML	○	1 GC		
	3.0	CLAYEY SILT: 7.5 YR 5/4, BROWN, HARD, DRY, CALICHE, 15% CLAY, 25% CALICHE, 60% SILT	ML	○	2 1.0		
	3.7			○	NR		
	5	SILT, GRAVEL & COBBLES: 7.5 YR 7/2, PINKISH GRAY, DOLOMITIC LIMESTONE, VERY HARD, DRY, BLACK HYDROCARBON SLUDGE AT 4.8' TO 5.0', COBBLES AND GRAVEL ARE 10 YR 7/1, LIGHT GRAY AT 6.5' TO T.D.	GM	○	3 1.0		
				○	NR		
				○	4 0.5		
				○	NR		
				○	5 0.4		
				○	NR		
				○	6 1.0		
				○	NR		
				○	7 1.0		
		○	NR				
		○	8 1.0				
		○	NR				
		○	9 0.5				
	19.7	AUGER REFUSAL AT 19.7'					
	20	GROUNDWATER NOT ENCOUNTERED WHILE DRILLING					
	25						
	30						
	35						

- | | |
|---------------------------|------------------------------|
| SPLIT-SPOON SAMPLER | WATER TABLE (TIME OF BORING) |
| STANDARD PENETRATION TEST | LABORATORY TEST LOCATION |
| UNDISTURBED SAMPLE | PENETROMETER (TONS/SQ. FT.) |
| WATER TABLE (24 HOURS) | NR: NO RECOVERY |
| | NS: NOT SAMPLED |
| | GC: GRAB COMPOSITE |

JOB NAME/NUMBER **MW-47 (BH-70)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/4/91

DRILLING METHOD HSA

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3804.4					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3806.18 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS 8 - 20 SILICA SAND PACK .010 SLOT PVC SCREEN SUMP SODIUM BENTONITE PELLETS</p> <p style="text-align: center;">7-3/8"</p>
	0	SILT: 7.5 YR 6/4, LIGHT BROWN, LOOSE, SOFT, DRY	ML		1 GC		
	3.0	CLAYEY SILT: 7.5 YR 5/4, BROWN, NON-PLASTIC, DRY, FRIABLE, CALICHE PRESENT 15% CLAY, 10% CALICHE	ML		2 NR		
	5	SILT, GRAVEL, COBBLES: SILT IS 7.5 YR 7/2, PINKISH GRAY, GRAVEL & COBBLES ARE 10 YR 7/1 LIGHT GRAY TO 7.5 YR 6/4 LIGHT BROWN, GRAVELS ARE DOLOMITIC LIMESTONE, LOOSE, CALICHE IN SILT	GM		3 NR		
	6.3				4 NS		
	8.16				5 NR		
	10				6 NR		
	15				7 NR		
	17.71				8 NR		
	18.2				9 NR		
	19.0	SANDSTONE: 2.5 YR 5/6, LIGHT OLIVE BROWN, MODERATELY, HARD, FINE GRAINED, SLIGHT HYDROCARBON ODOR, MOIST AT 22.0', COLOR CHANGES TO 2.5 YR 4/4, OLIVE BROWN AT 22.0'	SANDSTONE		10 NR		
	20		SANDSTONE		11 NR		
	25				12 NR		
	29.0				13 NR		
	30				NS		
	32.0	AUGER REFUSAL AT 32.0'					
	35	GROUNDWATER NOT ENCOUNTERED WHILE DRILLING					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-48 (BH-71)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/4/91

DRILLING METHOD HSA

DRILLED BY SHB

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3803.7					
	0 - 3.0	SILT: 10 YR 7/3, VERY PALE BROWN, LOOSE, DRY, SOFT	ML		1 GC NS		
	3.0 - 24.0	SANDSTONE: 2.5 YR 8/2, WHITE, FRIABLE, HIGHLY WEATHERED, SOFT TO MODERATELY HARD, SILTY, SLIGHTLY MOIST AT 4.0', 2.4 YR 7/4, PALE YELLOW, SLIGHTLY CEMENTED AT 7.5', MODERATELY HARD TO HARD, COLOR CHANGES TO 2.5 YR 7/2, LIGHT GRAY, 2.5 YR 6/8, OLIVE YELLOW AT 9.5', HARD CEMENTED LAYERS AT 17'-17.3', AND 17.8'-18.0			2 1.5 3 0.5 NR NS 4 NR 0.2 5 NR 0.2 NS 6 NR 0.3 7 NR 0.3 NS 8 NR 0.2 9 NR 0.6 NS NR		
	24.0 - 25.0	AUGER REFUSAL AT 24.0'			10 0.4		
	25.0 - 35.0	BOREHOLE OVM READING: 59.0 PPM GROUNDWATER NOT ENCOUNTERED WHILE DRILLING					

- | | |
|--|--|
| <ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) | <ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED GC: GRAB COMPOSITE |
|--|--|

JOB NAME/NUMBER **MW-49 (BH-72)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/5/91

DRILLING METHOD HSA

DRILLED BY SHB

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CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	'N' VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3811.2					
	0 - 2.5	SILT: 10 YR 7/3, VERY PALE BROWN, LOOSE, DRY, SOFT	ML	1	GC		1.00
	2.5 - 5	SANDSTONE: 2.5 Y 8/2, WHITE, DRY, MODERATELY HARD, VERY FINE GRAINED, SILTY, WEATHERED		2	NS		
	5 - 5.5	2.5 Y 7/4 PALE YELLOW AT 4.0'		3	NR		
	5.5 - 6			4	NS		
	6 - 8.5	2.5 Y 6/8 OLIVE YELLOW AT 8.5'		5	NS		
	8.5 - 9	MOIST AT 9.0'		6	NS		
	9 - 13.0	CEMENTED LAYER SET 13.0'-17.5'		7	NR		
	13.0 - 17.5			8	NS		
	17.5 - 19.0		SANDSTONE	9	NR		
	19.0 - 20	VERY MOIST TO WET AT 19.0'		10	NS		
	20 - 24.0	2.5 YR 4/4 OLIVE BROWN AT 20.0'		11	NR		
	24.0 - 25.0	VERY HARD & CEMENTED AT 24.0'-25.0'		12	NR		
	25.0 - 26.5			13	NR		
	26.5 - 28.5			14	NR		
	28.5 - 30			15	NR		
	30 - 34.51			16	NR		
	34.51 - 35.0	T.D. 35.0'		17	NR		34.51 35.0

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-50 (BH-79)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/6/91
 DRILLING METHOD HSA
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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	'N' VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3809.3					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3810.86 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0	SILT: 7.5 YR 6/4, LIGHT BROWN, LOOSE, DRY, SOFT	ML		1 GC		
	2.8	CLAYEY SILT: 7.5 YR 5/4, BROWN, FIRM, FRILABLE, DRY, 15% CLAY, 10% CALICHE	ML		2 NR 3 NR	1.0 0.1	
	5		ML		4 NR	1.0	
	8.5				5 NR	0.6	
	10	SILT, GRAVEL, COBBLES: SILT IS 10 YR 6/4 TO 5/4, LIGHT YELLOWISH BROWN TO YELLOWISH BROWN, DRY, GRAVEL & COBBLES ARE 2.5 YR 5/0 TO 4/0, GRAY TO DARK GRAY AND ARE DOLOMITIC LIMESTONE, VUGGY POROSITY, LIMESTONE IS ALSO 2.5 Y 6/2 LIGHT BROWNISH GRAY	GM		6 NR 7 NR	0.6 0.7	
	15				8 NR	0.5	
	17.9 18.5	SANDSTONE: 2.5 Y 6/6, OLIVE YELLOW HARD, FINE GRAINED, SILTY	SS				
	20	AUGER REFUSAL AT 18.5' BOREHOLE OVM READING: 0.0 PPM					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MW-51 (BH-74)**
 BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/6/91
 DRILLING METHOD HSA/SS
 DRILLED BY SHB
 LOGGED BY JMB
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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"11" VALUE	WELL COMPLETION DETAIL
	0	GROUND SURFACE: 3815.3					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3817.49 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 2" PVC RISER SODIUM BENTONITE PELLETS .010 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK SUMP 7-3/8"</p>
	0 - 2.8	SILT: 7.5 YR 6/4, LIGHT BROWN, ROOTLETS TOP 2.0'. LOOSE, SOFT, DRY	ML		1 NS	30	
	2.8 - 4.7	CLAYEY SILT: 7.5 YR 5/4, BROWN, FRIABLE, FIRM, NON-PLASTIC, DRY, 15% CLAY, 10% CALICHE	ML		2 NR	1.2	
	4.7 - 5.0				3 NR	0.9	
	5.0 - 10.0	SILT, GRAVEL & COBBLES: SILT IS 10 YR 6/4 TO 5/4, LIGHT YELLOWISH BROWN TO YELLOWISH BROWN, DRY, GRAVEL & COBBLES ARE 2.5 Y 5/0 TO 4/0, GRAY TO LIGHT GRAY TO 2.5 Y 6/2 LIGHT BROWNISH GRAVEL, GRAVELS ARE DOLOMITIC LIMESTONE, VUGGY POROSITY	GM		4 NR	0.6	
	10.0 - 15.0				5 NR	1.0	
	15.0 - 19.0				6 NR	1.0	
	19.0 - 19.25	DOLOMITIC LIMESTONE: 7.5 YR 6/2, PINKISH GRAY, VERY HARD, VUGGY POROSITY, MOIST	LIMESTONE		7 NR	0.5	
	19.25 - 20.0	AUGER REFUSAL AT 19.25' BOREHOLE OVM READING: 0.0 PPM			8 NR	0.35	
	20.0 - 35.0	GROUNDWATER NOT ENCOUNTERED WHILE DRILLING					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-52 (BH-75)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/7/91

DRILLING METHOD HSA/SS

DRILLED BY SHB

LOGGED BY JMB

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		GROUND SURFACE: 3807.5					
	0	COBBLEY CLAYEY SILT: BROWN, 10 YR 4/3, DRY, VERY LOW PLASTICITY, COBBLES FROM 3 CM TO 10 CM, SUB-ROUNDED		0.00	1 GC		
				0.00	NS		
				0.00	2 1.0		
				0.00	NR		
				0.00	3 0.2		
	5			0.00	NR		
		BOULDERY BELOW 7.5', ROUNDED, > 50CM	GM	0.00	NS		
				0.00	4 0.7		
				0.00	NR		
				0.00	NS		
				0.00	5 0.6		
				0.00	NR		
	10			0.00	NS		
		CLAYEY AND GRAVELLY BELOW 11.5'		0.00	7 0.6		
				0.00	NR		
				0.00	NS		
	13.6	AUGER REFUSAL AT 13.6'		0.00	NR		
	15	GROUNDWATER NOT OBSERVED DURING DRILLING					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED
- GC: GRAB COMPOSITE

JOB NAME/NUMBER **MW-53 (BH-77)**

BORING NUMBER **MARATHON/91029**

DATE DRILLED 6/7/91

DRILLING METHOD HSA/SS

DRILLED BY SHB

LOGGED BY JMB

CHECKED BY BJS

DRAWN BY: SAR

ROBERTS/SCHORNICK
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 (405) 261-2877

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 80 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
	0	GROUND SURFACE: 3821.90					VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3823.86 WEEP HOLE CONCRETE PAD CEMENT/BENTONITE GROUT MIX
	0 - 3.5	CLAYEY SILT: 10% CLAY, 90% 7.5 YR 6/4, UNCONSOLIDATED, DRY	ML	[Symbol]			
	3.5 - 6.0	SILTSTONE: 2.5 YR 6/1 WHITE, HARD, DRY	SILTSTONE	[Symbol]			
	6.0 - 8.0	SANDY DOLOMITE: VERY FINE GRAIN SILICA SAND, 10 YR 7/1 LT. GRAY, VERY HARD, FRACTURED, DRY	SANDY DOLOMITE	[Symbol]			
	8.0 - 15	SANDSTONE: VERY FINE GRAIN SILICA, WELL SORTED, HARD, MOIST, 10 YR 7/2 LT. GRAY, MASSIVE, MINOR IRON OXIDE MOTTLING FRACTURES (HORIZONTAL) AT 8.1, 8.8, 9.7, 10, & 10.3 FEET, SANDY DOLOMITE INTERBEDDED AT 10.3' TO 10.8', FRACTURES AT 6.2, 9.0, 10.2, 11.7, 12.9, 13.4, 13.9, 15.9 SANDSTONE VERY MOIST AFTER 12.6' VARYING DEGREES OF CARBONATE CEMENTATION	SANDSTONE	[Symbol]			4" PVC RISER VOLCLAY PURE GOLD GROUT 8" PVC CONDUCTOR CASING 10 5/8" BOREHOLE SODIUM BENTONITE PELLETS
	15 - 30	AFTER 22.0', 10 YR 5/2 GRAY BROWN, NO CARBONATE CEMENTATION, MODERATELY HARD, FRACTURES AT 17.7, 18.8, 20.5, 20.9, 24.5 FEET		[Symbol]			
	30 - 45	27.0' TO 27.3', 2.5 YR 7/4, PALE YELLOW		[Symbol]			
	45 - 46.2	2.5 YR GRAY BROWN AFTER 30', FRACTURES AT 29.7, 29.8, 29.9, 30.1, 30.2, 30.4, 30.6, 31.0, 32.2, 31.5, 31.9, 32.3, 32.5, 33.1, 33.5, 33.9, 34.1, 34.5, 34.9, 35.5, 36.8, 37.2, 37.5, 37.9, CALCITE AND IRON OXIDE FRACTURE FILL AFTER 34.0'	SANDSTONE	[Symbol]			.020 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK
	46.2 - 60	AFTER 35.1', MODERATELY WELL CEMENTED, ABUNDANT FRACTURES - EVERY 2 FEET		[Symbol]			
	60 - 72.0	AFTER 36.0', 2.5 YR 6/2, LIGHT BROWN GRAY TO 2.5 YR 6/4 LIGHT YELLOW BROWN IRON OXIDE STAINING, MOIST MOD. WELL CEMENTED AFTER 38.8', 2.5 YR 4/2 DARK GRAY BROWN GRADING INTO 10 YR 3/1 VERY DARK GRAY, VERY FINE GRAIN SANDSTONE BETWEEN 42.5' AND 43.5', VERY FINE GRAIN SILTY SANDSTONE 5 YR 4/1 DARK GRAY	SANDSTONE	[Symbol]			NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN
	72.0 - 75	SANDSTONE: VERY FINE GRAIN, 10 YR 5/1 GRAY TO 10 YR 3/1 VERY DARK GRAY, VERY HARD, MODERATELY FRACTURED, AFTER 47.0' 2.5 YR 7/0 LIGHT GRAY, MOTTLED WITH 10 YR 6/3 PALE BROWN, SLIGHTLY DOLOMITIC AFTER 50.7', BETWEEN 54.8' AND 55' 5 YR 4/1 DARK GRAY		[Symbol]			
	75 - 76.19	CONTINUING ALTERNATING BANDS OF 10 YR 5/1 GRAY AND 2.5 YR 7/6 LIGHT GRAY MOTTLED WITH 10 YR 6/3 PALE BROWN	DOLO.	[Symbol]			SUMP 7-5/8"
	76.19 - 90	BETWEEN 62.6' AND 62.7': SILTY SANDSTONE 5 YR 5/2 OLIVE GRAY, HIGHLY WEATHERED		[Symbol]			
	90 - 105	DOLOMITE: GRADATIONAL CONTACT WITH SANDSTONE, 5 YR 5/1 GRAY, VERY HARD, HORIZONTAL FRACTURES AT 72.8, 73, 73.3, 73.4, 74.7, 75.0, STRONG CONDENSATE ODOOR AT 76.0'		[Symbol]			NOTE: HOLLOW STEM AUGERING TO 6.0 FEET : NX WATER ROTARY CORING FROM 6.0 TO 76.19 FEET.
		T.D. 76.19'					
		W/L AFTER DRILLING 14.90'					
		NOTE: WATER ROTARY CORING AFTER 11.0 FEET, WATER LEVEL UNABLE TO BE DETERMINED DUE TO WET ROTARY DRILLING METHODS. : LOST CIRCULATION AT 11.0 FEET : BOREHOLE DRY AT 46.1 FEET ON 6/18/91					
		* LEVEL PRIOR TO WELL PURGING WATER LEVEL NOT OBSERVED DURING DRILLING. OPEN HOLE LEVEL ~ 43 FEET					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-54 (BH-80)**

DATE DRILLED 6/27/91 CONDUCTOR INSTALLED 6/16-17/91

DRILLING METHOD AIR ROTARY/WATER NX CORE

DRILLED BY SHB AND BOYLES BROS.

LOGGED BY GBR

CHECKED BY BJS

DRAWN BY SAR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 81 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
	0	GROUND SURFACE: 3792.60 SILT: WELL GRADED, VERY FINE GRAIN, 90% SILT, 10% SAND, NO PLASTICITY, 10 YR 8/4, VERY PALE BROWN, NO ODOR, DRY SOFT NON-STRATIFIED, CALCITE CEMENT, HCL(+) COLOR CHANGE TO 10 YR 6/8, BROWNISH YELLOW AT 5 FEET	ML		1		VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3794.40 WEEP HOLE CONCRETE PAD CEMENT/BENTONITE GROUT MIX 12" STEEL CONDUCTOR CASING 14" BOREHOLE VOLCLAY PURE GOLD GROUT SODIUM BENTONITE PELLETS 4" PVC RISER .020 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK SUMP
	6.0	SANDSTONE: VERY FINE GRAINED SILICA, 10 YR 6/3, PALE BROWN, 10 YR 5/3, BROWN, MODERATELY HARD TO VERY HARD, SLIGHTLY MOIST, WEATHERED, MOIST AND FRIABLE BETWEEN 18.5 AND 21.5'. AFTER 21.5' VERY HARD, FRACTURES LARGELY CEMENTED, FRACTURES AT 15.2, 16.0, 18.8, 17.2, 17.5, 18.5, 19.7, 20.0, 20.8, 21-21.5, 23.3, 24.0, NO ODOR.	SANDSTONE		2-6		
	10				7-10		
	15.9	10 YR 5/2 GRAY BROWN AFTER 25.0'			11-14		
	23.39	FRACTURE (HORIZONTAL) AT 28.5'			15-19		
	30.5				20-25		
	30.5	SANDY DOLOMITE: VERY FINE GRAIN SAND, 10 YR 6/1, LT. GRAY-GRAY, VERY HARD	SANDY DOLOMITE		26-29		
	31.5	DOLOMITE: MICROCRYSTAL, 2.5 YR 6/2, LIGHT BROWN GRAY, VERY HARD	DOLOMITE		30-31		
	35.0	FRACTURES AT 31.6, 32.1, 32.2, 32.5-33.5, 33.8, 33.9, 35.1, 35.7, 32.1 TO 32.2 FEET FRIABLE	DOLOMITIC SANDSTONE		32-35		
	39.6	SANDSTONE INTERBED, 5 YR 5/3 OLIVE, MOIST, IRON OXIDE AND PYRITE ALONG FRACTURES BELOW 33' AFTER 34.3', VERY HARD, FRACTURES LARGELY CEMENTED AFTER 35', GRADES	SANDSTONE		36-39		
	40	DOLOMITIC SANDSTONE: VERY FINE GRAIN SAND, GRADATIONAL CONTACT WITH DOLOMITE, VERY HARD 10 YR 6/1 LIGHT GRAY-GRAY 10 YR 5/2 GRAY BROWN 38.9' TO 39.6', FRACTURES 36.7', 37.8', 38.8', 42.4', 43.8', 44, 44.7'	SANDSTONE		40-43		
	46.0	SANDSTONE: VERY FINE GRAIN SILICA 2.5 YR 6/2 LIGHT BROWN GRAY, VERY HARD BETWEEN 6.9 AND 7.4 FEET, 10 YR 4/1 DARK GRAY ZONE, SILTSTONE INTERBED BETWEEN 42.8 AND 43.4 FEET, HIGHLY FRIABLE AND WEATHERED, 2.5 YR 4/2 DARK GRAY BROWN BETWEEN 43.4 AND 44.4 FEET DOLOMITIC SANDSTONE: VERY FINE GRAINED, 10 YR 6/1 LIGHT GRAY TO GRAY	DOLOMITIC SANDSTONE		44-46		
	50	AFTER 44.4 FEET SANDSTONE: VERY FINE GRAIN 5 YR 4/1 DARK GRAY, MOD. HARD, 5 YR 4/1 DARK GRAY 45 TO 46.1 FEET	SANDY DOLOMITE		47-49		
	55.0	DOLOMITIC SANDSTONE: VERY FINE GRAIN, 7.5 YR 7/0 LIGHT GRAY, VERY HARD, HORIZONTAL FRACTURES AT 44.1'	DOLOMITE		50-53		
	60	SANDY DOLOMITE: VERY FINE GRAIN 10 YR 6/2 LIGHT BROWN GRAY, VERY HARD, HORIZONTAL FRACTURES AT 49.9', 51.9', 52.7', 53.5', 53.7', 45' FRACTURE AT 49.9', VERTICAL FRACTURE AT 44.2' TO 55.0', PYRITE, CALCITE AND HEMATITE FRACTURE FILL, STRONG CONDENSATE ODOR AFTER 53.0'	DOLOMITE		54-57		
	65.0	DOLOMITE: 10 YR 6/2 LIGHT BROWN GRAY, HIGHLY FRACTURED WITH THIN INTERBEDS OF DOLOMITIC SILTSTONE AND SANDSTONE, STRONG CONDENSATE ODOR			58-61		
	70	T.D. 65.0'			62-65		

NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN

NOTE: UNABLE TO DETERMINE WATER LEVEL DURING DRILLING DUE TO ROTARY CORE DRILLING METHOD
 ROTARY WASH NX CORING FROM 15 TO 65 FEET, AIR ROTARY FROM 0 TO 15 FEET.

- SPLIT-SPEDON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

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JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-55 (BH-81)**

DATE DRILLED 6/25/91 CONDUCTOR INSTALLED 6/15-16/91

DRILLING METHOD AIR ROTARY/WATER ROTARY CORE

DRILLED BY SHB AND BOYLES BROS.

LOGGED BY GBR

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 82 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p style="font-size: small;">VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3782.45 WEEP HOLE CONCRETE PAD CEMENT/BENTONITE GROUT MIX 12" STEEL CONDUCTOR CASING 14" BOREHOLE 4" PVC RISER VOLCLAY PURE GOLD GROUT MIX SODIUM BENTONITE PELLETS .020 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-7/8"</p>
	0	GROUND SURFACE: 3780.3					
	0 - 6.0	CLAYEY SILT: 20% CLAY, 80% SILT, 10 YR 5/3, BROWN, DRY, UNCONSOLIDATED, LOW PLASTICITY	ML		1 NS 2 NS		
	6.0 - 9.5	SILTY CLAY: 30% SILT, 70% CLAY, 10 YR 5/3, BROWN, SOFT, MED. PLASTICITY, MINOR SUBANG DOLOMITE GRAVEL TO 1/4 INCH, MINOR DOLOMITE COBBLES TO APPROXIMATELY 3 INCHES	CL		3 NS 4 NS 5		
	9.5 - 17.7	DOLOMITE: 10 YR 4/1, DARK GRAY TO 10 YR 6/1, GRAY-LIGHT GRAY, DRY, HARD. VERTICAL FRACTURE BETWEEN 16.2-17.0' MODERATELY FRACTURED BELOW 17.0'	DOLOMITE		6 7 8 8.0 9 NX		
	17.7 - 25.0	DOLOMITE: WITH INTERBEDS OF SILTY DOLOMITE, 10 YR 5/2, GRAYISH BROWN, 10 YR 6/2, LIGHT BROWNISH GRAY, AND 10 YR 5/1, GRAY, ABUNDANT HEMATITE-REPLACED FOSSIL - POSSIBLY GRAPTOLITES OR SPONGESPICULES, AFTER 21.0', CHERT-LIKE CONCORDAL FRACTURING	DOLOMITE/SILTY DOLO.		10 11 NR		
	25.0 - 30.0	DOLOMITE: 10 YR 5/2, GRAYISH BROWN, MICRO-CRYSTALLINE, VERY HARD, HIGHLY FRACTURED, 2.5 Y 6/2, LIGHT BROWNISH GRAY SILT ALONG FRACTURES, MINOR IRON OXIDE STAINING	DOLOMITE		12 9.0 13 NX 14 15		
	30.0 - 40.0	STRONG CONDENSATE ODOR IN FRACTURE AT 32.8' IN FRACTURE 45' FROM VERTICAL STRONG CONDENSATE ODOR IN FRACTURES TO 35.6' AFTER 35.6', FRACTURES LARGELY CEMENTED			16 NR 17 5.0 18 NX 19		
	40.0 - 41.61	T.D. 41.61			NS		
	41.61 - 50.0	GROUNDWATER AT 32.75' 1/8" FLOATING PRODUCT STRONG CONDENSATE ODOR 6/21/91					
	50.0 - 70.0	NOTE: AIR ROTARY FROM 0 TO 15 FEET. : ROTARY WASH NX CORE FROM 15.0 TO 41.61 FEET					

<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p> SPLIT-SPOON SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p> </div> <div style="width: 45%;"> <p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY NS: NOT SAMPLED</p> </div> </div>
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JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-56 (BH-82)**

DATE DRILLED	CONDUCTOR INSTALLED
6/27/91	6/15/91
DRILLING METHOD	AIR ROTARY/WATER WASH NX CORE
DRILLED BY	BOYLES BROS. AND SHB
LOGGED BY	GHR
CHECKED BY	BJJ
DRAWN BY:	SAR

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 83 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
		GROUND SURFACE: 3785.6					
	0.0	SANDY SILT; SANDY DOLOMITE:	SW SANDY DOLOMITE				VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3787.70 WEEP HOLE CONCRETE PAD
	10.0	INTERBEDDED DOLOMITE/SILTSTONE/CHERT	SILTSTONE DOLOMITE CHERT				CEMENT/BENTONITE GROUT MIX
	20.0	DOLOMITE:	DOLOMITE				8" PVC CONDUCTOR CASING
	25.0						10 5/8" BOREHOLE
	40.0	DOLOMITE:	DOLOMITE				
	44.0	DOLOMITE:	DOLOMITE				
	46.0	DOLOMITE:	DOLOMITE				
	50.0						
	50.5	DOLOMITE:	DOLOMITE				
	56.0	DOLOMITE:	DOLOMITE				
	58.0	DOLOMITE:	DOLOMITE				
	65.0						
	65.5	GYPSSUM:	GYPSSUM				
	67.0	DOLOMITE:	DOLOMITE				
	74.0	DOLOMITE:	DOLOMITE				
	76.0	DOLOMITE:	DOLOMITE				
	80.0	DOLOMITE:	DOLOMITE				
	87.5						
	88.0	DOLOMITE:	DOLOMITE				
	90.0	DOLOMITE:	DOLOMITE				
	91.5	SILTSTONE:	SILTSTONE				
	96.0	DOLOMITE:	DOLOMITE				
	100.0	DOLOMITE:	DOLOMITE				
	106.0						
	108.0	DOLOMITE:	DOLOMITE				
		LIMESTONE:	LIMESTONE				
	119.5	LIMESTONE:	LIMESTONE				
	122.0	DOLOMITE:	DOLOMITE				
	125.0						
	126.0	LIMESTONE:	LIMESTONE				
	140.0						
	142.0	LIMESTONE:	LIMESTONE				
		SILTSTONE:	SILTSTONE				
	148.0						
	149.0	LIMESTONE:	LIMESTONE				
	150.0	LIMESTONE:	LIMESTONE				
	154.0	LIMESTONE:	LIMESTONE				
	158.0	LIMESTONE:	LIMESTONE				
	162.0	LIMESTONE:	LIMESTONE				
	166.0	DOLOMITE:	DOLOMITE				
	172.0	SANDSTONE: DOLOMITIC	SANDSTONE				
	175.0						

- SPUT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-57 (BH-83)**

DATE DRILLED 6/25/91 CONDUCTOR INSTALLED: 6/17-18/91

DRILLING METHOD AIR ROTARY/WATER ROTARY CORE/HSA

DRILLED BY BOYLES BROS.

LOGGED BY GHR

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 84 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p style="font-size: small;">VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3824.31 WEEP HOLE CONCRETE PAD CEMENT/BENTONITE GROUT MIX 8" PVC CONDUCTOR CASING 10 5/8" BOREHOLE VOLCLAY PURE GOLD GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 020 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-5/8"</p>
		GROUND SURFACE: 3821.60					
	0	CLAYEY SILT:	ML				
	5.0	SILTSTONE:	SILTSTONE				
	10.0	DOLOMITE:	DOLOMITE				
	15.0	DOLOMITE:	DOLOMITE				
	18.0	DOLOMITE:	DOLOMITE				
	20.5	DOLOMITE:	DOLOMITE				
	22.0	SANDSTONE:	SANDSTONE				
	28.0	DOLOMITE:	DOLOMITE				
	30.0	SANDSTONE:	SANDSTONE				
	35	SANDSTONE:	SANDSTONE				
	42.0	SANDSTONE:	SANDSTONE				
	44.0	SANDSTONE:	SANDSTONE				
	48.0	SANDSTONE:	SANDSTONE				
	56.0	SANDSTONE:	SANDSTONE				
	65.0	SANDSTONE:	SANDSTONE				
	70	SANDSTONE:	SANDSTONE				
	76.0	DOLOMITE:	DOLOMITE				
	82.0	SANDSTONE:	SANDSTONE				
	84.0	SANDSTONE:	SANDSTONE				
	94.0	SANDSTONE:	SANDSTONE				
	97.0	DOLOMITE:	DOLOMITE				
	100.0	DOLOMITE:	DOLOMITE				
	104.0	DOLOMITE:	DOLOMITE				
	105	DOLOMITE:	DOLOMITE				
	112.0	SANDY DOLOMITE:	DOLOMITE				
	118.0	SANDY DOLOMITE:	DOLOMITE				
	124.0	DOLOMITE:	DOLOMITE				
	135.0	DOLOMITE:	DOLOMITE				
	138.0	DOLOMITE:	DOLOMITE				
	140	DOLOMITE:	DOLOMITE				
	142.0	SANDY DOLOMITE:	DOLOMITE				
	164.0	SILTSTONE:	SILTSTONE				
	172.0	DOLOMITE:	DOLOMITE				
	175	DOLOMITE:	DOLOMITE				
	192.0	DOLOMITE:	DOLOMITE				
	198.0	DOLOMITIC LIMESTONE:	LIMESTONE				
	202.0	LIMESTONE:	LIMESTONE				
	205.0	LIMESTONE:	LIMESTONE				
	207.0	LIMESTONE:	LIMESTONE				
	210	SANDSTONE:	SANDSTONE				
	216.0	T.D. 216.0'					

<table style="width: 100%; border: none;"> <tr> <td style="border: none;"></td> <td style="border: none;">SPLIT-SPOON SAMPLER</td> <td style="border: none;"></td> <td style="border: none;">WATER TABLE (TIME OF BORING)</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">STANDARD PENETRATION TEST</td> <td style="border: none;"></td> <td style="border: none;">LABORATORY TEST LOCATION</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">UNDISTURBED SAMPLE</td> <td style="border: none;"></td> <td style="border: none;">PENETROMETER (TONS/SQ. FT.)</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">WATER TABLE (24 HOURS)</td> <td style="border: none;">NR:</td> <td style="border: none;">NO RECOVERY</td> </tr> <tr> <td></td> <td></td> <td style="border: none;">NS:</td> <td style="border: none;">NOT SAMPLED</td> </tr> </table>		SPLIT-SPOON SAMPLER		WATER TABLE (TIME OF BORING)		STANDARD PENETRATION TEST		LABORATORY TEST LOCATION		UNDISTURBED SAMPLE		PENETROMETER (TONS/SQ. FT.)		WATER TABLE (24 HOURS)	NR:	NO RECOVERY			NS:	NOT SAMPLED	<p style="font-size: small;">SEE BORING RECORD FOR DETAILED DESCRIPTION</p>
	SPLIT-SPOON SAMPLER		WATER TABLE (TIME OF BORING)																		
	STANDARD PENETRATION TEST		LABORATORY TEST LOCATION																		
	UNDISTURBED SAMPLE		PENETROMETER (TONS/SQ. FT.)																		
	WATER TABLE (24 HOURS)	NR:	NO RECOVERY																		
		NS:	NOT SAMPLED																		

JOB NAME/NUMBER *MARATHON/91029.01*

BORING NUMBER *MW-58 (BH-84)*

DATE DRILLED 6/31/91 CONDUCTOR INSTALLED 6/27/91

DRILLING METHOD 7-5/8" AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY GHR

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
& ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS
3700 W. ROBINSON
NORMAN, OKLAHOMA 73072
2461 321-1895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 86 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3815.28 WEEP HOLE CONCRETE PAD CEMENT/BENTONITE GROUT MIX 8" PVC CONDUCTOR CASING 10 5/8" BOREHOLE VOLCLAY PURE GOLD GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS .020 SLOT PVC SCREEN 8 - 20 SILICA SAND NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP</p>
		GROUND SURFACE: 3812.20					
	0 1.5	CLAYEY SILT: DOLOMITE:	DOLOMITE				
	9.0	DOLOMITIC SANDSTONE:	SANDSTONE				
	15.0	SANDSTONE:	SANDSTONE				
	19.0	DOLOMITIC SANDSTONE:	SANDSTONE				
	27.0						
	30.0	SANDSTONE:	SANDSTONE				
	32.5	SILTSTONE:	SILTSTONE				
	34.5						
	35	DOLOMITE:	DOLOMITE				
	37.0	DOLOMITIC SANDSTONE:	SANDSTONE				
	40.0	DOLOMITE:	DOLOMITE				
	45.0	DOLOMITE:	DOLOMITE				
	49.5	DOLOMITIC SANDSTONE:	SANDSTONE				
	50.5	SANDSTONE:	SANDSTONE				
	59.0	DOLOMITIC SANDSTONE:	SANDSTONE				
		SANDSTONE:	SANDSTONE				
		DOLOMITIC SANDSTONE:	SANDSTONE				
	70						
	72.0	SANDSTONE:	SANDSTONE				
	73.0	DOLOMITIC SANDSTONE:	DOLOMITE				
	77.5	DOLOMITE:	DOLOMITE				
	81.0	DOLOMITE:	DOLOMITE				
		SANDY DOLOMITE:	SANDSTONE				
		SANDSTONE:	SANDSTONE				
	93.0						
	95.0	SANDY DOLOMITE:	DOLOMITE				
	100.0	DOLOMITE:	DOLOMITE				
	105	DOLOMITE:	DOLOMITE				
	109.0						
	115.0	SANDY DOLOMITE:	DOLOMITE				
	121.0	DOLOMITIC SANDSTONE:	SANDSTONE				
	127.0	DOLOMITE:	DOLOMITE				
	131.0	SANDY DOLOMITE:	DOLOMITE				
	137.0	DOLOMITIC SANDSTONE:	SANDSTONE				
	140						
	145.0	SANDY DOLOMITE:	DOLOMITE				
		SANDY DOLOMITE:	DOLOMITE				
		DOLOMITIC SANDSTONE:	SANDSTONE				
	169.0						
	170.0	SILTSTONE:	SILTSTONE				
	175	SANDY DOLOMITE:	DOLOMITE				
	176.0	DOLOMITE:	DOLOMITE				
	185.0						
	185.5	SANDSTONE:	SANDSTONE				
		DOLOMITE:	DOLOMITE				
	203.0						
	210	DOLOMITIC SANDSTONE:	SANDSTONE				
	220.0	SANDSTONE:	SANDSTONE				
	220.0	BORING TERMINATED AT 220.0'					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- VR: NO RECOVER
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-60 (BH-86)**

DATE DRILLED 7/12/91 CONDUCTOR INSTALLED 7/9/91

DRILLING METHOD AIR HAMMER

DRILLED BY: BOYLES BROS.

LOGGED BY: M.J.

CHECKED BY: BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
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 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-1886

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 87 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
	0	GROUND SURFACE: 3813.30					
	0	CLAYEY SILT:	ML		1 GC		
	3.5	SANDSTONE:	SAND-STONE		2 GC		
	9.0	SANDY DOLOMITE:	SANDY DOLO.		3 GC		
	10				4 GC		
	13.0	SANDSTONE:	SAND-STONE		5 GC		
	17.0	DOLOMITE - SANDY DOLOMITE:	DOLO. & SANDY DOLO.		6 GC		
	20				7 GC		
	21.0	SANDSTONE:	SAND-STONE		8 GC		
					9 GC		
					10 GC		
					11 GC		
					12 GC		
					13 GC		
					14 GC		
					15 GC		
	30	SANDSTONE:	SAND-STONE		16 GC		
					17 GC		
					18 GC		
					19 GC		
					20 GC		
	40				21 GC		
					22 GC		
					23 GC		
					24 GC		
					25 GC		
					26 GC		
					27 GC		
					28 GC		
	50						
	56.0	BORING TERMINATED AT 56.0'					
	60	NOTE: SEE LOG BH-87 FOR MORE IN-DEPTH DESCRIPTION.					
	70						

7/13/91
▽ 45.49

▽ 53.0

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-61 (BH-87)**

DATE DRILLED 7/12/91 CONDUCTOR INSTALLED 7/9/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROTHERS

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
& ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS
3700 W. ROBINSON
NORMAN, OKLAHOMA 73072
(405) 321-3895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"11" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #87A FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p style="font-size: small;">VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3815.97 WEEP HOLE CONCRETE PAD 2.0 CEMENT BENTONITE GROUT MIX 8" PVC CONDUCTOR CASING 10 5/8" BORHOLE 69.95 4" PVC RISER 105 140 175 168.2 171.1 173.5 SODIUM BENTONITE PELLETS 8-20 SILICA SAND PACK .020 SLOT 4" PVC SCREEN NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 212.7 213.3 214.0 7 7/8"</p>
		GROUND SURFACE: 3813.6					
	0	CLAYEY SILT:	ML				
	9.0	SANDSTONE:	SANDSTONE				
	15.0	DOLOMITE:	DOLOMITE				
	23.0	SANDSTONE:	SANDSTONE				
	35	SANDSTONE:	SANDSTONE				
	70	SANDSTONE:	SANDSTONE				
	77.0	SANDY DOLOMITE:	SDY.DOLO				
	83.0	SANDSTONE:	SANDSTONE				
	95.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	101.0	SANDY DOLOMITE:	SDY.DOLO				
	105	DOLOMITIC SANDSTONE:	DOLO.SS				
	107.0	SANDSTONE:	SANDSTONE				
	111.0	SANDY DOLOMITE:	SDY.DOLO				
	122.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	131.0	SANDY DOLOMITE:	SDY.DOLO				
	140	DOLOMITIC SANDSTONE:	DOLO.SS				
	141.0	SANDY DOLOMITE:	SDY.DOLO				
	147.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	149.0	SANDSTONE:	SANDSTONE				
	171.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	175	DOLOMITIC SANDSTONE:	DOLO.SS				
	182.62						
	185.0	SANDSTONE:	SANDSTONE				
	187.0	SANDY DOLOMITE:	SANDY DOLOMITE				
	194.0						
	206.0	SANDSTONE:	SANDSTONE				
	210	SANDSTONE:	SANDSTONE				
	214.0	BORING TERMINATED AT 214.0'					
		NOTE: SEE LOG BH-87A FOR MORE IN-DEPTH DESCRIPTION.					

SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS)	WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED
--	---

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-61A (BH-87A)**

DATE DRILLED 7/15/91 CONDUCTOR INSTALLED 7/13/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROTHERS

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
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 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-3895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"I" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #88 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3819.90 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 8" PVC CONDUCTOR CASING 10 5/8" BOREHOLE VOLCLAY PURE GOLD GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8-20 SILICA SAND PACK 020 SLOT 4" PVC SCREEN NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-5/8"</p>
	0	GROUND SURFACE: 3817.00					
	0.5	CLAYEY SILT:	ML				
	8.0	CHERTY DOLOMITE:	CRT.DOLO.				
	10.0	SILTSTONE CHERTY DOLOMITE:	CRT.DOLO.				
	12.0	CHERTY DOLOMITE:	CRT.DOLO.				
		DOLOMITIC SILTSTONE:	DOLO. SILTSTONE				
	22.0	SANDSTONE:	SS				
	30.0	SANDSTONE:	SS				
	34.0	SANDSTONE:	SS				
	35	SANDSTONE:	SS				
	40.0	SANDSTONE:	SS				
	42.0	SANDSTONE:	SS				
	50.0	SANDSTONE:	SS				
	52.0	SANDSTONE:	SS				
	54.0	SANDSTONE:	SS				
	66.0	CHERTY DOLOMITE:	CRT.DOLO.				
	70	DOLOMITIC SANDSTONE:	DOLO.SS				
	72.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	74.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	77.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	92.0	CHERTY DOLOMITE:	CRT.DOLO.				
	96.0	CHERT:	CHERT				
	100.0	CHERTY DOLOMITE:	CRT.DOLO.				
	102.0	CHERTY DOLOMITE:	CRT.DOLO.				
	105	CHERTY DOLOMITE:	CRT.DOLO.				
	106.0	CHERTY DOLOMITE:	CRT.DOLO.				
	114.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	116.0	CHERTY DOLOMITE:	CRT.DOLO.				
	128.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	134.0	SANDSTONE & CHERTY DOLOMITE:	SS/CT.DOLO.				
	136.0	CHERTY DOLOMITE:	CRT.DOLO.				
	140	DOLOMITIC SANDSTONE:	DOLO.SS				
	150.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	154.0	CHERTY DOLOMITE:	CRT.DOLO.				
	162.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	164.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	174.0	CHERTY DOLOMITE:	CRT.DOLO.				
	175	CHERTY DOLOMITE:	CRT.DOLO.				
	184.0	DOLOMITIC SANDSTONE:	DOLO.SS				
	190.0	CHERTY DOLOMITE:	CRT.DOLO.				
	198.0	CHERTY DOLOMITE:	CRT.DOLO.				
	200.0	CHERTY DOLOMITE:	CRT.DOLO.				
	202.0	CHERTY DOLOMITE:	CRT.DOLO.				
	204.0	CHERTY DOLOMITE:	CRT.DOLO.				
	210	SANDSTONE:	SS				
	211.0	SANDSTONE:	SS				
	223.0	BORING TERMINATED AT 223.0'					
		NOTE: SEE LOG BH-88 FOR MORE IN-DEPTH DESCRIPTION.					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

ROBERTS/SCHORNICK
& ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS
3700 W. ROBINSON
NORMAN, OKLAHOMA 73072
(405) 251-1200

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-62 (BH-88)**

DATE DRILLED 7/24/91 CONDUCTOR INSTALLED 7/20/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROTHERS

LOGGED BY DHC

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #89 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3824.49 WEEP HOLE CONCRETE PAD 14" BOREHOLE 12" STEEL CONDUCTOR CASING CEMENT BENTONITE GROUT MIX 10 5/8" BOREHOLE 8" CONDUCTOR CASING VOLCLAY GOLD PURE GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS 8-20 SILICA SAND PACK .020 SLOT 4" PVC SCREEN NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-5/8"</p>
	0	GROUND SURFACE: 3823.30					
	0	GRAVELLY COBBLEY SILT:	SILT				
	14.0	CHERTY DOLOMITE:	CHERTY DOLOMITE				
	20.0	CHERTY DOLOMITE:	CRT. DOLO.				
	24.0	SANDSTONE:	SANDSTONE				
	24.5	DOLOMITE:	DOLOMITE				
	35		DOLOMITE				
	64.0	SANDSTONE:	SANDSTONE				
	70		DOLOMITE				
	76.0	DOLOMITE:	DOLOMITE				
	88.0	SANDSTONE:	SANDSTONE				
	96.0	DOLOMITE:	DOLOMITE				
	99.0	SANDSTONE:	SANDSTONE				
	105		DOLOMITE				
	108.0	DOLOMITE:	DOLOMITE				
	140		DOLOMITE				
	175		DOLOMITE				
	185.77		DOLOMITE				
	187.0	SANDSTONE:	SANDSTONE				
	204.0		DOLOMITE				
	204.0	DOLOMITE:	DOLOMITE				
	209.0	SANDSTONE:	SANDSTONE				
	215.0	SANDY DOLOMITE:	DOLOMITE				
	220.0	BORING TERMINATED AT 220.0'					
		NOTE: SEE LOG BH-89 FOR MORE IN-DEPTH DESCRIPTION.					

<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"></td> <td style="width: 50%; border: none;">SPLIT-SPOON SAMPLER</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">STANDARD PENETRATION TEST</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">UNDISTURBED SAMPLE</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">WATER TABLE (24 HOURS)</td> </tr> </table>		SPLIT-SPOON SAMPLER		STANDARD PENETRATION TEST		UNDISTURBED SAMPLE		WATER TABLE (24 HOURS)	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"></td> <td style="width: 50%; border: none;">WATER TABLE (TIME OF BORING)</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">LABORATORY TEST LOCATION</td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">PENETROMETER (TONS/SQ. FT.)</td> </tr> <tr> <td style="border: none;">NR: NO RECOVERY</td> <td style="border: none;">NS: NOT SAMPLED</td> </tr> </table>		WATER TABLE (TIME OF BORING)		LABORATORY TEST LOCATION		PENETROMETER (TONS/SQ. FT.)	NR: NO RECOVERY	NS: NOT SAMPLED
	SPLIT-SPOON SAMPLER																
	STANDARD PENETRATION TEST																
	UNDISTURBED SAMPLE																
	WATER TABLE (24 HOURS)																
	WATER TABLE (TIME OF BORING)																
	LABORATORY TEST LOCATION																
	PENETROMETER (TONS/SQ. FT.)																
NR: NO RECOVERY	NS: NOT SAMPLED																

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **MW-63 (BH-89)**

DATE DRILLED 7/20-30/91 CONDUCTOR INSTALLED 7/20-26/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLE'S BROTHERS

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
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 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 571-1899

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLING INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #90 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3798.57 WEEP HOLE CONCRETE PAD CEMENT BENTONITE GROUT MIX 8" PVC CONDUCTOR CASING 10 5/8" BOREHOLE VOLCLAY PURE GOLD GROUT MIX 4" PVC RISER SODIUM BENTONITE PELLETS .020 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-5/8"</p>
	02.0	GROUND SURFACE: 3796.2 SILTY SANDY LOAM: SANDSTONE:	SANDSTONE				
	10.0	SANDSTONE:	SANDSTONE				
	12.0	SANDSTONE:	SANDSTONE				
	14.0	SANDSTONE:	SANDSTONE				
	16.0	SANDSTONE:	SANDSTONE				
	18.0	SANDSTONE:	SANDSTONE				
	22.0	SANDSTONE:	SANDSTONE				
	24.0	SANDSTONE:	SANDSTONE				
	26.0	SANDSTONE:	SANDSTONE				
	28.0	SANDSTONE:	SANDSTONE				
	30	SANDSTONE:	SANDSTONE				
	36.0	SANDSTONE:	DOLOMITIC SANDSTONE				
	40.0	DOLOMITIC SANDSTONE:	SANDSTONE				
	50.0	SANDSTONE:	SANDSTONE				
	59.0	DOLOMITIC CHERT:	DOLOMITIC CHERT				
	64.0	SANDY DOLOMITE:	SANDY DOLOMITE				
	70.0	SANDSTONE:	SANDSTONE				
	81.0	DOLOMITE:	DOLOMITE				
	90						
	112.0	DOLOMITIC LIMESTONE:	DOLOMITIC LIMESTONE				
	120						
	125.0	LIMESTONE:	LIMESTONE				
	130.0	DOLOMITIC LIMESTONE:	LIMESTONE				
	131.0	SANDSTONE:	SANDSTONE				
	144.0	SANDSTONE:	SANDSTONE				
	146.0	DOLOMITIC LIMESTONE:	LIMESTONE				
	150	SANDSTONE:	SANDSTONE				
	151.0						
	160.0	DOLOMITIC LIMESTONE:	DOLOMITIC LIMESTONE				
	180						
	200.0	T.D. 200.0'					
	210						

	SPLIT-SPOON SAMPLER		WATER TABLE (TIME OF BORING)
	STANDARD PENETRATION TEST		LABORATORY TEST LOCATION
	UNDISTURBED SAMPLE		PENETROMETER (TONS/SQ. FT.)
	WATER TABLE (24 HOURS)	NR:	NO RECOVERY
		NS:	NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-64 (BH-90)**

DATE DRILLED 8/11/91 CONDUCTOR INSTALLED 8/5/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

ROBERTS/SCHORNICK
 & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-3895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #91 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
	0	GROUND SURFACE: 3760.1					VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3763.31 WEEP HOLE CONCRETE PAD
	0	SANDY SILTY LOAM: 10 YR 5/6, YELLOWISH BROWN, DRY	ML	[Symbol]	1 GC		1.0
	4.0	CHERTY DOLOMITIC LIMESTONE: 10 YR 6/2, LIGHT BROWNISH GRAY, INTERBEDDED WITH CLAYEY SILTSTONE, 10 YR 6/0, LIGHT BROWNISH YELLOW, DRY	LIMESTONE/SILTSTONE	[Symbol]	2 GC 3 GC 4 GC 5 GC		VOLCLAY GROUT
	10	CHERTY DOLOMITIC LIMESTONE: 10 YR 5/3, BROWN INTERBEDDED WITH SILTSTONE, 10 YR 6/6, LIGHT BROWNISH YELLOW, DRY	LIMESTONE/SILTSTONE	[Symbol]	6 GC		10
	12.0	CHERTY DOLOMITIC LIMESTONE: 10 YR 5/2, GRAYISH BROWN, AND CHERT, 10 YR 6/4, BROWNISH YELLOW, DRY	LIMESTONE/CHERT	[Symbol]	7 GC 8 GC 9 GC 10 GC		CEMENT/BENTONITE GROUT
	20	CHERTY DOLOMITE: 10 YR 6/1, GRAY AND CHERT, 5 Y 7/3, PINK, DRY	CHERTY DOLOMITE	[Symbol]	11 GC 12 GC 13 GC 14 GC		4" PVC RISER
	28.0	DOLOMITE: 10 YR 7/1, LIGHT GRAY, VERY HARD, DRY	DOLOMITE	[Symbol]	15 GC 16 GC 17 GC 18 GC 19 GC 20 GC		8" PVC CONDUCTOR CASING
	30			[Symbol]	21 GC		10 5/8" DIAMETER BOREHOLE
	42.5	SANDSTONE: 5 YR 4/3, REDDISH BROWN, VERY FINE GRAIN, SOFT, MOIST TO WET	SANDSTONE	[Symbol]	22 GC		30.00
	44.0	CHERTY DOLOMITE: DOLOMITE, 10 YR 5/2, GRAYISH BROWN, CHERT IS 10 YR 5/6, YELLOWISH BROWN, HARD, CHERT EXHIBITS CONCHOIDAL FRACTURING, DOLOMITE - MICROCRYSTALLINE	CHERTY DOLOMITE	[Symbol]	23 GC 24 GC 25 GC 26 GC 27 GC		32.50
	50			[Symbol]			34.37
	54.4	T.D. 54.4'		[Symbol]			40.0
	60			[Symbol]			40.0
	70			[Symbol]			53.80 54.48

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-65 (BH-91)**

DATE DRILLED 8/12/91 CONDUCTOR INSTALLED 8/8/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY JMB

CHECKED BY BJS

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 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-3885

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #91A FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p style="font-size: small;">VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3263.26 WEEP HOLE CONCRETE PAD 10 5/8" DIAMETER BOREHOLE CEMENT BENTONITE GROUT MIX 8" PVC CONDUCTOR CASING 4" PVC RISER PURE GOLD VOLCLAY GROUT MIX SODIUM BENTONITE PELLETS .020 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-7/8"</p>
		GROUND SURFACE: 3760.7					
	0	SANDY SILTY LOAM:	ML		1-2		
	4.0	CHERTY DOLOMITIC LIMESTONE:	LIMESTONE		3-4		
	10.0	CHERTY DOLOMITIC LIMESTONE:	LIMESTONE		5-6		
	12.0	CHERTY DOLOMITIC LIMESTONE:	LIMESTONE		7-8		
		CHERTY DOLOMITIC LIMESTONE:	LIMESTONE		9-10		
	20.0	CHERTY DOLOMITE:	DOLOMITE		11-12		
	25				13-14		
	28.0	DOLOMITE:	DOLOMITE		15-16		
					17-18		
					19-20		
	42.5	SANDSTONE:	SANDSTONE		21-22		
	44.0	CHERTY DOLOMITE:	DOLOMITE		23-24		
	50				25-26		
	54.0	DOLOMITE:	DOLOMITE		27-28		
	58.0	CHERTY DOLOMITE:	CHERTY DOLOMITE		29-30		
					31-32		
	66.0	DOLOMITE:	DOLOMITE		33-34		
	70.0	DOLOMITE:	DOLOMITE		35-36		
	75				37-38		
	76.0	CHERTY DOLOMITE:	CHERTY DOLOMITE		39-40		
	82.0	DOLOMITE:	DOLOMITE		41-42		
					43-44		
	90.0	DOLOMITE:	DOLOMITE		45-46		
					47-48		
	100				49-50		
					51-52		
	112.0	DOLOMITE:	DOLOMITE		53-54		
	118.0	DOLOMITE:	DOLOMITE		55-56		
	122.0	DOLOMITE:	DOLOMITE		57-58		
					59-60		
	125	DOLOMITE:	DOLOMITE		61-62		
					63-64		
	130.77				65-66		
	134.0	SANDSTONE:	SANDSTONE		67-68		
					69-70		
	146.0	NO SAMPLE RETURN FROM 146'-166' DRILLED LIKE SANDSTONE	SANDSTONE ?		71-72		
	150				73-74		
	166.0	I.D. 166.0'			75-76		

- | | |
|---|---|
| <ul style="list-style-type: none"> CME CONTINUOUS AUGER SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) | <ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) N.R. NO RECOVERY NS: NOT SAMPLED |
|---|---|

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-65A (BH-91A)**

CONDUCTOR INSTALLED _____

DATE DRILLED 3/16/91 8/12/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY KMH

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD # 92 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
	0	GROUND SURFACE: 3826.3	SOIL SS/LS		1	2	VENTED CAP
	0.2	TOP SOIL	SS/DOL		3	4	LOCKING STEEL PROTECTOR
	2.0	SANDSTONE/ LIMESTONE:	DOLMITE		5	6	CASING DATUM: 3828.98
	6.0	SANDSTONE/ DOLOMITE:			7	8	WEEP HOLE
		DOLOMITE:			9	10	CONCRETE PAD
	20.0	SANDSTONE:	SANDSTONE		11	12	8" PVC CONDUCTOR CASING
					13	14	CEMENT/BENTONITE GROUT MIX
	35				15	16	10 5/8" DIAMETER BOREHOLE
					17	18	PURE GOLD VOLCLAY GROUT MIX
					19	20	
					21	22	
					23	24	
					25	26	
					27	28	
					29	30	
					31	32	
					33	34	
					35	36	
	70	SANDSTONE:	SANDSTONE		37	38	
	76.0	DOLOMITE:	DOLOMITE		39	40	
	78.0	SANDSTONE / DOLOMITE:	SANDSTONE DOLOMITE		41	42	
					43	44	
					45	46	
					47	48	
					49	50	
					51	52	
	105	SANDSTONE:	SANDSTONE		53	54	
					55	56	
	112.0	SANDSTONE:	SANDSTONE		57	58	
					59	60	
	120.0	DOLOMITE:	DOLOMITE		61	62	
					63	64	
	125.0	SANDSTONE:	SANDSTONE		65	66	
					67	68	
					69	70	
					71	72	
	140				73	74	
					75	76	
	148.0	SANDSTONE:	SANDSTONE		77	78	
					79	80	
	158.0	DOLOMITE:	DOLOMITE		81	82	
					83	84	
					85	86	
					87	88	
	175				89	90	
					91	92	
					93	94	
					95	96	
					97	98	
					99	100	
					101	102	
	202.0	SANDSTONE:	SANDSTONE		103	104	
	205.0	DOLOMITE:	DOLOMITE		105	106	
	210				107	108	
					109	110	
					111	112	
					113	114	
					115	116	
	232.5	T.D. 232.5'					
	245						

- CME CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-66 (BH-92)**

DATE DRILLED 8/18/91 CONDUCTOR INSTALLED 8/18/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS

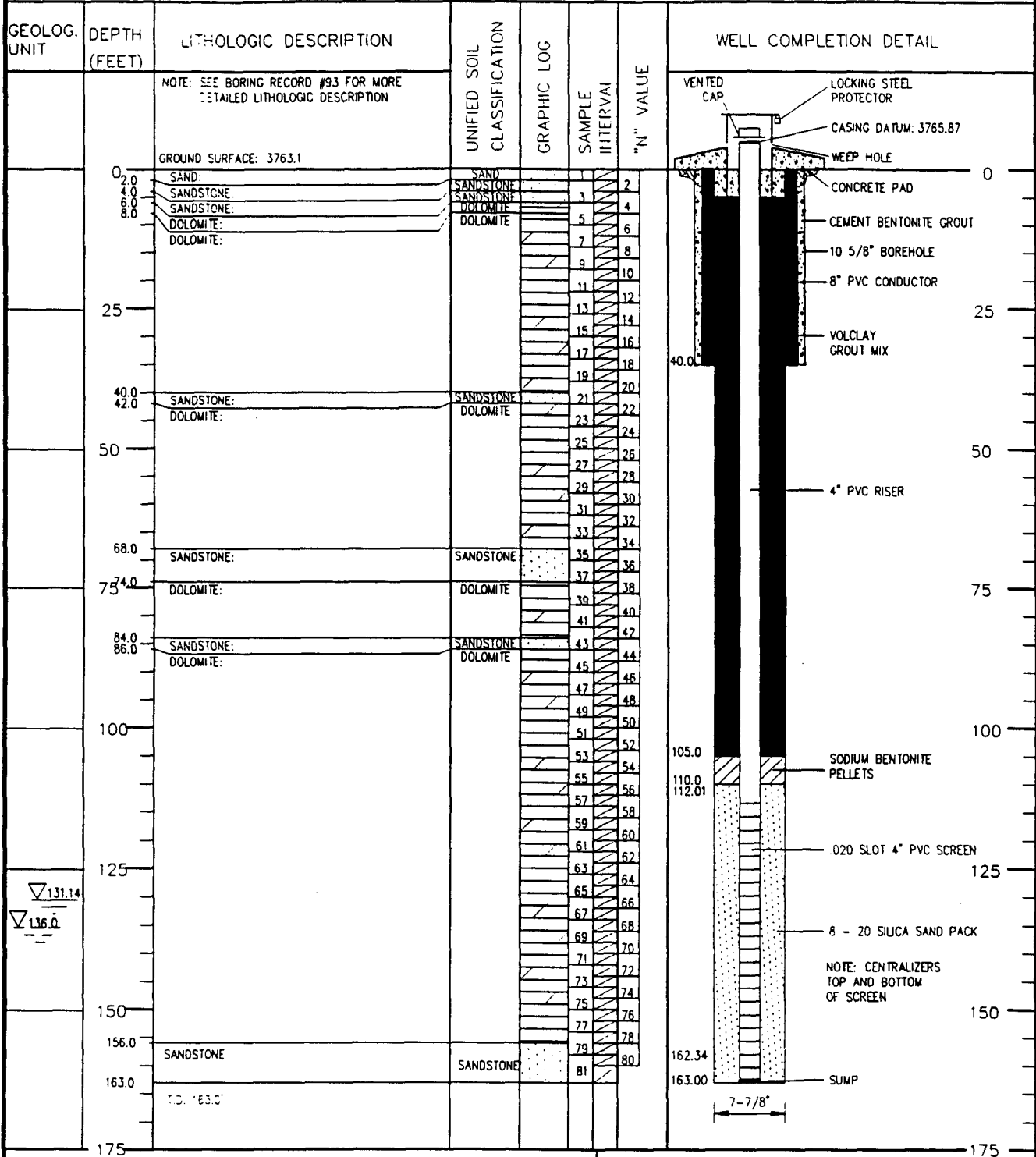
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WELL COMPLETION RECORD



CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	PENETROMETER (TONS/SQ. FT.)
WATER TABLE (24-HOURS)	NR: NO RECOVERY
	NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-67 (BH-93)**

DATE DRILLED 8/23/91 CONDUCTOR INSTALLED 8/19/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY TPG

CHECKED BY BJS

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"U" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #94 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3797.83 WEEP HOLE CONCRETE PAD 12" STEEL CONDUCTOR CASING 14" DIAMETER BOREHOLE CEMENT BENTONITE GROUT MIX 4" PVC RISER 8" PVC CONDUCTOR CASING 10 5/8" DIAMETER BOREHOLE VOLCLAY PURE GOLD GROUT MIX SODIUM BENTONITE PELLETS 020 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP 7-7/8"</p>
		GROUND SURFACE: 3794.4					
	0.42	CLAYEY SILT			1		
		GRAVELLY COBBLELY SILT	GM		5		
	13.0	DOLOMITE	DOLOMITE		7		
	20.0	DOLOMITE	DOLOMITE		9		
	22.0	DOLOMITE	DOLOMITE		11		
	24.0	SILTY SANDSTONE	SANDSTONE		13		
		SANDSTONE	SANDSTONE		15		
	30.0	DOLOMITE	DOLOMITE		17		
	35.0	DOLOMITE	DOLOMITE		19		
	38.0	DOLOMITE	DOLOMITE		21		
		DOLOMITE	DOLOMITE		23		
	50.0	SANDSTONE	SANDSTONE		25		
	52.0	SANDSTONE	SANDSTONE		27		
	55.0	SANDSTONE	SANDSTONE		29		
	58.0	SANDSTONE	DOLOMITE		31		
		DOLOMITE	DOLOMITE		33		
	66.0	DOLOMITE	DOLOMITE		35		
	70.0	DOLOMITE	DOLOMITE		37		
		DOLOMITIC SANDSTONE	DOL/SS		39		
	80.0	SANDY DOLOMITE	SANDY/DOL		41		
		DOLOMITE	DOLOMITE		43		
	90.0	SILTSTONE	SILTSTONE		45		
		DOLOMITE	DOLOMITE		47		
	96.0	CHERTY DOLOMITE	CHT/DOL		49		
		DOLOMITE	DOLOMITE		51		
	102.0	DOLOMITE	DOLOMITE		53		
	105.0	DOLOMITE	DOLOMITE		55		
		DOLOMITE	DOLOMITE		57		
		DOLOMITE	DOLOMITE		59		
	120.0	DOLOMITE	DOLOMITE		61		
	122.0	CHERTY DOLOMITE	CHT/DOL		63		
	126.0	DOLOMITE	DOLOMITE		65		
	130.0	DOLOMITE	DOLOMITE		67		
	134.0	DOLOMITE	DOLOMITE		69		
	136.0	SILTY SANDSTONE	SANDSTONE		71		
	140.0	SANDSTONE	SANDSTONE		73		
		SILTY SANDSTONE	CLAY/SILT		75		
		CONGLOMERATE	CONGLOMERATE		77		
		DOLOMITE	DOLOMITE		79		
		DOLOMITE	DOLOMITE		81		
		DOLOMITE	DOLOMITE		83		
		DOLOMITE	DOLOMITE		85		
		DOLOMITE	DOLOMITE		87		
		DOLOMITE	DOLOMITE		89		
		DOLOMITE	DOLOMITE		91		
		DOLOMITE	DOLOMITE		93		
		DOLOMITE	DOLOMITE		95		
		DOLOMITE	DOLOMITE		97		
		DOLOMITE	DOLOMITE		99		
		DOLOMITE	DOLOMITE		101		
		DOLOMITE	DOLOMITE		103		
		DOLOMITE	DOLOMITE		105		
		DOLOMITE	DOLOMITE		107		
		DOLOMITE	DOLOMITE		109		
		DOLOMITE	DOLOMITE		111		
		DOLOMITE	DOLOMITE		113		
		DOLOMITE	DOLOMITE		115		
		DOLOMITE	DOLOMITE		117		
		DOLOMITE	DOLOMITE		119		
		DOLOMITE	DOLOMITE		121		
		DOLOMITE	DOLOMITE		123		
		DOLOMITE	DOLOMITE		125		
		DOLOMITE	DOLOMITE		127		
		DOLOMITE	DOLOMITE		129		
		DOLOMITE	DOLOMITE		131		
		DOLOMITE	DOLOMITE		133		
		DOLOMITE	DOLOMITE		135		
		DOLOMITE	DOLOMITE		137		
		DOLOMITE	DOLOMITE		139		
		DOLOMITE	DOLOMITE		141		
		DOLOMITE	DOLOMITE		143		
		DOLOMITE	DOLOMITE		145		
		DOLOMITE	DOLOMITE		147		
		DOLOMITE	DOLOMITE		149		
		DOLOMITE	DOLOMITE		151		
		DOLOMITE	DOLOMITE		153		
		DOLOMITE	DOLOMITE		155		
		DOLOMITE	DOLOMITE		157		
		DOLOMITE	DOLOMITE		159		
		DOLOMITE	DOLOMITE		161		
		DOLOMITE	DOLOMITE		163		
		DOLOMITE	DOLOMITE		165		
		DOLOMITE	DOLOMITE		167		
		DOLOMITE	DOLOMITE		169		
		DOLOMITE	DOLOMITE		171		
		DOLOMITE	DOLOMITE		173		
		DOLOMITE	DOLOMITE		175		
		DOLOMITE	DOLOMITE		177		
		DOLOMITE	DOLOMITE		179		
		DOLOMITE	DOLOMITE		181		
		DOLOMITE	DOLOMITE		183		
		DOLOMITE	DOLOMITE		185		
		DOLOMITE	DOLOMITE		187		
		DOLOMITE	DOLOMITE		189		
		DOLOMITE	DOLOMITE		191		
		DOLOMITE	DOLOMITE		193		
		DOLOMITE	DOLOMITE		195		
		DOLOMITE	DOLOMITE		197		
		DOLOMITE	DOLOMITE		199		
		DOLOMITE	DOLOMITE		201		
		DOLOMITE	DOLOMITE		203		
		DOLOMITE	DOLOMITE		205		
		DOLOMITE	DOLOMITE		207		
		DOLOMITE	DOLOMITE		209		
		DOLOMITE	DOLOMITE		211		
		DOLOMITE	DOLOMITE		213		
		DOLOMITE	DOLOMITE		215		
		DOLOMITE	DOLOMITE		217		
		DOLOMITE	DOLOMITE		219		
		DOLOMITE	DOLOMITE		221		
		DOLOMITE	DOLOMITE		223		
		DOLOMITE	DOLOMITE		225		
		DOLOMITE	DOLOMITE		227		
		DOLOMITE	DOLOMITE		229		
		DOLOMITE	DOLOMITE		231		
		DOLOMITE	DOLOMITE		233		
		DOLOMITE	DOLOMITE		235		
		DOLOMITE	DOLOMITE		237		
		DOLOMITE	DOLOMITE		239		
		DOLOMITE	DOLOMITE		241		
		DOLOMITE	DOLOMITE		243		
		DOLOMITE	DOLOMITE		245		

- CME CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SO. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-68 (BH-94)**

DATE DRILLED 8/31/91 CONDUCTOR INSTALLED 8/24/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY TPG

CHECKED BY BJS

DRAWN BY: BDR PAGE 1 OF 1

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 NORMAN, OKLAHOMA 73072
 (405) 321-1895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #95 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3805.11 WEEP HOLE CONCRETE PAD VOLCLAY PURE GOLD GROUT MIX CEMENT BENTONITE GROUT MIX 4" PVC RISER 12" STEEL CONDUCTOR CASSING SODIUM BENTONITE PELLETS 14" DIAMETER BOREHOLE 0.20 SLOT 4" PVC SCREEN 8 - 20 SILICA SAND PACK NOTE: CENTRALIZERS TOP AND BOTTOM OF SCREEN SUMP</p>
	0	GROUND SURFACE: 3801.7					
	0	SANDY SILT:	ML		1		
					2		
					3		
	6.0	SANDSTONE:	SANDSTONE		4		
	8.0	DOLOMITE:	DOLOMITE		5		
					6		
					7		
					8		
					9		
					10		
	20	DOLOMITE:	DOLOMITE		11	9.00	
					12		
	24.0	DOLOMITE:	DOLOMITE		13	10.80	
	26.0	DOLOMITE:	DOLOMITE		14	12.0	
	28.0	SANDSTONE:	SANDSTONE		15	13.15	
					16		
	30	SILTSTONE:	SILTSTONE		17		
	32.0	SILTY SANDSTONE:	SILTY SANDSTONE		18		
	34.0	SILTSTONE:	SILTSTONE		19		
					20		
					21		
					22		
					23		
					24		
					25		
	50	DOLOMITE:	DOLOMITE		26	47.08	
	52.0				27	47.86	
					28		
	56.0	T.D. 56.0'				56.00	
	60						
	70						

	CME CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)
	STANDARD PENETRATION TEST		LABORATORY TEST LOCATION
	UNDISTURBED SAMPLE		PENETROMETER (TONS/SQ. FT)
	WATER TABLE (24 HOURS)	NR:	NO RECOVERY
		NS:	NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-69 (BH-95)**

DATE DRILLED 8/30/91 CONDUCTOR INSTALLED 8/25/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY TPG/DHC

CHECKED BY BJS

DRAWN BY: BDR PAGE 1 OF 1

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WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		NOTE: SEE BORING RECORD #97 FOR MORE DETAILED LITHOLOGIC DESCRIPTION					
	0	GROUND SURFACE: 3919.5					
	6.0	COBBLES:	COBBLES	1-3	2-4		
		DOLOMITE:	DOLOMITE	4-5	5-6		
	18.0	DOLOMITE:	DOLOMITE	6-7	7-8		
	24.0	SANDY DOLOMITE:	SANDY DOLOMITE	8-9	9-10		
	34.0	DOLOMITE:	DOLOMITE	10-11	11-12		
	35	DOLOMITE:	DOLOMITE	12-13	13-14		
	46.0	CHERTY DOLOMITE:	CHERTY DOLOMITE	14-15	15-16		
	59.0	SANDSTONE:	SANDSTONE	16-17	17-18		
	62.0	DOLOMITE:	DOLOMITE	18-19	19-20		
	70	DOLOMITE:	DOLOMITE	20-21	21-22		
	74.0	DOLOMITE:	DOLOMITE	22-23	23-24		
	105			24-25	25-26		
	120.0	SANDSTONE:	SANDSTONE	26-27	27-28		
	140			28-29	29-30		
	175			30-31	31-32		
	210			32-33	33-34		
	222.0	T.D. 222.0'		34-35	35-36		
	245			36-37	37-38		

<p> CME CONTINUOUS AUGER SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY</p> <p>NS: NOT SAMPLED</p>
--	---

JOB NAME/NUMBER **MARATHON/91029.01**

BORING NUMBER **MW-70 (BH-97)**

DATE DRILLED 9/12/91 CONDUCTOR INSTALLED 9/11/91

DRILLING METHOD AIR HAMMER

DRILLED BY BOYLES BROS.

LOGGED BY KMH

CHECKED BY BJS

DRAWN BY: BDR PAGE 1 OF 1

ROBERTS/SCHORNICK
 & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-3895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED S.M. CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		Start: 10:28 (8/22/93) Stop: 15:15 (8/24/93)					<p>VENTED CAP LOCKING STEEL PROTECTOR CASING DATUM: 3778.05 0.50 WEEP HOLE CONCRETE PAD 8" STEEL CONDUCTOR CASING TO 69.1 CEMENT-BENTONITE GROUT MIX 12-1/4" DIAMETER HOLE TO 69.2 FEET 4" SCH. 80 PVC RISER CEMENT BENTONITE GROUT MIX 158.00 162.00 164.65 SODIUM BENTONITE PELLETS 4" #10 SLOT PVC SCREEN 8 - 20 SILICA SAND PACK 232.33 232.99 232.99 7-7/8" SUMP</p>
		GROUND ELEVATION: 3775.63					
	02.0	CLAYEY SILT SANDSTONE	SANDSTONE		0-1 GC		
	14.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	21.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		10 GC		
	28.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	35				20 GC		35
	46.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		10 GC		
	57.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	70				20 GC		70
	75.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		10 GC		
		SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	97.0	DOLOMITE	DOLOMITE		10 GC		
	103.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		10 GC		
	105				10 GC		105
	107.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	118.0	DOLOMITE	DOLOMITE		10 GC		
	133.0	SANDSTONE	SANDSTONE		10 GC		
	138.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		10 GC		
	140				10 GC		140
	142.0	DOLOMITE	DOLOMITE		10 GC		
	160.0				10 GC		
	162.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	166.0	DOLOMITE	DOLOMITE		10 GC		
	171.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	175				10 GC		175
	185.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		10 GC		
	192.0	SANDY DOLOMITE	SANDY DOLOMITE		10 GC		
	196.0	DOLOMITE	DOLOMITE		10 GC		
	210				10 GC		210
	220.0				10 GC		
	221.0	SANDSTONE	SANDSTONE		10 GC		
		DOLOMITE	DOLOMITE		10 GC		
	233.0	BORING TERMINATED AT 233.0 FEET			10 GC		
	245	FOR COMPLETE LITHOLOGICAL DESCRIPTION SEE BH-98 (MW-71)			10 GC		245

<ul style="list-style-type: none"> CME CONTINUOUS AUGER SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) 	<ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR NO RECOVERY GC: GRAB COMPOSITE
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MARATHON
JOB NAME/NUMBER **9311601T1**

BORING NUMBER **MW-71 (BH-98)**

DATE DRILLED 8/22/93 TO 8/24/93
 DRILLING METHOD AIR HAMMER/AIR ROTARY
 DRILLED BY LES
 LOGGED BY M.J.
 CHECKED BY BJS DRAWING NO. 93116B98
 DRAWN BY IAH PAGE 1 OF 1

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 (405) 321-3895

WELL COMPLETION RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE INTERVAL	"N" VALUE	WELL COMPLETION DETAIL
		Start: 19:05 Stop: 20:00 (8/25/93) Resume: 15:00 (8/29/93) GROUND SURFACE: 3818.61					
	0	SILTY SAND	SM		1 GC		VENTED CAP
	7.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE				LOCKING STEEL PROTECTOR
	15.0	SANDSTONE	SANDSTONE				CASING DATUM: 3819.00
	18.0	SANDSTONE	SANDSTONE				WEEP HOLE
	21.0	SANDY DOLOMITE	DOLOMITIC SANDSTONE		10 GC		CONCRETE PAD
	25.0	SANDSTONE	DOLOMITIC SANDSTONE				CEMENT BENTONITE GROUT MIX
	35	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		20 GC		14" DIAMETER STEEL CONDUCTOR CASING TO 39.5'
	41.0	SANDSTONE	SANDSTONE				17-1/2" DIAMETER BOREHOLE TO 39.50'
	55.0	DOLOMITE	DOLOMITE		30 GC		8" SCH. 80 PVC RISEP
	59.0	SANDSTONE	SANDSTONE				CEMENT BENTONITE GROUT MIX
	70				40 GC		
	81.0	DOLOMITE	DOLOMITE				
	89.0	SANDY DOLOMITE	SANDY DOLOMITE		50 GC		
	101.0	DOLOMITE	DOLOMITE				
	105				60 GC		
	140				70 GC		
	159.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE		80 GC		
	161.0	DOLOMITE	DOLOMITE				
	165.0	DOLOMITIC SANDSTONE	DOLOMITIC SANDSTONE				
	169.0	DOLOMITE	DOLOMITE		90 GC		
	175						172.10
							176.40
							177.32
	188.85				100 GC		SODIUM BENTONITE PELLETS
	198.0	DOLOMITIC LIMESTONE	DOLOMITIC LIMESTONE				8" .020 SLOT PVC SCREEN
	200.0	DOLOMITE	DOLOMITE				10 - 20 SILICA SAND PACK
	207.0	DOLOMITIC LIMESTONE	DOLOMITIC LIMESTONE		110 GC		
	210						
	219.0	DOLOMITE	DOLOMITE				
	220.0	LIMESTONE	LIMESTONE				
	226.0	SANDSTONE	SANDSTONE		120 GC		
		FOR COMPLETE LITHOLOGICAL DESCRIPTION SEE BH-99					
	241.5	BORING TERMINATED AT 241.5 FEET			125 GC NR		234.44
	245						235.38
							241.50

<p> CME CONTINUOUS AUGER SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 - 0.75)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY</p> <p>GC: GRAB COMPOSITE</p>
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MARATHON

JOB NAME/NUMBER **9311601T3**

BORING NUMBER **MW-72 (BH-99)**

DATE DRILLED 8/25/93 TO 8/29/93

DRILLING METHOD AIR HAMMER/AIR ROTARY

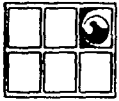
DRILLED BY LES

LOGGED BY M.J.L.

CHECKED BY B.J.S. DRAWING NO. 93116899

DRAWN BY: TAH PAGE 1 OF 1

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 NORMAN, OKLAHOMA 73072
 (405) 321-1895



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-73**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 205 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 10 ft. Type Steel
 Fill Material _____ Rig/Core Falling 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Dave Gagn Log By Bob Davis Date 11/29-30/94 Permit # _____
 Checked By Dulu Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

Well located 100 feet S of MW-72. Set 10 feet 8 5/8" surface CSG to 7 feet below grade after reaming hole to 12 1/4" to a depth of 7 feet. From 7 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-3							SPUD 0800 11/29/94 About 1 ft. alluvium before encountering bedrock. Rate of penetration about 30 ft/hr.
0							0-10 ft: DOLOMITE, medium light gray (N8), hard, interbedded with calcareous, SANDSTONE, pale olive (5 yr 5/2), soft, friable. Rate of penetration about 30 ft/hr (0'- 20')
2							10-20 ft: Dolomitic SANDSTONE, light gray (N7), moderately soft, moderate friable, dry, slightly calcareous interbedded with DOLOMITE, gray (10 yr 6/1), very hard, conchoidal fractures. Rate of penetration = 30 ft/hr.
4							20-30 ft: Dolomitic SANDSTONE, fine grained, light gray (N7), moderately soft, friable, dry, slightly calcareous interbedded with occasional DOLOMITE, medium light gray (N5), hard, conchoidal fractures. Rate of penetration = 30 ft/hr.
6		0					
8							
10							
12							
14							
16							
18							
20		0					
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-73

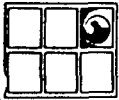
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							
26							0905-0930 = 25 minutes ty change Subs, bit & connect next 30' stand. Continue drilling at 0930, depth 30 feet.
28							
30		0					30-40 ft: SANDSTONE , fine grained, very light gray (N8), soft, friable, slightly calcareous, dry, interbedded with minor DOLOMITE, yellowish gray (5 yr 7/2), hard, conchoidal fractures.
32							
34							
36							Rate of penetration = 30 ft/hr.
38							
40		0					40-50 ft: Sandy DOLOMITE , very light gray (N8), moderately hard, dry, non-calcareous.
42							
44							Rate of penetration about 30 ft/hr.
46							
48							
50		0					50-80 ft: SANDSTONE , light gray (N7), fine grained, moderately soft, friable, non-calcareous interbedded with sandy DOLOMITE, very light gray (N8), moderately hard, dry, non-calcareous.
52							
54							Rate of penetration about 20 ft/hr.
56							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-73

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad NM Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					60-70 ft: Dolomitic SANDSTONE, light gray (N7), fine grained, moderately hard, dry noncalcareous interbedded with sandy DOLOMITE, medium light gray (N5), hard, crystalline.
62							
64							
66							Rate of penetration about 38 ft/hr.
68							
70		0					70-80 ft: Sandy DOLOMITE as above interbedded with dolomite, light gray, (N7), hard, brittle, conchoidal fractures, dry.
72							
74							Rate of penetration about 30 ft/hr.
76							
78							
80		0					80-90 ft: DOLOMITE, light brownish gray (5 yr 6/1) very hard, crystalline, conchoidal fractures.
82							
84							Rate of penetration about 18 ft/hr.
86							
88							



Drilling Log

Monitoring Well MW-73

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad NM Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88							
90		0					<p>90-100 ft: Sandy DOLOMITE, light gray (N7), moderately hard, crystalline, minor fine grained sand, conchoidal fractures, dry. Note: Cuttings are predominately powder (98%).</p> <p>Drilled 45 minutes with only 8 feet penetration.</p>
92							
94							
96							
98							
100		0					<p>100-110 ft: DOLOMITE, light brownish gray (5 yr 6/1) very hard, conchoidal fractures, interbedded sandy dolomite, light gray (N7), moderately hard, moderately hydrocarbon odor (PID = 0.0 ppm).</p> <p>1345-1430 Rig down - replaced JAWS gripping KB worn out. Downtime of 45 minutes. 1430 resumed drilling.</p> <p>Rate of penetration about 13 ft/hr.</p>
102							
104							
106							
108							
110		0					<p>110-120 ft: Sandy DOLOMITE, as above.</p> <p>Rate of penetration about 20 ft/hr.</p>
112							
114							
116							
118							
120		0					



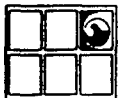
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-73

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad NM Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		0				120-130 ft: Sandy DOLOMITE, as above, interbedded with light brownish gray (5 yr 6/1), very hard, conchoidal fractures, moderate hydrocarbon odor, cuttings predominately "rock flour."
122						Rate of penetration about 15 ft/hr.
124						
126						
128						
130		16.4				130-140 ft: Sandy DOLOMITE, interbedded with dolomite, as above.
132						Rate of penetration 15 ft/hr.
134						
136						
138						
140		0				140-150 ft: DOLOMITE, as above.
142						Rate of penetration 40 ft/hr.
144						Rig shutdown for the day at 1700 hours.
146						11/30/94 Began setting up at 0645 hours, drilling at 0655. Found water in the hole.
148						0710 - Water in fuel filter - trying to fix problem - shutdown - had to go to town for new filters. <u>Rig down for 2 hours 5 minutes.</u>
150		0				0915 - Resume drilling. Rate of penetration 40 ft/hr.
152						150-160 ft: Dolomitic SANDSTONE, very light gray (N8), fine grained, moderately hard, non-calcareous, no hydrocarbon odor.



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-73

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad NM Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152							
154							Rate of penetration 17 ft/hr.
156							
158							
160		0					160-170 ft: Dolomitic SANDSTONE as above, with occasional sandy DOLOMITE, light gray (N7) moderately hard, non-calcareous, no hydrocarbon odor.
162							
164							Rate of penetration about 9 ft/hr.
166							
168							
170		0					170-180 ft: Lithology, as above, with minor dolomite, light brownish gray (5 yr 6/l), hard, brittle, conchoidal fractures, no hydrocarbon odor.
172							
174							
176							
178							
180		0					180-180 ft: DOLOMITE, light brownish gray (5 yr 6/l), very hard, microcrystalline, conchoidal fractures, no hydrocarbon odor, slightly calcareous (effervescent with 10% HCL).
182							
184							



GROUNDWATER
TECHNOLOGY

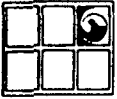
Drilling Log

Monitoring Well **MW-73**

Project MOC/Indian Basin Gas Plant
Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184							Rate of penetration about 11 ft/hr.
186							
188							
190		0					190-200 ft: DOLOMITE, as above, moderate-strong hydrocarbon odor.
192							
194		354					
196		0					Rate of penetration about 40 ft/hr.
198							
200		6					200-210 ft: DOLOMITE, as above, moderate-strong hydrocarbon odor, saturated, interbedded with dolomitic LIMESTONE, light gray (N7) chalky.
202							
204							Water at 205 feet.
206							
208							Rate of penetration about 27 ft/hr.
210		0					210-220 ft: Dolomitic LIMESTONE, light gray (N7), chalky, saturated moderate hydrocarbon odor.
212							
214							
216							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-73**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad NM Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216						
-218						
-220		0				
-222						Reached TD (220 ft) at 1415 hours. Reamed hole to 7' with 12 1/2" bit. Set 8 5/8" CSG to 7 feet with 3 feet above surface. Set CSG with 1 sack bentonite and 4 sacks ready mix cement. Moved Rig to MW-74 location at 1550 hours.
-224						
-226						
-228						
-230						
-232						
-234						
-236						
-238						
-240						
-242						
-244						
-246						
-248						



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 115 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 9.5 ft. Type Steel
 FMI Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Dave Gann Log By Bob Davis Date 11/30-12/06/94 Permit # _____
 Checked By Chelle Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

MW-74 located approximately 200 ft SW of MW-73. 8 5/8" surface casing set to 7 ft below ground. From 7 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-3							SPUD 1600 hours 11/30/94 Rate of penetration about 40 ft/hr.
0							0-0.5 ft: Approximately 4-6 " alluvium before bedrock.
2							0.5-10 ft: LIMESTONE, pinkish gray (5 yr 8/1), very hard, high effervescence with 10% HCL, dry, interbedded with DOLOMITE, light brown (5 yr 6/4), hard, brittle, conchoidal fractures, no hydrocarbon odor and SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, soft, friable, noncalcareous, dry.
4							Rate of penetration about 40 ft/hr.
6							
8							
10		0					10-20 ft: SANDSTONE/LIMESTONE/DOLOMITE, as above.
12							
14							
16							
18							Shutdown Rig at 1700 hours 11/30/94. Resume drilling at 0645 12/01/94. 0715-0830 Rig shutdown - change out jaws - downtime 1.25 hours.
20		0					20-30 ft: Dolomitic SANDSTONE, yellowish gray (5 yr 8/1), fine grained, hard, non-calcareous.
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-74

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26						
28						Change bit at 30 feet, resume drilling at 0935. Repack Kelley swivel, change filters and pull down. 0.75 hours down. Rate of penetration 60 ft/hr.
30		0				30-40 ft: Dolomitic SANDSTONE, as above, interbedded with sandstone, yellowish gray (5 yr 8/l), fine grained, moderately hard, non-calcareous, dry.
32						
34						Rate of penetration about 24 ft/hr.
36						
38						
40		0				40-50 ft: SANDSTONE, yellowish gray (5 yr 8/l), very fine grained, moderately soft, moderately friable, dry interbedded with sandy sandy dolomite, very light gray (N8), moderately hard, microcrystalline, conchoidal fractures.
42						
44						Rate of penetration 20 ft/hr.
46						
48						
50		0				50-60 ft: SANDSTONE, as above.
52						Rate of penetration about 30 ft/hr.
54						
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-74

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					<p>60-70 ft: Sandy DOLOMITE, very light gray (N8), moderately hard to hard, microcrystalline, interbedded with minor SANDSTONE, yellowish gray (5 yr 8/1), moderately soft, moderately friable, dry, non-calcareous, no hydrocarbon odor.</p> <p>Rate of penetration about 24 ft/hr.</p>
62							
64							
66							
68							
70		0					<p>70-80 ft: Sandy DOLOMITE, very light gray (N8), hard, brittle, microcrystalline, dry, no hydrocarbon odor.</p> <p>Rate of penetration about 17 ft/hr.</p>
72							
74							
76							
78							
80		0					<p>80-90 ft: DOLOMITE, light brownish gray (5 yr 6/1), hard, brittle microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.</p> <p>Rate of penetration about 17 ft/hr.</p>
82							
84							
86							
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-74

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90		0				90-100 ft: DOLOMITE interbedded with sandy dolomite, very light gray (N8), hard, brittle, dry, no hydrocarbon odor.
92						
94						
96						
98						
100		0				100-110 ft: DOLOMITE, light brownish gray (5 yr 6/1) to very light gray (N8), hard, microcrystalline, conchoidal fractures, dry, faint hydrocarbon odor.
102						
104						Rate of penetration about 30 ft/hr.
106						
108						
110		0				110-120 ft: DOLOMITE, as above, with minor sandy dolomite, light gray (N7), moderately hard, microcrystalline, saturated, no hydrocarbon odor.
112						
114						
116		0				Water at 115 feet with moderate-strong hydrocarbon odor; PID=0.0 ppm.
118						Rate of penetration about 12 ft/hr.
120		0				



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-74**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0				120-130 ft: DOLOMITE and sandy dolomite, as above.	
122							
124							Rate of penetration about 30 ft/hr.
126							
128							
130		0				130-140 ft: DOLOMITE, light brownish gray (5 yr 6/1) to very light gray (N8), hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
132						At 132 feet driller had to add water to system to remove cuttings.	
134						Abundant sand, fine grained, quartz, non-calcareous.	
136						Rate of penetration about 15 ft/hr.	
138							
140		0				140-150 ft: DOLOMITE/SAND, as above, no hydrocarbon odor.	
142							
144							Rate of penetration about 30 ft/hr.
146							
148							
150		0				150-160 ft: Abundant SAND with minor DOLOMITE.	
152							



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PTD (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152							
154							
156							
158							
160		0					
162							180-170 ft: SANDSTONE, yellowish gray (5 yr 7/2), fine grained, quartz grains, noncalcareous, interbedded with DOLOMITE, pale yellowish brown (10 yr 6/2), hard, cherty, conchoidal fractures, no hydrocarbon odor.
164							
166							
168							At 1605 hours pulled out of hole to run surface CSG, ream top hole to 7 feet with 12.25 " bit. Set 10 feet of 8 5/8" CSG to 7 feet below grade. Resume drilling 12/05/94 at 1215 hours.
170		0					
172							170-180 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) hard, cherty, microcrystalline, conchoidal fractures, no hydrocarbon odor.
174							
176							Rate of penetration about 15 ft/hr.
178							
180		0					
182							180-190 ft: DOLOMITE, as above.
184							



Drilling Log

Monitoring Well MW-74

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184						Rate of penetration 15 ft/hr.
186						
188						
190		0				190-200 ft: DOLOMITE, as above.
192						1400 hours at 192 feet, hydraulic pump failed. Rig down until pump can be replaced. Resumed drilling at 1615 hours on 12/06/94.
194						
196						Rate of penetration about 20 ft/hr.
198						
200		0				200-210 ft: DOLOMITE, as above, interbedded with LIMESTONE, light gray (N7), hard, crystalline, high effervescence with 10% HCL, no hydrocarbon odor.
202						
204						Rate of penetration about 30 ft/hr.
206						
208						
210		0				210-220 ft: SANDSTONE, yellowish gray (5 yr 7/2), fine grained, moderately hard, brittle, calcareous, quartz grains, no hydrocarbon odor, interbedded with DOLOMITE, as above.
212						
214						Rate of penetration about 40 ft/hr.
216						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-74

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216						
-218						
-220		0				Total depth at 1800 hours on 12/06/94. TD = 220 feet.
-222						
-224						
-226						
-228						
-230						
-232						
-234						
-236						
-238						
-240						
-242						
-244						
-246						
-248						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-75**

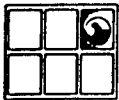
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 85 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 10 ft. Type Steel
 Fill Material _____ Rig/Core Falling 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 12/02-08/94 Permit # _____
 Checked By Mike Madsen License No. _____

See Site Map
For Boring Location

COMMENTS:

400 ft Southwest of MW-73. 8 5/8" surface CSG set to 10 feet below grade. Surface CSG is 27" above grade. From 10 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.25							SPUD 12/02/94 0935 hours
0							0-4 ft: Alluvium, silty SAND, pale yellowish brown, (10 yr 6/2), fine grained, soft, friable, dry. Rate of penetration about 40 ft/hr.
4							4-10 ft: Silty SAND, pale yellowish brown (10 yr 6/2), fine grained, soft, friable, dry. LIMESTONE, very pale orange (10 yr 8/2) hard, (high effervescence with 10% HCL) dry. DOLOMITE, light brownish gray (5 yr 6/1), very hard, crystalline, conchoidal fractures, dry.
10		0					10-20 ft: Sandy DOLOMITE, light gray (N7), fine to medium quartz grains, hard, conchoidal fractures, dry. Rate of penetration about 30 ft/hr.
20		0					20-30 ft: SANDSTONE, yellowish gray (5 yr 8/1) to light brownish gray (5 yr 6/1), fine grained quartz sand, moderately hard to hard, non-calcerous, dry with minor sandy DOLOMITE, light gray (N7), fine grained quartz sand, hard, brittle, conchoidal fractures, dry, no hydrocarbon odor.



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						Rate of penetration about 24 ft/hr.
26						
28						
30		0				30-40 ft: SANDSTONE, light gray (N7) to light brownish gray (5 yr 6/1), fine grained, moderately hard to soft, friable, dry, noncalcareous, with minor sandy DOLOMITE, as above.
32						
34						
36						Rate of penetration about 30 ft/hr.
38						
40		0				40-50 ft: SANDSTONE/sandy DOLOMITE, as above.
42						Change jaws on kelly. Down 55 minutes (1130-1225).
44						
46						
48						
50		0				50-60 ft: SANDSTONE, pale yellowish brown (10 yr 6/2) to light gray (N7), very fine grained, soft, friable, dry, noncalcareous, no hydrocarbon odor.
52						
54						
56						Rate of penetration about 30 ft/hr.



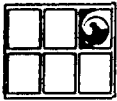
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					60-70 ft: With sandy DOLOMITE, light gray (N7) fine grained quartz, very hard, conchoidal fractures, dry, no hydrocarbon odor.
62							
64							Rate of penetration about 30 ft/hr.
66							
68							
70		0					70-80 ft: SANDSTONE, as above.
72							
74							Rate of penetration about 24 ft/hr.
76							
78							
80		0					80-80 ft: SANDSTONE interbedded with DOLOMITE, light brownish gray (5 yr 6/1), very hard, microcrystalline, conchoidal fractures, and sandy DOLOMITE, light gray (N7) fine grained quartz, very hard conchoidal fractures, saturated, no hydrocarbon odor.
82							
84							
86							Water at 85 feet, no hydrocarbon odor. Add water to air system to bring up cuttings. Distint "oily" sheen on water from the borehole.
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88							
90		0					90-100 ft: DOLOMITE/sandy dolomite (as above) with minor SANDSTONE.
92							
94							Rate of penetration about 30 ft/hr.
96							
98							
100							100-110 ft: DOLOMITE, grayish orange (10 yr 7/4), hard, crystalline (many rhombohedral crystals visible with hand lens), conchoidal fractures, saturated, no hydrocarbon odor.
102							
104							
106							Pulled out of hole to set surface CSG - 8 5/8" CSG to 10 feet BG. Grout with 1 sack bentonite, 7 sacks reedy mix cement. Rig down at 1630 hours 12/06/94. Resume drilling at 1320 hours 12/07/94.
108							
110		0					110-120 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), very hard, microcrystalline, occasionally cherty, conchoidal fractures, saturated, no hydrocarbon odor.
112							
114							Rate of penetration about 12 ft/hr.
116		0					
118							
120		0					



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		0				
122						
124						
126						Black liquid (hydrocarbons ?) observed mixed with water, hydrocarbon odor but no PID readings.
128						Rate of penetration about 15 ft/hr.
130		0				
132						
134						
136						
138						
140		0				
142						Black sheen on water, moderate hydrocarbon odor, PID = 0.0 ppm.
144						140-150 ft: DOLOMITE, light brownish gray (5 yr 6/1), hard, microcrystalline, occasionally cherty, conchoidal fractures, saturated, no hydrocarbon odor.
146						Rate of penetration about 15 ft/hr.
148						
150		0				
152						150-160 ft: DOLOMITE, as above, interbedded with SANDSTONE, pale yellowish brown (10 yr 6/2), moderately hard, moderately friable, very fine grained, non-calcareous, saturated, no hydrocarbon odor.



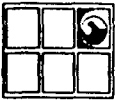
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152						
154						
156						
158						
160		0				160-170 ft: DOLOMITE with minor sandstone, as above, no hydrocarbon odor.
162						
164						Rate of penetration about 11 ft/hr.
166						
168						
170		0				170-180 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, interbedded with dolomitic SANDSTONE, fine quartz grains, very hard, non-calcareous, saturated, no hydrocarbon odor.
172						
174						Rate of penetration about 10 ft/hr.
176						
178						
180		0				180-180 ft: DOLOMITE, as above, no hydrocarbon odor.
182						
184						



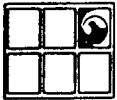
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184							Rate of penetration about 11 ft/hr.
186							
188							
190		0					190-200 ft: DOLOMITE, as above, moderately strong hydrocarbon odor.
192							
194							Rate of penetration about 11 ft/hr.
196							
198							
200		75.1					200-210 ft: DOLOMITE, as above, strong hydrocarbon odor.
202							
204							
206							
208							Rate of penetration about 30 ft/hr.
210		709					210-220 ft: SANDSTONE, pale yellowish brown, (10 yr 6/2), fine quartz grains, moderately soft, moderately friable, occasional vugs of secondary euhedral quartz crystals, calcareous cement, saturated, moderate hydrocarbon odor, minor DOLOMITE, as above, LIMESTONE, light gray (N7), hard, microcrystalline, massive.
212							
214							Drill break at 211 feet and approximately 8 inches, possible small sandstone stringer.
216							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-75

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216							
-218							
-220		3.2					Well TD at 220 ft. at 1100 hours 12/08/94.
-222							
-224							
-226							
-228							
-230							
-232							
-234							
-236							
-238							
-240							
-242							
-244							
-246							
-248							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

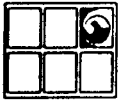
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 35 ft. Static _____
 Screen: Dia NA in. Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 9 ft. Type Steel
 Fill Material _____ Rig/Core Falling 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 12/07-12/94 Permit # _____
 Checked By Willie Mearns License No. _____

See Site Map
For Boring Location

COMMENTS:

Replacement well for MW-68 set 8 5/8" surface CSG to 6 ft. below grade on 12/7/94. From 6 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-3							SPUD well for surface CSG at 0700 hours 12/07/94.
0							0-6 ft: Encountered bedrock about 0.5 ft below grade, DOLOMITE, light brownish gray (5 yr 6/1), hard, microcrystalline, cherty, conchoidal fractures, dry.
2							Drilled to 6 feet. Resume drilling at 0625 hours on 12/09/94.
4							
6							6-10 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), to light gray (N7), hard, microcrystalline, occasionally cherty, conchoidal fractures, dry, no hydrocarbon odor.
8							
10		0					10-20 ft: DOLOMITE, as above.
12							
14							Rate of penetration about 7.5 ft/hr.
16							
18							
20		0					20-30 ft: DOLOMITE, light gray (N7) to medium light gray (N6), very hard, microcrystalline, dry, no hydrocarbon odor.
22							
24							



Drilling Log

Monitoring Well MW-76

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							Rate of penetration about 6 ft/hr.
26							
28							
30		0					30-40 ft: DOLOMITE, as above, with thin stringers of silty SANDSTONE/SILTSTONE, medium dark gray (N4). Fine grained, moderate- hard, noncalcareous, dry, moderate hydrocarbon odor.
32							
34							35 ft: Strong hydrocarbon odor at 35 feet with some moisture possible. Top of shallow zone aquifer.
36							
38							Rate of penetration about 24 ft/hr.
40		0					40-50 ft: SANDSTONE, light brownish gray (5 yr 6/1), silty, fine grained, moderate hard, noncalcareous, damp, interbedded with DOLOMITE (as above) and LIMESTONE, light gray (N7), hard, crystalline, effervescence with 10% HCL. No hydrocarbon odor.
42							
44							Rate of penetration about 15 ft/hr.
46							
48							
50							50-60 ft: SANDSTONE, DOLOMITE, LIMESTONE, as above, with moderate hydrocarbon odor, moist.
52							
54							
56							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					Water noted at 60 foot connection (probably from 35 ft.). 61-64 ft: Drilling break - SANDSTONE, pale yellowish orange (10 yr 8/6), fine grained, hard, calcareous cement, damp. Faint hydrocarbon odor. Rate of penetration about 30 ft/hr (60-70 interval).
62							
64							64-70 ft: GYPSUM, pale olive, (10 yr 6/2) very soft, friable, platy, moist, interbedded with minor SANDSTONE and DOLOMITE, as above. No hydrocarbon odor. Rate of penetration about 20 ft/hr.
66							
68							
70		0					70-80 ft: LIMESTONE, very light gray (N8), moderately soft to hard, chalky, interbedded with DOLOMITE, as above. Moist, fair hydrocarbon odor.
72							
74							
76							
78							
80		0					80-88 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, moderately brittle, noncalcareous, saturated, interbedded with minor DOLOMITE and LIMESTONE, as above. No hydrocarbon odor.
82							
84							
86							
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-76

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88							
90		0					<p>90-100 ft: Interbedded SANDSTONE and DOLOMITE, as above, no hydrocarbon odor. Occassional hematite stain and sandstone cuttings.</p> <p>Rate of penetration about 15 ft/hr.</p>
92							
94							
96							
98							
100		0					<p>100-110 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to brownish gray (5 yr 6/1), hard, microcrstalline, cherty, conchoidal fractures, no hydrocarbon odor, interbedded with SANDSTONE, as above (see 90 ft.).</p>
102							
104							
106							
108							
110		0					<p>110-120 ft: LIMESTONE, grayish orange (10 yr 7/4), to grayish orange pink (5 yr 7/2), moderately soft, crystalline, chalky, powdery in cutting. Minor DOLOMITE, no hydrocarbon odor.</p>
112							
114							
116							
118							
120		0					

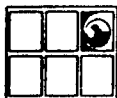


Drilling Log

Monitoring Well MW-76

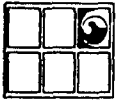
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-120		0					120-130 ft: LIMESTONE/DOLOMITE, as above. Down for routine maintenance (tighten clutch, etc.).	
-122								
-124								
-126								
-128								
-130		0					130-140 ft: LIMESTONE/DOLOMITE, as above, no hydrocarbon odor.	
-132								
-134							Rate of penetration about 40 ft/hr.	
-136								
-138								
-140		0					140-150 ft: SANDSTONE, grayish orange (10 yr 7/4), very fine grained, moderately hard, noncalcareous. Limey SANDSTONE, very pale orange (10 yr 8/2), very fine grained, well rounded, moderately hard, strong effervescence w/10% HCL, no hydrocarbon odor. Minor DOLOMITE.	
-142								
-144								Rate of penetration 60 ft/hr.
-146								
-148								
-150		0					150-160 ft: SANDSTONE, Limey SANDSTONE, minor DOLOMITE, as above, no hydrocarbon odor.	
-152								



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152						
154						
156						
158						
160		0				
162						
164						
166						
168						
170		0				
172						
174						
176						
178						
180		0				
182						
184						



Drilling Log

Monitoring Well MW-76

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184							Rate of penetration about 80 ft/hr.
186							
188							
190		0					190-200 ft: LIMESTONE, as above, with DOLOMITE, fractures in dolomite filled with calcareous cement, no hydrocarbon odor.
192							Soap added to water to bring up cuttings.
194							
196							
198							
200		0					200-210 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, calcareous, no hydrocarbon odor.
202							
204							
206							
208							
210		0					210-212 ft: SANDSTONE, grayish red (5yr 4/2), very fine grained, moderately hard, noncalcareous, no hydrocarbon odor.
212							
214							213-220 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, very calcareous, no hydrocarbon odor.
216							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-76

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216							
-218							
-220		0					Well TD at 1335 hrs. 12/12/94.
-222							
-224							
-226							
-228							
-230							
-232							
-234							
-236							
-238							
-240							
-242							
-244							
-246							
-248							



**GROUNDWATER
TECHNOLOGY**

Drilling Log

Monitoring Well **MW-77**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 80 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia NA in. Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 17.5 ft. Type Steel
 F#1 Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 12/07-13/94 Permit # _____
 Checked By Dixie Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

8.625 inches surface casing set to 15 feet on 12/07/94. Well completed on 12/13/94. Located 400 feet SE of MW-73. From 15 feet to 80 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5							Spud for surface casing at 0815 on 12/07/94.
0							Well spud in silty alluvium. Alluvium to a depth of 10 feet.
2							0-10 ft: SILTSTONE , moderate yellowish brown (10 yr 4/2), very soft, friable, dry.
4							
6							
8							
10		0					10-11 ft: LIMESTONE , light gray (N7), hard, crystalline, dry with subangular dolomitic gravel (1/2 inch to 3 inches), occasional SANDSTONE, light gray (N7), fine grained quartz, moderately soft, moderately friable, dry.
12							
14							
16							15-20 ft: DOLOMITE , pale yellowish brown (10 yr 6/2) to dark yellowish brown (10 yr 4/2), hard, cherty, microcrystalline, conchoidal fractures, dry, with minor LIMESTONE, light gray (N7), hard crystalline, dry.
18							
20		2.2					20-25 ft: DOLOMITE , as above, no hydrocarbon odor, minor LIMESTONE.
22							Rate of penetration about 15 ft/hr.
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-77

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <i>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</i>
24							
26		0					<p>25-30 ft: DOLOMITE and minor LIMESTONE with minor SILTSTONE, sandy, pale yellowish brown (10 yr 6/2), moderately hard, dry.</p> <p>**Change filters in air system - downtime 20 minutes**</p> <p>Rate of penetration 15 ft/hr.</p>
30		0					<p>30-35 ft: DOLOMITE, as above, with occasional SILTSTONE, dark yellowish orange (10 yr 6/6), (hematite stained), sandy, slightly calcareous, dry, no hydrocarbon odor.</p> <p>Rate of penetration 20 ft/hr.</p>
34		0					<p>35-40 ft: DOLOMITE, dry, moderate hydrocarbon odor.</p> <p>Rate of penetration about 15 ft/hr.</p>
40		14.8					<p>40-45 ft: DOLOMITE, as above, interbedded with sandstone, medium dark gray (N4), fine-medium quartz grains-round to subrounded, poorly sorted, very hard, non-calcareous, dry, no hydrocarbon odor.</p>
44		0					<p>45-50 ft: Dolomite, interbedded with minor SANDSTONE, dry, no hydrocarbon odor.</p> <p>Rate of penetration about 15 ft/hr.</p>
50		4.6					<p>50-55 ft: As above, dry, no hydrocarbon odor.</p>
54		23.0					<p>55-60 ft: DOLOMITE, as above, with minor SILTSTONE, dark yellowish orange (10 yr 6/6), hematite stained.</p>
56							



Drilling Log

Monitoring Well MW-77

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							moderately soft, non-calcareous, dry, faint hydrocarbon odor.
58							Rate of penetration about 15 ft/hr.
60		8.1					60-65 ft: DOLOMITE , as above, with SANDSTONE, dark yellowish orange (10 yr 6/6), very fine quartz grains, well rounded, hard, noncalcareous, well cemented, dry, no hydrocarbon odor.
62							Rate of penetration about 12 ft/hr.
64		0					65-70 ft: DOLOMITE and SANDSTONE , as above, dry, no hydrocarbon odor.
66							Rate of penetration about 30 ft/hr.
68							70-75 ft: DOLOMITE and SANDSTONE , as above, dry, no hydrocarbon odor.
70		0					Rate of penetration about 20 ft/hr.
72						75-80 ft: DOLOMITE and SANDSTONE , as above, with minor LIMESTONE, light gray (N7), hard, microcrystalline, dry, faint hydrocarbon odor.	
74		1.2					
76							
78							
80		13.1					Well Total Depth = 80 feet at 1115 hours on (12/13/94)
82							
84							
86							
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-78**

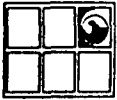
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 85 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 13.08 ft. Type Steel
 Fill Material _____ Rig/Core Falling 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Roy Spruill Log By Bob Davis Date 12/12-13/94 Permit # _____
 Checked By Luke M... .. License No. _____

See Site Map
For Boring Location

COMMENTS:

Located on North side of arroyo approximately 800 feet east of MW-57. 5/8" surface casing was set 11 feet below grade. Surface casing sticks up 25 inches above grade. Total length of surface casing is 13 feet 1 inch. From 11 feet to 80 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.1							Well spud for surface casing at 1505 12/12/94.
0							0-8 ft: Alluvium, SILTSTONE, moderate yellowish brown (10 yr 4/2) loose, dry.
2							
4							
6							
8							7-10 ft: SANDSTONE, yellowish gray (5 yr 8/1), silty, very fine grained, moderately hard, noncalcareous, dry, no hydrocarbon odor.
10		0					10-15 ft: SANDSTONE, as above, interbedded with minor DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, fractures, dry, occasional hematite staining.
12							
14							Rate of penetration about 20 ft/hr.
16		0					15-20 ft: DOLOMITE, dark yellowish orange (10 yr 6/6), very hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor.
18							Rate of penetration 20 ft/hr.
20		0					
22							20-25 ft: DOLOMITE, as above, dry, no hydrocarbon odor, pale yellowish brown (10 yr 6/2) to dark yellowish orange (10 yr 6/6).
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-78

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26		0				25-30 ft: DOLOMITE, as above.
28						Rate of penetration about 12 ft/hr.
30		0				30-35 ft: Dolomitic SANDSTONE, grayish black (N2), fine quartz grains, very hard, noncalcareous, with minor DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, dry. No hydrocarbon odors.
32						
34						Rate of penetration about 15 ft/hr.
36		9.9				35-40 ft: Dolomitic SANDSTONE, pale yellowish orange (10 yr 8/6) to pale yellowish brown (10 yr 6/2), as above.
38						Rate of penetration about 30 ft/hr.
40		9.9				40-45 ft: DOLOMITE, brownish gray (5 yr 4/1), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odors.
42						
44						Rate of penetration about 15 ft/hr.
46		12.9				45-50 ft: Sandy DOLOMITE, grayish black (N2) and DOLOMITE, as above.
48						Rate of penetration about 15 ft/hr.
50		0				50-55 ft: Sandy DOLOMITE and dolomite, as above, with SILTSTONE, dark yellowish brown (10 yr 6/6), moderately soft, dry, no hydrocarbon odor.
52						
54						Rate of penetration about 30 ft/hr.
56		0				55-80 ft: SANDSTONE, grayish orange (10 yr 7/4) to dark yellowish brown (10 yr 4/2), very fine grained, hard, well

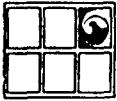


Drilling Log

Monitoring Well MW-78

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							cemented, calcareous, in fractures, dry, no hydrocarbon odor, interbedded with DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures. Rate of penetration about 15 ft/hr.
60		3.2					60-65 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish brown (10 yr 6/6), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor, interbedded with minor SANDSTONE, as above.
62							
64		0					
66							65-70 ft: SANDSTONE, as above, with interbedded DOLOMITE.
68							Rate of penetration about 30 ft/hr.
70		0					
72							70-75 ft: Sandy DOLOMITE, light gray (N7), medium gray (N5) to grayish orange (10 yr 7/4), very hard, fine grained quartz inclusions, dolomite is microcrystalline, dry, fair hydrocarbon odor.
74							Rate of penetration about 15 ft/hr.
76		40					75-80 ft: Sandy DOLOMITE, as above. Dry, no hydrocarbon odor.
78							Rate of penetration about 10 ft/hr.
80		0					
82							80-85 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), hard microcrystalline, cherty, conchoidal fractures. Dry, no hydrocarbon odor.
84							
86		0					TD @ 85 ft. 1610 hrs. 12/13/94.
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-79

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 80 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 8 ft. Type Steel
 Fill Material _____ Rig/Core Falling 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Roy Spruill Log By Bob Davis Date 12/14/94 Permit # _____
 Checked By Juixie Maramilla License No. _____

See Site Map
For Boring Location

COMMENTS:

Located approximately 150 ft SSW of BH-30 (MW-7). Set 8.625" surface casing to 5.5 ft. below ground with 2.5 ft. above ground. From 5.5 feet to 80 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5							Spud at 1345 hrs, 12/14/94.
0							0-1 ft: Alluvium, SILT, moderate yellowish brown (10 yr 5/4), loose, unconsolidated.
2							1-5 ft: DOLOMITE, grayish orange (10 yr 7/4), hard, microcrystalline, cherty, conchoidal fractures, dry.
4							Rate of penetration about 20 ft/hr.
6		0					5-10 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), as above.
8							Rate of penetration about 12 ft/hr.
10		0					10-15 ft: DOLOMITE, as above.
12							Rate of penetration about 15 ft/hr.
14		0					15-20 ft: DOLOMITE, as above, interbedded with dolomitic SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, well cemented.
16							Rate of penetration 15 ft/hr.
18		0					20-25 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor.
20							
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-79**

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

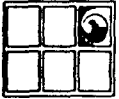
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						Rate of penetration about 10 ft/hr.
26		0				25-30 ft: DOLOMITE, as above, with minor dolomitic SANDSTONE, medium dark gray (N4), fine grained, moderately hard, well cemented, noncalcareous, dry, no hydrocarbon odor. * Set temporary surface casing to 2.5 feet to control caving. Rate of penetration 20 ft/hr.
30		0				30-35 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish brown (10 yr 4/2), as above, interbedded with SANDSTONE, light olive gray (5 yr 6/1) to dark yellowish orange (10 yr 6/6), fine grained, occasionally silty, moderately soft, minor hematite staining, dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
36		0				35-40 ft: DOLOMITE, as above, dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
42		0				40-45 ft: SANDSTONE, pale yellow brown (10 yr 6/2) to medium dark gray (N4), silty, fine grained, soft to moderately hard, occasional hematite staining, with minor DOLOMITE, as above. Dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
48		0				45-50 ft: SANDSTONE, as above, interbedded with dolomitic sandstone, medium dark gray (N4), moderately hard, fine grained, well cemented, non-calcareous and DOLOMITE, dark yellowish brown (10 yr 6/2), hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
54		20.4				50-55 ft: DOLOMITE and SANDSTONE, as above, dry, faint hydrocarbon odor. Rate of penetration about 12 ft/hr (with connection).
56						



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							55-80 ft: DOLOMITE, pale yellow brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, interbedded with dolomitic SANDSTONE, yellowish orange (10 yr 6/6), hard, fine grained, well cemented, fractures, non-calcareous, dry, no hydrocarbon odor. Rate of penetration about 12 ft/hr.
58							60-65 ft: DOLOMITE and dolomitic SANDSTONE, as above, dry, moderate hydrocarbon odor.
60		17.2					Rate of penetration about 12 ft/hr.
62							
64							
66		53.1					65-70 ft: DOLOMITE/dolomitic SANDSTONE, as above, cuttings are 90% powder, fine grains (after washing) are highly effervescent with 10% HCL., possibly limey sand, dry, moderate hydrocarbon odor.
68							
70		7.1					70-75 ft: Lithology, as above, dry, no hydrocarbon odor.
72							
74							
76		0				75-80 ft: Lithology, as above, dry, moderate hydrocarbon odor.	
78							
80		34.4				Well TD @ 80 ft., 1955 hrs. 12/14/94.	
82							
84							
86							
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-80

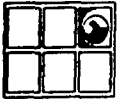
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 90 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 18.92 ft. Type Steel
 Fil Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Roy Spruill Log By Bob Davis Date 12/14-15/94 Permit # _____
 Checked By John Morrison License No. _____

See Site Map
For Boring Location

COMMENTS:

Located approximately 80 feet East of MW-70. Set 8 5/8" surface casing to 16.8 feet below ground with 2.3 feet above ground. From 16.8 feet to 90 feet is open borehole.

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.25						Spud well 1005 hours, 12/14/94.
0						Alluvium - dolomite/limestone coarse gravel and cobbles.
2						0-5 ft: Alluvium continues.
4						
6		0				5-10 ft: Dolomite gravels/DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor.
8						
10		0				10-15 ft: DOLOMITE, as above, with minor cherty, dark yellowish orange (10 yr 6/6).
12						
14		0				15-20 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to grayish orange (10 yr 7/4), microcrystalline, hard, conchoidal fractures interbedded with thin beds of SILTSTONE, dark yellowish brown (10 yr 6/6), soft, friable, dry, no hydrocarbon odor.
16						Rate of penetration about 20 ft/hr.
18						
20		0				20-25 ft: SANDSTONE, dark yellowish orange (10 yr 6/6), fine grained, silty, moderately hard, non-calcareous. Sandy DOLOMITE, dark yellowish brown (10 yr 4/2), hard, fine quartz grains. Minor DOLOMITE, pale yellowish brown (10 yr 6/2), microcrystalline, cherty, conchoidal fractures. Dry, no hydrocarbon odor.
22						
24						



Drilling Log

Monitoring Well **MW-80**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						Rate of penetration about 10 ft/hr.
26		0				25-30 ft: Predominantly DOLOMITE, as above, with minor SANDSTONE and sandy dolomite.
28						Rate of penetration about 8 ft/hr (with connection).
30		0				30-35 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), microcrystalline, hard, cherty, conchoidal fractures, minor hematite staining, dry, no hydrocarbon odor.
34						Rate of penetration about 15 ft/hr.
36		0				35-40 ft: DOLOMITE, as above, interbedded with SANDSTONE, dark yellowish brown (10 yr 4/2), fine grained, well cemented, dolomitic, dry, no hydrocarbon odor.
38						Rate of penetration about 20 ft/hr.
40		0				40-45 ft: DOLOMITE, as above, interbedded with minor thin beds of SANDSTONE, brownish gray (5 yr 4/1), moderate soft, fine grained, dry, no hydrocarbon odor.
42						
44		0				45-50 ft: DOLOMITE and SANDSTONE, as above, with sandy DOLOMITE, light gray (N7), hard, fine quartz grains, microcrystalline, non-calcareous, dry, no hydrocarbon odor.
46						
48		0				50-55 ft: Lithology, as above, dry, no hydrocarbon odor.
50						
52		0				
54						Rate of penetration about 15 ft/hr.
56		0				



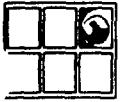
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-80

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						55-60 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), very fine grained, hard, well cemented, dolomitic, non-calcareous, with interbedded DOLOMITE, dark yellowish orange (10 yr 6/6), microcrystalline, hard, cherty, conchoidal fractures. Dry, moderate hydrocarbon odor. Rate of penetration about 15 ft/hr.
58						
60		89.0				60-65 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish orange (10 yr 6/6), as above, dry, no hydrocarbon odor. Rate of penetration about 12 ft/hr.
62						
64		19.6				65-70 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), as above, dry, moderate hydrocarbon odor. Rate of penetration about 15 ft/hr.
66						
68						70-75 ft: DOLOMITE, as above. Rate of penetration about 15 ft/hr.
70		68.8				
72						75-80 ft: DOLOMITE, as above, interbedded with minor SANDSTONE, dark yellowish orange (10 yr 6/6), fine to medium grained, poorly sorted, round to subrounded, calcareous, well cemented. Rate of penetration about 12 ft/hr.
74		4.5				
76						80-85 ft: DOLOMITE and SANDSTONE, as above. Rate of penetration about 15 ft/hr.
78						
80		0				85-90 ft: DOLOMITE and SANDSTONE, as above.
82						
84						
86						
88						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-80

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90		0				Well TD @ 90 ft. below grade.
92						
94						
96						
98						
100						
102						
104						
106						
108						
110						
112						
114						
116						
118						
120						

JEI

Jones Environmental, Inc.
 100 Wilson Street, Suite 100, Shreveport, Louisiana 71101
 (504) 526-6666

WELL LOG

PROJECT NAME/ID RATHON/509859	BORING/MW# MW-81	DATE DRILLED 9/19 - 9/20 9/22 - 9/23	DRILLING START TIME 14:00 - 9/19/95	DRILLING FINISH TIME 12:30 - 9/23/95
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ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM		
DRILLING METHOD AIR ROTORY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWNP/RGE

SKETCH MAP

SEE MONITOR WELL LOCATION MAP

REMARKS (DRILLING SEQUENCE)
 Drilled 7 7/8" pilot hole to 71' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. Surface casing to 71'bgl. Drilled 7 7/8" borehole from 71' to 225'bgl and Completed well with open borehole

BORHOLE DIAMETER 12 1/4" - 71', 7 7/8" - 225'	TOTAL DEPTH OF BORING 225'
--	-------------------------------

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
	D		5	50	CASING	ML	Brown silty sandy loam 5YR 3/4 Very pale orange 10YR 8/2 weathered LS. Effervesces easily
	D		5	43			Same as above 10 YR 8/2 with some chert nodules.
	D		6	27			Light olive gray 5Y 6/1 micro-crystalline DO with trace chert and conchoidal fractures.
20'	D		30	18			Same as above interbedded with fine grained quartz sand.
	D		20	21			Light olive gray 5Y 6/1 DO as above to medium light gray N6 interbedded with fine grain quartz sand. Pale yellow brown 10 YR 6/2 moderately well cemented fine grain quartz SS from 24'-26'.
30'	D		42	20			Light gray sandy LS N7 with trace DO with conchoidal fractures.
	D		15	33			Light olive gray 5Y 6/1 fine grained poorly cemented SS interbedded with light gray N7 sandy LS. Slight HC odor at 32'.
	D		22	30			Dark yellow brown 10YR 5/6 moderate well cemented. limy SS from 35'-37'. Pale yellow brown 10YR 6/2 very hard silica cemented DO from 37'-39'. Dark yellow brown 10YR 5/6 moderate to weakly cemented limy SS from 39'-40'. Slight HC odor.

LEGEND

PPM - PARTS PER MILLION
 FID - FLAME IONIZATION DETECTOR
 HC - HYDROCARBON
 LS - LIMESTONE
 DO - DOLOMITE
 SS - SANDSTONE

SAMPLE METHOD
 SPLIT SPOON
 DRILL CUTTINGS
 SHELBY TUBE
 DEPTH AT WHICH FIRST WATER ENCOUNTERED
 STAYING DEPTH OF FIRST WATER AFTER . . . HOURS

WELL NAME/ID MARATHON/509859	BORING/MWH MW-81	DATE DRILLED 9/19 - 9/20 9/22 - 9/23	DRILLING START TIME 14:00 - 9/19/95	DRILLING FINISH TIME 12:30 - 9/23/95
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SITE ADDRESS
INDIAN BASIN GAS PLANT - EDDY CO., NM

SKETCH MAP

DRILLING METHOD AIR ROTORY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWMP/RGE

SEE MONITOR WELL
 LOCATION MAP

REMARKS (DRILLING SEQUENCE)
 Drilled 7 7/8" pilot hole to 71' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. Surface casing to 71'bgl. Drilled 7 7/8" borehole from 71' to 225'bgl and Completed well with open borehole

BOREHOLE DIAMETER 7 7/8"	TOTAL DEPTH OF BORING 225'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
50'	D		26	25	Casing Cement		Same as above to 43'. Light gray N7 fine grained sandy LS from 43'-45'. Slight HC odor.
	D		17	21			Light brownish gray 5YR 6/1 weakly to poorly cemented fine grained limy. Sand from 45'-47'. Light olive gray 5Y 6/1. Sandy LS from 47'-50'. Slight HC odor.
	D		23	33			Same as above to 52'. Pale yellow brown 10YR 6/2 poorly to weakly cemented limy SS. Moist at 54'. Moderate HC odor.
60'	D		18	37.5			Same as above interbedded with olive gray 5Y 4/1 thinly bedded sandy LS. Wet at 59'. NOTE: Driller switched from air to fresh water.
	D		9	23			Same as above with trace thin beds of light olive gray 5Y 6/1 very well cemented sandy DO
70'	D		10	50			Same as above. Hard dry cherty DO at 70'
	D		12	15			Pale yellowish brown 10YR 6/2 hard cherty DO interbedded with grayish orange 10YR 7/4 very fine grain well cemented DO cemented SS. NOTE: Small sample recovery due to casing cement
80'	D		20	23			Dark yellowish brown 10YR 4/2 very fine grained weakly cemented dolomitic SS. Moderate HC odor.

LEGEND

PPM - PARTS PER MILLION
 FID - FLAME IONIZATION DETECTOR
 HC - HYDROCARBON

LS - LIMESTONE
 DO - DOLOMITE
 SS - SANDSTONE

SAMPLE METHOD

- SPLIT SPOON
- DRILL CUTTINGS
- SHELBY TUBE

- DEPTH AT WHICH FIRST WATER ENCOUNTERED
- STAYING DEPTH OF FIRST WATER AFTER _ HOURS

PROJECT NAME/# RATHON/509859		BORING#/H/W# MW-81		DATE DRILLED 9/19 - 9/20 9/22 - 9/23		DRILLING START TIME 14:00 - 9/19/95		DRILLING FINISH TIME 12:30 - 9/23/95	
ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM						SKETCH MAP SEE MONITOR WELL LOCATION MAP			
DRILLING METHOD AIR ROTORY		SURFACE ELEVATION (MGVD)		TOP OF CASING ELEV. (MGVD)					
GEOLOGIST A. WILSON		DRILLER WEST TEXAS WATER WELL SERVICE		DRILLING SUPERVISOR RONNY KEITH					
LATITUDE		LONGITUDE		SEC/TWMP/RGE					
REMARKS (DRILLING SEQUENCE) Drilled 7 7/8" pilot hole to 71' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. Surface casing to 71'bgl. Drilled 7 7/8" borehole from 71' to 225'bgl and Completed well with open borehole									
BOREHOLE DIAMETER 7 7/8"				TOTAL DEPTH OF BORING 225'					

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
100'	D		75	60	OPEN BOREHOLE		Dark yellowish brown 10YR 4/2 to brownish gray 5YR 4/1 very fine grained, weakly cemented SS with trace Light brown gray 5YR 6/1 cherty DO at 85'. Slight HC order
	D		25	11			Light brownish gray 5YR 6/1 hard cherty DO with trace very fine grained sand.
	D		15	25			Light brownish gray 5YR 6/1 hard cherty DO to grayish orange 10YR 7/4 hard micro-crystalline DO with conoidal fractures.
	D		15	21			Same as above to light brownish gray 5YR 6/1 micro-crystalline DO with conoidal fractures.
	D		15	23			Pale yellowish brown 10YR 6/2 and light brownish gray 5YR 6/1 micro-crystalline DO interbedded with pinkish gray 5YR 8/1 to light gray N7 very fine grain sandy DO. Very pale orange 10YR 8/2 very fine grain well cemented limy SS at 102' - 103'.
110'	D		11	38			Very pale orange 10YR 8/2 very fine grained weakly cemented limy SS.
	D		12	43			Same as above to 114'. Light brownish gray 5YR 6/1 cherty DO. NOTE: low sample recovery due to casing cement stuffing.
	D		10	19			Same as above. NOTE: low sample recovery due to casing cement stuffing.

LEGEND		SAMPLE METHOD			
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	DEPTH AT WHICH FIRST WATER ENCOUNTERED		
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	DRILL CUTTINGS	STAYING DEPTH OF FIRST WATER AFTER . HOURS		
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE			



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WELL LOG

PROJECT NAME/#	BORING#/HW#	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
MARATHON/509859	MW-81	9/19 - 9/20 9/22 - 9/23	14:00 - 9/19/95	12:30 - 9/23/95

SITE ADDRESS
INDIAN BASIN GAS PLANT - EDDY CO., NM

SKETCH MAP

 SEE MONITOR WELL
 LOCATION MAP

DRILLING METHOD	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
AIR ROTORY		
GEOLOGIST	DRILLER	DRILLING SUPERVISOR
A. WILSON	WEST TEXAS WATER WELL SERVICE	RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWMP/RGE

REMARKS (DRILLING SEQUENCE)
 Drilled 7 7/8" pilot hole to 71' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. Surface casing to 71'bgl. Drilled 7 7/8" borehole from 71' to 225'bgl and Completed well with open borehole

BOREHOLE DIAMETER	TOTAL DEPTH OF BORING
7 7/8"	225'

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
130'	D		10	19	OPEN BOREHOLE		Same as above to 125' with trace light brown 5YR 5/6 very fine grain moderate well cemented limy SS. NOTE: Low sample recovery due to casing cement sluffing.
	D		9	25		Lt brownish gray 5YR 6/1 cherty DO with trace pale yellowish brown 10YR 6/2 micro-crystalline DO. NOTE: low sample recovery.	
	D		9	17		Same as above. NOTE: low sample recovery due to casing cement sluffing.	
140'	D		12	23		Light gray N7 to light medium gray N6 very fine grained well cemented DO cemented SS from 136'-139'. Light brownish gray 5YR 6/1 cherty DO from 139'. NOTE: Low sample recovery	
	D		9	23		Light brownish gray 5YR 6/1 to light olive gray 5Y 6/1 cherty DO. NOTE: low sample recovery due to casing cement sluffing.	
150'	D		8	21		Same as above. Low sample recovery.	
	D		7	19		Same as above.	
160'	D		8	21		Same as above.	

LEGEND		SAMPLE METHOD		DEPTH AT WHICH FIRST WATER ENCOUNTERED
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	DRILL CUTTINGS	STAYING DEPTH OF FIRST WATER AFTER . HOURS
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	SHELBY TUBE		
HC - HYDROCARBON	SS - SANDSTONE			

WELL LOG

WELL NAME/ID RATHON/509859	BORING#/MW# MW-81	DATE DRILLED 9/19 - 9/20 9/22 - 9/23	DRILLING START TIME 14:00 - 9/19/95	DRILLING FINISH TIME 13:00 - 9/23/95
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ADDRESS
INDIAN BASIN GAS PLANT - EDDY CO., NM

SKETCH MAP

SEE MONITOR WELL
LOCATION MAP

DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWMP/RGE

REMARKS (DRILLING SEQUENCE)
Drilled 7 7/8" pilot hole to 71' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. Surface casing to 71'bgl. Drilled 7 7/8" borehole from 71' to 225'bgl and Completed well with open borehole

BOREHOLE DIAMETER 7 7/8"	TOTAL DEPTH OF BORING 225'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
170'	D	[Hatched pattern]	8	23	OPEN BOREHOLE		Pinkish gray 5YR 8/1 to light brownish gray 5YR 6/1 cherty DO.
	D	[Hatched pattern]	9	23		Light brownish gray 5YR 6/1 cherty DO with some very thin pinkish gray 5YR 8/1 very fine grained well cemented limy SS stringers.	
	D	[Hatched pattern]	8	25		Same as above.	
180'	D	[Hatched pattern]	19	25		Same as above.	
	D	[Hatched pattern]	8	19		Pinkish gray 5YR 8/1 cherty DO with some very fine grained limy sand stringers	
	D	[Hatched pattern]	9	20		Same as above. Slight HC odor.	
190'	D	[Hatched pattern]	8	21		Same as above. Slight HC odor.	
	D	[Hatched pattern]	65	43		Encountered water at 195' while drilling yellowish gray 5Y 8/1 very fine grain moderate well cemented limy SS. Moderate HC odor.	
200'							

LEGEND

PPM - PARTS PER MILLION	LS - LIMESTONE	[X] SPLIT SPOON	[V] DEPTH AT WHICH FIRST WATER ENCOUNTERED
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	[D] DRILL CUTTINGS	[▽] STAYING DEPTH OF FIRST WATER AFTER _ HOURS
HC - HYDROCARBON	SS - SANDSTONE	[■] SHELBY TUBE	



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WELL LOG

WELL NAME/ID RATHON/509859	BORING/MW# MW-81	DATE DRILLED 9/19 - 9/20 9/22 - 9/23	DRILLING START TIME 14:00 - 9/19/95	DRILLING FINISH TIME 13:00 - 9/23/95
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SITE ADDRESS
INDIAN BASIN GAS PLANT - EDDY CO., NM

SKETCH MAP

SEE MONITOR WELL
LOCATION MAP

DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWHP/RGE

REMARKS (DRILLING SEQUENCE)
Drilled 7 7/8" pilot hole to 71' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. Surface casing to 71' bgl. Drilled 7 7/8" borehole from 71' to 225' bgl and Completed well with open borehole

BOREHOLE DIAMETER 7 7/8"	TOTAL DEPTH OF BORING 225'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
210'	D		12	20	OPEN BOREHOLE		Same as above. No HC odor.
	D		11	20			Medium gray N5 very fine grained well cemented dolomitic SS.
	D		11	20			Grayish orange 10YR 7/4 fine to medium grained moderately well cemented Dolomitic SS. Strong HC odor.
220'	D		6	27			Grayish orange 10YR 7/4 very fine grained to fine grained moderate to weakly cemented SS. Slight HC odor.
	D		5	75			Same as above.
230'							
240'							

LEGEND		SAMPLE METHOD		DEPTH AT WHICH FIRST WATER ENCOUNTERED
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	STAYING DEPTH OF FIRST WATER AFTER _ HOURS	
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	DRILL CUTTINGS		
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE		



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WELL LOG

PROJECT NAME/ID PARATHON/509859	BORING/MW# MW-82	DATE DRILLED 9/20, 9/21, & 9/25/95	DRILLING START TIME 14:00 - 9/20/95	DRILLING FINISH TIME 17:15 - 9/25/95
SITE ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM			SKETCH MAP	
DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)	SEE MONITOR WELL LOCATION MAP	
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH		
LATITUDE	LONGITUDE	SEC/TWHP/RGE		
REMARKS (DRILLING SEQUENCE) Drilled 7 7/8" pilot hole to 66.75' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel surface casing to 66.75' bgl. Drilled 7 7/8" borehole from 66.75' to 227' bgl. Completed well open hole from 66.75' to 227' bgl.				
BOREHOLE DIAMETER 12 1/4"-66.75', 7 7/8"-227'		TOTAL DEPTH OF BORING 227'		

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
0'	D		3	60	CASING		Very pale orange 10YR 8/2 to pinkish gray 5YR 8/1 weathered Limestone (LS).
10'	D		5	23			Light brownish gray 5 YR 6/1 hard DD with concoidal fractures from 5'-7'. Pinkish gray 5YR 8/1 weathered LS from 7'-10' with trace very fine grained limy sand.
20'	D		3	12			Pale yellowish brown 10YR 6/2 hard DD interbedded with light olive gray 5Y 6/1 sandy LS with trace very fine grained limy sand.
30'	D		4	14			Grayish orange 10YR 7/4 to light brownish gray 5YR 6/1 moderately well cemented limy SS interbedded with pale yellowish brown 10YR 6/2 hard DD.
40'	D		15	16			Grayish orange 10YR 7/4 very fine grained well cemented. SS interbedded with light brownish gray 5YR 6/1 very fine grained, well cemented limy SS with trace biotite to 23'. Grayish orange 10YR 7/4 very fine grained moderate well cemented limy SS.
50'	D		12	25		CEMENT	Grayish orange 10YR 7/4 very fine grained, moderately well cemented limy SS to 29'. Pale yellowish brown 10YR 6/2 very fine grained, well cemented limy SS.
60'	D		11	25		CEMENT	Pale yellowish brown 10YR 6/2 well cemented, very fine grained limy SS interbedded with dark yellowish orange 10YR 6/6 very fine grained, moderate to poorly cemented SS.
70'	D		30	23			Moist, moderate yellowish brown 10YR 5/4 to brownish gray 5YR 4/1 moderate to well cemented, very fine grained, SS to 38'. Light brown gray 5YR 6/1 well cemented, very fine grained limy SS interbedded with light gray N7 cherty DD. Slight HC odor.

LEGEND

PPM - PARTS PER MILLION
 FID - FLAME IONIZATION DETECTOR
 HC - HYDROCARBON

LS - LIMESTONE
 DD - DOLOMITE
 SS - SANDSTONE

SAMPLE METHOD

- SPLIT SPOON
- DRILL CUTTINGS
- SHELBY TUBE

- DEPTH AT WHICH FIRST WATER ENCOUNTERED
- STAYING DEPTH OF FIRST WATER AFTER _____ HOURS



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WELL LOG

WELL NAME/ID MARATHON/509859	BORING/MWR MW-82	DATE DRILLED 9/20, 9/21, & 9/25/95	DRILLING START TIME 14:00	DRILLING FINISH TIME 18:30
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SITE ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM		
DRILLING METHOD AIR ROTORY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWHP/RGE

SKETCH MAP

SEE MONITOR WELL
LOCATION MAP

REMARKS (DRILLING SEQUENCE)
 Drilled 7 7/8" pilot hole to 66.75' below ground level (bgl).
 Reamed out pilot hole to 12 1/4" and set 8 5/8" steel surface casing to 66.75' bgl. Drilled 7 7/8" borehole from 66.75' to 227' bgl. Completed well open hole from 66.75' to 227' bgl.

BOREHOLE DIAMETER 12 1/4"-66.75', 7 7/8"-227'	TOTAL DEPTH OF BORING 227'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
50'	D		25	14	CEMENT CASING CEMENT OPEN BOREHOLE CEMENT		Light brownish gray 5YR 6/1 very fine grained, well cemented limy SS interbedded with light olive gray 5Y 6/1 sandy LS. Moderate HC odor.
	D		22	7.5			Olive gray 5Y 4/1 sandy LS interbedded with brownish gray very fine grained, well cemented limy SS. Light gray N7 cherty DD at 49'. Moderate HC odor.
	D		55	25			Light gray N7 to medium light gray N8 very fine grained DD cemented SS. Moderate HC odor.
60'	D		60	27		Moist	Brownish gray 5YR 4/1 poorly to weakly cemented very fine grained DD cemented SS. Strong HC odor.
	D		55	27			Light olive gray 5Y 6/1 very well cemented, Dolomitic SS interbedded with light gray sandy DD. Moderate HC odor.
70'	D		15	38			Light gray N7 very fine grained, very well cemented dolomitic SS. Slight HC odor.
	D		12	15			Light gray N7 to light olive gray 5Y 6/1 very fine grained, very well cemented dolomitic SS to 72'. Light olive gray sandy DD to brownish gray 5YR 4/1 cherty DD.
80'	D		10	19			Light brownish gray 5YR 6/1 to light gray N7 cherty DD to 77'. Dark yellowish brown 10YR 4/2 very fine grained, moderate well cemented limy SS.

LEGEND		SAMPLE METHOD	
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	DEPTH AT WHICH FIRST WATER ENCOUNTERED
FID - FLAME IONIZATION DETECTOR	DD - DOLOMITE	DRILL CUTTINGS	STAYING DEPTH OF FIRST WATER AFTER . HOURS
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE	

WELL LOG

WELL NAME/ID TRATHON/509859	BORING#/MWH MW-82	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
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SITE ADDRESS
INDIAN BASIN GAS PLANT - EDDY CO., NM

SKETCH MAP

 SEE MONITOR WELL
 LOCATION MAP

DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWMP/RGE

REMARKS (DRILLING SEQUENCE)
 Drilled 7 7/8" pilot hole to 66.75' below ground level (bgl).
 Reamed out pilot hole to 12 1/4" and set 8 5/8" steel surface casing to 66.75' bgl. Drilled 7 7/8" borehole from 66.75' to 227' bgl. Completed well open hole from 66.75' to 227' bgl.

BOREHOLE DIAMETER 7 7/8"	TOTAL DEPTH OF BORING 227'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
90'	D		12	50	OPEN BOREHOLE	Moist	Moist light brownish gray 5YR 6/1 to light gray N7 sandy DO to 82'. Grayish brown 5YR 3/2 very fine grained, moderate to weakly cemented, DOLMICTIC cemented, SS to 85'.
	D		8	38		Light olive gray 5Y 6/1 very fine grained, well cemented dolomitic SS from 85' - 87'. Grayish brown 5YR 3/2 very fine grained, moderate to weakly cemented DOLMICTIC cemented SS from 87' - 89'. Light gray N7 very fine grained sandy DO from 89' - 90'.	
	D		9	25		Light gray N7 to pale yellowish brown 10YR 6/2 very fine grained very well cemented sandy DO.	
100'	D		6	20		Pale yellowish brown 10YR 6/2 to light brownish gray 5YR 6/1 cherty DO.	
	D		8	17		Light brownish gray 5YR 6/1 cherty DO interbedded with very pale orange 10YR 8/2 cherty LS.	
110'	D		5	18		Light brownish gray 5YR 6/1 to grayish orange pink 5YR 7/2 cherty DO, interbedded with medium gray N5 very fine grained sandy DO.	
	D		12	20		Medium light gray N6 cherty DO interbedded with light brownish gray 5YR 6/1 very fine grained sand DO and yellowish gray 5YR 7/2 micro-crystalline DO.	
120'	D		6	20		Light brownish gray 5YR 6/1 to pinkish gray 5YR 8/1 cherty DO interbedded with light olive gray 5Y 6/1 very fine grained, well cemented liney SS from 117'-119'. Olive gray sandy DO to brownish gray 5YR 4/1 cherty DO from 119' - 120'.	

LEGEND PPM - PART PER MILLION FID - FLAME IONIZATION DETECTOR HC - HYDROCARBON LS - LIMESTONE DO - DOLOMITE SS - SANDSTONE	SAMPLE METHOD ☒ SPLIT SPOON D DRILL CUTTINGS ☒ SHELBY TUBE	∇ DEPTH AT WHICH FIRST WATER ENCOUNTERED ▼ STAYING DEPTH OF FIRST WATER AFTER . . . HOURS
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WELL LOG

WELL NAME/ID MARATHON/509859	BORING/MW# MW-82	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
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SITE ADDRESS
INDIAN BASIN GAS PLANT - EDDY CO., NM

SKETCH MAP

SEE MONITOR WELL LOCATION MAP

DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH
LATITUDE	LONGITUDE	SEC/TWMP/RGE

REMARKS (DRILLING SEQUENCE)
 Drilled 7 7/8" pilot hole to 66.75' below ground level (bgl).
 Reamed out pilot hole to 12 1/4" and set 8 5/8" steel surface casing to 66.75' bgl. Drilled 7 7/8" borehole from 66.75' to 227' bgl. Completed well open hole from 66.75' to 227' bgl.

BOREHOLE DIAMETER 7 7/8"	TOTAL DEPTH OF BORING 227'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
130'	D		11	18	OPEN BOREHOLE		Light brownish gray 5YR 6/1 cherty DD.
	D		9	23		Light gray N7 to light brownish gray 5YR 6/1 cherty DD to 128'. Pinkish gray 5YR 8/1 cherty LS from 128' - 130'.	
	D		6	27		Light gray N7 to light brownish gray 5YR 6/1 cherty DD interbedded with thin beds of medium dark gray N4 very fine grained, moderate well cemented, dolomitic SS.	
140'	D		6	21		Medium gray N5 to light brownish gray 5YR 6/2 cherty DD interbedded with very fine grained very well cemented sandy DD.	
	D		12	38		Light gray N7 very fine grained sandy DD to 141'. Yellowish gray 5Y 8/1 very fine grained, weakly cemented limy SS 141' - 144'. Light gray N7 very fine grained sandy DD from 144' - 145'.	
	D		15	43		Light gray N7 very fine grained, well cemented limy SS.	
150'	D		13	30		Light brownish gray 5YR 6/1 cherty DD interbedded with yellowish gray, very fine grained, well cemented limy SS.	
	D		10	18		Light brownish gray 5YR 6/1 cherty DD interbedded with light gray N7, very fine grained sandy DD.	
160'	D						

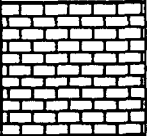
LEGEND		SAMPLE METHOD		DEPTH AT WHICH FIRST WATER ENCOUNTERED
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	STAYING DEPTH OF FIRST WATER AFTER _ HOURS	
FID - FLAME IONIZATION DETECTOR	DD - DOLOMITE	DRILL CUTTINGS		
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE		






WELL NAME/NO	BORING/MW#	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
RATHON/509859	MW-82			
SITE ADDRESS			SKETCH MAP	
INDIAN BASIN GAS PLANT - EDDY CO., NM			SEE MONITOR WELL LOCATION MAP	
DRILLING METHOD	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)		
AIR ROTARY				
GEOLOGIST	DRILLER	DRILLING SUPERVISOR		
A. WILSON	WEST TEXAS WATER WELL SERVICE	RONNY KEITH		
LATITUDE	LONGITUDE	SEC/TWMP/RGE		
REMARKS (DRILLING SEQUENCE)				
Drilled 7 7/8" pilot hole to 66.75' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. surface casing to 66.75' bgl. Drilled 7 7/8" borehole from 66.75' to 227' bgl. Completed well open hole from 66.75' to 227' bgl.				
BOREHOLE DIAMETER		TOTAL DEPTH OF BORING		
7 7/8"		227'		

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
	D		4	30	OPEN BOREHOLE		Brownish gray 5YR 4/1 to light olive gray 5Y 6/1 very fine grained, moderate to well cemented limy SS to 164'. Light brownish gray 5YR 6/1 cherty DD from 164' - 165'.
170'	D		4	20		Light brownish gray 5YR 6/1 cherty DD and sandy DD.	
	D		9	20		Same as above with some pale yellow brown 10YR 6/2 very fine grained limy sand.	
180'	D		6	21		Pinkish gray 5YR 8/1 cherty DD.	
	D		7	14		Pinkish gray 5YR 8/1 to light brownish gray 5YR 6/1 cherty DD.	
190'	D		5	19		Same as above.	
	D		4	16		Same as above.	
200'	D		4	38		Same as above to 197'. Very pale orange 10YR 8/2 moist to wet very fine grained, well cemented limy SS from 197' - 200'. Slight HC odor.	

LEGEND		SAMPLE METHOD		DEPTH AT WHICH FIRST WATER ENCOUNTERED
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	STAYING DEPTH OF FIRST WATER AFTER _ HOURS	
FID - FLAME IONIZATION DETECTOR	DD - DOLOMITE	DRILL CUTTINGS		
HC - HYDROCARBON	HC - HYDROCARBON	SHCLBY TUBE		

NAME/# MARATHON/509859		BORING/MW# MW-82	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
SITE ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM			SKETCH MAP SEE MONITOR WELL LOCATION MAP		
DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)			
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH			
LATITUDE	LONGITUDE	SEC/TWMP/RGE			
REMARKS (DRILLING SEQUENCE) Drilled 7 7/8" pilot hole to 66.75' below ground level (bgl). Reamed out pilot hole to 12 1/4" and set 8 5/8" steel. surface casing to 66.75' bgl. Drilled 7 7/8" borehole from 66.75' to 227' bgl. Completed well open hole from 66.75' to 227' bgl.					
BOREHOLE DIAMETER 7 7/8"			TOTAL DEPTH OF BORING 227'		

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
210'	D		6	33	OPEN BOREHOLE		Very pale orange 10YR 8/2 very fine grained, well cemented limy SS.
	D		8	60			Very pale orange 10YR 8/2 very fine grained, well cemented limy SS to brownish gray 5YR 4/1 very fine grained, well to moderate well cemented dolomitic SS.
	D		6	30			Brownish gray 5YR 4/1 very fine grained, well to moderate well cemented dolomitic SS interbedded with grayish orange 10YR 7/4 vuggy LS with quartz crystal replacement in vuggs.
220'	D		4	33			Grayish orange 10YR 7/4 LS interbedded with light olive gray 5Y 6/1 very fine grained, moderate well cemented dolomitic SS.
	D		4	30			Moderate yellowish brown 10YR 5/4 very fine grained, moderate well cemented dolomitic SS interbedded with very pale orange 10YR 8/2 very fine grained sandy LS.
230'				24			Same as above except dolomitic SS is well to very well cemented.

LEGEND		SAMPLE METHOD	
PPM - PARTS PER MILLION	LS - LIMESTONE	 SPLIT SPOON	 DEPTH AT WHICH FIRST WATER ENCOUNTERED
FID - FLAME IONIZATION DETECTOR	DD - DOLOMITE	 DRILL CUTTINGS	 STAYING DEPTH OF FIRST WATER AFTER _ HOURS
HC - HYDROCARBON	SS - SANDSTONE	 SHELBY TUBE	

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63
 Surface Elev. _____ Total Hole Depth 250 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 196.1 ft. Static 191.6 ft.
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 in. Length 67.5 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Scott Underwood Date 9/30/96 Permit # _____
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Initial boring installed to 227 ft. by Jones Environmental, Inc. (JEI) and deepened to 250 ft. by Fluor Daniel GTI on 9/30/96.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						12.25-inch borehole with 8-inch surface casing from 0 to 67.5 ft.
0						0-5 Ft: v. pale orange (10yr 8/2) to pinkish gray (5yr 8/1) weathered LIMESTONE .
2		3	600			
4						
6						5-7 Ft: l. brownish gray (5yr 6/1) DOLOMITE , hard, conchoidal fractures.
8		5	23			7-10 Ft: Pinkish gray (5yr 8/1), weathered LIMESTONE , with trace v. fine-grained limey sand.
10						
12						10-15 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , hard, with interbedded l. olive gray (5y 6/1) sandy LIMESTONE , with trace v. fine-grained limey sand.
14		3	12			
16						15-20 Ft: Grayish orange (10yr 7/4) to l. brownish gray (5yr 6/1) limey SANDSTONE , mod. to well cemented, interbedded with pale yellowish brown (10yr 6/2) DOLOMITE , hard.
18		4	14			
20						
22						20-23 Ft: Grayish orange (10yr 7/4) SANDSTONE , v. fine-grained, well cemented, interbedded with l. brownish gray (5yr 6/1) limey SANDSTONE , v. fine-grained, well cemented, trace biotite.
24		15	16			23-25 Ft: Grayish orange (10yr 7/4) limey SANDSTONE , v. fine-grained, mod. to well cemented.



Drilling Log

Recovery Well MW-82

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		15	16			25-29 Ft: Grayish orange (10yr 7/4) limey, SANDSTONE , v. fine-grained, mod. to well cemented.
26						
28						
30		12	25			29-30 Ft: Pale yellowish brown (10yr 6/2) limey SANDSTONE , v. fine-grained, well cemented. 30-35 Ft: Pale yellowish brown (10yr 6/2) limey SANDSTONE , v. fine-grained, well cemented, interbedded with d. yellowish orange (10yr 6/6) SANDSTONE , v. fine-grained, mod. to poorly cemented.
32						
34		11	25			
36						35-38 Ft: Mod. yellowish brown (10yr 5/4) to brownish gray (5yr 4/1) SANDSTONE , mod. to well cemented, v. fine-grained, moist.
38		30	23			38-40 Ft: L. brown gray (5yr 6/1) limey SANDSTONE , well cemented, v. fine-grained, interbedded with l. gray (N7) cherty DOLOMITE . Slight hydrocarbon odor.
40						40-45 Ft: L. brownish gray (5yr 6/1) limey SANDSTONE , v. fine-grained, well cemented, interbedded with l. olive gray (5yr 6/1) sandy LIMESTONE , mod. hydrocarbon odor.
42		25	14			
44						45-49 Ft: Olive gray (5y 4/1) sandy LIMESTONE interbedded with brownish gray limey SANDSTONE , v. fine-grained, well cemented.
46						
48		22	7.5			
50						49-50 Ft: L. gray (N7) cherty DOLOMITE , mod. hydrocarbon odor.
52						50-55 Ft: Light gray (N7) to med. light gray (N8) dolomitic cemented SANDSTONE , v. fine-grained, mod. hydrocarbon odor.
54		55	25			
56						55-80 Ft: Brownish gray (5yr 4/1) dolomitic cemented SANDSTONE , weakly cemented, v. fine-grained, strong hydrocarbon odor. Moist.



Drilling Log

Recovery Well MW-82

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58		60	27			
60						
62						80-85 Ft: L. olive gray (5y 6/1) dolomitic SANDSTONE , interbedded with l. gray sandy DOLOMITE , v. well cemented, mod. hydrocarbon odor.
64		55	27			
66						65-70 Ft: L. gray (N7) dolomitic SANDSTONE , v. fine-grained, v. well cemented, slight hydrocarbon odor.
68		15	38			Open borehole from 67.5 to 250 ft.
70						70-72 Ft: L. gray (N7) to l. olive gray (5y 6/1), dolomitic SANDSTONE , v. well cemented, v. fine-grained.
72						72-75 Ft: L. olive gray (sandy) to l. brownish gray (5yr 4/1 cherty) DOLOMITE .
74		12	15			
76						75-77 Ft: L. brownish gray (5yr 6/1) to l. gray (N7) cherty DOLOMITE .
78		10	19			77-80 Ft: D. yellowish brown (10yr 4/2) limey SANDSTONE , v. fine-grained, mod. to well cemented.
80						80-82 Ft: L. brownish gray (5yr 6/1) to l. gray (N7) sandy DOLOMITE .
82		12	50			82-85 Ft: Grayish brown (5yr 3/2) dolomitic SANDSTONE , v. fine-grained, mod. to weakly cemented.
84						85-87 Ft: L. olive gray (5yr 6/1) dolomitic SANDSTONE , v. fine-grained, well cemented.
86						87-89 Ft: Grayish brown (5yr 3/2) dolomitic SANDSTONE , v. fine-grained, mod. to weakly cemented.
88		8	38			



Drilling Log











Recovery Well MW-82

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88	[Empty Box]	8	38	[Dotted Pattern]		
90						89-90 Ft: L. gray (N7) sandy DOLOMITE, v. fine-grained.
92		9	25	[Diagonal Hatching]		90-95 Ft: L. gray (N7) to pale yellowish brown (10yr 6/2) sandy DOLOMITE, v. fine-grained, v. well cemented.
94						95-100 Ft: Pale yellowish brown (10yr 6/2) to l. brownish gray (5yr 6/1) cherty DOLOMITE.
96		6	20	[Diagonal Hatching]		
98						100-105 Ft: L. brownish gray (5 yr 6/1) cherty DOLOMITE interbedded with v. pale orange (10yr 8/2) cherty LIMESTONE.
100		8	17	[Diagonal Hatching]		
102						105-110 Ft: L. brownish gray (5yr 6/1) to grayish orange pink (5yr 7/2) cherty DOLOMITE interbedded with med. gray (N5) sandy DOLOMITE, v. fine-grained.
104		5	18	[Diagonal Hatching]		
106						110-117 Ft: Med. l. gray (N6) cherty DOLOMITE, interbedded with l. brownish gray (5yr 6/1) sandy DOLOMITE, v. fine-grained, and yellowish gray (5yr 7/2) DOLOMITE, m.crystalline.
108		12	20	[Diagonal Hatching]		
110						
112	6	20	[Dotted Pattern]			
114					117-119 Ft: L. brownish gray (5yr 6/1) to pinkish gray (5yr 8/1) cherty DOLOMITE, interbedded with l. olive gray (5y 6/1) limey SANDSTONE, v. fine-grained, well cemented.	
116						
118						119-120 Ft: Olive gray sandy DOLOMITE to brownish gray (5yr 4/1) cherty DOLOMITE.
120						

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%																		
120						120-125 Ft: L. brownish gray, cherty DOLOMITE.																		
122						11	18		125-130 Ft: L. gray (N7) to l. brownish gray (5yr 6/1), cherty DOLOMITE.															
124										128-130 Ft: Pinkish gray (5yr 8/1) cherty LIMESTONE.														
126										8	23		130-135 Ft: L. gray (N7) to l. brownish gray (5yr 6/2) cherty DOLOMITE interbedded with thin beds of med. d. gray (N4) dolomitic SANDSTONE, v. fine-grained, mod. to well cemented.											
128														135-140 Ft: Med. gray (N5) to l. brownish gray (5yr 6/2) cherty DOLOMITE interbedded with sandy DOLOMITE, v. fine-grained, v. well cemented.										
130														6	27		140-141 Ft: L. gray (N7) sandy DOLOMITE, v. fine-grained.							
132																		141-144 Ft: Yellowish gray (5y 8/1) limey SANDSTONE, v. fine-grained, weakly cemented.						
134																					144-145 Ft: L. gray (N7) sandy DOLOMITE, v. fine grained.			
136																					6	21		145-150 Ft: L. gray (N7) limey SANDSTONE, v. fine-grained, well cemented.
138																								
140																								
142																								
144						12	38																	
146																								
148																								
150													15			43								
152																								



Drilling Log

Recovery Well MW-82

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PIID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
152							
154		13	30				
156							155-160 Ft: L. brownish gray (5yr 6/1) cherty DOLOMITE interbedded with l. gray (N7) sandy DOLOMITE, v. fine-grained.
158		10	18				
160							160-164 Ft: Brownish gray (5yr 4/1) to l. olive gray (5y 6/1) limey SANDSTONE, v. fine-grained, mod. to well cemented.
162		4	30				
164							164-165 Ft: L. brownish gray (5yr 6/1) cherty DOLOMITE. 165-170 Ft: L. brownish gray (5yr 6/1) cherty and sandy DOLOMITE.
166							
168		4	20				
170							170-175 Ft: Same as above (some pale yellow brown (10yr 6/2) limey sand, v. fine-grained).
172		9	20				
174							175-180 Ft: Pinkish gray (5yr 8/1) cherty DOLOMITE.
176							
178	6	21					
180						180-185 Ft: Pinkish gray (5yr 8/1) to l. brownish gray (5yr 6/1) cherty DOLOMITE.	
182	7	14					
184							



Drilling Log

Recovery Well MW-82

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%			
184		5	19			185-190 Ft: Same as above			
186						190-195 Ft: Same as above.			
188						Depth to water on 9/30/96.			
190									
192									
194						4	16		195-197 Ft: Same as above.
196									Depth to water (initial) as encountered during drilling (9/20-25/95).
198						4	38		197-200 Ft: V. pale orange (10yr 8/2) limey SANDSTONE, v. fine-grained, well cemented, moist to wet, slight hydrocarbon odor.
200									200-205 Ft: V. pale orange (10yr 8/2) limey SANDSTONE, v. fine-grained, well cemented.
202						6	33		
204				205-210 Ft: V. pale orange (10yr 8/2) limey SANDSTONE, v. fine-grained, well cemented, to brownish gray (5yr 4/1) dolomitic SANDSTONE, v. fine-grained, mod. to well cemented.					
206									
208	8	60							
210									
212	6	30			210-215 Ft: Brownish gray (5yr 4/1) dolomitic SANDSTONE, v. fine-grained, well to mod. well cemented, interbedded with grayish orange (10yr 7/4) vuggy LIMESTONE (quartz crystal replacement in vugs).				
214									
216					215-220 Ft: Grayish orange (10yr 7/4) LIMESTONE, interbedded with l. olive gray (5y 6/1) dolomitic SANDSTONE, v. fine-grained, mod. to well cemented.				





Drilling Log

Recovery Well MW-82

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
216	[Empty Box]	4	33	[Pattern]		220-225 Ft: Mod. yellowish brown (10yr 5/4) dolomitic SANDSTONE, v. fine-grained, mod. to well cemented, interbedded with v. pale orange (10yr 8/2) sandy LIMESTONE, v. fine-grained.
218						
220		4	30	[Pattern]		225-230 Ft: Same as above (dolomitic SANDSTONE well to v. well cemented).
222						
224		47	60	[Pattern]		230-235 Ft: V. pale brown (10yr 8/4) sandy DOLOMITE, hard, little hydrocarbon staining, some v. thin beds of sandstone, hydrocarbon odor.
226						
228		19.6	50	[Pattern]		235-240 Ft: Same as above (becomes sandier).
230						
232		14.8	38	[Pattern]		240-245 Ft: Pale yellow (2.5 7/4) silty SANDSTONE, fine to v. fine-grained, subrounded to rounded, mod. sorted, trace d. mineral, hydrocarbon odor.
234						
236	9.2	50	[Pattern]		245-250 Ft: V. pale brown (10yr 7/4) sandy DOLOMITE, hard, m.crystalline, cuttings are blocky and coarse sand sized, occ. v. thin beds of dolomitic sand, faint hydrocarbon odor.	
238						
240						
242						
244						
246						
248						

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-248						
-250						
-252						
-254						
-256						
-258						
-260						
-262						
-264						
-266						
-268						
-270						
-272						
-274						
-276						
-278						
-280						

PROJECT NAME/# RATHON/509859		BORING#/HW# MW-83		DATE DRILLED 9/20, 9/22, & 9/26		DRILLING START TIME 15:00 - 9/21/95		DRILLING FINISH TIME 17:00					
ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM						SKETCH MAP SEE MONITOR WELL LOCATION MAP							
DRILLING METHOD AIR ROTORY		SURFACE ELEVATION (MGVD)		TOP OF CASING ELEV. (MGVD)									
GEOLOGIST A. WILSON		DRILLER WEST TEXAS WATER WELL SERVICE		DRILLING SUPERVISOR RONNY KEITH									
LATITUDE		LONGITUDE		SEC/TWMP/RGE									
REMARKS (DRILLING SEQUENCE) Drilled 7 7/8' pilot hole to 40' below ground level (bgl). Reamed out pilot hole to 12 1/4' and set 8 5/8' steel. surface casing to 39'bgl. Drilled 7 7/8' borehole from 39' to 202' bgl. Complete well open hole from 39' to 202' bgl.													
BOREHOLE DIAMETER 12 1/4' - 39', 7 7/8' - 202'					TOTAL DEPTH OF BORING 202'								
DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA						
	D		7	60	CASING	ML	Dark yellowish brown 10YR 4/2 sandy loam from 0' - 6'. Grayish orange 10YR 7/4 cherty DO interbedded w/very pale orange 10YR 8/2 to pale yellow orange 10YR 8/6 very fine grained moderate well cemented SS.						
	D		7	30			Same as above						
	D		6	20			Very pale orange 10YR 8/2 cherty DO interbedded w/grayish orange 10YR 7/4 to grayish orange pink 5YR 7/2 very fine grained, very well cemented DOLOMITIC Sandstone (SS) with Mn & Fe oxide staining						
20'	D		8	14			Very light gray N7 cherty DO interbedded with pinkish gray 5YR 8/1, light brownish gray 5YR 6/1, and yellowish gray 5YR 8/1 very fine grained, very well cemented DOLOMITIC SS with Mn & Fe oxide staining.						
	D		9	10	CEMENT	CEMENT	Light gray N7 to medium light gray N6 sandy DO interbedded w/dark yellowish orange 10YR 6/6 and very light gray N8 very fine grained, well cemented DOLOMITIC SS and pinkish gray 5YR 8/1 very fine grain very well cemented DOLOMITIC SS w/Fe oxide staining.						
30'	D		12	12			Light brownish gray 5YR 6/1 very fine grained, very well cemented DO cement SS to 29'. Grayish orange 10YR 7/4 to dark yellowish orange 10YR 6/6 very fine grained, well cemented limey SS with Fe oxide staining.						
	D		10	7.5			Same as above interbedded w/grayish orange 10YR 7/4 to pale yellowish brown 10YR 6/2 very hard cherty DO.						
	D		18	27			Light brown yellow 5YR 6/1 to medium light gray N6 cherty DO interbedded w/brownish gray 5YR 4/1 very fine grained, very well cemented DOLOMITIC SS.						
LEGEND		PPM - PARTS PER MILLION		FID - FLAME IONIZATION DETECTOR		HC - HYDROCARBON		LS - LIMESTONE		DO - DOLOMITE		SS - SANDSTONE	
		SAMPLE METHOD		<input checked="" type="checkbox"/> SPLIT SPOON <input checked="" type="checkbox"/> DRILL CUTTINGS <input checked="" type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> DEPTH AT WHICH FIRST WATER ENCOUNTERED <input checked="" type="checkbox"/> STAYING DEPTH OF FIRST WATER AFTER 1 HOURS							

CT NAME#	BORING#/MW#	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
MARATHON/509859	MW-83	9/26/95	08:30	17:00
SITE ADDRESS			SKETCH MAP SEE MONITOR WELL LOCATION MAP	
INDIAN BASIN GAS PLANT - EDDY CO., NM				
DRILLING METHOD	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)		
AIR ROTORY				
GEOLOGIST	DRILLER	DRILLING SUPERVISOR		
A. WILSON	WEST TEXAS WATER WELL SERVICE	RONNY KEITH		
LATITUDE	LONGITUDE	SEC/TWMP/RGE		
REMARKS (DRILLING SEQUENCE)				

BOREHOLE DIAMETER	TOTAL DEPTH OF BORING
7 7/8"	202'

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
50'	D	[Hatched Pattern]	23	20	OPEN BOREHOLE [Hatched Pattern]		Very light gray N8 to yellowish gray 5YR 8/1 very fine grain ED, sandy DO interbedded with light brownish gray 5YR 6/1 to brownish gray 5YR 4/1 very fine grain ED, moderate to well cemented DOLOMITIC SS.
	D	[Hatched Pattern]	25	16			Same as above.
	D	[Hatched Pattern]	10	17			Very pale orange 10YR 8/2 very fine grained, sandy DO interbedded with pinkish gray 5YR 8/1 cherty DO.
60'	D	[Hatched Pattern]	8	12			Pale yellowish brown 10YR 6/2 cherty DO interbedded with dark yellowish orange cherty LS
	D	[Hatched Pattern]	7	43			Light brownish gray cherty DO to 62' very pale orange 10YR 8/2 very fine grained, very well cemented limy SS at 62' - 65'.
70'	D	[Hatched Pattern]	60	19			Light brownish gray 5YR 6/1 cherty DO and sandy DO interbedded with grayish orange 10YR 7/4 cherty LS and light olive gray 5YR 6/1 very fine grained, sandy LS.
	D	[Hatched Pattern]	90	12			Light brownish gray 5YR 6/1 cherty DO and sandy DO interbedded.
80'	D	[Hatched Pattern]	12	17			Light gray N7 very fine grained, moderately well cemented limy SS with Fe oxide staining 75' - 77'. Brownish gray 5YR 4/1 very fine grained, sandy DO to light brownish gray 5YR 6/1 cherty DO from 77' - 80'

LEGEND		SAMPLE METHOD	
PPH - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	DEPTH AT WHICH FIRST WATER ENCOUNTERED
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	DRILL CUTTINGS	STAYING DEPTH OF FIRST WATER AFTER . . . HOURS
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE	

WELL NAME/#	BORING#/HW#	DATE DRILLED	DRILLING START TIME	DRILLING FINISH TIME
RATHON/509859	MW-83	9/26/95	08:30	17:00
SITE ADDRESS			SKETCH MAP	
INDIAN BASIN GAS PLANT - EDDY CO., NM			SEE MONITOR WELL LOCATION MAP	
DRILLING METHOD	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)		
AIR ROTARY				
GEOLOGIST	DRILLER	DRILLING SUPERVISOR		
A. WILSON	WEST TEXAS WATER WELL SERVICE	RONNY KEITH		
LATITUDE	LONGITUDE	SEC/TWMP/RGE		
REMARKS (DRILLING SEQUENCE)				
BOREHOLE DIAMETER			TOTAL DEPTH OF BORING	
7 7/8"			202'	

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
	D		18	18	OPEN BOREHOLE		Light brownish gray 5YR 6/1 cherty DD to 83'. Very pale orange 10YR 8/2 very fine grained sandy LS 83' - 85'
	D		85	19			Light brownish gray 5YR 6/1 to medium Light gray N6 cherty DD interbedded with brownish gray 5YR 4/1 very fine grained, sandy DD and very thin beds of yellowish gray 5YR 7/2 very fine grained, sandy LS.
	D		8	43			Light brownish gray 5YR 6/1 very fine grained sandy DD interbedded with very thin bedded yellowish gray 5Y 8/1 dolomitic SS.
100'	D		10	38			Pale yellowish brown 10YR 6/2 cherty DD and very fine grained sandy DD interbedded with very pale orange 10YR 8/2, grayish orange 10R 7/4 and yellowish gray 5Y 8/1 very fine grained, well cemented limy SS.
	D		7	25			Same as above
110'	D		18	25			Pale yellowish brown 10YR 6/2 to grayish orange 10YR 7/4 very fine grained sandy DD interbedded w/thin beds of grayish orange 10YR 7/4 to very pale orange 10YR 8/2 very fine grained, moderate to well cemented limy SS.
	D		25	38			Pale yellow brown 10YR 6/2 cherty DD interbedded with light brownish gray 5YR 6/1 to pink gray 5YR 8/1 very fine grained sandy DD to 113'. Moderate to weakly cemented pale yellowish orange 10YR 8/6 limy SS from 113' - 115'.
	D		11	19			Pale yellowish brown 10YR 6/2 cherty DD interbedded with grayish orange 10YR 7/4 very fine grained moderately well cemented limy SS.

LEGEND

- | | | | |
|---------------------------------|----------------|----------------|--|
| PPM - PARTS PER MILLION | LS - LIMESTONE | SPLIT SPOON | DEPTH AT WHICH FIRST WATER ENCOUNTERED |
| FID - FLAME IONIZATION DETECTOR | DD - DOLOMITE | DRILL CUTTINGS | STAYING DEPTH OF FIRST WATER AFTER _ HOURS |
| HC - HYDROCARBON | SS - SANDSTONE | SHELBY TUBE | |

JECT NAME/## MARATHON/509859	BORING#/MW# MW-83	DATE DRILLED 9/26/95	DRILLING START TIME	DRILLING FINISH TIME
SITE ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM			SKETCH MAP SEE MONITOR WELL LOCATION MAP	
DRILLING METHOD AIR ROTORY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)		
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH		
LATITUDE	LONGITUDE	SEC/TWHP/RGE		
REMARKS (DRILLING SEQUENCE)				
BOREHOLE DIAMETER 7 7/8"		TOTAL DEPTH OF BORING 202'		

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
130'	D		12	27	OPEN BOREHOLE 		Medium gray NS cherty DO interbedded with pale yellowish brown IOYR 6/2 to yellowish gray 5Y 8/1 very fine grained, sandy LS.
	D		11	20			Light brownish gray 5YR 6/1 cherty and sandy DO interbedded with pinkish gray 5YR 8/1 very fine grained sandy LS.
	D		17	19			Same as above
140'	D		14	17			Light brownish gray 5YR 6/1 cherty DO interbedded with very thin beds of very pale orange IOYR 8/2 very fine grained, very well cemented limey SS.
	D		14	19			Same as above
150'	D		9	21			Light brownish gray 5YR 6/1 to pinkish gray 5YR 8/1 cherty DO
	D		8	20			Light brownish gray 5YR 6/1 cherty DO interbedded with very pale orange IOYR 8/2 very fine grained sandy LS.
160'	D		5	27			Light brownish gray 5YR 6/1 cherty DO interbedded with yellowish gray 5Y 8/1 and very pale orange IOYR 8/2 very fine grained limy SS.

LEGEND			SAMPLE METHOD		
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	DEPTH AT WHICH FIRST WATER ENCOUNTERED		
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	DRILL CUTTINGS	STAYING DEPTH OF FIRST WATER AFTER . HOURS		
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE			

WELL NAME/ID MATHON/509859	BORING#/MW# MW-83	DATE DRILLED 9/26/95	DRILLING START TIME	DRILLING FINISH TIME
SITE ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM			SKETCH MAP	
DRILLING METHOD AIR ROTARY	SURFACE ELEVATION (MGVD)	TOP OF CASING ELEV. (MGVD)	SEE MONITOR WELL LOCATION MAP	
GEOLOGIST A. WILSON	DRILLER WEST TEXAS WATER WELL SERVICE	DRILLING SUPERVISOR RONNY KEITH		
LATITUDE	LONGITUDE	SEC/TWMP/RGE		
REMARKS (DRILLING SEQUENCE)				

BOREHOLE DIAMETER 7 7/8"	TOTAL DEPTH OF BORING 202'
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DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
170'	D		21	38	OPEN BOREHOLE		Light brownish gray 5YR 6/1 cherty DD interbedded with very pale orange 10YR 8/2 very fine grained limy SS. Slight HC odor.
	D		5	27			Same as above
	D		6	27			Pinkish gray 5YR 8/1 cherty DD to 172'. Grayish orange 10YR 7/4 very fine grain limy SS from 172' - 175'. NOTE: Lost circulation at 172'.
180'	D		7	21			Very pale orange 10YR 8/2 to grayish orange 10YR 7/4 very fine grained sandy DD interbedded with yellowish gray 5Y 8/1 very fine grained, moderately well cemented limy SS.
	D		4	27			Same as above. Very little recovery due to lost circulation.
190'	D		4	43			Grayish orange 10YR 7/4 very fine grained, moderately well cemented dolomitic SS.
	D		3	43			Same as above.
200'	D		3	43			Very pale orange 10YR 8/2 to dark yellowish orange 10YR 6/6 very fine grained, moderately well cemented dolomitic SS.

LEGEND		SAMPLE METHOD		DEPTH AT WHICH FIRST WATER ENCOUNTERED
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	STAYING DEPTH OF FIRST WATER AFTER _ HOURS	
FID - FLAME IONIZATION DETECTOR	DD - DOLOMITE	DRILL CUTTINGS		
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE		



PROJECT NAME/ID MARATHON/509859		BORING#/H/W MW-83		DATE DRILLED 9/26/95		DRILLING START TIME		DRILLING FINISH TIME	
SITE ADDRESS INDIAN BASIN GAS PLANT - EDDY CO., NM						SKETCH MAP SEE MONITOR WELL LOCATION MAP			
DRILLING METHOD AIR ROTARY		SURFACE ELEVATION (MGVD)		TOP OF CASING ELEV. (MGVD)					
GEOLOGIST A. WILSON		DRILLER WEST TEXAS WATER WELL SERVICE		DRILLING SUPERVISOR RONNY KEITH					
LATITUDE		LONGITUDE		SEC/TWHP/RGE					
REMARKS (DRILLING SEQUENCE)									
BOREHOLE DIAMETER 7 7/8"				TOTAL DEPTH OF BORING 202'					

DEPTH (FT)	SAMPLE METHOD	GRAPHIC LOG	FID (PPM)	DRILL RATE	WELL COMPLETION	USGS CLASS.	DESCRIPTION OF STRATA
210'	D		21	38			Same as above.

LEGEND		SAMPLE METHOD	
PPM - PARTS PER MILLION	LS - LIMESTONE	SPLIT SPOON	DEPTH AT WHICH FIRST WATER ENCOUNTERED
FID - FLAME IONIZATION DETECTOR	DO - DOLOMITE	DRILL CUTTINGS	STAYING DEPTH OF FIRST WATER AFTER ... HOURS
HC - HYDROCARBON	SS - SANDSTONE	SHELBY TUBE	



Drilling Log

Monitoring Well MW-84

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 170 ft. Diameter 17/11 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia Open Hole in. Length _____ Type/Size _____
 Casing: Dia 12 in./8 in. Length 48 ft./65 ft. Type Steel
 FM Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Mud/Air Rotary
 Driller Ronnie Kieth Log By Kevin Spencer Date 6/25/96 Permit # RA-5131-S-22
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:
Start 8/4/96 Finish 8/9/96 Found groundwater at 30' bgs. Zone produced about 5-15 gpm.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0		0	150			17-inch borehole with 12-inch casing 0 to 48 Ft. 0-5 Ft: SAND and GRAVEL (color not distinguishable by Munsel chart). Sands are brown, fine grained. Gravels are 1/2 to 3/4" diameter.
2						
4						
6						5-10 Ft: Same as above (gravels are 3/4 to 2" diameter).
8		0	38			
10						10-15 Ft: Same as above
12		0	7			
14						
16						
18		0	5			
20						
22		0	5			20-25 Ft: Gray (10yr 5/1) DOLOMITE , hard, microcrystalline, conchoidal fractures, minor limestone, argillaceous, (moderately hard).
24						



Drilling Log

Monitoring Well MW-84

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26						
28		0	6			25-30 Ft: Gray (10 yr 5/1), DOLOMITE , hard, micro-crystalline, conchoidal fractures, and very pale brown (10 yr 7/3) sandy DOLOMITE , hard, fine grained sand, well cemented.
30						30-35 Ft: Same as above (minor light brownish gray (10 yr 6/2) LIMESTONE , hard, microcrystalline, slight reaction with HCl).
32		0	6			
34						
36						35-40 Ft: Yellow (10 yr 7/6) to very pale brown (10 yr 7/3) and gray (10 yr 5/1) sandy DOLOMITE , very hard, fine grained sand, well cemented, and minor gray (10 yr 5/1) DOLOMITE , micro crystalline, conchoidal fractures.
38		7.8	18			
40						40-45 Ft: Same as above (softer at 42 Ft.).
42						
44		8.7	27			
46						45-50 Ft: Same as above
48		5.7	25			11-inch borehole with 8-inch casing 48 to 65 Ft.
50						50-55 Ft: Same as above
52						
54		0	25			
56						55-60 Ft: Same as above (harder, well cemented).



Drilling Log

Monitoring Well MW-84

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		0	15			
58						
60						80-85 Ft: Same as above
62		0	14			
64						7.875-inch open borehole 65 to 170 Ft.
66						65-70 Ft: Brown (10 yr 5/3) DOLOMITE , hard microcrystalline matrix, conchoidal fractures, slightly sandy.
68		2.9	15			
70						70-75 Ft: Light brownish gray (10 yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, and yellowish brown (10 yr 5/6) sandy DOLOMITE , hard, fine-grained sand in dolomite matrix.
72		2.9	11			
74						
76						75-80 Ft: Light brownish gray (10 yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures.
78		2.9	12			
80						80-85 Ft: Same as above
82						
84		5.9	15			
86						85-90 Ft: Yellow (10 yr 7/6) and light reddish brown (5 yr 6/4) DOLOMITE , hard, microcrystalline, conchoidal fractures, and minor limestone, very pale brown (10 yr 7/4), microcrystalline.
88		2.9	13			



Drilling Log

Monitoring Well MW-84

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88		2.9	13			
90						90-93 Ft: Light gray (10 yr 7/2) SANDSTONE, very fine-to fine-grained, moderately sorted, poorly cemented.
92		2.9	21			
94						93-95 Ft: Light brownish gray (10 yr 6/2), hard, DOLOMITE microcrystalline, conchoidal fractures.
96						95-100 Ft: Brownish yellow (10 yr 6/6), slightly sandy DOLOMITE
98		0	20			
100						100-105 Ft: Light brownish gray (10 yr 6/2) sandy DOLOMITE, hard, microcrystalline, conchoidal fractures.
102		0	20			
104						105-110 Ft: Same as above (less sandy).
106						
108		0	17			
110						110-115 Ft: Brownish yellow (10 yr 6/6) DOLOMITE, hard, slightly sandy to microcrystalline, conchoidal fractures.
112	0	21				
114						
116					115-120 Ft: Same as above (trace green, possibly glauconite sandy).	
118	0	20				
120						



Drilling Log

Monitoring Well MW-84

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120	[Well Completion Diagram]			[Graphic Log Diagram]		120-125 Ft: Light yellowish brown (10 yr 6/3) sandy DOLOMITE mod. hard, very fine- to fine-grained sand in dolomite matrix, very slight moisture.
122						
124		0	27			
126						125-130 Ft: Yellow (10 yr 7/6) SANDSTONE and sandy DOLOMITE (same as above), very fine-grained, well sorted, poorly cemented, subrounded, slightly moist. Hydrocarbon odor.
128		0	43			
130						130-135 Ft: Same as above (Start mist pump at 135 Ft.).
132		5.7	43			135-140 Ft: Same as above
134						
136						140-145 Ft: Same as above
138		0	50			
140						145-150 Ft: Yellow (10yr 7/6) SANDSTONE fine- to med-grain, moderately sorted, poorly cemented, subangular, wet, and light yellowish brown (10 yr 6/3) sandy DOLOMITE, fine-grained sand in dolomitic matrix.
142		0	50			
144						150-155 Ft: Same as above
146		0	60			
148						
150						
152						



Drilling Log

Monitoring Well MW-84

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152	[Well Completion Diagram]					
154		0	60	[Dotted Pattern]		155-160 Ft: Same as above
156						
158		0	75	[Dotted Pattern]		
160				[Hatched Pattern]		160-165 Ft: Light brownish gray (10 yr 6/2) sandy DOLOMITE and yellow (10 yr 7/8) fine-grained SAND in dolomitic matrix, moderately hard to soft, moderately to poorly cemented. (Lost circulation at 162').
162		0	38	[Hatched Pattern]		
164				[Hatched Pattern]		65-170 Ft: Same as above
166				[Hatched Pattern]		
168		0	60	[Hatched Pattern]		
170				[Hatched Pattern]		TD at 170 Ft. at 1225 hrs. on 6/25/96.
172						
174						
176						
178						
180						
182						
184						

Drilling Log



Monitoring Well **MW-85**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 235 ft. Diameter 12.25/7.875 in.
 Top of Casing _____ Water Level Initial 56 ft. Static _____
 Screen: Dia Open Borehole Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 in. Length 75 ft. Type Steel
 FM Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Kevin Spencer Date 6/4/96 Permit # RA-5131-S-23
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
-2						
0						
2		0	100	[Pattern]		12.25-inch borehole with 8-inch casing 0 to 75 Ft. 0-5 Ft: Pale yellow (2.5y 8/3) and light gray (2.5y 7/2) LIMESTONE , argillaceous, extremely fractured, extremely weathered along fractures, dry.
4						
6						5-10 Ft: Olive gray (5y 4/2) dolomitic SAND , fine-grained sand, moderate to poorly cemented, well rounded, poorly sorted, dry.
8		2.5	50	[Pattern]		
10						10-15 Ft: Pale brown (10yr 6/3) sandy DOLOMITE and dolomitic sand (same as above), fine-grained sand in dolomitic matrix, hard, dry, and very pale brown (10 yr 7/2) sandy LIMESTONE , well cemented, very fine- to fine-grained sand in calcite matrix, hard, dry.
12		5.0	25	[Pattern]		
14						
16						15-20 Ft: Dark grayish brown (2.5y 4/2) dolomitic SAND , very fine- to fine-grained, poorly cemented, well rounded, well sorted, dry.
18		7.7	50	[Pattern]		
20						20-25 Ft: Graysih brown (2.5y 5/2) sandy DOLOMITE , very fine- to fine-grained sand, very well cemented, well rounded, well sorted, dry.
22						
24		5.0	4	[Pattern]		



Drilling Log

Monitoring Well MW-85

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26						
28		5.0	13			27-30 Ft: Very pale brown (10 yr 7/2) DOLOMITE , hard, microcrystalline, conchoidal fractures. Dark gray (10 yr 4/1) silty sand, very fine-grained, well rounded, well sorted, moderately cemented. Very minor white (10 yr 8/2) limestone, slightly sandy, hard, dry.
30						
32		22	14			30-35 Ft: Gray (10 yr 6/1) dolomitic silty SAND , very fine-grained, well rounded, moderately cemented, high silt content, dry.
34						
36						
38		7.0	75			35-42 Ft: Light gray (10 yr 7/2) silty SAND , very fine-grained, moderately rounded, well sorted, very silty, reacts with HCl, soft, friable, and minor white (10 yr 8/1) limestone, argillaceous, moderately hard, dry.
40						
42		22	50			42-48 Ft: Gray (10 yr 5/2) dolomitic SANDSTONE very fine to fine-grained, mod. sorted, well rounded, poorly cemented, dry.
44						
46		5.0	43			48-52 Ft: Light gray (10 yr 7/2) silty SANDSTONE , v. fine-grained, well to moderately rounded, moderately sorted, very silty, reacts with HCl, soft, friable, slightly moist.
48						
50						
52		5.0	27			52-55 Ft: Gray (10 yr 5/2) dolomitic SANDSTONE , v. fine-to fine-grained, moderately sorted, moderately to well rounded, poorly cemented, slightly moist.
54						
56						Groundwater encountered at 56 ft.



Drilling Log

Monitoring Well MW-85

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						55-80 Ft: Same as above (Dark gray (10 yr 4/1), black (10 yr 2/1), and gray (7.5 yr N61) cemented and friable sand in alternating layers).
58		5.0	33			
60						60-85 Ft: Same as above
62		2.5	30			
64						65-70 Ft: Same as above
66						
68		5.0	50			
70						70-75 Ft: Same as above
72		5.0	75			
74						
76						7.875-inch open borehole 75 to 235 Ft. 75-80 Ft: Gray (10 yr 6/1) SANDSTONE, v. fine- to fine-grained sand, moderately sorted, subrounded, moderately to poorly cemented. Layered with gray (10 yr 6/2) DOLOMITE, microcrystalline, hard, conchoidal fractures, slightly sand, slightly moist.
78		1.2	50			
80						80-85 Ft: Gray (5y 6/1) DOLOMITE, microcrystalline, hard, conchoidal fractures, interbedded with thin beds of dark gray (5y 4/1) silty SAND, slightly moist.
82		1.2	9			
84						
86						85-90 Ft: Grayish brown (10 yr 5/2) SANDSTONE, very fine- to fine-grained, moderately sorted, subrounded, poorly cemented, moist (at 87').
88		1.2	30			



Drilling Log

Monitoring Well MW-85

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description									
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%									
88		1.2	30			80-95 Ft: Same as above (fine-grained, well sorted, moist).									
90		3.7	50												
92															
94															
96							1.2	14	95-100 Ft: Grayish brown (10 yr 5/2) DOLOMITE , micro-crystalline, hard conchoidal fractures. Interbedded with gray (10 yr 5/1) SANDSTONE , very fine-grained, well sorted, subrounded, moderately cemented.						
98															
100										1.2	21	100-105 Ft: Same as above			
102															
104															
106													1.2	20	105-110 Ft: Grayish brown (10 yr 5/2) DOLOMITE , micro-crystalline, hard, conchoidal fractures.
108															
110															
112															
114	0	27	115-120 Ft: Same as above												
116															
118															
120															



Drilling Log

Monitoring Well MW-85

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120						120-125 Ft: Same as above
122		1.2	38			
124						125-130 Ft: Gray (10 yr 5/1) SANDSTONE, fine- to medium-grained, moderately sorted, subrounded to subangular, moderately cemented. Interbedded with grayish brown (10 yr 5/2) DOLOMITE, microcrystalline, hard, conchoidal fractures.
126		1.2	20			
128						130-135 Ft: Gray (10 yr 5/1) SANDSTONE, very fine- to fine- grained, well sorted, subrounded, poorly cemented.
130	1.2	17				
132						135-140 Ft: Same as above
134	1.2	30				
136						140-145 Ft: Grayish brown (10 yr 5/2) DOLOMITE and SANDSTONE (as above), hard microcrystalline, conchoidal fractures.
138	6.3	21				
140						145-150 Ft: Light gray (10 yr 7/1) SANDSTONE, very fine-grained, well sorted, well to subrounded, moderately cemented, trace white mica.
142	1.2	21				
144						150-155 Ft: Same as above (no white mica).
146	1.2	21				
148						
150						
152						



Drilling Log

Monitoring Well **MW-85**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152	[Empty Box]	1.2	18	[Dotted Pattern]		155-160 Ft: Same as above
154						
156						
158		1.2	20	[Dotted Pattern]		160-165 Ft: Same as above
160						
162		1.2	14	[Dotted Pattern]		165-170 Ft: Light brownish gray (10 yr 6/2) DOLOMITE and SANDSTONE (as above), hard, m. crystalline, conchoidal fractures.
164						
166		1.2	17	[Vertical Line Pattern]		170-175 Ft: Same as above (more dolomite than sand).
168						
170		1.2	14	[Vertical Line Pattern]		175-180 Ft: Same as above
172						
174	1.2	13	[Vertical Line Pattern]		180-185 Ft: Same as above	
176						
178	1.2	14	[Vertical Line Pattern]			
180						
182	1.2	14	[Vertical Line Pattern]			
184						



Drilling Log

Monitoring Well MW-85

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
184				[Patterned Column]		185-190 Ft: Same as above	
186							
188		1.2	17				
190							190-195 Ft: Same as above
192		1.2	16				
194							
196							195-200 Ft: Same as above (more sandy)
198		1.2	20				
200							200-205 Ft: Light grayish brown (10 yr 6/2) DOLOMITE , hard, conchoidal fractures, microcrystalline, and light gray SANDSTONE , fine-grained, subrounded.
202		1.2	23				
204					205-210 Ft: Same as above		
206							
208	6.3	75					
210						210-215 Ft: Light grayish brown (10 yr 6/2) DOLOMITE , conchoidal fractures, microcrystalline, soft.	
212	3.7	75					
214						215-220 Ft: Very pale brown (10 yr 7/3) DOLOMITE , microcrystalline, moderately hard, conchoidal fractures; and very pale (10 yr 7/3) SANDSTONE , fine- to medium-grained, subrounded to subangular, moderately sorted.	
216							



Drilling Log

Monitoring Well MW-85







Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
216	[Empty Box]	3.7	43	[Vertical Line]		brown (10 yr 7/3) SANDSTONE , fine- to medium-grained, subrounded to subangular, moderately sorted.
218						
220		1.2	43	[Dotted Pattern]		220-225 Ft: Pale yellow (2.5y 7/4) SANDSTONE , very fine- to fine-grained, moderately sorted, subangular, poorly cemented, with minor dolomite, strong reaction with HCl.
222						
224						
226	1.2	38	[Dotted Pattern]		225-230 Ft: Same as above	
228						
230						
232	1.2	27	[Dotted Pattern]		230-235 Ft: Same as above (friable sand)	
234						
236						TD = 235 Ft.
238						
240						
242						
244						
246						
248						

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63
 Surface Elev. _____ Total Hole Depth 225 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 in. Length 75 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air/Mud Rotary
 Driller Ronnie Kieth Log By Eric Matzner Date 6/11/96 Permit # _____
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:
Start on 6/11/96. Open borehole from 75 to 120 ft.. Borehole deepened to 225 ft. on 10/01/96 by Fluor Daniel GTI.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						8-inch surface casing 0 to 5 ft. Open Borehole from 75 to 225 ft.
0						0-0.5 Ft: Top soil. Pale brown (10yr 6/3). 0.5-5 Ft: White (2.5y N8) chalky LIMESTONE , mod. hard, slightly weathered.
2		0	100			
4						
6						5-10 Ft: Very pale brown (10yr 7/3) chalky LIMESTONE , and grayish brown (2.5y 5/2) dolomitic sand. Sand is very fine- to fine- grained, mod. sorted, mod. cemented, subrounded.
8		0	14			
10						10-15 Ft: Pale yellow (2.5y 8/3) silty SANDSTONE , silt is v. fine-grained, calcareous cement, subrounded, mod. sorted, reacts with HCL, dry, hard.
12		0	100			
14						15-20 Ft: Same as above.
16						
18		0	25			
20						20-25 Ft: L. brownish gray (10yr 6.2), SANDSTONE and dolomitic SANDSTONE , v. fine-grained, well cemented, mod. sorted, well rounded.
22		2.5	108			
24		2.5	38			



Drilling Log

Recovery Well MW-86

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PTD (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		2.5	38			25-30 Ft: Same as above (SANDSTONE/dolomitic SANDSTONE, dry).
26						
28						30-35 Ft: Same as above (with pale yellow (2.5y 7/4) dolomitic sandstone bed from 32'-34', v. fine-grained, mod. sorted, subrounded, dry, with mod. calcareous cement).
30						
32		2.5	132			35-40 Ft: Same as above (dry to slight moisture).
34						
36						40-45 Ft: Grayish brown (2.5y 5/2) dolomitic SANDSTONE, v. fine sand, well cemented, mod. sorted, subrounded, occ. mica flakes, some intervals of limestone, very slight moisture.
38		0	60			
40						45-50 Ft: Same as above (harder at 47', less limestone beds, dry to slight moisture).
42						
44		2.5	84			50-55 Ft: Same as above (very slight moisture).
46						
48		2.5	108			55-80 Ft: L. brownish gray (2.5y 6/2) dolomitic SANDSTONE, v. fine-grained sand, mod. sorted, mod. cemented, subrounded, slight moisture.
50						
52		0	72			
54						
56						

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		0	84			
58		0	84			
60		0	84			60-65 Ft: Same as above (slightly darker color, grayish brown (2.5y 5/2), slight moisture).
62		0	84			
64		0	84			
66		2.5	72			Switched over to mist pump. 65-70 Ft: D. gray (2.5y N41) dolomitic SANDSTONE , v. fine-grained sand, mod. to well cemented, sub to well rounded, mod. sorted.
68		2.5	72			
70		2.5	132			70-74 Ft: Same as above
72		2.5	132			Annulus filled with bentonite 72 to 75 ft.
74		2.5	132			74-75 Ft: L. grayish brown (10yr 6/2) dolomitic LIMESTONE
76		2.5	132			7.875-inch open borehole 75 to 120 ft.
78		0	132			75-80 Ft: Gray (10yr 5.5/1) DOLOMITE , slightly sandy matrix becoming more sandy with depth, m. crystalline, trace pyrite, dry.
80		0	132			
82		2.5	132			80-85 Ft: L. brownish gray (10yr 6.2) SANDSTONE , med. hard, silt to v. fine-grained quartz, mod. sorted, sub- to well rounded, v. slight moisture, v. slight reaction with HCl (poss. dolomite cement).
84		2.5	132			Switched over to mist pump.
86		0	132			85-90 Ft: Gray (10yr 6/1) DOLOMITE , v. hard, m. crystalline, conchoidal fractures, slightly sandy matrix, interval of softer sandy dolomite, and occ. chalk.
88		0	132			









Drilling Log

Recovery Well MW-86


Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88		2.5				80-85 Ft: Same as above (less chalk, little (15%) sand).
90						
92						
94						
96						
98						
100						
102						
104						
106						105-110 Ft: L. gray (10yr 7/1) dolomitic SANDSTONE, v. fine grained sand, dolomitic/calcareous cement, mod. sorted, well rounded, mod. cemented. Cuttings are friable sand.
108						
110						110-115 Ft: Same as above.
112	0					
114	0	115-120 Ft: Dolomitic SANDSTONE, light gray (10yr 7/1), thin beds of dolomite/limestone.				
116						
118						
120		Separate-phase hydrocarbons at 120 ft. Hole re-entered and deepened to 225 ft. on 10/1/96.				

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%				
120		32.5	18			120-125 Ft: L. brownish gray (10yr 6/2) sandy DOLOMITE , hard, m.crystalline, occ. v. thin beds of silty sandstone, dolomite has conchoidal fractures, trace dark minerals, hydrocarbon odor.				
122										
124										
126		14.4	25			125-130 Ft: L. gray (10yr 7/1) silty SANDSTONE , mod. hard, fine- to v.fine-grained, rounded to subrounded, mod. sorted, slight hydrocarbon odor.				
128										
130										130-135 Ft: Same as above.
132										
134		15.8	20			135-140 Ft: Same as above.				
136										
138		9.2	30			140-145 Ft: Same as above.				
140										
142	4.7	18								
144										
146	8.8	17			145-150 Ft: L. gray (2.5y 7/2) and l. brownish gray (10yr 6/2) sandy DOLOMITE , hard, fine-grained, subrounded, Cuttings are med. to coarse sand size, conchoidal fractured dolomite, occ. thin beds of gray and brown sandstone, slight hydrocarbon odor, trace glauconite.					
148										
150									150-155 Ft: Same as above (dolomite is m.crystalline).	
152										

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152		24.4	19			155-180 Ft: Same as above.
154						
156		7.6	17			160-165 Ft: Same as above.
158						
160		8.1	18			165-170 Ft: Same as above.
162						
164		4.2	18			170-175 Ft: Same as above.
166						
168		8.1	14			175-180 Ft: Same as above.
170						
172		10.2	18			180-185 Ft: Same as above.
174						
176	23.4	20				
178						
180						
182						
184						



Drilling Log

Recovery Well MW-86

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%				
184		10.2	43							
186						185-190 Ft: White (2.5y 8/2) dolomitic SANDSTONE, poorly cemented, subrounded to subangular, mod. sorted, med. to fine-grained, hydrocarbon odor.				
188										
190						190-195 Ft: Same as above.				
192						12.6	100			
194										
196						195-200 Ft: L. brownish gray (10yr 6/2) sandy DOLOMITE, mod. hard, conchoidal fractures, occ. thin beds of dolomitic sandstone, hydrocarbon odor.				
198						22.7	43			
200										
202						56.8	50			
204										
206	74.0	50								
208										
210										
212	166.2	100								
214										
216										



Drilling Log

Recovery Well MW-86

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350154.63

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 60%
-216		174.0	60			
-218						
-220		96.5	75			220-225 Ft: L. brownish gray (10yr6/2) dolomitic SANDSTONE, mod. cement, hard, rounded to subrounded, mod. sorted, occ. v. thin beds of sandy dolomite, hydrocarbon odor.
-222						
-224						
-226						
-228						
-230						
-232						
-234						
-236						
-238						
-240						
-242						
-244						
-246						
-248						



Drilling Log

Monitoring Well MW-86

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 120 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia Open Borehole Length _____ Type/Size _____
 Casing: Dia 8 in. Length 75 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Eric Matzner Date 6/11/96 Permit # RA-5131-S-24
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Start on 6/11/96 Open borehole from 75' to 120'.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						8-inch surface casing 0 to 75 Ft.
0.5		0	100			0-0.5 Ft: Top soil. Pale brown (10 yr 6/3).
0.5						0.5-5 Ft: White (2.5y N8/) chalky Limestone, moderately hard, slightly weathered.
5						5-10 Ft: Very pale brown (10 yr 7/3) chalky Limestone and grayish brown (2.5y 5/2) dolomitic SAND. Sand is very fine to fine grained, moderately sorted, moderately cemented, subrounded.
10		0	14			
10						10-15 Ft: Pale yellow (2.5y 8/3) silty SANDSTONE, silt is very fine grained, calcareous cement, subrounded, moderately sorted, reacts with HCl, dry, hard.
15						15-20 Ft: Same as above
20		0	25			
20						20-25 Ft: SANDSTONE and dolomitic sandstone light brownish gray (10yr 6/2), very fine-grained, well cemented, moderately sorted, well rounded.
22		2.5	108			
24		2.5	38			

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		2.5	38			25-30 Ft: Same as above (SANDSTONE and dolomitic sandstone, dry).
26						
28						30-35 Ft: Same as above (with pale yellow (2.5y 7/4) dolomitic sandstone bed from 32'-34', very fine-grained, moderately sorted, subrounded, dry, with moderate calcareous cement.
30						
32		2.5	132			35-40 Ft: Same as above (dry to slightly moist).
34						
36		0	60			40-45 Ft: Grayish brown (2.5y 5/2) dolomitic SANDSTONE, very fine sand, well cemented, moderately sorted, subrounded, occasional mica flakes, some intervals of limestone, very slight moisture.
38						
40						45-50 Ft: Same as above (harder at 47', less limestone beds, dry to slight moisture).
42		2.5	84			
44						50-55 Ft: Same as above (very slight moisture).
46						
48		2.5	108			55-60 Ft: Light brownish gray (2.5y 6/2) dolomitic SANDSTONE very fine grained sand, moderately sorted, moderately cemented, subrounded, slight moisture.
50						
52		0	72			
54						
56						



Drilling Log

Monitoring Well MW-86

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58		0	84			
60						60-65 Ft: Same as above (slightly darker color, grayish brown (2.5y 5/2), slight moisture).
62		0	84			
64						Switched over to mist pump.
66		2.5	72			65-70 Ft: Dark gray (2.5y N4t) dolomitic SANDSTONE , very fine grained sand, moderately to well cemented, sub to well rounded, moderately sorted.
68						
70						70-74 Ft: Same as above
72		2.5	132			Annulus filled with bentonite 72 to 75 Ft.
74						74-75 Ft: Light grayish brown (10 yr 6/2) dolomitic LIMESTONE , micrite, conchoidal fracturing, very hard, slight reaction with HCl, microcrystalline, trace of black specks.
76		0				7.875-inch open borehole 75 to 120 Ft. 75-80 Ft: Gray (10 yr 5.5/1) DOLOMITE , slightly sandy matrix, becoming more sandy with depth, microcrystalline, trace pyrite, dry.
78						
80						80-85 Ft: L. brownish gray (10 yr 6/2) SANDSTONE , med. hard, silt to very fine grained quartz, moderately sorted, sub- to well rounded, very slight moisture, very slight reaction with HCl (possible dolomite cement).
82		2.5				
84						Switch over to mist pump.
86		0				85-90 Ft: Gray (10 yr 6/1) DOLOMITE , very hard, microcrystalline, conchoidal fracturing, slightly sandy matrix, intervals of softer sandy dolomite, and occasional chalk.
88						

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
88	[Empty Box]			[Hatched Pattern]			
90							90-85 Ft: Same as above (less chalk, little (15%) sand).
92		2.5					
94							
96							95-100 Ft: L. gray (10yr7/2)sandy DOLOMITE , m. crystalline, some (20%) sand, very fine-grained, moderately sorted, subrounded, well cemented.
98		0					
100							100-105 Ft: Same as above
102		2.5					
104							
106							105-110 Ft: Light gray (10 yr 7/1) dolomitic SANDSTONE , very fine grained sand, dolomitic/calcareous cement, moderatley sorted well rounded, moderatley cemented. Cuttings are friable sand.
108		2.5					
110							110-115 Ft: Same as above (gray (10 yr 6/1)).
112	0						
114							
116							
118	0						
120						115-120 Ft: Dolomitic SANDSTONE , light gray (10 yr 7/1), thin beds of dolomite/limestone. Separate phase hydrocarbons at 120 Ft. TD at 120 Ft.	



Drilling Log

Monitoring Well MW-87

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 170 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 154 ft. Static 110.1 ft.
 Screen: Dia 4 in. Length 20 ft. Type/Size 0.04" SCH 40 PVC
 Casing: Dia 4 in. Length 145 ft. Type SCH 40 PVC, Flush Thread
 Fil Material 6/9 Silica Sand/Bentonite Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By S. Underwood Date 8/5/96 Permit # _____
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

 Start 8/5/96 Finish 8/9/96 Portland cement from 0' to 15'; Volclay from 15' to 130'; Bentonite chips from 130'-140.8'; sand from 140.8' to 170'; Stainless steel centralizers at 146' and 164'.

Depth (ft)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
0						0-5 Ft: Topsoil, brown (10 yr 4/3), soft, dry, fine-grained SAND, silty, trace organics (roots).
2		0.7	100		SP	5-7 Ft: Same as above
8		0	100			7-10 Ft: Pale yellow (2.5y 7/4), sandy DOLOMITE, hard, dry, well cemented.
12		0.7	38			10-15 Ft: Light brownish gray (10 yr 6/2) and light yellowish brown (2.5y 6/4), silty dolomitic SANDSTONE, very fine- to fine-grained, moderately sorted, subrounded, dry, weakly cemented, friable, trace silt, occasional thin beds of light gray sandy dolomite, matrix reacts with HCl.
16		0.7	20			15-20 Ft: Same as above
20		0	23			20-25 Ft: Same as above



Drilling Log

Monitoring Well MW-87

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PIID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0	20			25-30 Ft: Dark grayish brown (2.5y 5/2) and light gray (2.5 N/7) silty SANDSTONE , very hard, well cemented, very fine- to fine-grained, subrounded to rounded, moderately sorted.
26						
28		0	19			30-35 Ft: Pale brown (10 yr 6/3) DOLOMITE , very hard, dry, microcrystalline, possible siliceous cement. Cuttings are flat and blocky with conchoidal fractures.
32						
34		0	20			35-40 Ft: Light brownish gray (10 yr 6/2) and dark grayish brown silty dolomitic SANDSTONE , dry, hard, well cemented, very fine- to fine-grained, subrounded to rounded, moderately sorted, occasional thin beds of sandy dolomite.
36						
38		0	17			40-45 Ft: Same as above
40						
42	0	30			45-50 Ft: Same as above	
44						
46	0	25			50-55 Ft: Same as above	
48						
50	0	25			55-60 Ft: Same as above	
52						
54						
56						



Drilling Log

Monitoring Well MW-87

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		0	14			
58						
60						
62						
64						
66						
68						
70						
72						
74						
76						<p>60-85 Ft: Light gray (10 yr 6/1) and light brownish gray (10 yr 6/2) DOLOMITE, very hard, microcrystalline, possible siliceous cement. Cuttings break flat and blocky with conchoidal fractures.</p>
78						<p>65-70 Ft: Same as above.</p>
80						<p>70-75 Ft: Light brownish gray (10 yr 6/1) and light yellowish brown (10 yr 6/4) DOLOMITE, very hard, microcrystalline, dry. Cuttings break flat and blocky, with conchoidal fractures. Dolomite interbedded with very thin beds of dark gray dolomitic sandstone.</p>
82						<p>75-80 Ft: Dark grayish brown (2.5 yr 4/2) dolomitic, silty SANDSTONE, hard, slightly moist, very fine- to fine-grained, moderately sorted, subrounded, well cemented, occasional thin beds of pale brown, microcrystalline, dolomite, trace of d. green shale poss. glauconite. (Driller notes HC odor at this interval)</p>
84						<p>80-85 Ft: Same as above</p>
86						<p>85-90 Ft: Pale brown (10 yr 6/3) sandy DOLOMITE, very hard, dry, microcrystalline, occasional thin beds of dolomitic sand. Cuttings break into coarse sand size, flat blocky plates with conchoidal fractures.</p>
88						



Drilling Log

Monitoring Well MW-87

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%				
88						90-85 Ft: Same as above				
90										
92										
94						0	14	95-100 Ft: Very dark grayish brown (10 yr 3/2) silty dolomitic SANDSTONE, very hard, very fine- to fine-grained, mod. sorted, rounded, well cemented, occasional thin beds of light brownish gray (10 yr 6/2) dolomite, microcrystalline, matrix reacts with HCl.		100-105 Ft: Same as above
96										
98										
100						0	21	105-110 Ft: Same as above		110-115 Ft: Same as above
102										
104										
106						0.5	20	115-120 Ft: Light gray (2.5y 7/2) and light olive brown (2.5y 5/2) silty dolomitic SANDSTONE, slightly moist, moderately hard, poorly cemented beds, very fine- to fine-grained, rounded to sub rounded, moderately sorted, occasional thin beds of pale brown dolomite, Cuttings are coarse sand to silt size. Matrix reacts with HCl. Faint hydrocarbon odor.		
108										
110										
112	0	19								
114										
116										
118	0	33								
120										
	0	60								



Drilling Log

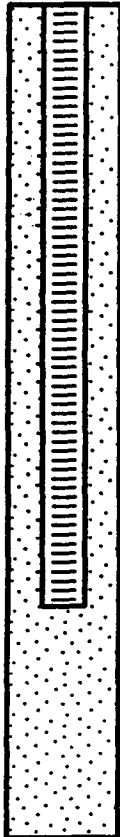


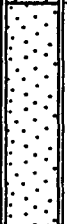
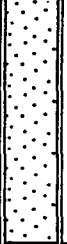
Monitoring Well MW-87

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%									
120		0	43			(Kelly bar rattles near top of run, hard zone). 120-125 Ft: Same as above									
122						125-130 Ft: Same as above (no HC odor).									
124															
126															
128							0.5	30	130-135 Ft: Light brownish gray (10 yr 6/2) silty dolomitic SANDSTONE, dry, moderately hard, very fine- to fine-grained, rounded, moderately sorted, moderately cemented. Cuttings are coarse sand to silt sized. Occasional very thin beds of microcrystalline dolomite. Bentonite chips in annulus 130 to 140.8 Ft.						
130															
132										0	33	135-140 Ft: Same as above			
134															
136													0.5	18	140-145 Ft: Light brownish gray (10 yr 6/2) silty DOLOMITE, moderately hard, dry, microcrystalline, conchoidal fractures. Cuttings are coarse sand to silt sized. Occasional thin beds of dolomitic sand.
138															
140	0	17	145-150 Ft: Same as above Stainless steel centralizer at 146 Ft.												
142															
144															
146															
148				0	16	150-155 Ft: Same as above (with sandy dolomite)									
150															
152							0	14							
152															

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152		0	14			Groundwater encountered at 154'.
154						155-160 Ft: Light brownish gray (10 yr 6/2) and brownish yellow (10 yr 6/6) sandy DOLOMITE , hard, occasional thin beds of dolomitic silty sand.
156		0	17			
158						
160						160-165 Ft: Brownish yellow (10 yr 6/6) and very dark brown (10 yr 7/3) silty dolomitic SANDSTONE , hard, very fine- to fine- grained, poorly sorted, common very thin beds of sandy dolomite, secondary cementation is friable. Stainless steel centralizer at 164 Ft.
162		0.7	10			
164						165-170 Ft: Same as above
166						
168		0	15			
170						TD at 170 Ft.
172						
174						
176						
178						
180						
182						
184						



Drilling Log

Monitoring Well MW-87A

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 130 ft. Diameter 12.25/7.875 in.
 Top of Casing _____ Water Level Initial Dry Static _____
 Screen: Dia Open Hole Length _____ Type/Size _____
 Casing: Dia 8 in. Length 10 ft. Type Steel
 Well Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Scott Underwood Date 8/6/96 Permit # _____
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Start 8/6/96 Finish 8/7/96 Moved approximately 55' east of MW-87. Set steel surface casing from 0'-10'; then cleaned out borehole from 70'-130'.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						12.25-inch borehole with 8-inch casing 0 to 10 Ft.
2		0	150			0-5 Ft: Brown sandy loam, hard, dry, fine grained SAND , (10yr 4/3).
4						
6						5-10 Ft: Light brownish gray (10 yr 6/2) and light yellowish brown (2.5y 6/4) silty dolomitic SANDSTONE , very fine to fine-grained, moderately sorted, rounded to subrounded, slightly moist, weakly cemented, moderately hard, friable, occasional beds of light gray sandy dolomite.
8		0	100			
10						10-15 Ft: Same as above 7.875-inch open borehole 10 to 130 Ft.
12		0.7	43			
14						15-20 Ft: Same as above
16						
18		0	20			
20						20-25 Ft: Same as above
22		0	38			
24						



Drilling Log

Monitoring Well MW-87A

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
24						25-30 Ft: Dark grayish brown (2.5y 5/2) and light gray (2.5y N/7) silty SANDSTONE , dry, hard, very fine to fine grained, rounded to subrounded, moderately sorted. Rate of penetration about 23 ft/hr (25'-30').	
26							
28		0	23			30-35 Ft: Same as above	
30							
32		0.7	33				
34							
36							35-40 Ft: Pale brown (10 yr 6/3) sandy DOLOMITE , very hard, dry, microcrystalline, possibly siliceous cement. Cuttings are flat and blocky with conchoidal fractures, trace pyrite, occasional thin beds of dark grayish brown silty sandstone.
38		0	27				
40							40-45 Ft: Light brownish gray (10 yr 6/2) and dark grayish brown (10 yr 3/2) silty dolomitic SANDSTONE , dry, hard, well cemented, very fine to fine grained, subrounded to rounded, moderately sorted, occasional thin beds of sandy dolomite.
42		0	18				
44				45-50 Ft: Same as above			
46							
48	0	17					
50				50-55 Ft: Same as above			
52							
54	0	25					
56					55-60 Ft: Same as above		



Drilling Log

Monitoring Well MW-87A

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%				
56	[Empty Box]	0	20	[Dotted Pattern]						
58										
60										
62						0	20	[Hatched Pattern]		60-85 Ft: Light gray (10 yr 6/1) and light brownish gray sandy DOLOMITE , very hard, microcrystalline, possible siliceous cement, breaks into flat, blocky cuttings with conchoidal fractures, trace pyrite, occasional very thin beds of sandstone.
64										
66										
68						0	17	[Hatched Pattern]		65-70 Ft: Same as above
70										
72						0	16	[Hatched Pattern]		70-75 Ft: Same as above
74										
76										
78	7.5	30	[Dotted Pattern]		75-80 Ft: Dark grayish brown (2.5y 4/2) dolomitic silty SANDSTONE , slight moisture, very fine-to fine-grained, subrounded to rounded, well cemented, occasional very thin beds of crystalline dolomite, trace yellow sandstone (HC odor).					
80										
82										
84	0	20	[Dotted Pattern]		80-85 Ft: Same as above					
86										
88	0	15	[Hatched Pattern]		85-90 Ft: Pale brown (10yr 6/3) sandy Dolomite , very hard, dry, microcrystalline, occasional thin beds of dolomitic sand. Cuttings are coarse sand to silt size, trace of yellow dolomite, trace of pyrite.					



Drilling Log

Monitoring Well MW-87A

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
88	[Empty Box]	0	15	[Hatched Pattern]			
90						90-95 Ft: Same as above	
92		0	15	[Hatched Pattern]			
94							
96					[Dotted Pattern]		95-100 Ft: Very dark grayish brown (10 yr 3/2) and light brownish gray (10 yr 6/2) silty dolomitic SANDSTONE, dry, hard, very fine to fine grained, moderately sorted, rounded. Cuttings are fine gravel to silt sized, occasional thin beds microcrystalline dolomite.
98		0	15	[Dotted Pattern]			
100						100-105 Ft: Same as above	
102		0	20	[Dotted Pattern]			
104							
106						105-110 Ft: Same as above	
108		0	15	[Dotted Pattern]			
110						110-115 Ft: Same as above	
112	0	38	[Dotted Pattern]				
114							
116						115-120 Ft: Light gray (2.5y 7/2) and light olive brown (2.5y 5/2) silty dolomitic SANDSTONE, slight moisture, faint HC odor, moderately hard, weak & well cemented beds, very fine- to fine-grained rounded to subrounded, moderately sorted, occasional very thin beds of pale brown dolomite. Cuttings are fine gravel to silt sized, did not absorb water when sprayed.	
118	0	27	[Dotted Pattern]				
120							



Drilling Log

Monitoring Well MW-87A

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-120	[]			[.]		120-125 Ft: Same as above
-122		0	45			
-124						
-126		0	50			125-130 Ft: Same as above
-128						
-130						Dry during drilling and upon completion. TD at 130 Ft.
-132						
-134						
-136						
-138						
-140						
-142						
-144						
-146						
-148						
-150						
-152						



Drilling Log

Monitoring Well MW-88

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 175 ft. Diameter 12.25/7.875 in.
 Top of Casing _____ Water Level Initial 30/69/161 Static 161 ft.
 Screen: Dia 4 in. Length 35 ft. Type/Size SCH 40 PVC/0.04 in.
 Casing: Dia 8 in./4 in. Length 60/142.5 ft. Type SCH 40 PVC
 Fill Material 6/9 Silica Sand/Bent./P. Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Scott Underwood Date 8/4/96 Permit # _____
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Start 8/4/96. Finish 8/9/96. Found groundwater at 30' bgs. Zone produced about 5-15 gpm. Installed 8" surface casing from 0-60'. Found additional zone of perched groundwater at 69'. Portland cement from 0'-15' followed by Volclay from 15'-129'. SCH 40 PVC well installed from +2.5' to 140' and screened with 0.04" PVC from 140'-175'. Est. flow rate during drilling: 60-80 gpm.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						12.25-inch borehole with 8-inch surface casing 0 to 60 Ft. and 4-inch well casing + 2.5 to 140 Ft.
2		0.7	75			0-5 Ft.: Brown sandy loam, hard, dry, fine grained SAND, silty, trace organics (10yr4/3). Rate of Penetration about 75ft/hr (0'-5').
4					SM	5-10 Ft: Same as above
6						
8		1.4	30			
10						10-15 Ft: Pale brown (10 yr 6/3) and dark grayish brown (2.5y 4/2) silty dolomitic SANDSTONE, dry, hard, very fine to to fine-grained, moderately sorted, subrounded, well cemented, with occassional thin beds of crystalline dolomite and light olive brown sandy silt (2.5y 5/4).
12		0.7	43			
14						15-20 Ft: Same as above
16						
18		0	21			
20						20-25 Ft: Same as above, with common thin beds of olive brown sandy silt, soft, with little clay).
22						
24			21			



Drilling Log

Monitoring Well MW-8

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%						
24	[Well Completion Diagram]	0	18	[Graphic Log]		<p>25-30 Ft: Pale brown (10 yr 6/3) and dark grayish brown (2.5y 4/2) dolomitic SANDSTONE, moist, moderately hard, very fine to fine grained, moderately sorted, subrounded, well cemented, thin beds of crystalline dolomite sandstone interbedded with olive brown sandy silt.</p> <p>Driller reports water at approximately 29 Ft. Returns are wet. No mist pump. Air and formation water returns. Estimated flow rate 8 gpm (very rough estimate).</p> <p>30-35 Ft: Same as above</p>						
26												
28												
30												
32												
34												
36												
38												
40												
42							[Well Completion Diagram]	0	50	[Graphic Log]		<p>35-40 Ft: Olive gray (5y 5/2) and brown (10 yr 5/2) SANDSTONE moderately hard, very fine to fine grained, moderately sorted, subrounded, well cemented.</p> <p>40-45 Ft: Same as above (poorly cemented).</p> <p>45-50 Ft: Same as above</p>
44												
46												
48												
50												
52												
54												
56	[Well Completion Diagram]	0	33	[Graphic Log]		<p>50-55 Ft: Same as above</p> <p>55-60 Ft: Same as above (well cemented beds interbedded with poorly cemented beds).</p>						
52												
54												
56												



Drilling Log

Monitoring Well MW-88

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58		0	13			
60						End 8-inch surface casing at 60 Ft.
62		0.7	33			60-65 Ft: Brown (10 yr 5/3) and grayish brown (2.5y 5/2) silty dolomitic SANDSTONE , very hard to moderately hard, interbedded well and weak beds, moist, very fine-to fine-grained, rounded, mod. sorted.
64						
66						65-70 Ft: Same as above (becomes wet 69', driller note 6" free fall drop (69.0'-69.5' then quick drilling from 69.5'-70.0'. Water rises to approx. 38' bgs in borehole, borehole wet below 69').
68		1.5	100			
70						70-75 Ft: Dark gray (10 yr 44/1) and gray (5y 5/1) silty dolomitic SANDSTONE , hard, very fine-to fine-grained, subrounded to rounded, well-cemented, moderately sorted.
72		0	60			
74						
76						75-80 Ft: Same as above
78		0	50			
80						80-85 Ft: Same as above (faint HC odor).
82						
84		1.7	38			
86						85-90 Ft: Gray sandy (5y 5/1) DOLOMITE , very hard, conchoidal fractures, microcrystalline, occasional thin beds of sandstone.
88						



Drilling Log

Monitoring Well MW-8

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90						90-95 Ft: Dark gray (10 yr 4/1) and gray (5y 5/1) silty dolomitic SANDSTONE , hard, well cemented, v.fine-to fine-grained, subrounded to rounded, moderately sorted (faint hydrocarbon odor).
92		0	21			
94						
96						95-100 Ft: Same as above
98		0	25			
100						100-105 Ft: Same as above
102		0	33			
104						
106						105-110 Ft: L. gray (10 yr 7/1) silty dolomitic SANDSTONE , hard, very fine-to fine-grained, moderately sorted, with occasional very thin beds of dolomite.
108		0	30			
110						110-115 Ft: Light gray (10 yr 7/1) sandy DOLOMITE , very hard, microcrystalline (cuttings are coarse sand size, occasional thin beds of dolomitic sand).
112						
114		0	18			115-120 Ft: Same as above
116						
118		0	19			
120						



Drilling Log

Monitoring Well MW-88

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						120-122
122-124						125-130 Ft: Same as above
124-126						
126-128		0.7	30			
128-130						130-135 Ft: Pale brown (10 yr 6/3) DOLOMITE, micro-crystalline, conchoidal fractures. Cuttings are coarse to medium sand-sized, trace sand.
130-132		0	19			
132-134						135-140 ft: Same as above
134-136						
136-138		0	16			
138-140						140-145 Ft: Same as above
140-142						
142-144		0	20			
144-146						145-150 Ft: Same as above
146-148						
148-150		0	17			
150-152						150-155 Ft: Pale brown (10 yr 6/3) silty dolomitic SANDSTONE, moderately hard to soft, weak cement, very fine to medium grained, poorly sorted, rounded to angular, trace fossils (possible forams and radiolaria), trace pyrite.



Drilling Log

Monitoring Well MW-8

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152		0	23			155-180 Ft: Same as above
154						
156						
158		0.7	38			
160						
162		0	50			
164						
166		0	27			
168						
170						
172	0	43			170-175 Ft: Same as above	
174						
176						TD = 175 Ft.
178						
180						
182						
184						



Drilling Log

Monitoring Well MW-89

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 232 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 212 ft. Static 212 ft.
 Screen: Dia 4 in. Length 40 ft. Type/Size 0.04 in.
 Casing: Dia 4 in. Length 188.5 ft. Type SCH 40 PVC
 Fill Material 6/9 Silica sand Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air/Mist Rotary
 Driller Ronnie Kieth Log By Scott Underwood Date 8/2/96 Permit # _____
 Checked By Underwood/Fields License No. _____

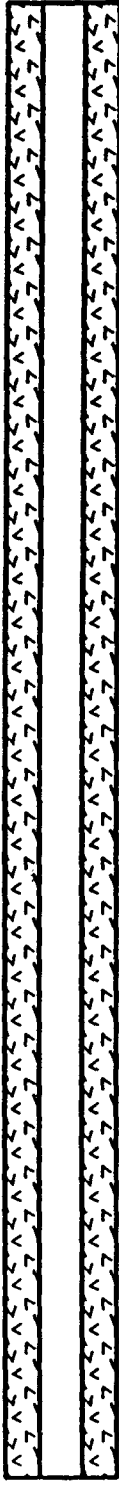




See Site Map
For Boring Location

COMMENTS:

SPUD hole at 1300 hrs. on 8/3/96 Finish 8/3/96. Stainless steel centralizers at 186', 206', 226'.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						-3 Not to scale
0						0-4 Ft: Yellowish-brown (10 yr 5/4)sandy LOAM with some dolomite gravel
2		0	90			
4						4-5 Ft: Very pale brown (10 yr 8/3) dolomitic silty SAND , very fine to medium grained, poorly sorted, dry, soft, with occasional thin beds of dolomite. Sand is poorly cemented and friable. 5-10 Ft: Same as above
6						
8		0.7	50			
10						10-15 Ft: Same as above
12		0.7	50			
14						
16						15-20 Ft: Grayish brown (10 yr 5/2) dolomitic LIMESTONE , tracv. fine sand, becomes hard at 18'. Limestone is hard with interbedded thin soft beds (2-3").
18		1.5	27			
20						20-25 Ft: Same as above
22		0	27			
24						

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
24		0	38			25-30 Ft: Pale brown (10 yr 6/3), and light gray (10 yr 7/2) DOLOMITE , hard, dry, occasional thin dolomitic sand beds (<2/3"), sand is very fine to fine grained.					
26											
28											
30											
32							0	27			30-35 Ft: Pale brown (10 yr 6/3) and light gray (10 yr 7/2) silty dolomitic SANDSTONE , dry, soft, poorly sorted, very fine to fine grained, subrounded, occasional thin beds of harder sandy dolomite. Sandstone is weakly cemented.
34											
36											
38											
40											
42											
36											
38											
40											
42											
44											
46	1.5	60			40-45 Ft: Same as above (moist cuttings).						
44											
46											
48											
50						0	75			45-50 Ft: Same as above	
48											
50											
52											
54											
56											0
52											
54											
56											
56	0	75			55-60 Ft: Grayish brown (10 yr 5/2) silty SANDSTONE , very fine to fine grained, moderately sorted, subrounded, friable, very						
56											



Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description		
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
56		0	75			weakly cemented, very moist, soft, occasional very thin beds (<2") of dolomitic SANDSTONE, matrix reacts with HCl.		
58								
60							60-65 Ft: Same as above	
62			0		60			
64								
66								
68			0		75			
70								70-75 Ft: Grayish brown (10 yr 5/2) and very dark grayish brown (10 yr 3/2) silty SANDSTONE, very fine-to fine-grained, moderately sorted, subrounded, weakly cemented, occasional very thin beds of dolomitic SANDSTONE, matrix reacts with HCl.
72			0		60			
74								
76						75-80 Ft: Same as above (becomes harder at 79').		
78		0	60					
80						80-85 Ft: Same as above (becomes harder at 83'. Sandstone is cemented with calcium carbonate).		
82		11.1	51					
84								
86		17.3	27			85-90 Ft: White (10 yr 8/2) DOLOMITE, microcrystalline, very hard, conchoidal fractures, dry, possibly siliceous dolomite.		
88								

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90						
92		0	38			90-95 Ft: Grayish brown (2.5 y 5/2) silty dolomitic SANDSTONE, very fine- to fine- grained, moderately sorted, subrounded, soft, weakly cemented, slight moisture, occasional thin hard beds of dolomitic SANDSTONE, matrix reacts with HCl. (Slight HC odor).
94						
96		0.7	21			95-100 Ft: DOLOMITE (10 yr 7/1), microcrystalline, very hard, conchoidal fractures, dry, possibly siliceous dolomite. Cuttings are fine to coarse sand size.
98						
100						100-105 Ft: Same as above
102		0	20			
104						
106		0	18			105-110 Ft: Same as above
108						
110						110-115 Ft: Same as above
112		0	17			
114						
116						115-120 Ft: Same as above
118		0	23			
120						



Drilling Log

Monitoring Well MW-89

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120	[Well Completion Diagram]	0	18	[Graphic Log]		120-125 Ft: Pale brown (10 yr 6/3) DOLOMITE , microcrystalline, very hard, conchoidal fractures, dry, possibly siliceous dolomite. Cuttings are coarse sand sized. Trace sand.
122						125-130 Ft: same as above
124						
126						
128		0	27			
130						130-135 Ft: Light gray (7.5 yr N7/) silty dolomitic SANDSTONE , very fine to fine grained, moderately sorted, subrounded, dry, hard, occasional thin beds of dolomite, well cemented.
132		0	35			
134						
136						135-140 Ft: Gray (7.5 yr N6/) sandy DOLOMITE , microcrystalline, hard, conchoidal fractures, becomes wet at 137'. Possible siliceous cement. Very thin beds of dolomitic sand. (Switched to mist pump)
138		0	25			
140						140-145 Ft: Same as above
142		0	33			
144						
146						145-150 Ft: Same as above
148		0	30			
150						150-155 Ft: Light gray (10 yr 7/l) sandy DOLOMITE , and light brownish gray dolomitic silty sand (interbedded). Dolomite is hard, microcrystalline, possibly siliceous cement, common thin beds of dolomitic silty sand, sand is fine grained, subrounded, moderately sorted.
152						



Drilling Log

Monitoring Well MW-89

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152						
154		0	21			155-160 Ft: Same as above
156						
158		0	25			
160						160-165 Ft: Very pale brown (10 yr 7/3) DOLOMITE, microcrystalline, very hard, possibly siliceous conchoidal fractures. Cuttings are fine to coarse grained, flat, blocky, coarse sand.
162		0	23			
164						
166						165-170 Ft: Same as above. Thin beds of silty dolomitic sand, white (10 yr 8/2), very fine to fine grained, moderately sorted, subrounded to rounded, soft, poorly cemented, common occasional very thin beds of DOLOMITE, trace of green medium grained sand.
168		0	25			
170						170-175 Ft: Very pale brown (10 yr 7/3) sandy DOLOMITE, microcrystalline, hard, conchoidal fractures. Cuttings are coarse sand sized. Occasional very thin beds of dolomitic sand (<2"). Dolomite possibly siliceous cement.
172		0	20			
174						
176						175-180 Ft: Same as above
178		0	18			Bentonite in annulus 178.5 to 182 Ft.
180						180-185 Ft: Same as above
182		0	25			
184						



Drilling Log

Monitoring Well MW-89

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PIID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184		0	23			185-190 Ft: Very pale brown (10 yr 7/3) DOLOMITE , microcrystalline, very hard, possible siliceous cement, conchoidal fractures. Cuttings are flat, coarse sand to fine gravel size, blocky Stainless steel centralizer at 186 Ft.
186						190-195 Ft: Same as above
188						192-195 Ft: Same as above
190						195-200 Ft: Same as above
192						200-205 Ft: Same as above
194						205-210 Ft: Very pale brown (10 yr 7/3) sandy DOLOMITE , microcrystalline, hard siliceous cement. Cuttings are coarse gravel size, occasional very thin beds of dolomitic sand. Return water increases, estimated depth to water during drilling is 212 Ft. Stainless steel centralizer at 206 Ft.
196						210-215 Ft: Brown (10 yr 4/3) and light gray dolomitic silty SANDSTONE , very fine to fine grained, moderately sorted, subrounded, moderately hard, friable moderate cement, occasional thin beds of dolomite, trace shale.
198						215-220 Ft: Same as above
200						
202						
204						
206						
208						
210						
212						
214						
216						



Drilling Log

Monitoring Well MW-89

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-216							
-218							
-220							
-222		0	48			<p>220-225 Ft: White (5 yr 8/1) and very pale brown DOLOMITE (sandy), hard, microcrystalline, interbedded with very thin beds of sandstone.</p>	
-224							
-226						<p>225-232 Ft: Same as above Stainless steel centralizer at 226 Ft.</p>	
-228		0	48				
-230		0	24				
-232						TD at 232 Ft.	
-234							
-236							
-238							
-240							
-242							
-244							
-246							
-248							



Drilling Log

Shallow Zone Monitor Well 90

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 60 ft. Diameter 7 5/8 in/7 in.
 Top of Casing 2.5 ft. Water Level Initial 49 ft. Static _____
 Screen: Dia 4 in. Length 50 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/13/96 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at surface. Groundwater encountered during drilling at 49 Ft.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						7 5/8-inch hole drilled to 5 Ft. Temp. set 7 11/3-inch odex csg. Drill 7-inch hole to 60 Ft.
0						0-5 Ft: Dark yellowish orange (10yr 6/6) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, with minor light brown (5yr 5/6) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well sorted, poorly cemented, calcareous, no hydrocarbon odor.
2			50			
4						5-10 Ft: DOLOMITE and SANDSTONE , as above.
6		.3				
8			50			
10		1.5				10-15 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor, with minor SANDSTONE , as above.
12			46			
14						
16		12.4				15-20 Ft: Brownish black (5yr 2/1) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, interbedded with pale yellowish brown (10yr 6/2) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well sorted, moderately well cemented, calcareous, no hydrocarbon odor.
18			46			
20		96				20-25 Ft: DOLOMITE and SANDSTONE , as above with pale olive (10yr 6/2), CLAY , soft, damp, no hydrocarbon odor.
22			38			
24						



Drilling Log

Shallow Zone Monitor Well 90

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%																																																
24		1.5	41			25-30 Ft: Brownish gray (5yr 4/1) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor, with minor SANDSTONE , as above.																																																
26						18.2	41			30-35 Ft: DOLOMITE and minor SANDSTONE , as above.																																												
28										1.5	41			35-40 Ft: DOLOMITE and minor SANDSTONE , as above.																																								
30														41				40-45 Ft: Pale yellowish brown (10yr 6/2) to dark yellowish orange (10yr 6/2) DOLOMITE , very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor, with minor SANDSTONE , as above.																																				
32																		30				45-50 Ft: DOLOMITE and SANDSTONE , as above (sandstone % increased w/depth).																																
34																						50				Water encountered at 49 Ft.																												
36																										50				50-55 Ft: DOLOMITE and SANDSTONE , as above.																								
38																														4.2																								
40																																			50																			
42																																								4.3														
44																																																						
46																																																						
48																																																						
50																																																						
52																																																						
54																																																						
56																																																						



Drilling Log

Shallow Zone Monitor Well 90

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		9.3	36			
58						Total depth at 60 Ft.
60						
62						
64						
66						
68						
70						
72						
74						
76						
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 91

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/14/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 14 Ft. No water encountered during drilling.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						
0						7 5/8-inch hole drilled to 20 Ft. Temp. set 7 11/3-inch odex csg. at 20 Ft. Drilled 7-inch hole to 70 Ft. total depth.
2			30			0-5 Ft: ARROYO ALLUVIUM, dolomite fragments from cobbles and boulders, no hydrocarbon odor.
4		0				5-10 Ft: ARROYO ALLUVIUM, as above.
6			25			10-14 Ft: ARROYO ALLUVIUM, as above.
8		0				14-20 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
10			25			20-25 Ft: DOLOMITE, as above.
12			38			
14		0				
16			43			
18						
20						
22						
24						

Drilling Log



Shallow Zone Monitor Well 91

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%																												
24		0	60			25-30 Ft: DOLOMITE, as above with minor grayish orange (10yr 7/4) SANDSTONE, dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.																												
26						1.5	40			30-35 Ft: DOLOMITE and minor SANDSTONE, as above.																								
28										9.4	40			35-40 Ft: Pale brown (5yr 5/2) to light brown (5yr 5/6) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, moderate hydrocarbon odor, w/minor SANDSTONE, as above.																				
30														10.1	50			40-45 Ft: SANDSTONE, as above with strong hydrocarbon odor. Occasional minor pale yellowish brown (10yr 6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures.																
32																		27.9	40			45-50 Ft: DOLOMITE, as above. Minor SANDSTONE, as above, faint hydrocarbon odor.												
34																						11.1	27			50-55 Ft: DOLOMITE and minor SANDSTONE, as above with moderate hydrocarbon odor.								
36																										80.8				55-60 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, faint hydrocarbon odor.				
38																																		
40																																		
42																																		
44																																		
46																																		
48																																		
50																																		
52																																		
54																																		
56																																		



Drilling Log

Shallow Zone Monitor Well 91

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		23.1	27			<p>60-65 Ft: DOLOMITE as above with no hydrocarbon odor.</p> <p>65-70 Ft: DOLOMITE as above.</p>
58						
60						
62			40			
64						
66	2.5	27			<p>Total depth at 70 Ft.</p>	
68						
70						
72						
74						
76						
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 92

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 8/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/14/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 21 Ft. No water encountered during drilling.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
2.5						7 5/8-inch hole drilled to 25 Ft. Temp. set 7 11/32-inch odex csg. at 25 Ft. Drilled 7-inch hole to 70 Ft. total depth.	
0						0-5 Ft: ARROYO ALLUVIUM, silt, very loose, dry, dolomite, fragments from cobbles and boulders, minor sandstone fragments.	
2				30			
4			6.5				5-10 Ft: ARROYO ALLUVIUM, as above.
6							
8				38			
10			0.7				10-15 Ft: ARROYO ALLUVIUM, predominantly dolomite fragments.
12							
14			0.8				15-21 Ft: ARROYO ALLUVIUM, as above.
16							
18				21			
20			132				
22							21-25 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
24				23			



Drilling Log

Shallow Zone Monitor Well 92

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
24		68.4	43			25-30 Ft: DOLOMITE, as above.	
26							
28							
30						41.1	30-35 Ft: DOLOMITE, as above.
32							
34						10.8	35-40 Ft: DOLOMITE, as above.
36							
38						38	
40						16.1	40-45 Ft: DOLOMITE, as above w/interbedded grayish orange SANDSTONE, moderatley dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, faint hydrocarbon odor.
42						4.9	36
44							
46							
48							
50	3.1	50-55 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor with interbedded brownish gray (5yr 4/1) SANDSTONE, moderately dense, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.					
52	36						
54	2.5	36					
56							



Drilling Log

Shallow Zone Monitor Well 92

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		2.8	40			60-85 Ft: DOLOMITE and SANDSTONE, as above.
58						
60						
62						
64						
66	6.1	3.2	33			65-70 Ft: DOLOMITE and minor SANDSTONE, as above
68						
70						
72						
74						
76						Total depth at 70 Ft.
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 93

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/13/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 17 Ft: No water encountered during drilling. Drilled 0-40 Ft on 1/13/97 and 45-70 Ft on 1/14/97.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						7 5/8-inch hole drilled to 20 Ft. Temp. set 7 11/32-inch odex csg. at 20 Ft. Drilled 7-inch hole to 70 Ft. total depth.
0						0-5 Ft: ARROYO ALLUVIUM , silt and dolomite fragments from cobbles and boulders.
2			43			
4		0				5-10 Ft: ARROYO ALLUVIUM , as above.
6			25			
8		0				10-17 Ft: ARROYO ALLUVIUM , as above.
10			25			
12						
14		0				
16			25			
18						17-20 Ft: Pale yellowish brown (10yr 6/2), DOLOMITE , hard, dry, microcrystalline, conchoidal fracture, no hydrocarbon odor.
20		0.5				20-25 Ft: DOLOMITE , as above.
22			38			
24						



Drilling Log

Shallow Zone Monitor Well 93

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
24		0.7	36			25-30 Ft: DOLOMITE, as above.	
26						12.2	46
28		3.8	38				
30						0.5	43
32		0	40				
34						0.3	36
36		1.2					
38							
40							
42							
44							
46							
48							
50							
52							
54							
56							



Drilling Log

Shallow Zone Monitor Well 93

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		1.4	50			<p>60-65 Ft: Interbedded SANDSTONE and DOLOMITE, as above.</p>
58						
60						
62						
64						
66		15.9	38			<p>65-70 Ft: Interbedded SANDSTONE and DOLOMITE, as above.</p>
68						
70						
72						
74						
76		24.1	33			<p>Total depth at 70 Ft.</p>
78						
80						
82						
84						
86						
88						

Drilling Log

Monitoring Well MW-94



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 230 ft. Diameter 12.25/7.875 in.
 Top of Casing _____ Water Level Initial 50 ft. Static _____
 Screen: Dia Open Hole in. Length _____ Type/Size _____
 Casing: Dia 8" in. Length 65 ft. Type Steel
 FW Material _____ Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Eric Matzner Date 6/10/96 Permit # RA-5131-S-25
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Start at 0945 hrs. on 6/10/96. Borehole relocated NNE initial cased hole. (-N35 E, approximately 100-150 yds.) Estimated flow rate at 50 - 54 ft., 4 gpm.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						12.25-inch borehole with 8-inch casing 0 to 65 Ft.
2						0-5 Ft: Light brownish gray (10 yr 6/2) DOLOMITE , conchoidal fracturing, slightly sandy matrix.
4		0	30			
6		0	25			5-10 Ft: Graysih brown (10 yr 5.5/2) DOLOMITE , conchoidal fracturing, slightly sandy matrix, dry, occasional calcium carbonate fragments.
8						
10						10-15 Ft: Olive gray (5y 5/2) DOLOMITE and gray (7.5 yr N 6/) SANDSTONE , moderately cemented, well sorted, well rounded, dry. Matrix does not react with HCl.
12		2.4	21			
14						
16						15-20 Ft: Pale yellow (2.5 y 7/4) dolomitic SANDSTONE , very fine-grained, moderately cemented, well sorted, well rounded.
18		0	43			
20						20-25 Ft: Light brownish gray (2.5y 6/2) dolomitic SANDSTONE , moderately cemented, moderately sorted, well rounded, dry. (interbedded interval of dolomitic sandstone and sandstone).
22		2.4	30			
24						



Drilling Log

Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant
 Location Indian Basin, Carlsbad NM

Owner Marathon Oil Company
 Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26						
28		7.6	43			25-30 Ft: Same as above
30						
32		2.4	30			30-35 Ft: Light olive brown (2.5y 5/3) dolomitic SANDSTONE, very fine-grained, moderately sorted, well rounded, moderate to poorly cemented, dry to slightly moist.
34						
36						
38		2.4	43			35-40 Ft: Very dark greenish brown (10 yr 3/2) SANDSTONE, very fine-grained, moderately sorted, well rounded, moist to wet, moderately cemented, hard. Moist, no odor. Begin misting hole.
40						
42		2.4	25			40-45 Ft: Dark gray (7.5y N4/) and gray (7.5 yr N6/) SANDSTONE, moderatley sorted, moderately cemented, well rounded.
44						
46						
48		2.4	43			45-50 Ft: Same as above (water at 50'-54' - 4 gpm).
50						
52		2.4	43			50-55 Ft: Same as above (dark gray).
54						
56						55-80 Ft: Same as above



Drilling Log

Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58		2.4	50			
60						
62		0	11			80-85 Ft: Gray (10 yr 6/1) DOLOMITE , conchoidal fractures, microcrystalline, small light green clasts, slight reaction with HCl.
64						
66		11.9	20			7.875-inch open borehole 65 to 230 Ft. 85-70 Ft: Dark gray (10 yr 4/1) dolomitic SANDSTONE , very fine-grained, moderately sorted, well rounded, well cemented, hard.
68						
70						70-75 Ft: Gray (2.5y N6/) dolomitic SANDSTONE , very fine-grained, moderately sorted, well rounded, well cemented.
72		7.4	50			
74						
76		1.2	10			75-80 Ft: Gray (10 yr 6/1) DOLOMITE and LIMESTONE , microcrystalline, very hard, conchoidal fractures, dry, moderate reaction with HCL.
78						
80						80-85 Ft: Gray (10 yr 6/1) DOLOMITE , microcrystalline, very hard, conchoidal fractures, dry.
82		0	10			
84						
86						85-90 Ft: Same as above
88		0	10			



Drilling Log

Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						90-95 Ft: Same as above
90						
92		1.2	11			95-100 Ft: Same as above
94						
96						
98		3.7	14			100-105 Ft: Gray (5 yr 6/1) dolomitic Limestone, micro-crystalline, conchoidal fractures, hard, reacts slightly with HCl.
100						
102		2.4	15			105-110 Ft: Same as above
104						
106						
108	0	13		110-115 Ft: Same as above (slightly sandy matrix).		
110						
112	0	33		115-120 Ft: Gray (10 yr 6/1) dolomitic Limestone, slightly sandy, microcrystalline, trace pyrite crystals, hard.		
114						
116						
118	0	23				
120						



Drilling Log

Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120	[Empty Box]	0	27	[Blocky pattern]		120-125 Ft: Gray (10 yr 6/1) dolomitic LESTONE, sandy, conchoidal fractures.	
122							
124							
126						60	125-130 Ft: Gray (10 yr 6/1) sandy dolomitic LESTONE, little pyrite, cross stratification, powdery, dry.
128							
130							130-135 Ft: Same as above (less sandy, less pyrite, hard, dry).
132						23	
134							
136						16	135-140 Ft: Gray (2.5 y N5/) and light brownish gray (2.5y 6/2) sandy DOLomite, trace black grains (possibly magnesium).
138							
140			140-145 Ft: Gray (5y 5/1) dolomitic SHALE/SILTSTONE, moderately hard, very thinly laminated, platy cuttings.				
142	27						
144							
146	18	145-150 Ft: Light gray (10 yr 7/2) LESTONE, interbedded hard and soft limestone, chalky, moderately sandy, very fine-grained, occasional calcite crystals, hard.					
148							
150			150-155 Ft: Same as above (white (10 yr 8/1), hard).				
152	5.0	19					



Drilling Log

Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
152		5.0	19			155-180 Ft: Same as above	
154							
156							
158		0	18				
160		2.4	15				160-185 Ft: Same as above
162							
164							
166		2.4	17				165-170 Ft: Same as above (tan at 167'-168').
168							
170		5.0	21				170-175 Ft: Same as above
172							
174	5.0	150			175-180 Ft: White (10 yr 8/2) CHALK, silt sized, with occasional sand sized grains, moist, strong reaction w/HCL, soft.		
176							
178							
180						180-185 Ft: Same as above (more sandy).	
182						5.0	100
184							

Drilling Log



Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>			
-184	[Empty well completion box]	5.0	100	[Cross-hatched graphic log]		185-190 Ft: Same as above			
-186									
-188									
-190									
-192									
-194									
-196									
-198									
-200									
-202						5.0	75	[Dotted graphic log]	
-204									
-206									
-208									
-210									
-212									
-214									
-216									
-216	5.0	75	[Brick-pattern graphic log]		210-215 Ft: Light gray (10 yr 7/2) sandy Limestone, very fine-grained. Limestone and dark gray (10 yr 4/1) shale interbeds.				
-216					215-220 Ft: Same as above (common secondary porosity, intervals of hard and soft sediments).				



Drilling Log

Monitoring Well MW-94

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

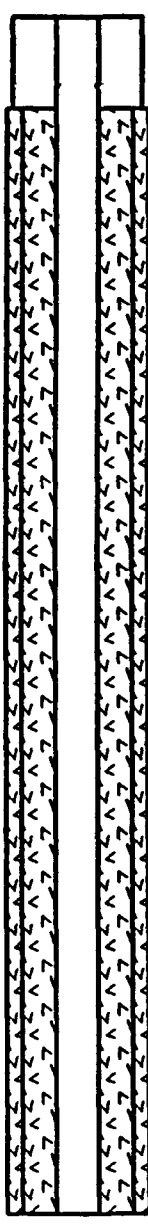

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
216	[Empty Box]	2.4	75	[Brick Pattern]		220-225 Ft: Light brownish gray (10 yr 6/2) sandy LIMESTONE, secondary porosity (abundant), hard but crumbles, slightly dolomitic limestone, slight reaction with HCl.
218						
220		5.0	50	[Brick Pattern]		225-230 Ft: Gray (10 yr 5/1) sandy LIMESTONE and DOLOMITE, poorly sorted, subangular, ferrous and magnesium carbonate grains.
222						
224	[Empty Box]	2.4	43	[Brick Pattern]		TD at 230 ft. on 6/11/96
226						
228						
230						
232						
234						
236						
238						
240						
242						
244						
246						
248						

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228
 Surface Elev. _____ Total Hole Depth 145 ft. Diameter 7 7/8 in.
 Top of Casing _____ Water Level Initial 123.5 ft. Static _____
 Screen: Dia 4 in. Length 30 ft. Type/Size 0.040 in.
 Casing: Dia 4 in. Length 111 ft. Type Sch. 40 PVC
 Fill Material Gravel/Grout Rig/Core Gardner Denver 15W
 Drill Co. West Texas Method Mud/Air Rotary
 Driller V. Parker Log By Bob Davis Date 03/31/97 Permit # _____
 Checked By Davis, Fields License No. _____

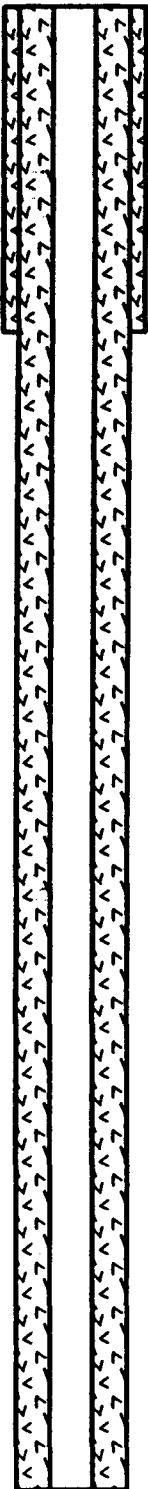

See Site Map
For Boring Location

COMMENTS:

Bedrock at 29 ft. Used mud system to drill top hole. Switched to air rotary system out of 8 5/8-inch steel surface casing at 31 ft.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5		No PID readings due to mud system to 31 ft.	Not able to calculate drill rates from 0-31 ft. due to caving of borehole in arroyo alluvium.			12 1/4-inch hole drilled to 31 ft. Set 8 5/8-inch steel casing to 31 ft. Drilled 7 7/8-inch hole to 145 ft. (below grade) total depth.
0						0-5 ft.: ARROYO ALLUVIUM, pale yellowish brown (10YR 6/2) silt, loose, dry, interbedded with dolomite fragments from dolomitic gravels, cobbles, and boulders.
2						5-10 ft.: ARROYO ALLUVIUM, as above.
4						
6						
8						
10						10-15 ft.: ARROYO ALLUVIUM, as above.
12						
14						
16						
18						
20						15-20 ft.: ARROYO ALLUVIUM, as above.
22						
24						20-25 ft.: ARROYO ALLUVIUM, as above.

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
24						25-29 ft: ARROYO ALLUVIUM, as above.		
26							29-30 ft: Grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
28								
30								
32		10						
34								
36		3.8						35-40 ft: Pale yellowish brown (10YR 6/2) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor.
38		30						
40	4.1					40-45 ft: Pale yellowish brown (10YR 6/2) sandy DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, sand grain inclusions range in color from pale yellowish brown (10YR 6/2) to black (N1).		
42								
44	27							
46	74.9					45-50 ft: Pale yellowish brown (10YR 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, interbedded with pale yellowish brown (10YR 6/2) DOLOMITE/SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor.		
48	25							
50	41.4					50-55 ft: Pale yellowish brown (10YR 6/2), SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, moderately to strong hydrocarbon odor.		
52								
54	30							
56	32.4					55-80 ft: SANDSTONE , as above.		

Drilling Log



Monitoring Well 95

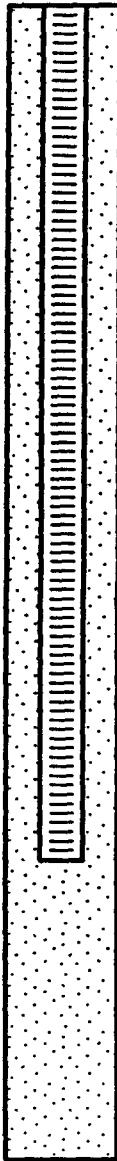
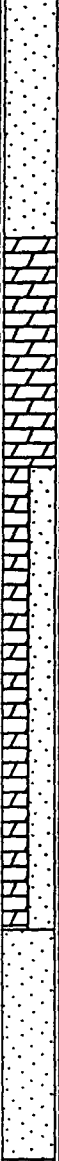
Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Prof. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
56						
58			27			
60		196				60-65 ft.: Pale yellowish brown (10YR 6/2) DOLOMITIC SANDSTONE , dense, dry, very fine- to fine-grained, subrounded to rounded, well-sorted, well-cemented, calcareous interbedded with grayish brown (5YR 3/2) SANDSTONE , moderate dense, dry, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, strong hydrocarbon odor.
62			23			
64		153.7				65-70 ft.: SANDSTONE , as above, interbedded with pale brown (5YR 5/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, moderate to strong hydrocarbon odor.
66			14			
68		146.3				70-75 ft.: SANDSTONE and DOLOMITE , as above, with moderate hydrocarbon odor.
70			30			
72		28.4				75-80 ft.: Dark yellowish orange (10YR 6/6) SANDSTONE , loose, damp, very fine-grained, subrounded, well-sorted, poorly-cemented, calcareous, interbedded with minor pale brown (5YR 5/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
74			33			
76	10.4				80-85 ft.: Pale brown (5YR 5/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor, with minor SANDSTONE .	
78		20				
80	20.6				85-90 ft.: DOLOMITE and SANDSTONE , as above.	
82						
84						
86						
88			20			

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
88			20			
90		40.0				90-95 ft.: DOLOMITE and SANDSTONE, as above.
92			21			
94						
96		5.1				95-100 ft.: Pale yellowish brown (10YR 6/2) DOLOMITIC SANDSTONE, hard, dry, fine- to medium-grained, subrounded to angular, well-sorted, poorly-cemented, calcareous, no hydrocarbon odor (sand-sized cuttings are dolomite).
98			30			
100		3.5				100-105 ft.: DOLOMITIC SANDSTONE, as above, slightly moist.
102						
104			19			
106		0.0				105-110 ft.: DOLOMITIC SANDSTONE, as above.
108			30			
110		2.5				110-115 ft.: DOLOMITIC SANDSTONE, as above.
112			27			
114		3.5				115-120 ft.: DOLOMITIC SANDSTONE, as above.
116						
118			27			
120		3.5				

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		3.5				120-125 ft.: Pale yellowish brown (10YR 6/2) SANDSTONE , moderate dense, damp, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor. Well making water immediately below 123 ft. Interface probe indicates top of water at 123.5 ft. below grade (1415 hrs. 4/2/97).
122		21				
124		2.5				
126		16				
128						
130		2.2				
132		33				
134		0.0				
136						
138		25				
140					140-145 ft.: SANDSTONE , as above.	
142						
144	38					
146						Total depth at 145 ft. below grade.
148						
150						
152						



Drilling Log

Monitoring Well 96

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228
 Surface Elev. _____ Total Hole Depth 135 ft. Diameter 7 7/8 in.
 Top of Casing _____ Water Level Initial 110 ft. Static _____
 Screen: Dia 4 in. Length 30 ft. Type/Size 0.040 in.
 Casing: Dia 4 in. Length 97.5 ft. Type Sch. 40 PVC
 Fill Material Gravel/Grout Rig/Core Gardner Denver 15W
 Drill Co. West Texas Method Air Rotary
 Driller R. Keith Log By Bob Davis Date 03/25/97 Permit # _____
 Checked By Davis, Fields License No. _____

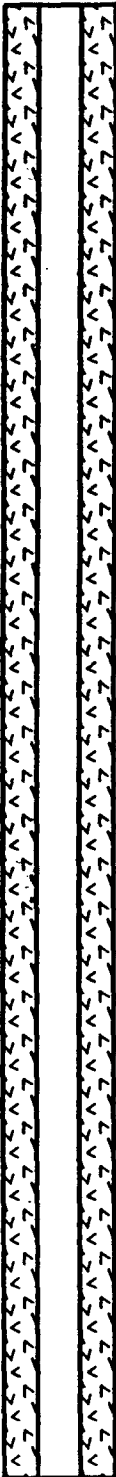

See Site Map
For Boring Location

COMMENTS:

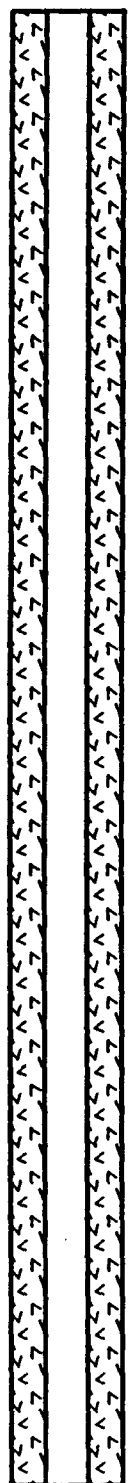


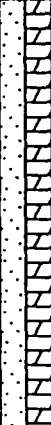


Bedrock at 6 ft.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5 Not to scale						12 1/4-inch hole drilled to 10 ft. Set 8 5/8-inch steel casing to 10 ft. Drilled 7 7/8-inch hole to 135 ft., total depth.
0						0-8 ft: ARROYO ALLUVIUM , pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/4) SANDSTONE , moderately dense, dry, very fine-grained, subrounded to subangular, well-sorted, calcareous, no hydrocarbon odor.
2		75				
4		0				
6		38				
8						6-10 ft: Pale yellowish brown (10YR 6/2) SANDSTONE , as above. Interbedded with dark yellowish orange (10YR 6/4) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
10	0					10-15 ft: Pale yellowish brown (10YR 6/2) SANDSTONE , dense, dry, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, interbedded with grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
12	25					
14	5.1					
16						15-20 ft.: DOLOMITE , as above.
18	21					
20	6.5					
22						20-25 ft: Pale yellowish brown (10YR 6/2) SANDSTONE , moderate dense, dry, very fine-grained, rounded to subrounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor, with minor DOLOMITE , as above.
24	15					

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
24		4.7	38			25-30 ft: SANDSTONE, as above.	
26						30-35 ft: SANDSTONE, as above.	
28							
30							
32							
34							
36							
38							
40							40-45 ft: SANDSTONE, as above, with minor grayish orange (10YR 7/4) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
42							
44	45-50 ft: SANDSTONE and DOLOMITE, as above.						
46							
48	50-55 ft: DOLOMITE, as above, with minor sandstone, as above.						
50							
52	55-60 ft: Pale yellowish brown (10YR 6/2) to medium yellowish brown (10YR 5/4) SANDSTONE, moderately dense, damp, very fine-grained, rounded to subrounded,						
54							
56							

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
56						well-sorted, well-cemented, calcareous, with interbedded grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor. 60-65 ft.: SANDSTONE , as above.	
58		20					
60		6.6					
62							
64		23					
66		3.5					65-70 ft.: Grayish orange (10YR 7/4) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
68		23					
70		5.0					70-75 ft.: Pale yellowish brown (10YR 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
72		20					
74		5.7					75-80 ft.: Pale yellowish brown (10YR 6/2) to dusky yellowish brown (10YR 2/2) SANDSTONE , moderate dense, damp, very fine-grained, subrounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor, interbedded with DOLOMITE , as above.
76							
78	25						
80	2.2			80-85 ft.: SANDSTONE and DOLOMITE , as above.			
82	21						
84					85-90 ft.: SANDSTONE and DOLOMITE , as above.		
86	18.8						
88	20						

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90		2.3				80-85 ft.: SANDSTONE and DOLOMITE, as above.
92			27			
94		3.8				95-100 ft.: Pale yellowish orange (10YR 8/6) SANDSTONE, loose, moist, very fine-grained, rounded to subrounded, well-sorted, poorly-cemented, calcareous, no hydrocarbon odor.
96			60			
98		2.7				100-105 ft.: SANDSTONE, as above.
100			60			
102		4.7				105-110 ft.: Pale yellowish brown (10YR 6/2) SANDSTONE, loose, moist, very fine-grained, rounded to subrounded, well-sorted, poorly-cemented, calcareous, no hydrocarbon odor.
104			30			
106		6.0				110-115 ft.: SANDSTONE, as above. (Note: Top of water at 110 ft. below grade based on interface probe reading taken immediately after drilling the well).
108			50			
110		4.7				115-120 ft.: Dark yellowish orange (10YR 6/6) SANDSTONE, loose, saturated, very fine to fine-grained, subrounded, well-sorted, poorly-cemented, calcareous, no hydrocarbon odor. (Note: water encountered at approximately 115 ft during drilling).
112			23			
114		5.9				
116						
118						
120						

Drilling Log



Monitoring Well 96

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>	
-120		5.9		•••••		120-125 ft.: SANDSTONE, as above.	
-122				•••••			
-124				21	•••••		
-126			3.9		•••••		125-130 ft.: Dark yellowish orange (10YR 6/6) DOLOMITIC SANDSTONE, loose, saturated, very fine to fine-grained, subrounded to angular, well-sorted, poorly-cemented, no hydrocarbon odor.
-128				23	•••••		
-130		4.7				130-135 ft.: Pale yellowish brown (10YR 6/2) SANDSTONE and DOLOMITIC SANDSTONE, loose, saturated, fine-grained, rounded to subangular, well-sorted, poorly-cemented, no hydrocarbon odor.	
-132			43				
-134							
-136						Total depth at 135 ft. below grade.	
-138							
-140							
-142							
-144							
-146							
-148							
-150							
-152							



Drilling Log

Monitoring Well 97

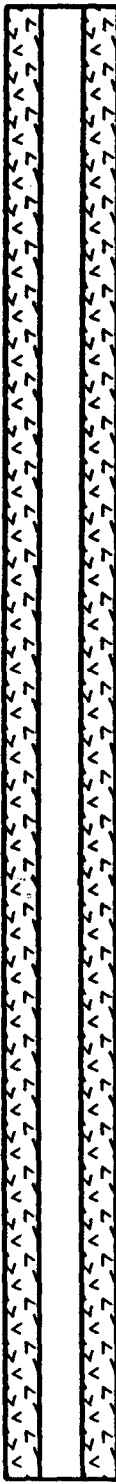






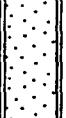
Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228
 Surface Elev. _____ Total Hole Depth 148 ft. Diameter 7 7/8 in.
 Top of Casing _____ Water Level Initial 120 ft. Static _____
 Screen: Dia 4 in. Length 30 ft. Type/Size 0.040 in.
 Casing: Dia 4 in. Length 107.5 ft. Type Sch. 40 PVC
 F# Material Gravel/Grout Rig/Core Gardner Denver 15W
 Drill Co. West Texas Method Air Rotary
 Driller V. Parker Log By Bob Davis Date 03/21/97 Permit # _____
 Checked By Davis, Fields License No. _____

See Site Map
For Boring Location

COMMENTS:
Bedrock at 8 ft below grade.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5 Not to scale						12 1/4-inch hole drilled to 10 ft. Set 8 5/8-inch steel casing to 10 ft. Drilled 7 7/8-inch hole to 148 ft total depth (below grade).
0						0-5 ft.: ARROYO ALLUVIUM, grayish orange (10YR 7/4), silt, loose, dry, calcareous and dolomite fragments, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
2		38				
4		0				5-8 ft.: ARROYO ALLUVIUM, grayish orange (10YR 7/4) silt, loose, dry, calcareous, no hydrocarbon odor.
6						
8		19				8-10 ft.: Grayish orange (10YR 7/4) SANDSTONE, very loose, dry, very fine to medium grained, subrounded, well-sorted, calcareous, no hydrocarbon odor.
10		0				10-15 ft.: Grayish orange (10YR 7/4) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
12		19				
14		0.7				15-20 ft.: DOLOMITE, as above.
16						
18		23				
20		1.1				20-25 ft.: Pale yellowish brown (10YR-6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
22		17				
24		0.8				

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%			
24		0.8				25-30 ft.: Grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.			
26									
28		16				30-35 ft.: Pale yellowish brown (10YR 6/2) DOLOMITE , as above.			
30		1.4							
32		9							
34		8.8					35-40 ft.: DOLOMITE , as above, with minor interbedded pale yellowish brown (10YR 6/2) SANDSTONE , moderately dense, dry, very fine-grained, rounded to subrounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor.		
36		25							
38		1.1					40-45 ft.: Dark yellowish brown (10YR 4/2) SANDSTONE , moderately dense, dry, very fine-grained, rounded to subrounded, well-sorted, well-cemented, slightly calcareous, no hydrocarbon odor.		
40		38							
42		6.7							
44	17					45-50 ft.: Pale yellowish brown (10YR 6/2) sandy DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, interbedded with pale yellowish brown (10YR 6/2) SANDSTONE , dense, dry, very fine-grained, rounded, well-sorted, well-cemented, no hydrocarbon odor.			
46	27								
48	2.9					50-55 ft.: SANDSTONE , as above.			
50	27								
52	1.2					55-60 ft.: Pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2) SANDSTONE , moderate dense, dry, very fine-grained, rounded, well-sorted, well-cemented, calcareous, no hydrocarbon odor.			
54									
56									

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						56
58			38			
60		17.3				80-85 ft: SANDSTONE, as above.
62						
64			50			
66		1.0				85-70 ft: SANDSTONE, as above.
68						
70			20			
72		8.4				70-78 ft: SANDSTONE, as above.
74						
76		2.0				75-80 ft: Pale yellowish brown (10YR 6/2) DOLOMITIC SANDSTONE, dense, dry, very fine to fine-grained, rounded to subrounded, well-sorted, poorly- to medium-cemented, calcareous, no hydrocarbon odor.
78						
80		39.6				80-85 ft: DOLOMITIC SANDSTONE, as above.
82						
84			20			
86		24.6				85-90 ft: DOLOMITIC SANDSTONE, as above.
88						
			27			

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90		13.7				90-95 ft.: DOLOMITIC SANDSTONE , as above. Interbedded with pale yellowish brown (10YR 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
92			21			
94						
96		8.1				95-100 ft.: DOLOMITE , as above, with minor SANDSTONE , as above.
98			21			
100		20.3				100-105 ft.: Pale yellowish brown (10YR 6/2) DOLOMITIC SANDSTONE , dense, dry, very fine-grained, subrounded, well-sorted, well-cemented, calcareous interbedded with pale yellowish brown (10YR 2/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
102			21			
104						
106		9.5				105-110 ft.: DOLOMITE , as above.
108			21			
110		8.8				110-115 ft.: DOLOMITE , as above.
112						
114			25			
116		5.8				115-120 ft.: Pale yellowish brown (10yr 6/2) DOLOMITIC SANDSTONE , dense, dry, very fine-grained, subrounded to subangular, well-sorted, poorly to medium-cemented, calcareous with DOLOMITE , as above.
118			25			
120		5.3				



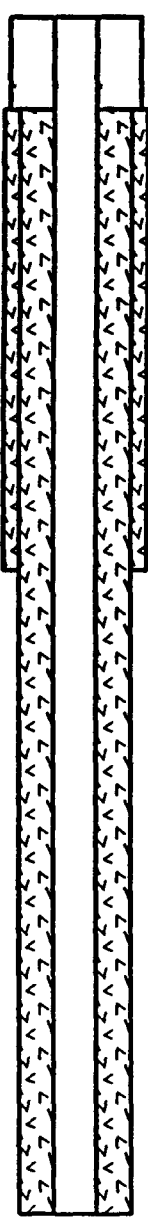
Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		5.3				120-125 ft.: DOLOMITIC SANDSTONE, as above. Water below grade based on interface probe reading taken immediately after drilling the well.	
122							
124		25					
126		6.6					125-130 ft.: DOLOMITIC SANDSTONE, as above. Cutting saturated @ 128 ft.
128							
130		23					
132		6.2					130-135 ft.: DOLOMITIC SANDSTONE, as above. Interbedded with pale yellowish brown (10YR 6/2) SANDSTONE, loose to moderately dense, saturated, very fine-grained, rounded to subrounded, well-sorted, poorly-cemented, no hydrocarbon odor.
134							
136		21					
138		6.9					135-140 ft.: DOLOMITIC SANDSTONE, and SANDSTONE, as above.
140							
142	25						
144							
146	7.1					140-145 ft.: DOLOMITIC SANDSTONE and SANDSTONE, as above.	
148							
150	7.1					145-148 ft.: DOLOMITIC SANDSTONE and SANDSTONE, as above.	
152							
		6.3	25			Total depth at 148 ft.	

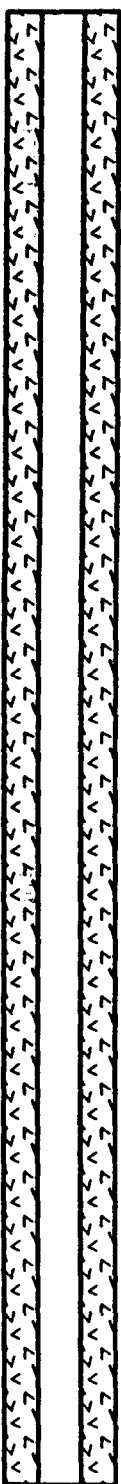







Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228
 Surface Elev. _____ Total Hole Depth 165 ft. Diameter 7 7/8 in.
 Top of Casing 2 ft. Water Level Initial 140.5 ft. Static _____
 Screen: Dia 4 in. Length 30 ft. Type/Size 0.040 in.
 Casing: Dia 4 in. Length 127.5 ft. Type Sch. 40 PVC
 F# Material Gravel/Grout Rig/Core Gardner Denver 15W
 Drill Co. West Texas Method Air Rotary
 Driller R. Keith Log By Bob Davis Date 03/25/97 Permit # _____
 Checked By Davis, Fields License No. _____

See Site Map
For Boring Location

COMMENTS:
Bedrock at surface.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5 Not to scale						12 1/4-inch hole drilled to 10 ft. Set 8 5/8-inch steel casing 10 ft. Drilled 7 7/8-inch hole to 165 ft. total depth below grade
0						0-8 ft.: Grayish orange (10YR 7/4) DOLIMITE , hard, dry, microcrystalline, conchoidal fractures interbedded with grayish orange (10YR 7/4) SANDSTONE , loose to moderately dense, dry, fine-grained, subrounded, well-sorted, no hydrocarbon odor.
2		60				
4		0				
6						
8			12			8-10 ft.: Pale yellowish brown (10YR 6/6) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
10		0				10-15 ft.: DOLOMITE , as above.
12						
14		15				
16		0				15-20 ft.: DOLOMITE , as above, with minor (6-inch; 18.5-19 ft.) dark yellowish orange (10YR 6/6) silty SANDSTONE , very loose, damp, very fine-grained, subrounded, well-sorted, calcareous, no hydrocarbon odor.
18		18				
20		1.3				
22						20-25 ft.: Pale yellowish brown (10yr 6/6) DOLOMITE , very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
24		14				

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		3.4				
26						
28		27				25-30 ft.: Grayish orange (10YR 7/4) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-sorted, calcareous, interbedded with pale yellowish brown (10YR 6/6), DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
30		1.3				
32		25				30-35 ft.: Pale brown (5YR 5/2) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-sorted, calcareous, no hydrocarbon odor.
34		5.3				
36		25				35-40 ft.: SANDSTONE , as above, with interbedded pale yellowish brown (10YR 6/6) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
38		11				
40		43				40-45 ft.: SANDSTONE , as above.
42		5.3				
44		30				45-50 ft.: SANDSTONE , as above, with faint hydrocarbon odor.
46		60.5				
48	43				50-58 ft.: SANDSTONE , as above, no hydrocarbon odor.	
50	17.6					
52						
54						
56						



Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58			14			58-80 ft.: Pale yellowish brown (10YR 6/6) DOLOMITE , very hard, dry microcrystalline, conchoidal fractures, no hydrocarbon odor.
60		2.0				80-85 ft.: DOLOMITE , as above. Interbedded with pale brown (5YR 5/2) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-sorted, calcareous, no hydrocarbon odor.
62			14			
64		12.3				65-70 ft.: DOLOMITE and SANDSTONE , as above.
66			19			
68		7.4				70-75 ft.: DOLOMITE and SANDSTONE , as above.
70			25			
72		12.9				75-80 ft.: DOLOMITE , as above.
74			18			
76		6.9				80-85 ft.: DOLOMITE , as above, with pale yellowish orange (10YR 7/4) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well-rounded, calcareous, no hydrocarbon odor.
78			83			
80		1.1				85-90 ft.: DOLOMITE and SANDSTONE , as above.
82			21			
84						
86						
88						

Drilling Log



Monitoring Well 98

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
88			21			
90		0.8			80-95 ft.: DOLOMITE, as above, with minor SANDSTONE, as above.	
92						
94		20				
96		0.2			95-100 ft.: Pale yellowish brown (10YR 6/2), DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
98						
100		21			100-105 ft.: DOLOMITE, as above.	
102		0.2				
104		30			105-110 ft.: DOLOMITE, as above, interbedded with minor, dark yellowish brown (10YR 6/6), moderately dense, dry, very fine-grained, subrounded, well-sorted, slightly calcareous, no hydrocarbon odor.	
106		0				
108		27				
110		0.2			110-115 ft.: SANDSTONE, as above.	
112						
114	30					
116	0		115-120 ft.: Very pale orange (10YR 5/2) SANDSTONE, loose, damp, very fine-grained, subrounded, well-sorted, calcareous, no hydrocarbon odor.			
118						
120	0.4		33			

Drilling Log

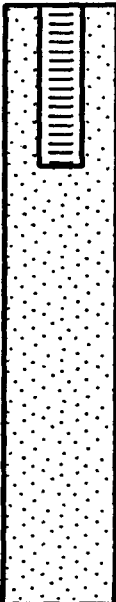
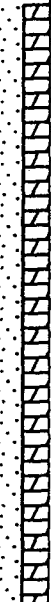
Monitoring Well 98



Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
120		0.4				120-125 ft.: SANDSTONE, as above.
122		33				
124		2.5			124-130 ft.: SANDSTONE, as above.	
126						
128		38				
130		0.8			130-135 ft.: SANDSTONE, as above, moist.	
132						
134		60				
136		0			135-140 ft.: SANDSTONE, as above.	
138		43				
140		0			140-145 ft.: Grayish orange (IOYR 7/4) SANDSTONE, loose, moist, very fine-grained, subrounded, well-sorted, calcareous, moderate hydrocarbon odor. Water at 140 ft below grade based on interface probe reading taken immediately after drilling the well.	
142		50				
144		5.0			145-150 ft.: SANDSTONE, as above, saturated. (Note: water is being added to drilling sytem).	
146						
148		50				
150			150-155 ft.: Pale yellowish brown (IOYR 6/2) SANDSTONE, loose, saturated, fine to medium-grained, subrounded, well-sorted, no hydrocarbon odor.			
152	0					

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
152						with minor, pale yellowish brown (10YR 6/2) DOLOMITE , hard, saturated, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
154		60				155-160 ft.: SANDSTONE with minor DOLOMITE , as above.	
156		0.2					
158		60					
160		0					160-165 ft.: SANDSTONE and DOLOMITE , with increasing percentage of dolomite with depth.
162			27				
164		0.4					
166						Total depth at 165 ft.	
168							
170							
172							
174							
176							
178							
180							
182							
184							



Drilling Log

Shallow Zone Monitor Well 99

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/13/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 12 Ft. No water encountered during drilling.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2.5						7 5/8-inch hole drilled to 20 Ft. Temp. set 7 11/32-inch odex csg. to 20 Ft. drilled 7-inch hole to 70 Ft. total depth.					
0									0-5 Ft: ARROYO ALLUVIUM , light brown (5yr 8/4) silt, loose, dry with dolomite and sandstone fragments, from cobbles and boulders, no hydrocarbon odor.		
2							43				
4							3.7				
6											5-12 Ft: ARROYO ALLUVIUM , predominantly dolomite fragments with minor silt and sandstone fragments.
8								30			
10							0				
12								17			12-15 Ft: Dark yellowish orange (10yr 6/6) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, with minor grayish orange (10yr 7/4) SANDSTONE , mod. dense, dry, very fine-grained, subrounded, well sorted, moderately well cemented, calcareous, no hydrocarbon odor.
14											
16											15-20 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
18								13			
20							70				
22											
24								43			20-25 Ft: DOLOMITE , as above interbedded with grayish orange (10yr 7/4) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well sorted, moderately well cemented, calcareous, faint hydrocarbon odor.



Drilling Log

Shallow Zone Monitor Well 99

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26		39.5				
28			38			
30		44.2				30-35 Ft: DOLOMITE and SANDSTONE, as above.
32						
34			43			
36		51.9				35-40 Ft: Pale yellowish orange (10yr 7/4) SANDSTONE, moderately dense, dry, very fine-grained, subrounded to subangular, well sorted, moderately well cemented, calcareous, faint hydrocarbon odor, with minor DOLOMITE.
38			46			
40		2.4				40-45 Ft: SANDSTONE, as above, interbedded with pale yellowish brown (10yr 6/2) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, faint hydrocarbon odor.
42			40			
44		69.9				45-50 Ft: SANDSTONE and DOLOMITE, as above.
46						
48			40			
50		1.5				50-55 Ft: SANDSTONE and DOLOMITE, as above, no hydrocarbon odor.
52			43			
54		16.2				55-60 Ft: SANDSTONE and DOLOMITE, as above.
56						



Drilling Log

Shallow Zone Monitor Well 99

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		49.8	46			60-65 Ft: DOLOMITE as above interbedded with minor SANDSTONE
58						
62			64	46		
66	68	36				
70		19.1				Total depth at 70 Ft.
72						
74						
76						
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 100

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/11/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at surface. No water encountered during drilling.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-2.5						7 5/8-inch hole drilled to 5 Ft. Temp. set 7 11/32-inch odex csg. to 5 Ft, drilled 7-inch hole to 70 Ft. total depth.	
0						0-5 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
2				30			
4			0				5-10 Ft: DOLOMITE , as above.
6				43			
8							10-15 Ft: DOLOMITE , as above.
10			1.4				
12				43			
14							
16			37.9				15-20 Ft: DOLOMITE , as above interbedded with dark yellowish orange (10yr 6/6) SANDSTONE , moderately dense, dry, very fine- to fine-grained, subrounded to angular, well sorted, well cemented, calcareous, no hydrocarbon odor.
18				68			
20			2.6				20-25 Ft: DOLOMITE , as above interbedded with pale yellowish brown (10yr 2/2) SANDSTONE , as above.
22				38			
24							



Drilling Log

Shallow Zone Monitor Well 100

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		14.3	43			25-30 Ft: DOLOMITE and SANDSTONE, as above.
26						
28		19.0	43			30-35 Ft: DOLOMITE and SANDSTONE, as above.
30						
32		0.8	60			35-40 Ft: Grayish orange (10yr 7/4) to pale yellowish brown (10yr 6/2) SANDSTONE, moderately dense, dry, very fine-grained, subrounded, well sorted, moderately well cemented, calcareous, no hydrocarbon odor, with minor DOLOMITE.
34						
36		2.4	33			40-45 Ft: Pale brown (5yr 5/2) SANDSTONE, moderately dense to dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor, interbedded with grayish orange (10yr 7/4) DOLOMITE, hard, microcrystalline, conchoidal fractures.
38						
40		58.9	43			45-50 Ft: SANDSTONE and DOLOMITE, as above.
42						
44	11.4	30			50-55 Ft: Light grayish brown (5yr 6/1) to brownish gray (5yr 4/1) DOLOMITE, hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
46						
48	28.2				55-60 Ft: DOLOMITE, as above.	
50						
52						
54						
56						



Drilling Log

Shallow Zone Monitor Well 100

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		11.1	33			60-85 Ft: DOLOMITE, as above.
58						
60			29			65-70 Ft: DOLOMITE, as above interbedded with minor pale yellowish brown (10yr 6/2) SANDSTONE, dense, dry, very fine-grained, subrounded, well sorted, poorly cemented, calcareous, no hydrocarbon odor.
62						
64	6.8	19.9	30			Total depth at 70 Ft.
66						
68						
70						
72						
74						
76						
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 101

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 F# Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/11/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 3 Ft., below grade. No water encountered during drilling.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
2.5						7 5/8-inch hole drilled to 20 Ft. Temp. set 7 11/32-inch odex csg. to 20 Ft. drilled 7-inch hole to 70 Ft. total depth.	
0						0-3 Ft: ARROYO ALLUVIUM, dolomite fragments from cobbles and boulders.	
2				10			
4			0				3-5 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor. 5-10 Ft: DOLOMITE, as above.
6							
8				30			
10			0.9				10-15 Ft: DOLOMITE, as above with minor very pale orange (10yr 8/2) SANDSTONE, moderately dense, dry, very fine-grained, subrounded, well sorted, moderately well cemented, calcareous.
12							
14			2.0				15-20 Ft: Brownish gray (5yr 4/1) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor with minor interbedded SANDSTONE, as above.
16							
18				46			
20			3.0				20-25 Ft: DOLOMITE with minor SANDSTONE, as above.
22							
24				30			



Drilling Log

Shallow Zone Monitor Well 101

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26		15.2				25-30 Ft: DOLOMITE with interbedded minor SANDSTONE, as above.
28			46			
30		8.2				30-35 Ft: DOLOMITE and interbedded minor SANDSTONE, as above.
32			36			
34						
36		44.2				35-40 Ft: Very pale orange (10yr 8/2) SANDSTONE, moderately dense, dry, very fine-grained, subrounded to subangular, well sorted, moderately well cemented, calcareous, no hydrocarbon odor, interbedded with brownish gray (5yr 4/1) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures.
38			50			
40		16.2				40-45 Ft: SANDSTONE and DOLOMITE, as above.
42			30			
44						
46		21.4				45-50 Ft: SANDSTONE and DOLOMITE, as above.
48			43			
50		46.8				50-55 Ft: Brownish gray (5yr 4/1) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor, with minor, interbedded SANDSTONE, as above.
52			38			
54		6.0				55-60 Ft: DOLOMITE and minor SANDSTONE, as above.
56						



Drilling Log

Shallow Zone Monitor Well 101

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		16.2	38			<p>60-65 Ft: DOLOMITE and minor SANDSTONE, as above.</p>
58						
60						
62						
64						
66						
68						
70	0	40			Total depth at 70 Ft.	
72						
74						
76						
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 102

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 80 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 70 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/9/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at surface. Original location moved ~25' north (on edge of arroyo). No water encountered.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5						7 5/8-inch hole drilled to 5 Ft. Temp. set 7 11/32-inch odex csg. to 5 Ft. drilled 7-inch hole to 80 Ft. total depth.
0						0-5 Ft: Grayish orange (10yr 7/4) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor. Bedrock at surface.
2			23			
4		5.0				
6						5-10 Ft: DOLOMITE , as above with minor SANDSTONE , moderately dense, dry, fine-grained, subrounded, well sorted, poorly cemented, calcareous, no hydrocarbon odor.
8			38			
10		3.7				10-15 Ft: DOLOMITE with minor SANDSTONE , as above.
12			38			
14		9.0				
16						15-20 Ft: DOLOMITE and SANDSTONE , as above, sandstone percentage increasing with depth.
18			50			
20		8.1				
22			38			20-25 Ft: Pale brown (5yr 5/2) SANDSTONE , dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, with minor light brownish gray (5yr 6/1) DOLOMITE , hard, microcrystalline, fractured, no hydrocarbon odor.
24						



Drilling Log

Shallow Zone Monitor Well 102

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26		41.7				
28			43			
30		13.6				30-35 Ft: SANDSTONE and DOLOMITE, as above.
32			43			
34						
36		2.3				35-40 Ft: Grayish orange (10yr 7/4) SANDSTONE, moderately dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.
38			38			
40		1.8				40-45 Ft: SANDSTONE, as above with minor interbedded DOLOMITE
42			42			
44						
46		1.0				45-50 Ft: SANDSTONE with minor interbedded DOLOMITE, as above.
48			48			
50		11.8				50-55 Ft: SANDSTONE with minor interbedded DOLOMITE, as above.
52			43			
54		3.7				55-60 Ft: DOLOMITE, as above with minor SANDSTONE, as above.
56						



Drilling Log

Shallow Zone Monitor Well 102

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
56		3.7	36			80-85 Ft: DOLOMITE and minor SANDSTONE, as above.		
58								
60								
62								
64							36	
66							4.1	
68							38	
70							0.4	
72							43	70-75 Ft: Light brownish gray (5yr 6/1) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
74								
76	75-80 Ft: DOLOMITE and SANDSTONE, as above. SANDSTONE increases with depth.							
78	0	0				Total depth at 80 Ft.		
80								
82								
84								
86								
88								



Drilling Log

Shallow Zone Monitor Well 103

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/10/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 20.5 Ft. No water encountered during drilling.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						7 5/8-inch hole drilled to 25 Ft. Temp. set 7 11/32-inch odex csg. to 25 Ft. drilled 7-inch hole to 70 Ft. total depth.
0						0-5 Ft: ARROYO ALLUVIUM , dolomite fragments from cobbles and boulders.
2			30			
4		0				
6						5-10 Ft: ARROYO ALLUVIUM , as above.
8			33			
10		0				10-15 Ft: ARROYO ALLUVIUM , as above.
12						
14		9.8				
16						15-20.5 Ft: ARROYO ALLUVIUM , as above.
18			25			
20		0.5				
22						
24			25			20.5-25 Ft: Grayish orange (10yr 7/4) SANDSTONE , moderately dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.



Drilling Log

Shallow Zone Monitor Well 103

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 0233502II.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26		1.2	38			25-30 Ft: Brownish gray (5yr 4/1) DOLOMITE , very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
30		13.5	40			30-35 Ft: DOLOMITE , as above interbedded with grayish orange (10yr 7/4) SANDSTONE , moderately dense, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.
36		0.5	40			35-40 Ft: SANDSTONE , as above.
40		5.9	33			40-45 Ft: SANDSTONE , as above.
46		9.0	33			45-50 Ft: Brownish gray (5yr 4/1) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor, with minor SANDSTONE , as above.
50		12.7	32			50-55 Ft: DOLOMITE and minor SANDSTONE , as above.
54		3.3				55-60 Ft: DOLOMITE and SANDSTONE , as above with sandstone increasing to 50%.
56						



Drilling Log

Shallow Zone Monitor Well 103

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						56
58		50				
60	1.1			80-85 Ft: DOLOMITE and minor SANDSTONE, as above.		
62						
64		33				
66		8.1			85-70 Ft: DOLOMITE with minor SANDSTONE, as above.	
68			33			
70		4.8				Total depth at 70 Ft.
72						
74						
76						
78						
80						
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 104

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228.60
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 12 1/4" / 7 7/8" in in.
 Top of Casing 2.5 ft. Water Level Initial 171 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8" in. Length 37.5 ft. Type Steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller R. Ketih Log By Bob Davis Date 5/13/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:
12 1/4" borehole drilled to 35 ft. 8 5/8" steel casing run to 35 ft. 7 7/8" borehole drilled to 220 feet. total depth.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						
0						
2			150			0-5 Ft: ARROYO ALLUVIUM , dark yellowish brown (10yr 4/2) SILT : pale yellowish brown (10yr 6/2); sand, loose, fine- to medium-grained, well graded, poorly cemented, dry, no odor.
4						
6		7.5				5-10 Ft: Very pale orange (10yr 8/2) to grayish orange (10yr 7/4) SANDSTONE , loose to moderate dense, fine- to medium-grained, subrounded to subangular, well sorted, mod. cemented, calcareous, dry, no odor.
8						
10		30.3				10-15 Ft: Grayish orange (10yr 9/4) SANDSTONE , as above
12						
14						
16		2.7				15-20 Ft: Pale yellowish brown (10yr 6/2) to mod. yellowish brown (10yr 5/4) DOLOMITE , very hard, microcrystalline, conchoidal fractures, dry, no odor.
18			23			
20		4.9				20-25 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , as above interbedded with pale yellowish brown (10yr 6/2) SANDSTONE , very dense, fine-grained, well sorted, well cemented, calcareous, dry, no odor.
22						
24			21			



Drilling Log

Shallow Zone Monitor Well 104

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228.60

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
24							
25-30			50			25-30 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE , med. dense, fine-grained, well sorted, well cemented, calcareous, dry, no odor.	
30-35		0				30-35 Ft: SANDSTONE , as above.	
32			33				
34							
35-40		14.2					35-40 Ft: SANDSTONE , as above
36							
38			38				
40			23.4				
42				27			
44							
45-50		42.3					45-50 Ft: SANDSTONE , as above
46				25			
48							
50		4.2				50-55 Ft: Light brown (5yr 6/4) DOLOMITE , very hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.	
52			14				
54							
55-60	0					55-60 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE , dense fine-grained, subrounded to subangular, well sorted, well cemented, dry, no hydrocarbon odor.	
56							

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228.60

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58		18				
60		0				60-65 Ft: Dark yellowish brown (10yr 4/2) SANDSTONE , as above.
62		25				
64						
66		0				65-70 Ft: SANDSTONE , as above.
68		33				
70		37.1				70-75 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , very hard, microcrystalline, conchoidal fractures, dry, no odor.
72		19				
74						
76	120.1				75-80 Ft: DOLOMITE , as above.	
78	20					
80	0				80-85 Ft: DOLOMITE , as above.	
82						
84	21					
86	16.8				85-90 Ft: DOLOMITE , as above.	
88	19					



Drilling Log

Shallow Zone Monitor Well 104

Project Indian Basin Remediation

Owner Marathon Oil Company

Location Eddy County, New Mexico

Proj. No. 023350228.60

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90		49.3				90-95 Ft: DOLOMITE, as above.
92			20			
94						
96		0				95-100 Ft: DOLOMITE, as above.
98			23			
100		1.3				100-105 Ft: DOLOMITE as above, interbedded with grayish orange (10yr 7/4) SANDSTONE, moderately dense, very fine-grained, subrounded, well sorted, moderately well cemented, calcareous, dry.
102			30			
104		0				105-110 Ft: Grayish orange (10yr 7/4) DOLOMITIC SANDSTONE, hard, fine- to coarse-grained, subrounded to angular, well sorted, poorly cemented, calcareous, dry, no hydrocarbon odor (Dolomite is sand sized particles).
106			19			
108						
110		0				110-115 Ft: DOLOMITIC SANDSTONE, as above, with grayish orange (10yr 7/4) DOLOMITE, hard, microcrystalline, conchoidal fractures, dry, no odor.
112			19			
114						
116		0				115-120 Ft: DOLOMITIC SANDSTONE and DOLOMITE, as above.
118			19			
120		74.1				



Drilling Log

Shallow Zone Monitor Well 104

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350228.60

Depth (ft)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-120	[Well Completion Diagram]	74.1		[Graphic Log]		120-125 Ft: Pale yellowish orange (10yr 8/6) SANDSTONE , dense to hard, fine- to coarse-grained, subrounded to angular, well sorted, poorly cemented, calcareous, damp, no hydrocarbon odor.	
-122		21				125-130 Ft: Pale yellowish brown (10 yr 6/2) SANDSTONE , moderate dense, very fine-grained, subrounded, well sorted, poorly cemented, damp, no hydrocarbon odor.	
-124		0					
-126		43					
-128		0					130-135 Ft: SANDSTONE , as above.
-130		43					
-132		0					135-140 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, damp, no hydrocarbon odor, interbedded with SANDSTONE as above.
-134		16					
-136		0					140-145 Ft: SANDSTONE with minor DOLOMITE , as above.
-138		23					
-140		70.3					145-150 Ft: SANDSTONE , as above.
-142		25					
-144	0			150-155 Ft: Pale yellowish brown (10yr 6/2) DOLOMITIC SANDSTONE , hard, fine- to coarse-grained, subrounded to angular, well-sorted poorly cemented, calcareous, damp, no hydrocarbon odor.			
-146	17						
-148							
-150							
-152							



Drilling Log

Shallow Zone Monitor Well 154

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228.60

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
152			17				
154							
156		9.1					155-180 Ft: DOLOMITIC SANDSTONE, as above.
158			20				
160		50.8					180-185 Ft: Grayish orange (10yr 7/4) SANDSTONE, hard, fine- to medium-grained, subrounded, well-sorted, poorly cemented, calcareous, damp, strong hydrocarbon odor with minor dolomite grains.
162			21				
164		1999					185-170 Ft: SANDSTONE, as above. Dolomite grains increasing to approximately 50%, weak odor.
166			21				
168							
170		433					170-175 Ft: SANDSTONE, as above with very minor, pale yellowish brown (10yr 6/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, saturated, weak hydrocarbon odor.
172			19				
174		186					175-180 Ft: SANDSTONE, and very minor DOLOMITE as above
176		21					
178							
180	1999				180-185 Ft: SANDSTONE AND DOLOMITE, as above. Dolomite increases to 40%, moderate hydrocarbon odor.		
182		23					
184							



Drilling Log

Shallow Zone Monitor Well 104

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350228.60

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
184	[Well Completion Diagram]	620	18	[Graphic Log]		<p>185-190 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dense, very fine- to fine-grained, subrounded, well-sorted, moderately- to poorly cemented, calcareous, saturated, no hydrocarbon odor.</p>		
186								
188								
190							186	<p>190-195 Ft: SANDSTONE, as above.</p>
192							25	
194							127	<p>195-200 Ft: Pale yellowish orange (10yr 8/6) SANDSTONE, as above.</p>
196								30
198								
200							481	<p>200-205 Ft: SANDSTONE, as above.</p>
202							60	
204							1783	<p>205-210 Ft: SANDSTONE, as above.</p>
206	27							
208								
210	<p>210-215 Ft: Moderate yellowish brown (10yr 5/4) SANDSTONE, as above.</p>							
212								
214								
216	<p>215-220 Ft: SANDSTONE, as above.</p>							



Drilling Log

Shallow Zone Monitor Well 104

Project Indian Basin Remediation

Owner Marathon Oil Company

Location Eddy County, New Mexico

Proj. No. 023350228.60

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216		24.1	75			Total Depth 220ft
-218						
-220						
-222						
-224						
-226						
-228						
-230						
-232						
-234						
-236						
-238						
-240						
-242						
-244						
-246						
-248						



Drilling Log

Shallow Zone Monitor Well 105

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 80 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 70 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/9/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at surface. No water encountered.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5						7 5/8-inch hole drilled to 5 Ft. Temp. set 7-11/32 inch odex csg. to 5 Ft. below grade drilled 7-inch hole to 80 Ft. total depth.
0						0-5 Ft: Yellowish gray (5yr 8/1) DOLOMITE , hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
2			30			
4						5-10 Ft: DOLOMITE , as above.
6		0				
8			43			
10		1.6				10-15 Ft: DOLOMITE , as above with interbedded grayish orange (10yr 7/4) SANDSTONE (10-11 Ft.), moderately dense, dry, fine-grained, subrounded, well sorted, calcareous, poorly cemented, no hydrocarbon odor.
12			33			
14		3.7				
16						15-19.5 Ft: DOLOMITE , as above.
18			43			
20		1.0				19.5-20.5 Ft: SANDSTONE , as above.
22						20.5-25 Ft: Light grayish brown (5yr 6/1) DOLOMITE , very hard, dry, microcrystalline, conchoidal fractures, interbedded with grayish orange (10yr 7/4) SANDSTONE , dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.
24			38			



Drilling Log

Shallow Zone Monitor Well 105

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		19.7	43			25-30 Ft: Interbedded DOLOMITE and SANDSTONE, as above.
26						8.2
28		2.0	50		40-45 Ft: SANDSTONE, as above with occasional light brownish gray (5yr 6/1) DOLOMITE, hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
30					5.4	30
32		2.4	43			
34					0.9	50
36	2.5					
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						



Drilling Log

Shallow Zone Monitor Well 105

Project Indian Basin Remediation

Owner Marathon Oil Company

Location Eddy County, New Mexico

Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		4.8	50			80-85 Ft: DOLOMITE with minor SANDSTONE
58						
60						
62						
64						
66	14.6	38			65-70 Ft: DOLOMITE with minor SANDSTONE	
68						
70						
72	9.2	38			70-75 Ft: Interbedded SANDSTONE and DOLOMITE, as above.	
74						
76	3.8	38			75-80 Ft: DOLOMITE, very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
78						
80			38			Total depth at 80 Ft.
82						
84						
86						
88						



Drilling Log

Shallow Zone Monitor Well 106

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 92 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 80 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fill Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/8/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
 For Boring Location
 COMMENTS:
 Steel well monument 2.5 Ft. above
 grade. No water encountered. Bedrock
 at 12 Ft.

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						7 5/8-inch hole drilled to 30 Ft. Temp. set 7-11/32 inch odex csg. Drilled 7-inch hole to 92 Ft. Install well through odex csg. and then pull csg.
0						0-5 Ft: ARROYO ALLUVIUM, light brownish gray (5yr 6/1) to brownish gray (5yr 4/1) dolomite fragments from arroyo cobbles and boulders. Very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
2			38			5-10 Ft: ARROYO ALLUVIUM, as above.
4			0			10-12 Ft: ARROYO ALLUVIUM, as above.
6			0			12-15 Ft: Light brownish gray (5yr 6/1) to brownish gray (5yr 4/1), DOLOMITE, very hard, dry, microcrystalline, conchoidal fractures, no hydrocarbon odor.
8			30			15-20 Ft: DOLOMITE, as above.
10			0			20-25 Ft: DOLOMITE, as above with interbedded very pale orange (10yr 8/2) SANDSTONE, moderately dense, dry, fine-grained, subrounded, very calcareous, no hydrocarbon odor, minor chert.
12			0.3			
14				33		
16						
18				30		
20			0			
22						
24				27		



Drilling Log

Shallow Zone Monitor Well 106

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 0233502II.6I

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26		0	43			25-30 Ft: Very pale orange (10yr 8/2) SANDSTONE, moderately dense, dry, fine-grained, subrounded, moderately sorted, calcareous, minor DOLOMITE, no hydrocarbon odor.
30		0				30-35 Ft: Calcareous SANDSTONE, as above.
32			43			
34						
36		0				35-40 Ft: Brownish gray (5yr 4/1) SANDSTONE, moderately dense to dense, dry, very fine- to fine-grained, subrounded, well sorted, calcareous, no hydrocarbon odor.
38			38			
40		0				40-45 Ft: Gray orange (10yr 7/4) SANDSTONE, moderately dense dry, very fine-grained, subrounded, well sorted, calcareous, no hydrocarbon odor.
42			30			
44						
46		0.5				45-50 Ft: Brownish gray (5yr 4/1) SANDSTONE, moderately dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor.
48			38			
50		4.5				50-55 Ft: SANDSTONE, as above.
52			27			
54		0				
56						55-80 Ft: Grayish orange (0yr 7/4) DOLOMITE, very dense, dry, microcrystalline with interbedded brownish gray (5yr 4/1) SANDSTONE, hard, dry, very fine-grained, subrounded, well sorted, well cemented, no hydrocarbon odor.



Drilling Log

Shallow Zone Monitor Well 106

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
56		1.5	27				
58							
60							
62							
64							
66							
68							
70							
72							
74							
76						0	
78							
80	3.7						
82							
84							
86	1.5						
88							



Drilling Log

Shallow Zone Monitor Well 106

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90						
92						Total depth at 92 Ft.
94						
96						
98						
100						
102						
104						
106						
108						
110						
112						
114						
116						
118						
120						



Drilling Log

Shallow Zone Monitor Well 107

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61
 Surface Elev. _____ Total Hole Depth 70 ft. Diameter 7 5/8 in./7 in.
 Top of Casing 2.5 ft. Water Level Initial _____ Static _____
 Screen: Dia 4 in. Length 60 ft. Type/Size PVC/0.040" in.
 Casing: Dia 4 in. Length 12.5 ft. Type PVC
 Fil Material 6/12 Sand Pack Rig/Core Ingersoll-Rand TH-60
 Drill Co. PC Exploration Method Air Rotary
 Driller S. Mott Log By Bob Davis Date 1/10/97 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Bedrock at 17.5 Ft. below grade. No water encountered during drilling

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5						7 5/8-inch hole drilled to 20 Ft. Temp. set 7 11/32-inch odex csg. to 20 Ft. drilled 7-inch hole to 70 Ft. total depth.
0						0-5 Ft: ARROYO ALLUVIUM, cobbles and boulder fragments, dolomite and sandstone.
2			43			
4		0				
6						5-10 Ft: ARROYO ALLUVIUM, dolomite and sandstone fragments.
8			43			
10		0.6				10-17.5 Ft: ARROYO ALLUVIUM, as above.
12			14			
14		0.7				
16						
18			18			17.5-20 Ft: Grayish orange (10yr 7/4) SANDSTONE, dense, dry, very fine-grained, subrounded, well sorted, well cemented, calcareous, no hydrocarbon odor with minor light brownish gray (5yr 6/1) DOLOMITE, hard, microcrystalline, conchoidal fractures.
20		0.5				20-25 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, no hydrocarbon odor with minor SANDSTONE, as above.
22			33			
24						



Drilling Log

Shallow Zone Monitor Well 107

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26		54.5	38			25-30 Ft: DOLOMITE and SANDSTONE, as above. SANDSTONE increases with depth.
28						
30		30.1				30-35 Ft: Grayish orange (10yr 7/4) SANDSTONE, moderately dense, dry, very fine-grained, subrounded, well sorted, fairly well cemented, calcareous, non hydrocarbon odor with minor, light brownish gray (5yr 6/1), hard, microcrystalline, conchoidal fractures.
32			40			
34		1.4				35-40 Ft: SANDSTONE, as above.
36						
38			55			
40		0.5				40-45 Ft: SANDSTONE, as above.
42			30			
44		2.0				45-50 Ft: Grayish orange (10yr 7/4) SANDSTONE, moderately dense to soft, damp, very fine- to fine-grained, subrounded, well sorted, poorly cemented, calcareous, no hydrocarbon odor.
46						
48			50			
50		0.4				50-55 Ft: Brownish gray (5yr 4/1) DOLOMITE, hard, damp, microcrystalline, conchoidal fractures, no hydrocarbon odor, minor SANDSTONE, as above.
52			36			
54		40.1				55-60 Ft: DOLOMITE, as above interbedded with pale yellowish brown (10yr 6/2) SANDSTONE, moderately dense, damp, very fine- grained, subrounded, well sorted, moderately cemented, calcareous.
56						



Drilling Log

Shallow Zone Monitor Well 107

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350211.61

Depth (ft.)	Well Completion	PID/LEL (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%			
						56		2.2	47
58									
60									
62									
64	47								
66	1.0	65-70 Ft: DOLOMITE and SANDSTONE, as above.							
68									
70			Total depth at 70 Ft. No water encountered.						
72									
74									
76									
78									
80									
82									
84									
86									
88									

Drilling Log



Monitoring Well **MW-108**

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 170 ft. Diameter 12 1/4" & 7 7/8 in.
 Top of Casing 2.5 ft. Water Level Initial 130 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8 in. Length 42 ft. Type steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 05/16/97 Permit # _____
 Checked By Peter Raftery License No. RG 4018

See Site Map
For Boring Location

COMMENTS:

12 1/4" borehole drilled to 39.5 ft. 8 5/8" steel casing run to 39.5 ft. 7 7/8" borehole drilled to 170 ft total depth. Bedrock @ surface.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5						
0						
2			38			
4						
6		0				
8			27			
10		4.2				
12			27			
14						
16		9.4				
18			30			
20		4.2				
22			18			
24						

All percentages are approximate.

0-5 Ft: Pale yellowish brown (10yr 5/4) to grayish orange (10yr 7/4) **DOLOMITE**, hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.

5-10 Ft.: **DOLOMITE**, as above.

10-15 Ft.: **DOLOMITE**, as above.

15-20 Ft.: **DOLOMITE**, as above, interbedded with pale yellowish brown (10yr 6/2) **SANDSTONE**.


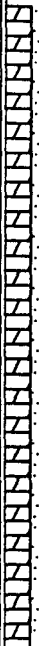
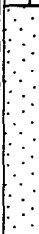
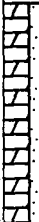
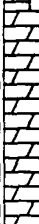
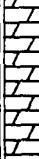
20-25 Ft.: **DOLOMITE** with minor sandstone, as above.

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		16.2				25-30 Ft.: DOLOMITE and SANDSTONE , as above. Sandstone colours range from pale yellowish brown (10yr 6/2) to pale yellowish orange (10yr 8/6).
26						38
30		10.0				30-35 Ft.: Grayish orange (10yr 7/4) SANDSTONE , moderately- dense, fine-grained, subrounded, well-sorted, well cemented, calcareous, dry, no hydrocarbon odor.
32		30				
34		15.8				35-40 Ft.: SANDSTONE , as above, interbedded with pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.
36		25				
38		4.3				40-45 Ft.: SANDSTONE and DOLOMITE , as above.
40		30				
42		0				45-50 Ft.: Pale yellowish brown (10yr 6/2) SANDSTONE , moderately-dense to dense, fine-grained, well-sorted, well cemented, calcareous, dry, no hydrocarbon odor.
44		30				
46		0				50-55 Ft.: SANDSTONE , as above.
48		25				
50		0				55-60 Ft.: SANDSTONE , as above, interbedded with pale yellowish brown (10yr 6/2) DOLOMITE , very hard, microcrystalline, conchoidal fractures, dry, faint hydrocarbon odor.
52		48.3				
54						
56						

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
56		8.3	27			60-65 Ft.: DOLOMITE and SANDSTONE , as above.					
58											
60											
62											
64											
66							0		65-70 Ft.: DOLOMITE , as above, interbedded with moderate yellowish brown (10yr 5/4) SANDSTONE , dense, fine-grained, subrounded, well-sorted, well to moderately cemented, calcareous, damp, no hydrocarbon odor.		
68							33				
70							0				
72							27				70-75 Ft.: Pale yellowish brown (10yr 6/2) to grayish orange (10yr 7/4) DOLOMITIC SANDSTONE , hard, fine- to coarse-grained, subrounded to angular, well-sorted, poorly-cemented, calcareous, damp, no hydrocarbon odor.
74							0				
76	20		75-80 Ft. Pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.								
78	0										
80	20				80-85 Ft.: DOLOMITE , as above, interbedded with grayish orange (10yr 7/4) to moderate yellowish orange (10yr 5/4) SANDSTONE , dense, subrounded, fine-grained, subrounded, well-sorted, well-cemented, calcareous, damp, moderate hydrocarbon odor.						
82	48.1										
84	20										
86	20					85-90 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.					
88	20										



Drilling Log

Monitoring Well MW-108

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88			20			
90		0			90-95 Ft.: DOLOMITE, as above.	
92			19			
94						
96		0			95-100 Ft.: DOLOMITE, as above, and pale yellowish brown (10yr 6/2) SANDSTONE, hard, fine- to medium-grained, subrounded to angular, well-sorted, poorly cemented, calcareous, damp, no hydrocarbon odor. Approximately 40% of sand-sized grains are dolomitic.	
98			21			
100		19.1			100-105 Ft.: DOLOMITE and SANDSTONE, as above.	
102			30			
104						
106		20.9			105-110 Ft.: DOLOMITE and SANDSTONE, as above.	
108			25			
110		49.0			110-115 Ft.: DOLOMITE and SANDSTONE, as above.	
112		25				
114						
116	0		115-120 Ft.: DOLOMITE and SANDSTONE, as above.			
118		18				
120		0				

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		0				120-125 Ft.: DOLOMITE and SANDSTONE, as above.
122		17				
124						
126		0				125-130 Ft.: DOLOMITE and SANDSTONE, as above.
128		33				
130		0				Note: Well making water @ 130 ft.
132		30				130-135 Ft.: Very pale orange (10yr 8/2) SANDSTONE, dense, fine-grained, subrounded, well-sorted, poorly cemented, calcareous, saturated, no hydrocarbon odor.
134						
136		17.3				135-140 Ft.: SANDSTONE, as above.
138		50				
140	82.2			140-145 Ft.: Dark yellowish orange (10yr 6/6) SANDSTONE, as above.		
142						
144						
146	0			145-150 Ft.: SANDSTONE, as above.		
148	60					
150						
152						150-155 Ft.: SANDSTONE, as above, interbedded with grayish brown (5yr 3/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, saturated, no hydrocarbon odor.



Drilling Log

Monitoring Well MW-108

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152	[Well Completion Diagram]					
154						
156		15.1				155-160 Ft.: Grayish brown (10yr 7/4) SANDSTONE , moderately dense, fine-grained, subrounded, well-sorted, poorly cemented, calcareous, saturated, no hydrocarbon odor.
158		60				
160		0				160-165 Ft.: SANDSTONE , as above.
162						
164		75				
166		0				165-170 Ft.: SANDSTONE , as above.
168						
170		75	0			Total depth: 170 ft.
172						
174						
176						
178						
180						
182						
184						

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01
 Surface Elev. _____ Total Hole Depth 20.2 ft. Diameter 8 in.
 Top of Casing _____ Water Level Initial None ft. Static None ft.
 Screen: Dia 4 in. Length 10 ft. Type/Size 0.010 in.
 Casing: Dia 4 in. Length 8 ft. Type Sch 40 PVC
 Fill Material _____ Rig/Core _____
 Drill Co. Layne Christenson Method Reverse Air Dual Tube
 Driller Dwight Peterson Log By L.S. Stevenson Date 06/17/98 Permit # _____
 Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Transmission lines nearby hand located by Marathon personnel. * PID from chips recovered from cyclone.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							Light brown, SILT, hard, dry.
2		1.2	MW109-1.5	22			Brown, SILT, soft, trace moisture.
4		0	MW109-3.5	8		ML	Dark brown, SILT, hard, trace moisture.
6		0	MW109-5.5	4			
8		12.1	MW109-7.5	2		CL	Brown, silty CLAY, with 1" pebbles. No recovery, 1 fragment broken dolomite lodged in shoe.
10				30			
12		129	MW109-11.5	4			Broken rock and gravel, black, plastic, cohesive, tar-like material in shoe, with strong odor. Probable oil-saturated clay.
14				3			No recovery, split spoon refusal. Oil-stained cobbles from cyclone, 2 to 4" and larger.
16				6			Oil-stained cobbles from cyclone, 2 to 4" and larger.
18				15			DOLOMITE fragments in cyclone outfall.
20		48*	MW109-19	3			Olive, SANDSTONE.
20		1.8*	MW109-20	2			LIMESTONE, soft.
22							Gray, DOLOMITE, very hard.
24							20.2', Total depth of MW-109.

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01
 Surface Elev. _____ Total Hole Depth 230 ft. Diameter 8 in.
 Top of Casing _____ Water Level Initial 194 ft. Static 182 ft.
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 in. Length 39.5 ft. Type 8 inch Steel
 Fill Material _____ Rig/Core Gardner-Denver
 Drill Co. West Texas Method Air Rotary
 Driller Ronnie Keith Log By L.S. Stevenson Date 06/15&16/98 Permit # _____
 Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

8 inch surface casing to ~40 feet bgs into rock, open hole thereafter.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							Yellow, fine grained SAND and SILT, with pebbles to 1/2".
2						SM	
4							
6							
8							Gray, DOLOMITE.
10							Olive, SANDSTONE, soft.
12							
14							
16							
18							
20							
22							
24							

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						Light gray, LIMESTONE, moderately soft.
26						
28						
30		0	MW110-30			Grayish brown, SANDSTONE, trace moisture.
32						
34						Light gray, LIMESTONE, hard.
36						
38						Gray, LIMESTONE/SANDSTONE.
40						Gray, DOLOMITE, hard.
42						
44						
46						Brown, SANDSTONE, moist.
48						Gray, DOLOMITE, moderately hard.
50						
52						
54						
56						



Drilling Log

Monitoring Well MW-110










Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58						
60						
62						
64						
66						
68						
70						
72						
74		0	MW110-74			SANDSTONE, moist. DOLOMITE.
76						
78		0	MW110-78			Grayish brown, SANDSTONE, moist.
80						Dark gray, LIMESTONE, soft, trace moisture.
82						Light gray, DOLOMITE, hard.
84						
86						
88						

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90						
92						
94		0.4	MW110-94			Dark gray, SANDSTONE, moist.
96						Light gray, DOMOLITE, moderately hard.
98						
100						
102						Gray, SANDSTONE, soft, trace moisture.
104						Light gray, DOMOLITE, moderately hard.
106						
108						Light grayish green, LIMESTONE, soft.
110						
112						
114						
116						
118						Grayish green, LIMESTONE, with small (1mm) inclusions, soft, moist.
120						

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120							Grayish green, LIMESTONE, soft, moist.
122							Light gray, LIMESTONE, sandy, moderately hard, trace moisture.
124							
126							Gray, DOLOMITE, hard, dry.
128							
130							
132							
134							Light brown, SANDSTONE, hard, dry.
136							
138							Gray, DOLOMITE, hard.
140							
142							Light brown and light gray, interbedded SANDSTONE and DOLOMITE, hard, dry.
144							
146							Light gray, LIMESTONE, soft, dry.
148							
150		0	NW110-150				
152							



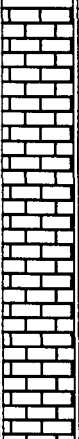

Drilling Log

Monitoring Well MW-110

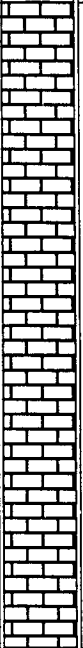
Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152							Light brown, SANDSTONE, hard.
154							Gray, LIMESTONE, soft, trace moisture.
156							White, LIMESTONE, soft, trace moisture.
158							
160		0	MW110-160				
162							
164							
166							
168							
170							Light tan, LIMESTONE, with trace sand, moist.
172							
174							
176		0	MW110-175				White, LIMESTONE, moderately hard, trace moisture.
178							
180		1.7	MW110-180				
182							
184							

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
						(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184		17.7	MW110-185			NOTE: PID = 7.1 in well exhaust. White, LIMESTONE, moderately hard, trace moisture, slight hydrocarbon odor.
186						
188						
190						
192						Light tan, LIMESTONE, soft, trace moisture, no apparent odor.
194		0	MW110-184		▽	Encountered water.
196						Tan to olive, LIMESTONE, chips in moist cuttings.
198						
200						
202						
204						
206						
208						
210						
212						
214						
216						

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description	
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
-216							Tan to olive, LIMESTONE.	
-218								
-220								
-222								
-224								
-226								
-228								
-230								230', Total depth of MW-110.
-232								
-234								
-236								
-238								
-240								
-242								
-244								
-246								
-248								

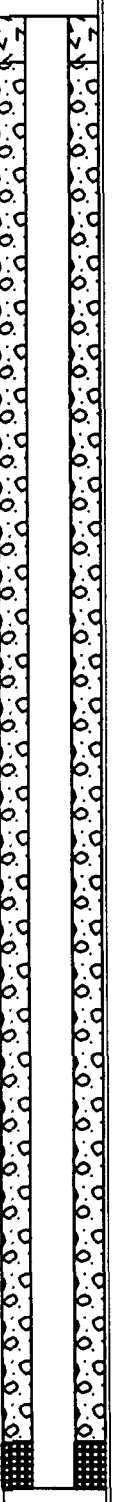

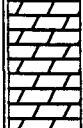
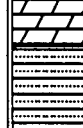
Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01
 Surface Elev. _____ Total Hole Depth 230 ft. Diameter 8 in.
 Top of Casing _____ Water Level Initial _____ Static 200.24 ft.
 Screen: Dia 8 in. Length 40 ft. Type/Size 0.010 in.
 Casing: Dia 8 in. Length 190 ft. Type Sch 40 PVC
 Fill Material _____ Rig/Core Gardner-Denver
 Drill Co. West Texas Method Air Rotary
 Driller Ronnie Keith Log By L.S. Stevenson Date 06/17/98 Permit # _____
 Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-5							
0							Tan, SILT.
2						ML	Yellow, SILT.
4							Yellow, SANDSTONE, soft, dry.
6							Gray, DOLOMITE, moderately hard.
8							Gray, DOLOMITE, soft.
10							Gray, DOLOMITE ("bedrock"), very hard.
12							
14							SHALE (?), soft. Gray, DOLOMITE, hard.
16							
18							
20							Olive, SANDSTONE, soft, trace moisture.
22							DOLOMITE, hard.
24							SANDSTONE lense.

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							DOLOMITE.
26							Olive, SANDSTONE, moderately soft, trace moisture. Olive, SANDSTONE, soft, moist.
28							
30							
32							Light gray, DOLOMITE, moderately hard.
34							Olive, SANDSTONE, soft, moist.
36							
38							Brown, SANDSTONE, soft, moist.
40							
42							
44							Gray, SANDSTONE, hard.
46							Dark brown, SANDSTONE, very soft, moist.
48							Gray, DOLOMITE, hard.
50							Grayish brown, SANDSTONE, soft, moist.
52							
54							
56							




















Drilling Log

Monitoring Well **MW-111**

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
56							Grayish brown, SANDSTONE, soft, damp.	
58								
60								
62							Water from hole, switch to mist pump operation.	
64							SANDSTONE, very soft.	
66								
68								Gray, DOLOMITE, moderately hard. White, SANDSTONE, medium grained, very soft.
70								
72								
74								White, SANDSTONE, medium grained, softer. Gray, SANDSTONE, moderately soft.
76								
78								
80						Gray, SANDSTONE, moderately soft.		
82								
84								
86							Gray, SANDSTONE, moderately hard.	
88								

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01


















Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88		0	NW111-88				Gray, DOLOMITE, with trace chert.
90							Light gray, SANDSTONE, medium grained.
92							
94							
96							Gray, SANDSTONE, mostly coarse grained, moderately hard.
98							
100							Gray, SANDSTONE, fine to medium grained, moderately hard.
102							
104							
106							
108							Olive, SANDSTONE, moderately hard.
110							Light gray, LIMESTONE, with some sand, moderately hard.
112							
114							
116							Light gray to white, medium grained SAND, with gray sandstone, soft.
118							
120							



Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description
							(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120							Light gray, SANDSTONE.
122							Light gray, LIMESTONE, soft.
124							Light gray, DOLOMITE, with some sand, moderately hard.
126							
128							
130							
132							Gray, SANDSTONE, fine to medium grained, very soft.
134							
136							Gray, LIMESTONE.
138							
140							
142							Gray, LIMESTONE.
144							
146							LIMESTONE, with chert.
148							
150							Gray to brown, SANDSTONE, soft.
152							Tan, LIMESTONE, with some sand, moderately hard.

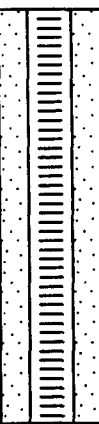
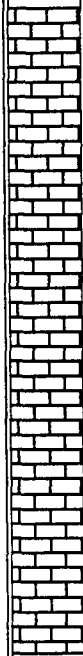
Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152						
154						
156						Tan, LIMESTONE, hard.
158						
160						Tan, LIMESTONE, hard.
162						
164						
166						Tan, LIMESTONE, hard.
168						
170						Tan, LIMESTONE, hard.
172						
174						
176						Brown, SANDSTONE, moderately hard. Tan, LIMESTONE, hard.
178						
180						
182						
184						

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184						Tan, LIMESTONE, hard. Well beginning to produce more water, estimated 5 gpm.
186						Tan, LIMESTONE, softer.
188						
190						Apparent top of Lower Queen, strong sulfur odor, 6 ppm hydrogen sulfide at well exhaust.
192						Tan, LIMESTONE, soft.
194						
196						Tan, LIMESTONE, soft.
198						
200						Tan, LIMESTONE, soft.
202						
204						Lost circulation, water production increasing.
206						LIMESTONE.
208						
210						
212						
214						
216						

Project Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 105469.01

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216						Fractured LIMESTONE.
-218						
-220						
-222						
-224						
-226						
-228						
-230						
-232						
-234						
-236						230', Total depth of MW-III.
-238						
-240						
-242						
-244						
-246						
-248						



Drilling Log

Supply Well SW-03

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105
 Surface Elev. _____ Total Hole Depth 230 ft. Diameter 12.25/7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia Open Hole Length _____ Type/Size _____
 Casing: Dia 8 in. Length 81.5 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Kieth Log By Kevin Spencer Date 6/3/96 Permit # RA-5131-S-26
 Checked By Underwood/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Estimated flow rate during drilling: 10-15 gpm.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						12.25-inch borehole with 8-inch casing 0 to 81.5 Ft.
2		2.0	60			0-5 Ft: White (5 yr 8/1) Limestone (chalky) and pinkish gray (5 yr 6/2) DOLOMITE, conchoidal fractures, massive, dense.
4						5-10 Ft: Same as above (dolomite has vuggy porosity).
6						
8		5.0	75			
10						10-15 Ft: Same as above (dolomite s. darker l. gray (10 yr 6/1).
12		5.0	60			
14						
16		5.0	50			15-20 Ft: Same as above (dolomite pinkish gray (5 yr 6/2) and dark gray (7.5 yr 4/1).
18						
20						20-25 Ft: Light brownish gray (10 yr 6/2) sandy Limestone and pinkish gray (5 yr 6/2) DOLOMITE, massive, dense, conchoidal fractures.
22		5.0	33			
24						



Drilling Log

Supply Well SW-03

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26		2.3				<p>25-30 Ft: Light gray (2.5y 7/2) and white (5 yr 8/1) LIME STONE chalky, silty, dry. White limestone is very soft and powdery. Minor pinkish gray (7.5 yr 6/2) and gray (7.5 yr N5/) dolomite, conchoidal fractures, microcrystalline, dry.</p> <p>Mist hole to bring cuttings up, then add soap to mist.</p>
30						<p>30-35 Ft: Gray (7.5 yr 5.4/) and pale red (2.5 yr 6/2) DOLOMITE, microcrystalline, occasional vuggy porosity, some pinkish gray (7.5 yr 6.5/2) limestone, conchoidal fractures, vuggy porosity.</p>
32		2.3	60			
34						<p>35-37 Ft: Same as above (hard).</p>
36						
38		7.7	75			<p>37-45 Ft: Dark gray (10 yr 4/1) dolomitic SANDSTONE, slightly cemented, fine-grained, no reaction with HCl.</p>
40						
42		7.3	75			<p>45-50 Ft: Gray (2.5y N2/ and 5y 5/) dolomitic SANDSTONE, fine-grained, poorly cemented and gray (5y N6/) DOLOMITE, micro-crystalline, conchoidal fractures, slightly sandy.</p>
44						
46						
48		4.8	23			<p>50-55 Ft: Same as above (interbedded dolomitic sandstone (2.5y N2/) and gray (5y N6/) dolomite).</p>
50						
52		4.8	25			
54						<p>55-80 Ft: Same as above</p>
56		4.8	75			

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		4.8	75			60-65 Ft: Same as above (dolomite has vuggy porosity, and dolomitic sandstone is poorly to well cemented).
58						
60						
62		2.3	33			
64						
66		4.8	25			65-70 Ft: Gray (2.5y N5/) DOLOMITE , microcrystalline, very hard, interbedded with dark gray (2.5y N4/) dolomitic sandstone.
68						
70						70-75 Ft: Gray (10 yr 5/1) DOLOMITE , microcrystalline, conchoidal fractures.
72		4.8	27			
74						
76		4.8	16			75-80 Ft: Gray (10 yr 6/1) DOLOMITE , microcrystalline, some sand grains (wackstone), hard, conchoidal fractures.
78						
80		4.8	11			80-81.5 Ft: Same as above 7.875-inch open borehole from 81.5 to 230 Ft.
82						81.5-85 Ft: V. dark grayish brown (10 yr 3/2) dolomitic SANDSTONE , very fine- to fine-grained, moderately sorted, subrounded, alternating beds of moderately and poorly cemented sandstone.
84		3.7	14			
86						85-87 Ft: Same as above
88		6.3				87-90 Ft: Grayish brown (10 yr 5/2) DOLOMITE , microcrystalline, hard, conchoidal fractures, dry.



Drilling Log

Supply Well SW-03

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
88		6.3						
90							90-95 Ft: Same as above	
92								
94		1.2	12					
96								95-98 Ft: Grayish brown (10 yr 5/2) sandy DOLOMITE , fine-grained sand in dolomite matrix, hard, conchoidal fractures, dry.
98		1.2	18					98-107 Ft: Grayish brown (10 yr 5/2) dolomitic SANDSTONE , fine-grained, subrounded, well sorted, soft, friable to poorly cemented, moist from 104'-106'.
100								
102								
104		3.7	60					
106								
108	54	27				107-109 Ft: Grayish brown (10 yr 5/2) sandy DOLOMITE , very fine-grained, subrounded, moderately hard, conchoidal fractures, dry.		
110						109-115 Ft: Gray (10 yr 5/1) SANDSTONE , very fine- to fine-grained, well to subrounded, moderately sorted, poorly cemented, dry.		
112								
114	8.9	50						
116						115-118 Ft: Same as above (very slightly moist).		
118								
120	12	43				118-120 Ft: Gray (10 yr 5/1) sandy DOLOMITE , very hard, fine-grained, dry.		

Drilling Log



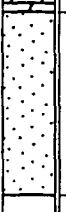


Supply Well SW-03

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>	
120	[Empty Box]			[Hatched Pattern]		120-125 Ft: Light brownish gray (10 yr 4/2) DOLOMITE , very hard, conchoidal fractures, microcrystalline, dry. (powdery).	
122		0	13	[Hatched Pattern]			
124					[Hatched Pattern]		125-130 Ft: Same as above
126					[Hatched Pattern]		
128		1.2	14		[Hatched Pattern]		
130					[Hatched Pattern]		130-135 Ft: Same as above
132					[Hatched Pattern]		
134		1.2	17		[Hatched Pattern]		
136					[Hatched Pattern]		135-140 Ft: Same as above
138					[Hatched Pattern]		
140				[Hatched Pattern]		140-145 Ft: Same as above (very pale brown (10 yr 7/3).	
142				[Hatched Pattern]			
144	3.7	27		[Hatched Pattern]			
146				[Hatched Pattern]		145-150 Ft: Light brownish gray (10 yr 4/2) and yellow (10 yr 7/6) DOLOMITE , slightly sandy, hard, conchoidal fractures, dry, mostly powder.	
148				[Hatched Pattern]			
150	1.2	18		[Hatched Pattern]			
152				[Hatched Pattern]		150-155 Ft: Same as above	

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152		1.2	19			155-180 Ft: Same as above
154						
156						
158						
160						
162						
164						
166						
168						
170						
172						
174	1.2	14			175-180 Ft: Same as above	
176						
178						
180		1.2	15			180-185 Ft: Grayish brown (2.5y 5/2) SANDSTONE , very fine to fine-grained, subrounded to subangular, moderately sorted, moderately cemented, no reaction with HCl.
182						
184						



Drilling Log

Supply Well SW-03

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
184						185-190 Ft: Same as above	
186							
188		1.2	38				
190							190-195 Ft: Light yellowish brown (2.5y6/4) sandy LIMESTONE and light gray (10 yr 6/2) DOLOMITE, microcrystalline, angular fractures.
192		1.2	100				195-200 Ft: Same as above (minor dolomite).
194							
196							
198		1.2	43				
200							200-205 Ft: Pink (5 yr 7/4) SANDSTONE, very fine- to fine- grained, moderately sorted, subangular to subrounded, poorly sorted, poorly cemented.
202		1.2	43				205-210 Ft: Same as above (minor light gray (10 yr 6/1) dolomite microcrystalline, hard).
204							
206							
208	1.2	21				210-215 Ft: Reddish brown (2.5 yr 5/4) SANDSTONE, very fine to fine-grained, moderately sorted, subrounded to subangular, poorly cemented.	
210							
212							
214	0	50				215-220 Ft: Red (10r 5/4), weak, SANDSTONE, very fine- to medium-grained, poorly sorted, moderately cemented, subangular.	
216							



Drilling Log

Supply Well SW-03

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350105

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
216	[Empty Box]	0	27	[Dotted Pattern]		220-225 Ft: Pinkish gray (7.5 yr 7/2) SANDSTONE, very fine to fine-grained, well sorted, subangular, moderately cemented, minor dolomite, microcrystalline, conchoidal fractures.
218						
220		0	27	[Hatched Pattern]		225-230 Ft: Pinkish gray (7.5 yr 6/2) DOLOMITE, microcrystalline, conchoidal fractures.
222						
224		0	100			TD at 230 ft.
226						
228						
230						
232						
234						
236						
238						
240						
242						
244						
246						
248						



Drilling Log

Vapor Point VE-1

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 214 ft. Diameter 12.25 in./ 7 7/8 in.
 Top of Casing 33" (aq) ft Water Level Initial 209 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 5/8 in. Length 80 ft. Type Steel
 F# Material Portland Cement Rig/Core Gardner Denver 15 W
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Keith Log By Bob Davis Date 12/9/96 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Drilled 0-77.5' on 12/9/96. Drilled 77.5' to 120' on 12/13/96. Drilled from 120' to 214' TD on 12/16/96. Steel casing sticks up 33" above grade.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						12.25-inch borehole with 8 5/8-inch surface casing from 0 to 77.5 Ft. 7 3/8-inch borehole drilled from 77.5 Ft to 214 Ft total depth.
0						0-.5 Ft Soil.
2			21			.5-21 Ft Very light gray (N7) LIMESTONE, dry, very dense, microcrystalline, no hydrocarbon odor, slight reaction with HCL.
4		0				
6						
8			100			
10		0				
12			50			
14		0				
16						
18		0	50			
20		0				
22						
24			75			21-27 Ft Grayish orange (10 yr 7/4) SANDSTONE, damp, mod. hard, very fine-grained, subrounded to rounded, well sorted, no hydrocarbon odor.



Drilling Log

Vapor Point VE-1

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0				
26						
28			75			27-32 Ft: Dark yellowish orange (10yr 6/6) SANDSTONE, damp, mod. hard, very fine-grained, subrounded to rounded, well sorted, no hydrocarbon odor.
30		0				
32			43			32-48 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE
34						
36		0				
38			75			
40		0				
42			60			
44		0				
46						
48			38			48-52 Ft: Light gray (N4) to medium light gray LIMESTONE, dry, very dense, microcrystalline, no hydrocarbon odor, slight reaction with HCL.
50		0				
52			43			52-74 Ft: Gray (N7) to brownish gray (5yr 4/1) SANDSTONE, dry, mod. hard, very fine- to fine- grained, subrounded, well sorted, no hydrocarbon odor.
54		0				
56						



Drilling Log

Vapor Point VE-1
















Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58			75			
60		0				60-65 Ft: SANDSTONE as above.
62			75			
64		0				65-70 Ft: SANDSTONE as above.
66						
68			75			
70		0				70-74 Ft: SANDSTONE as above.
72						
74			43			
76		0				74-80 Ft: Light gray (N7) SANDSTONE, grades to sandy DOLOMITE, dry, very hard, conchoidal fractures, microcrystalline, no hydrocarbon odor.
78			15			Open borehole from 77.5 to total boring depth.
80		0				
82			75			80-85 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, damp, dense, fine-grained, subrounded, mod. sorted, calcareous, no hydrocarbon odor.
84						
86		80				85-90 Ft: SANDSTONE as above (faint hydrocarbon odor).
88			30			

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90		40				90-95 Ft: Light brownish gray (5 yr 6/1) DOLOMITE, dry, hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.
92			17			
94						
96						95-100 Ft: DOLOMITE (as above) interbedded with thin beds of medium gray (N5) CLAY, damp, mod. soft, platy, and light brownish gray (5yr 6/1) LIMESTONE, dense, microcrystalline, mod. reaction with HCL, no hydrocarbon odor.
98			23			
100		40				100-105 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, mod. dense, very fine- to fine-grained, mod. well sorted, subrounded, calcareous, no hydrocarbon odor.
102			20			
104		0				105-110 Ft: SANDSTONE as above.
106						
108			38			
110		0				110-115 Ft: SANDSTONE as above.
112			27			
114						
116		0				115-120 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, v. hard, microcrystalline, occ. dolomite crystals, conchoidal fractures, no hydrocarbon odor.
118			20			
120		0				



Drilling Log

Vapor Point VE-1

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0				120-125 Ft: DOLOMITE as above.	
122							
124		43					
126		0					125-130 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, very hard, microcrystalline, interbedded with SANDSTONE, mod. dense, v. fine-grained, subrounded, mod. well sorted, no hydrocarbon odor.
128							
130		0					130-135 Ft: DOLOMITE and SANDSTONE as above.
132							
134		25					
136		0					135-140 Ft: DOLOMITE and SANDSTONE as above.
138							
140		0					140-145 Ft: DOLOMITE and SANDSTONE as above.
142							
144	30						
146	0				145-150 Ft: Light brownish gray (5yr 6/1) SANDSTONE, dry, mod. dense, v. fine-grained, subrounded to subangular, mod. well sorted, no hydrocarbon odor.		
148							
150	0				150-155 Ft: SANDSTONE as above.		
152							
			43				



Drilling Log

Vapor Point VE-1

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PIG (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152			43			
154						
156		0				155-180 Ft: Light brown (5yr 6/1) DOLOMITE, dry, v. hard, microcrystalline, conchoidal fractures, with minor SANDSTONE, no hydrocarbon odor.
158				19		
160		0				160-165 Ft: DOLOMITE as above (no sandstone).
162						
164				17		
166		0				165-170 Ft: DOLOMITE as above.
168						
170		0				170-175 Ft: DOLOMITE as above.
172						
174		0				
176						
178			25			175-180 Ft: Light brown (5yr 6/1) DOLOMITE, dry, v. hard, microcrystalline, conchoidal fractures, with minor SANDSTONE, no hydrocarbon odor.
180	0					180-185 Ft: Brownish gray (5yr 4/1) SANDSTONE, dry, mod. dense, v. fine-grained, mod. well sorted, subrounded to subangular, no hydrocarbon odor, interbedded with light brownish gray (5yr 6/1) DOLOMITE, hard, microcrystalline. (Sandstone is predominate).
182						
184			23			

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 210 ft. Diameter 12.25 in./7 3/8 in.
 Top of Casing 33" (ag) ft Water Level Initial 205 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 5/8 in. Length 75 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 15 W
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Keith Log By Bob Davis Date 12/10/96 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:
Drilling Dates: 12/10/96, 0 to 35 ft.,
12/11/96, 35 to 72.5 ft., 12/17/96, 72.5 to
210 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						12.25-inch borehole with 8 5/8-inch surface casing from 0 to 72.5 ft. 7 7/8-inch borehole drilled to 210 ft. T.D.
0						0-5 Ft: Soil, sandy loam.
2			100			5-9 Ft: Very pale orange (10yr 8/2) LIMESTONE, dry, soft, microcrystalline, reacts with 10% HCl, interbedded with pale yellowish brown (10yr 8/2) SANDSTONE, dry, friable, very fine-grained, subrounded, no hydrocarbon odor.
4		0				
6						
8			27			
10		0				9-10 Ft: Light gray (N7) to light med. gray (N6) LIMESTONE, dry, dense, microcrystalline, reacts with HCl, no hydrocarbon odor.
12			27			10-15 Ft: Light gray (N7) to mod. yellowish brown (10yr 5/4) SANDSTONE, dry, mod. dense, v. fine- to fine-grained, subrounded to subangular, very calcareous, no hydrocarbon odor.
14		0				15-20 Ft: SANDSTONE as above.
16						
18			25			
20		0				20-25 Ft: SANDSTONE as above (with mod. hydrocarbon odor and occ. grayish orange (10yr_7/4) CHERT, dense, conchoidal fractures.
22						
24			43			

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0				25-30 Ft: SANDSTONE as above.
26			100			
28						
30		0				30-42 Ft: Pale yellowish brown (10yr 6/2) to mod. yellowish brown (10yr 5/4) SANDSTONE, dry, mod. dense, v. fine-grained, subrounded, slightly calcareous, faint hydrocarbon odor, interbedded with med. gray (N6) LIMESTONE, mod. dense, microcrystalline, v. faint hydrocarbon odor.
32			50			
34		0				
36						
38			38			
40		0				
42						42-48 Ft: Light brownish gray (5yr 6/1) to brownish gray (5yr 4/1) SANDSTONE, damp, med. vense, v. fine- to fine-grained, subrounded, calcareous cementation, mod. hydrocarbon odor.
44		0				
46						
48						48-55 Ft: Light brownish gray (5yr 6/1) to brownish gray (5yr 4/1) SANDSTONE, damp, dense to v. dense, very fine- to fine-grained, subrounded, calcareous, no hydrocarbon odor.
50		0	30			
52			27			
54						55-80 Ft: SANDSTONE as above.
56		0				

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PTD (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58			50			
60		0				60-62 Ft: SANDSTONE as above.
62			75			62-70 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, damp, mod. dense, v.fine- to fine-grained, subrounded, mod. well sorted, slightly calcareous, faint hydrocarbon odor.
64		0				
66						
68			50			
70		0				70-75 Ft: SANDSTONE as above.
72						Open borehole from 72.5 to total boring depth.
74			100			
76		0				75-80 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, v. hard, microcrystalline, conchoidal fractures.
78			15			
80		0				80-85 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, damp, soft, v.fine- to fine-grained, subrounded to rounded, mod. hydrocarbon odor.
82			60			
84						
86		0				85-90 Ft: SANDSTONE as above.
88			75			



Drilling Log

Vapor Point VE-2

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
88	[Empty Box]	0	75	[Dotted pattern]				
90							90-95 Ft: SANDSTONE as above (dense, faint hydrocarbon odor).	
92								
94					33	[Dotted pattern]		
96					0	[Hatched pattern]		95-100 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, hard, microcrystalline, conchoidal fractures, interbedded with pale brown (5yr 5/2) SANDSTONE, dense, v. fine-grained, well sorted, subrounded, well cemented, no hydrocarbon odor.
98					25	[Hatched pattern]		
100					0	[Hatched pattern]		100-105 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.
102					27	[Hatched pattern]		
104					0	[Hatched pattern]		105-110 Ft: Interbedded DOLOMITE and SANDSTONE (refer to 95-100 Ft.).
106								
108					27	[Hatched pattern]		
110					0	[Dotted pattern]		110-115 Ft: Med. light gray (N6) SANDSTONE, dry, dense, v. fine-grained, well sorted, subrounded, well cemented, faint hydrocarbon odor, minor dolomite.
112			43	[Dotted pattern]				
114								
116			0	[Dotted pattern]		115-120 Ft: SANDSTONE as above.		
118			33	[Dotted pattern]				
120			0	[Dotted pattern]				

Drilling Log



Vapor Point VE-2

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>	
-120	[Empty Box]	0		NNNNNNNN			
-122						120-125 Ft: SANDSTONE as above, interbedded with light brownish gray (5yr 6/1) DOLOMITE, dry, hard, micro crystalline, conchoidal fractures, no hydrocarbon odor.	
-124				27			
-126			0		[Dotted Pattern]		125-130 Ft: Very light gray (N8) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
-128				16			
-130			0				130-135 Ft: SANDSTONE as above.
-132				25			
-134							135-140 Ft: SANDSTONE as above.
-136			0				
-138				19			
-140			0				140-145 Ft: SANDSTONE as above.
-142				30			
-144						145-150 Ft: SANDSTONE as above.	
-146		0					
-148			21				
-150		0				150-155 Ft: SANDSTONE as above.	
-152							



Drilling Log

Vapor Point VE-2

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PIG (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
152		0	21			155-160 Ft: SANDSTONE as above.					
154			33				160-165 Ft: SANDSTONE as above.				
156			14								
158			0					165-170 Ft: SANDSTONE as above with minor light brownish gray (5yr 6/1) DOLOMITE, hard, microcrystalline, conchoidal fractures.			
160			13								
162			0						170-175 Ft: SANDSTONE and DOLOMITE as above.		
164			13								
166			0							175-180 Ft: Very pale orange (10 yr 8/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, calcareous, no hydrocarbon odor.	
168			13								
170			0								180-185 Ft: Very pale orange (10yr 8/2) SANDSTONE, dry, v. fine-grained, well sorted, subrounded, interbedded with light brownish gray DOLOMITE, hard, microcrystalline, no hydrocarbon odor.
172			19								
174											
176											
178											
180											
182											
184											



Drilling Log

Vapor Point VE-2

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company

Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
184		0					
186						185-190 Ft: Very pale orange (10yr 8/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.	
188						21	
190						0	190-195 Ft: SANDSTONE as above.
192						16	
194						0	195-200 Ft: SANDSTONE as above (with minor dolomite).
196							
198						20	
200						0	200-205 Ft: SANDSTONE as above.
202							
204	30						
206	0	Groundwater encountered at 205 ft. on 12/17/96. 205-210 Ft: SANDSTONE as above (saturated).					
208	43						
210	0	Boring terminated at 210 ft.					
212							
214							
216							

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 202 ft. Diameter 12.25 in./7 7/8 in.
 Top of Casing 38" (ag) ft Water Level Initial 197 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 5/8 in. Length 75 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 15W
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Keith Log By Bob Davis Date 12/9/96 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Casing is 30" above grade. Drilling dates:
12/9/96: 0 to 72.5 ft., 12/17/96: 72.5 to
140 ft., 12/18/96: 140 to 202 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						12.25-inch borehole with 8 5/8-inch surface casing from 0 to 72.5 ft. 7 7/8-inch hole drilled to 202 ft. total depth.
0		0				0-5 Ft: Soil.
2			60			5-5 Ft: Light gray (N7) LIMESTONE, dry, mod. dense, micro crystalline, no hydrocarbon odor, slight reaction with HCl, interbedded with thin beds of mod. yellowish brown (10yr 5/4) SILTSTONE, dry, mod. soft.
4		0				5-7 Ft: Light gray (N7) LIMESTONE, dry, dense, micro crystalline, no hydrocarbon odor, trace of pale yellowish brown (10yr 6/2) chert, hard, conchoidal fractures.
6						7-20 Ft: Light gray to pale yellowish brown SANDSTONE, dry, med. dense, v. fine-grained, subrounded, well sorted, calcareous, no hydrocarbon odor.
8			50			
10		0				
12			75			
14		0				
16						
18			50			
20		0				20-31 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, med. dense, v. fine-grained, subrounded, mod. well sorted, calcareous, no hydrocarbon odor.
22						
24			100			



Drilling Log

Vapor Point VE-3

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26						
28			100			
30		0				
32			27			31-40 Ft: Light gray (N7) to pale yellowish brown (10yr 6/2), SANDSTONE dry, dense, v. fine-grained, mod. well sorted, no hydrocarbon odor, calcareous cementation, no hydrocarbon odor, occ. very thin beds of brownish gray (5yr 4/1) sandy silt.
34		0				
36			50			
38						
40		0				40-45 Ft: SANDSTONE as above.
42						
44			19			
46						45-50 Ft: SANDSTONE as above.
48			43			
50						50-55 Ft: SANDSTONE as above.
52			38			
54						
56						55-60 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE damp, mod. dense, v. fine-grained, subrounded, well sorted, poorly cemented, no hydrocarbon odor.

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico


Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58			43			
60		0				
62			38			
64		0				63-72.5 Ft: Light gray (N7) to pale yellowish brown (10yr 6/2) SANDSTONE , damp, dense, v. fine- to fine-grained, subrounded, well sorted, no hydrocarbon odor, occ. v. thin beds of v. pale orange (10yr 8/2) CHERT , v. dense, conchoidal fractures. slightly calcareous, faint hydrocarbon odor.
66		0				
68			75			
70		0				
72		0	60			
74		0	27			Open borehole from 72.5 Ft. to total boring depth. 72.5-75 Ft: Light brownish gray (5yr 6/1) DOLOMITE , hard, microcrystalline, interbedded with minor SANDSTONE , dry, soft, v. fine-grained, mod. sorted, subrounded, calcareous cementation, no hydrocarbon odor.
76		0				75-80 Ft: SANDSTONE as above.
78			23			
80		0				80-85 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE , dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, faint hydrocarbon odor.
82			38			
84		0				85-90 Ft: SANDSTONE as above (no hydrocarbon odor).
86						
88			33			

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%				
88	[Empty Box]	0	33	[Dotted Pattern]	[Empty]	80-95 Ft: SANDSTONE as above.				
90										
92										
94			16							
96			0				[Horizontal Line Pattern]	85-100 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, v. hard, microcrystalline, conchoidal fractures, with minor v. light gray (N8) SANDSTONE, v. fine-grained, mod. soft, well sorted, poorly cemented, calcareous.		
98										
100			0						100-105 Ft: SANDSTONE as above.	
102			20							
104			0						[Dotted Pattern]	105-110 Ft: Light brownish gray (5yr 6/1) SANDSTONE, dry mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
106										
108			25							
110			0							
112	38									
114	[Empty Box]	0	[Dotted Pattern]	[Empty]	115-120 Ft: SANDSTONE as above.					
116										
118						25				
120						0				

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0				120-125 Ft: SANDSTONE as above.	
122							
124		23					
126		0					125-130 Ft: SANDSTONE as above (with minor dolomite).
128		25					
130		0					130-135 Ft: SANDSTONE as above.
132		27					
134		0					135-140 Ft: SANDSTONE as above.
136							
138		18					
140	0				140-145 Ft: SANDSTONE as above.		
142	30						
144						145-150 Ft: SANDSTONE as above.	
146	0						
148	33						
150	0					150-155 Ft: SANDSTONE as above.	
152							



Drilling Log

Vapor Point VE-3

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152		0	33			155-160 Ft: SANDSTONE as above.
154						
156						
158						
160						
162						
164						
166						
168						
170						
172		0	30			165-170 Ft: SANDSTONE as above.
164						
166						
168						
170						
172		15	16			170-175 Ft: SANDSTONE as above.
174						
176						
176			14			175-180 Ft: Yellowish gray (5yr 8/1) DOLOMITE, dry, v. hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.
178						
180						
182						
184			18			180-185 Ft: DOLOMITE as above.
182						
184						

Drilling Log



Vapor Point VE-3

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>		
-184	[Empty Box]	0	50	[Hatched Pattern]				
-186							185-190 Ft: Very pale orange (10yr 8/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, v. calcareous.	
-188								
-190								180-195 Ft: SANDSTONE as above.
-192								
-194								
-196								195-200 Ft: SANDSTONE as above.
-198							▽	Groundwater encountered at 197 Ft. on 12/18/96.
-200								200-202 Ft: SANDSTONE as above (saturated).
-202						100		Boring terminated at 202 Ft.
-204								
-206								
-208								
-210								
-212								
-214								
-216								

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 183 ft. Diameter 12.25 in./7 7/8 in.
 Top of Casing 34" (ag) ft Water Level Initial 178 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 5/8 in. Length 60 ft. Type Steel
 Fill Material Portland Cement Rig/Core Gardner Denver 15 W
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Keith Log By Bob Davis Date 12/11/96 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Drilling dates: 12/11/96: 0 to 57.5 ft.,
12/18/96: 57.5 to 175 ft., 12/19/96: 175 to
183 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						12.25-inch borehole with 8 5/8-inch surface casing from 0 to 57.5 Ft. 7 7/8-inch borehole to 183 Ft. total depth.
0						0-4 Ft: Med. light gray (N6) Limestone, dry, mod. dense, microcrystalline, no hydrocarbon odor, strong reaction with HCl; weathered.
2			60			
4						4-10 Ft: Med. light gray (N6) to brownish gray (5yr 4/1), SANDSTONE dry, med. dense, v. fine-grained, well sorted, subrounded, slight reaction with HCl, no hydrocarbon odor.
6		0				
8			27			
10		0				10-15 Ft: SANDSTONE as above.
12			23			
14						
16		0				15-23 Ft: Med. light gray (N6) to pale yellowish brown (10yr 6/2) SANDSTONE, dry, dense, v. fine-grained, well sorted, subrounded, well cemented, no hydrocarbon odor, with occ. thin beds of Limestone, dense, microcrystalline.
18			43			
20		0				
22						
24			43			23-30 Ft: Pale yellowish brown (10yr 8/6) SANDSTONE, damp, mod. dense, v. fine-grained, mod. rounded to subrounded, well sorted, no hydrocarbon odor.



Drilling Log

Vapor Point VE-4

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		0				
26						
28			33			
30		0				
32			14			30-35 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, damp, dense, v. fine-grained, mod. well sorted, subrounded, calcareous, no hydrocarbon odor, with occasional beds of DOLOMITE, dense, microcrystalline.
34		0				
36			75			35-40 Ft: Dark yellowish brown SANDSTONE, damp, mod. dense, v. fine-grained, well sorted, subrounded, no hydrocarbon odor.
38						
40		0				40-45 Ft: Pale yellowish brown (10yr 6/2) to dark yellowish brown (10yr 4/2) SANDSTONE as above.
42			21			
44		0				45-50 Ft: SANDSTONE as above.
46						
48			43			
50		0				50-55 Ft: SANDSTONE as above.
52			38			
54						
56		0				55-60 Ft: SANDSTONE as above.



Drilling Log

Vapor Point VE-4

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56		0				Open borehole from 57.5 Ft. to total boring depth.
58			60			
60		0				60-85 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, v. calcareous, no hydrocarbon odor.
62			60			
64						
66		0				65-70 Ft: Brownish gray (5yr 4/1) SANDSTONE, dry, dense, v. fine-grained, well sorted, subrounded to subangular, well cemented, no hydrocarbon odor.
68			38			
70		0				70-78 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE, dry, v. hard, microcrystalline, some conchoidal fracturing, no hydrocarbon odor.
72			10			
74		0				
76						78-80 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, v. calcareous, no hydrocarbon odor.
78			25			
80		0				80-85 Ft: SANDSTONE as above.
82						
84			30			
86		0				85-90 Ft: SANDSTONE as above.
88			19			



Drilling Log

Vapor Point VE-4

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
88	[Empty Box]	0	19	[Dotted pattern]				
90							80-95 Ft: Dark yellowish orange (10yr 6/6) DOLOMITE, dry, hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
92								
94					12.5	[Diagonal hatching]		
96								85-100 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, hard, microcrystalline, interbedded with pale yellowish brown (10yr 6/2) SANDSTONE, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
98					20	[Diagonal hatching]		
100								100-105 Ft: SANDSTONE as above.
102					16	[Diagonal hatching]		
104								
106								105-110 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, soft, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
108					43	[Dotted pattern]		
110								110-115 Ft: Interbedded DOLOMITE and SANDSTONE (refer to 95-100 ft).
112			38	[Dotted pattern]				
114								
116						115-120 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, hard, microcrystalline, no hydrocarbon odor, with minor calcareous SANDSTONE (cuttings are sand-sized).		
118			13	[Diagonal hatching]				
120								



Drilling Log

Vapor Point VE-4

Project MOC/Indian Basin Gas Plant . Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0	14			120-125 Ft: DOLOMITE as above (with minor SANDSTONE).	
122							
124							
126		0	27			125-130 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, hard, microcrystalline (cuttings are sand-sized), with interbedded pale yellowish brown (10yr 6/2) SANDSTONE, mod. dense, v. fine-grained, well sorted, subrounded to rounded, fair cementation, calcareous, no hydrocarbon odor.	
128							
130		0				130-135 Ft: DOLOMITE and SANDSTONE as above.	
132				21			135-140 Ft: DOLOMITE and SANDSTONE as above.
134							
136		0					
138				19			140-145 Ft: Light brownish gray (5yr 6/1) SANDSTONE, dry, soft, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
140	0						
142			30			145-150 Ft: SANDSTONE as above.	
144						150-155 Ft: SANDSTONE as above.	
146	0						
148			50				
150	0						
152							



Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152		0	33			155-160 Ft: SANDSTONE as above.
154						
156			38			160-165 Ft: Gray orange (10yr 7/4) SANDSTONE, damp, soft, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
158						
160			38			165-170 Ft: SANDSTONE (as above) with light brownish gray (5yr6/1) DOLOMITE, hard, microcrystalline, (cuttings are sand-sized), no hydrocarbon odor.
162						
164			21			170-175 Ft: SANDSTONE and DOLOMITE as above.
166						
168			15			175-180 Ft: Pale yellowish brown (10 yr 6/2) SANDSTONE, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, faint hydrocarbon odor, (saturated at 178 ft).
170						
172	20			Groundwater encountered at 178 Ft. on 12/19/96.		
174						
176	15			180-183 Ft: SANDSTONE as above.		
178						
180					Boring terminated at 183 Ft.	
182						
184						



Drilling Log

Vapor Point VE-5

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 168 ft. Diameter 12.25 in./7 7/8 in.
 Top of Casing 2.5' (aq) ft Water Level Initial 163 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size Open Borehole in.
 Casing: Dia 8 5/8 in. Length 60 ft. Type Steel
 FM Material Portland Cement Rig/Core Gardner Denver 15 W
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronnie Keith Log By Bob Davis Date 12/12/96 Permit # _____
 Checked By Davis/Fields License No. _____

See Site Map
For Boring Location

COMMENTS:

Drilling dates: 12/13/96: 0 to 57.5 ft.,
12/19/96: 57.5 to 168 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						12.25-inch borehole with 8 5/8-inch surface casing from 0 to 57.5 ft. 7 7/8-inch borehole to 163 Ft. total depth.
0						0-5 Ft: Pale brown (5yr 5/2) sandy LOAM, dry, loose, v. fine-grained SAND and SILT, no hydrocarbon odor, strong reaction with HCl, calcareous.
2			4			
4						
6		0				5-10 Ft: Very pale orange (10yr 8/2) SANDSTONE, dry, med. dense, subrounded, well sorted, calcareous, strong reaction with HCL, no hydrocarbon odor.
8			7			
10		0				10-15 Ft: SANDSTONE as above (pale brown [5yr 5/2]).
12			6			
14						
16		0				15-20 Ft: SANDSTONE as above (very pale orange [10yr 8/2]).
18			6			
20		0				20-25 Ft: SANDSTONE as above.
22						
24			21			



Drilling Log

Vapor Point VE-5

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Eddy County, New Mexico

Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26		0				25-30 Ft: SANDSTONE as above.
28			9			
30		0				30-35 Ft: SANDSTONE as above (pale brownish yellow [10yr 6/2]).
32			5			
34		0				35-40 Ft: SANDSTONE as above.
36			4			
38						
40		140				40-45 Ft: SANDSTONE as above (moderate hydrocarbon odor).
42			5			
44		140				45-51 Ft: Pale yellowish brown (10yr 6/2) to pale brown (5yr 6/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, rounded to subrounded, calcareous, mod. hydrocarbon odor.
46			8			
48						
50		80				
52			18			51-57.5 Ft: Light brownish gray (5yr 6/1) DOLOMITE, dry, dense, crystalline, interbedded with pale yellowish brown (10yr 6/2) SANDSTONE, dry, v. fine-grained, well sorted, subrounded, calcareous, mod. hydrocarbon odor.
54						
56		160	13			



Drilling Log

Vapor Point VE-5

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 60%
56			13			Open borehole from 57.5 ft. to total boring depth.
58		0	43			57.5-60 Ft: Pale brown (5yr 5/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, calcareous, poor to well cementation, no hydrocarbon odor.
60		0				
62			30			
64						
66		0				65-70 Ft: Pale brown (5yr 5/2) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, well cemented, calcareous, no hydrocarbon odor, interbedded with pale yellowish brown (10yr 6/2) DOLOMITE, dry, hard, microcrystalline, conchoidal fractures.
68		0	25			
70		0				70-75 Ft: SANDSTONE and DOLOMITE as above.
72						
74			21			
76						75-80 Ft: SANDSTONE and DOLOMITE as above (dolomite is sand-sized in drill cuttings).
78			18			
80						80-85 Ft: SANDSTONE and DOLOMITE as above.
82						
84		0	13			
86						85-90 Ft: Light brownish gray (5yr 6/1) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, mod. hydrocarbon odor.
88			30			



Drilling Log

Vapor Point VE-5

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
88			30					
90		0					90-95 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, dense, v. fine-grained, well sorted, subrounded, well cemented; calcareous, faint hydrocarbon odor.	
92					23			
94		0						
96								95-100 Ft: Light brownish gray (5yr 6/1) SANDSTONE, dry, dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, interbedded with light brownish gray (5yr 6/1) DOLOMITE, hard, microcrystalline, no hydrocarbon odor (cuttings are sand-sized).
98					14			
100		0						100-105 Ft: SANDSTONE and DOLOMITE as above.
102		0			19			
104		0						105-110 Ft: SANDSTONE and DOLOMITE as above.
106								
108		0			21			110-115 Ft: SANDSTONE and DOLOMITE as above.
110		0						
112	0		18					
114								
116	0					115-120 Ft: SANDSTONE and DOLOMITE as above.		
118			27					
120	0							



Drilling Log

Vapor Point VE-5

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%		
120	[Empty Box]	0		[Vertical Line]		120-125 Ft: SANDSTONE and DOLOMITE as above (with minor dolomite).		
122								
124					27			
126		0						125-130 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, dry, soft, v. fine-grained, well sorted, subrounded, poorly cemented, faint hydrocarbon odor.
128					43			
130		0						130-135 Ft: SANDSTONE as above.
132								
134		0			27			
136								
138		0						
140								
142					23			
144								
146		0						145-150 Ft: Light brownish gray (5yr 6/1) SANDSTONE, dry, mod. dense, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, with interbedded DOLOMITE, v. hard, microcrystalline to crystalline (some rhombohedral dolomite crystals observed, drill cuttings are sand-sized), no hydrocarbon odor.
148								
150	0		20			150-155 Ft: SANDSTONE and DOLOMITE as above.		
152								



Drilling Log

Vapor Point VE-5

Project MOC/Indian Basin Gas Plant
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

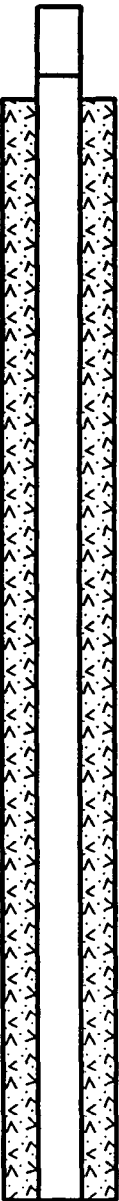
Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
152							
154		0	17			155-160 Ft: SANDSTONE and DOLOMITE as above.	
156		0					
158			17				
160		0					160-165 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE, soft, v. fine-grained, well sorted, subrounded, poorly cemented, calcareous, no hydrocarbon odor.
162							Groundwater encountered at 163 ft. on 12/19/96.
164					25		165-170 Ft: SANDSTONE as above.
166		0					
168		0			18		Boring terminated at 168 ft.
170							
172							
174							
176							
178							
180							
182							
184							

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 150 ft. Diameter 12 1/4" & 7 7/8 in.
 Top of Casing 2.5 ft. Water Level Initial 140 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8 in. Length 42.5 ft. Type steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 05/14/97 Permit # _____
 Checked By Peter Rafferty License No. RG 4018

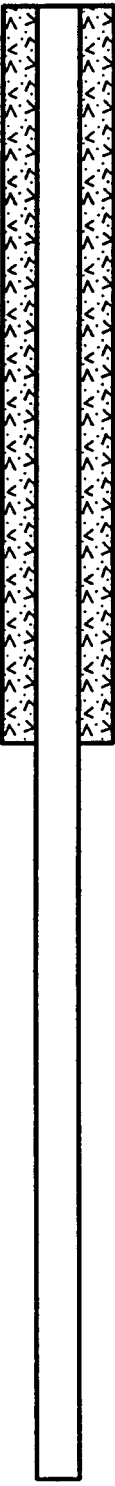
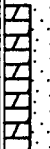
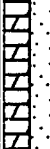
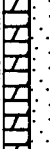

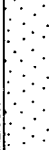
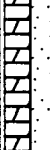
See Site Map
For Boring Location

COMMENTS:

12 1/4" borehole drilled to 40 ft. 8 5/8" steel casing run to 40 ft. 7 7/8" borehole drilled to 150 ft total depth. Bedrock @ surface.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						All percentages are approximate.
0						0-5 Ft: Pale yellowish brown (10yr 6/2) DOLOMITE , hard microcrystalline, conchoidal fractures, no hydrocarbon odor.
2		27				
4		2.0				5-10 Ft: DOLOMITE , as above.
6		19				
8						
10		1.6				10-15 Ft.: DOLOMITE , as above.
12		25				
14		3.4				15-20 Ft.: DOLOMITE , as above.
16						
18	20					
20	9.1				20-25 Ft.: DOLOMITE , as above, interbedded with pale yellowish brown (10yr 6/2) SANDSTONE , moderately dense, very fine-grained, subrounded, well-sorted, well cemented, calcareous, no hydrocarbon odor.	
22						
24	38					

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		27.5	30			25-30 Ft.: SANDSTONE and DOLOMITE , as above. Sandstone predominates.
26						
28		7.9	23			30-35 Ft.: DOLOMITE and SANDSTONE , as above. Dolomite predomantes.
30						
32		65.5	43			35-40 Ft.: Pale yellowish brown (10yr 6/2) to pale brown (5yr 5/2) SANDSTONE , moderately dense, very fine-grained, subrounded, well-sorted, moderately well cemented, dry, no hydrocarbon odors. Minor DOLOMITE as above.
34						
36						
38						
40		9.7	50			40-45 Ft.: Pale yellowish brown (10yr 6/2) SANDSTONE , moderately dense, very fine-grained, subrounded, well-sorted, moderately cemented, calcareous, damp, no hydrocarbon odor.
42						
44						
46		0	23			45-50 Ft.: SANDSTONE , as above.
48						
50	1.8	20			50-55 Ft.: SANDSTONE , as above, with pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, damp, no odor.	
52						
54	27.8				55-60 Ft.: SANDSTONE and DOLOMITE , as above.	
56						



Drilling Log

Vapor Point VE-16

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PTD (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58			16			
60		119				60-65 Ft.: SANDSTONE and DOLOMITE, as above.
62						
64		20				
66		9.5				65-70 Ft.: Grayish orange (10yr 7/4) DOLOMITE, hard, microcrystalline, conchoidal fractures, damp, no hydrocarbon odor.
68					16	
70		63.4				70-75 Ft.: Pale yellowish brown (10yr 6/2) SANDSTONE, moderately dense to dense, very fine-grained, subrounded, well-sorted, well cemented, calcareous, damp, no hydrocarbon odor with DOLOMITE, as above.
72					20	
74		49.9				75-80 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, damp, no hydrocarbon odor.
76			20			
78						
80	176			80-85 Ft.: DOLOMITE, as above.		
82						
84	17					
86	294			85-90 Ft.: DOLOMITE, as above.		
88			16			





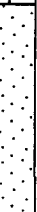

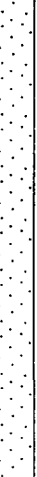
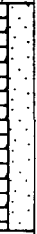
Drilling Log

Vapor Point VE-16

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
88			16			90-95 Ft.: DOLOMITE, as above.	
90		252					
92		17					
94							95-100 Ft.: Pale yellowish brown (10 yr 6/2) DOLOMITIC SANDSTONE, hard, fine- to medium-grained, angular, well-sorted, poorly cemented, damp, no hydrocarbon odor.
96		0					
98					27		100-105 Ft.: Grayish orange (10yr 7/1) DOLOMITIC SANDSTONE, dense, very fine-grained, subangular to angular, well-sorted, poorly cemented, calcareous, damp, no hydrocarbon odor.
100		0					
102					30		
104							105-110 Ft.: DOLOMITIC SANDSTONE, as above.
106		0					
108					27		110-115 Ft.: DOLOMITIC SANDSTONE, as above.
110		0					
112			50				
114					115-120 Ft.: Grayish orange (10yr 7/4) SANDSTONE, moderately dense, very fine-grained, subrounded to subangular, well-sorted, poorly cemented, calcareous, damp, no hydrocarbon odor.		
116	0						
118			30				
120	0						

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

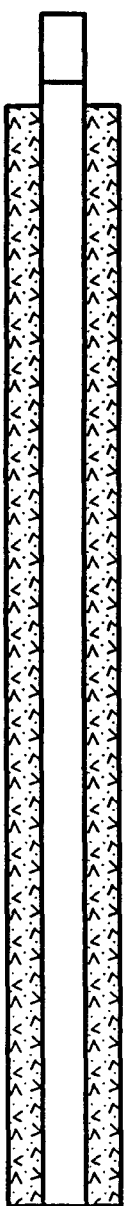
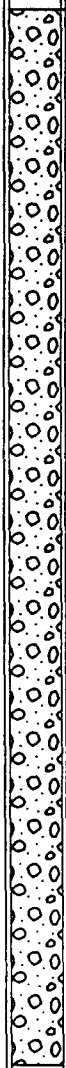
Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0				120-125 Ft.: SANDSTONE , as above with very minor moderate brown (5yr 4/4) SILTSTONE .	
122		38					
124			0			125-130 Ft.: SANDSTONE , as above (no siltstone).	
126							
128			50				
130			0			130-135 Ft.: SANDSTONE , as above.	
132			60				
134			433				135-140 Ft.: Pale yellowish orange (10yr 8/6) SANDSTONE , moderately dense, very fine-grained, subrounded, well-sorted, poorly cemented, calcareous, moist, no hydrocarbon odor.
136							
138			50				
140		999+			▽	140-145 Ft.: SANDSTONE , as above. Note: well making water at 140 ft. - saturated at 140 ft.	
142		100					
144		22					
146						145-150 Ft.: Dark yellowish orange (10yr 6/6) SANDSTONE , dense, medium- to coarse-grained, subrounded to subangular, well-sorted, poorly cemented, saturated, no odor, with pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures.	
148		75					
150		200				Total depth: 150 ft.	
152							

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 130 ft. Diameter 12 1/4" & 7 7/8 in.
 Top of Casing 2.5 ft. Water Level Initial 120 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8 in. Length 40 ft. Type steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 05/19-20/97 Permit # _____
 Checked By Peter Rafferty License No. RG 4018

See Site Map
For Boring Location

COMMENTS:

12 1/4" borehole drilled to 38 ft. 8 5/8" steel casing run to 38 ft. 7 7/8" borehole drilled to 130 ft total depth. Bedrock @ 23 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						All percentages are approximate.
0						0-5 Ft: Light brown (5yr 6/4) silt, 100% silt, sof, dry, no odor. Note: Lithology described from sidewall of mudpit adjacent to well.
2						
4						
6						5-10 Ft: ARROYO ALLUVIUM, light brown (5yr 6/4) silt, loose, with interbedded dolomite and sandstone fragments from cobbles and boulders. Note: Lithology inferred from adjacent arroyo bedcut and adjacent wells.
8						
10						10-15 Ft: ARROYO ALLUVIUM, as above.
12						
14						
16						15-20 Ft: ARROYO ALLUVIUM, as above.
18						
20						20-23 Ft: ARROYO ALLUVIUM, as above.
22						
24						23-38 Ft: BEDROCK. Unable to describe lithology due to drilling mud.



Drilling Log

Vapor Point VE-17

Project Indian Basin Remediation

Owner Marathon Oil Company

Location Eddy County, New Mexico

Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
						24	
26							
28							
30							
32							
34							
36							
38							
40						38-45 Ft: Pale yellowish brown (10yr 6/2) SANDSTONE , moderately dense, fine-grained, subrounded to angular, well-sorted, well cement, calcareous matrix, damp, no hydrocarbon odor.	
42		0	19				
44						45-50 Ft: SANDSTONE , as above.	
46							
48			19				
50		0				50-55 Ft: SANDSTONE , as above.	
52							
54			19				
56		0				55-60 Ft: Pale yellowish orange (10yr 8/6) SANDSTONE , moderately dense, subrounded, well-sorted, well cemented, calcareous, damp, no hydrocarbon odor.	

Drilling Log



Vapor Point VE-17

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
56	[Well Completion Diagram]					
58			30			
60			0			
62			11			
64						
66			492			
68				23		
70			403			
72				23		
74			72.1			
76						75-80 Ft.: DOLOMITE , as above. Interbedded with pale yellowish brown (10yr 6/2) LIMESTONE , dense, microcrystalline, damp, no odor.
78			21			
80		660				
82						80-85 Ft.: Grayish orange (10yr 7/4) to pale yellowish-brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, damp, no hydrocarbon odor.
84			27			
86		430				
88			17			85-90 Ft.: DOLOMITE , as above.



Drilling Log

Vapor Point VE-17

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						88
90		418				90-95 Ft.: DOLOMITE, as above.
92			15			
94						
96		431				95-100 Ft.: Grayish orange (10yr 7/4) SANDSTONE, moderately dense, fine- to medium-grained, subrounded, well-sorted, poorly cemented, calcareous, damp, no hydrocarbon odor.
98			27			
100		150				100-105 Ft.: Grayish orange (10yr 7/4) SANDSTONE, moderately dense, fine-grained, subrounded, well-sorted. Moderate to well cemented, calcareous matrix, damp, no hydrocarbon odor, pale yellowish brown (10yr 6/2). DOLOMITE, hard, microcrystalline, conchoidal fractures and pale yellowish brown (10yr 6/2) LIMESTONE, dense, microcrystalline.
102			23			
104		202				
106			25			105-110 Ft.: Pale yellowish brown (10yr 6/2) SANDSTONE, dense, fine-grained, subrounded to subangular, well-sorted, well cemented, calcareous, damp, no odor.
108						
110		751				110-115 Ft.: SANDSTONE, as above. Interbedded with pale yellowish brown (10yr 6/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, damp, no hydrocarbon odor.
112			23			
114		816				115-120 Ft.: DOLOMITE and minor SANDSTONE, as above.
116			19			
118						
120		1999				

Drilling Log



Vapor Point VE-17

Project Indian Basin Remediation

Owner Marathon Oil Company

Location Eddy County, New Mexico

Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>	
-120-	<div style="border: 1px solid black; width: 100px; height: 100px; margin: auto;"></div>	1999				<p>Water encountered at 120 ft.</p> <p>120-125 Ft.: DOLOMITE and SANDSTONE, as above, saturated.</p>	
-122-			38				
-124-			164				<p>125-130 Ft.: DOLOMITE and SANDSTONE, as above.</p>
-126-			38				
-128-							
-130-		121				<p>Total depth: 130 ft.</p>	
-132-							
-134-							
-136-							
-138-							
-140-							
-142-							
-144-							
-146-							
-148-							
-150-							
-152-							

Drilling Log



Vapor Point VE-18

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 163 ft. Diameter 8 7/8 in.
 Top of Casing 2.5 ft. Water Level Initial 153 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8 in. Length 37.5 ft. Type steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 05/27/97 Permit # _____
 Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

12 1/4" borehole drilled to 35 ft. 8 5/8" steel casing run to 35 ft. 7 7/8" borehole drilled to 163 ft total depth. Bedrock @ 15 ft. No sample recovery from 150 to 163 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
-2.5 Not to scale 0 2 4 6 8 10 12 14 16 18 20 22 24		0	0			All percentages are approximate. 0-5 Ft.: ARROYO ALLUVIUM , dolomite and sandstone fragments from boulders and cobbles. 5-10 Ft.: ARROYO ALLUVIUM , as above. 10-15 Ft.: ARROYO ALLUVIUM , as above. 15-25 Ft.: Bedrock. Unable to describe lithology due to drilling mud. No hydrocarbon odor.



Drilling Log

Vapor Point VE-18

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
24		0					
26							
28							
30		0					
32							
34		0					
36							35-40 Ft.: Pale yellowish brown (10yr 6/2), SANDSTONE , dense, fine-grained, subrounded, well-sorted, well cemented, calcareous matrix, dry, no hydrocarbon odor.
38				17			
40			6.4				40-45 Ft.: SANDSTONE , as above, with interbedded pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.
42				18			
44						45-50 Ft.: SANDSTONE and DOLOMITE , as above.	
46		15.6					
48			23				
50		5.9				50-55 Ft.: Medium gray (N5) to pale yellowish brown (10yr 6/2), SANDSTONE , as above.	
52			20				
54							
56		29.2				55-60 Ft.: SANDSTONE , as above.	



Drilling Log

Vapor Point VE-18

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PTD (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56	[Well Completion Diagram]			[Graphic Log]		
58		27				
60		15.0				60-65 Ft.: Very pale orange (10yr 8/2) SANDSTONE , moderately dense, very fine-grained, subrounded to subangular, well-sorted, poorly cemented, calcareous, dry, no hydrocarbon odor, approximately 30 to 40% of sand grains are dolomite.
62						
64		17				
66		1.5				65-70 Ft.: SANDSTONE , as above.
68		43				
70		31.3				70-75 Ft.: SANDSTONE , as above.
72						
74		27				
76		18.2				75-80 Ft.: SANDSTONE , as above.
78		27				
80		2.1				80-85 Ft.: SANDSTONE , as above.
82						
84	50					
86	0.5		85-90 Ft.: Very pale orange (10yr 8/2) to pale yellowish brown (10yr 6/2) SANDSTONE , moderately dense, very fine- to fine-grained, subrounded to subangular, well-sorted, poorly cemented, calcareous, dry, no hydrocarbon odor.			
88	21					



Drilling Log

Vapor Point VE-18

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88	[Well Completion Diagram]					
90		167.1				90-95 Ft.: SANDSTONE, as above.
92			25			
94						
96		6.8				95-100 Ft.: SANDSTONE, as above.
98			25			
100		1.7				100-105 Ft.: SANDSTONE, as above.
102						
104						
106		8.1				105-110 Ft.: SANDSTONE, as above.
108			33			
110		3.3				110-115 Ft.: SANDSTONE, as above.
112		30				
114						
116	.3				115-120 Ft.: SANDSTONE, as above.	
118		30				
120	4.1					



Drilling Log

Vapor Point VE-18

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						120
122			27			
124						
126		6.3				125-130 Ft.: SANDSTONE, as above.
128			25			
130		0.5				130-135 Ft.: Medium gray (N5) to pale yellowish brown (10yr 6/2) SANDSTONE, moderately dense, very fine- to coarse-grained, subrounded to subangular, well-sorted, poorly cemented, calcareous, dry, no hydrocarbon odor.
132			27			
134						
136		5.3				135-140 Ft.: SANDSTONE, as above.
138			33			
140		0.9				140-145 Ft.: Light gray (N7) SANDSTONE, moderately dense, very fine-grained, subrounded to subangular, well-sorted, poorly cemented, calcareous, dry, no hydrocarbon odor.
142			43			
144						
146		15.3				145-150 Ft.: SANDSTONE, as above.
148			27			
150						
152						150-155 Ft.: No recovery. Drilling characteristics indicate dolomite lithology. Lack of recovery probably due to formation fractures.



Drilling Log

Vapor Point VE-18

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						152
154	23				155-160 Ft.: No recovery. Probable DOLOMITE.	
156						
158	27				160-163 Ft.: No recovery. Probable DOLOMITE.	
160						
162						
164	27				Total depth: 163 ft.	
166						
168						
170						
172						
174						
176						
178						
180						
182						
184						

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 150 ft. Diameter 8 7/8 in.
 Top of Casing 2.5 ft. Water Level Initial 140 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8 in. Length 37.5 ft. Type steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 05/28/97 Permit # _____
 Checked By Peter Rafferty License No. RG 4018

See Site Map
For Boring Location

COMMENTS:

12 1/4" borehole drilled to 35 ft. 8 5/8" steel casing run to 35 ft. 7 7/8" borehole drilled to 150 ft total depth. Bedrock @ 9 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5						
0						All percentages are approximate.
2						0-5 Ft: ARROYO ALLUVIUM , light brown (5yr 6/4) silt, loose, with interbedded dolomite and sandstone fragments from cobbles and boulders. Note: Lithology descriptions inferred from adjacent arroyo bedcut.
4						5-8 Ft: ARROYO ALLUVIUM , as above.
6						
8						
10						9-35 Ft.: Bedrock . Unable to describe lithology due to drilling mud.
12						
14						
16						
18						
20						
22						
24						



Drilling Log


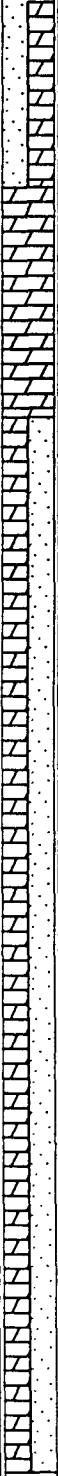
Vapor Point VE-19

Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
						24
26						
28						
30		0				
32						
34		0				
36			30			35-40 Ft.: Pale yellowish brown (10yr 6/2) to dark yellowish orange (10yr 6/6) SANDSTONE , moderatley dense, very fine to fine-grained, subrounded to subangular, well-sorted, moderate to well cemented, calcareous matrix, damp, no hydrocarbon odor, interbedded with pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fracture.
38						
40		746				40-45 Ft.: SANDSTONE and DOLOMITE , as above.
42						
44			33			
46		422				45-50 Ft.: SANDSTONE with minor DOLOMITE , as above.
48			38			
50		81.0				50-55 Ft.: Medium gray (N4) to dark yellowish orange (10yr 6/6) SANDSTONE with minor DOLOMITE , as above.
52						
54			30			
56		97.1				55-60 Ft.: SANDSTONE and DOLOMITE , as above.

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
56							
58		21					
60		377					60-65 Ft.: Pale brown (5yr 5/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.
62		21					
64		0.6					
66							65-70 Ft.: DOLOMITE as above, with grayish orange (10yr 7/4) SANDSTONE , moderately dense to dense, fine-grained, subrounded to subangular, well-sorted, well cemented, calcareous, damp, no hydrocarbon odor.
68		23					
70		150.7					70-75 Ft.: DOLOMITE with minor SANDSTONE , as above.
72		21					
74		0					75-80 Ft.: DOLOMITE and minor SANDSTONE , as above.
76							
78		23					
80	0				80-85 Ft.: DOLOMITE and minor SANDSTONE , as above.		
82	33						
84	0						
86					85-90 Ft.: DOLOMITE , as above, with very pale orange (10yr 8/2) SANDSTONE , dense, fine-grained, well-sorted, poorly cemented, calcareous, dry, no hydrocarbon odor. Note: approximately 30-40% sand grains are dolomitic.		
88	33						



Drilling Log

Vapor Point VE-19

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88			33			
90		0			90-95 Ft.: SANDSTONE, as above.	
92		33				
94						
96		0			95-100 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE, very hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor and SANDSTONE, as above.	
98		43				
100		0			100-105 Ft.: DOLOMITE and SANDSTONE, as above.	
102		43				
104						
106		0			105-110 Ft.: DOLOMITE and SANDSTONE, as above.	
108		38				
110		0			110-115 Ft.: DOLOMITE and SANDSTONE, as above.	
112	43					
114						
116	0		115-120 Ft.: Very pale orange (10yr 8/2) SANDSTONE, moderately dense, very fine-grained, subrounded, well-sorted, poorly cemented, calcareous, dry, no hydrocarbon odor.			
118	38					
120	0					



Project Indian Basin Remediation
 Location Eddy County, New Mexico

Owner Marathon Oil Company
 Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0				120-125 Ft.: SANDSTONE, as above.	
122		43					
124							
126		0					125-130 Ft.: SANDSTONE, as above.
128		43					
130		0					130-135 Ft.: Pale yellowish orange (10yr 8/2) SANDSTONE, moderately dense, very fine-grained, subrounded, well-sorted, poorly cemented, calcareous, damp, no hydrocarbon odor.
132		43					
134		0					135-140 Ft.: SANDSTONE, as above.
136							
138		50					
140	0			140-145 Ft.: SANDSTONE, as above, with pale yellowish brown (10yr 6/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, saturated, no hydrocarbon odor. Note: Driller reported strong hydrocarbon odor while drilling from 140 to 150 ft. No volatiles recorded with PID.			
142	60						
144	0			145-150 Ft.: SANDSTONE, as above.			
146							
148	75						
150	0				Total depth: 150 ft.		
152							



Drilling Log

Vapor Point VE-20

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60
 Surface Elev. _____ Total Hole Depth 160 ft. Diameter 8 7/8 in.
 Top of Casing 2.5 ft. Water Level Initial 150 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8 5/8 in. Length 37.5 ft. Type steel
 Fill Material _____ Rig/Core Gardner Denver 15W
 Drill Co. West Texas Water Serv Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 05/29/97 Permit # _____
 Checked By Peter Rafferty License No. RG 4018

See Site Map
For Boring Location

COMMENTS:

12 1/4" borehole drilled to 37.5 ft. 8 5/8" steel casing run to 37.5 ft. 7 7/8" borehole drilled to 160 ft total depth. Bedrock @ 4 ft.

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5						All percentages are approximate.
0						0-4 Ft: ARROYO ALLUVIUM , light brown (5yr 6/4) silt, loose, dolomite and sandstone fragments from cobbles and boulders, dry, no hydrocarbon odor.
2						
4		0				4-10 Ft.: Pale yellowish brown (10yr 6/2) to dark yellowish orange (10yr 6/6) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.
6						
8			38			
10		0				10-15 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE , as above.
12			21			
14						
16		0				15-20 Ft.: DOLOMITE , as above.
18			15			
20		44.3				
22			21			20-25 Ft.: DOLOMITE , as above, with interbedded, very pale orange (10yr 8/2) SANDSTONE , moderately dense, very fine-grained, well-sorted, moderately to poorly cemented, calcareous, dry, no hydrocarbon odor.
24						



Drilling Log

Vapor Point VE-20

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		4.5	17			25-30 Ft.: DOLOMITE and SANDSTONE, as above.
26						
28						
30		0.6	17			30-35 Ft.: DOLOMITE and SANDSTONE, as above.
32						
34						
36		19.2	27			35-40 Ft.: DOLOMITE and pale yellowish brown (10yr 6/2) SANDSTONE, moderately dense, very fine-grained, subrounded to subangular, well-sorted, well cemented, calcareous matrix, dry, no hydrocarbon odor.
38						
40		0	19			40-45 Ft.: DOLOMITE and SANDSTONE, as above.
42						
44		20.0	21			45-50 Ft.: DOLOMITE and SANDSTONE, as above.
46						
48	6.4	30	50-55 Ft.: DOLOMITE and SANDSTONE, as above. SANDSTONE color ranges from pale yellowish brown (10yr 6/2) to dark yellowish orange (10yr 6/6).			
50						
52	94.0					
54						
56						



Drilling Log

Vapor Point VE-20

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56	[Well Completion Diagram]			[Graphic Log]		
58			23			
60		34.7				60-65 Ft.: DOLOMITE and SANDSTONE , as above. Note: sandstone is pale yellowish brown (10yr 6/2).
62			20			
64		28.2				
66			17			65-70 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE , very hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.
68						
70		41.1				70-75 Ft.: Dark yellowish brown (10yr 6/2) DOLOMITE , very hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor with minor pale yellowish orange (10yr 8/6) SANDSTONE , moderately dense, fine-grained, subrounded to subangular, well-sorted, well cemented, calcareous, dry, no hydrocarbon odor.
72						
74						75-80 Ft.: DOLOMITE and SANDSTONE , as above.
76						
78						
80				80-85 Ft.: DOLOMITE and SANDSTONE , as above.		
82						
84						
86				85-90 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE , hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.		
88						



Drilling Log

Vapor Point VE-20

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88			18			
90		2.8			90-95 Ft.: DOLOMITE, as above.	
92			17			
94			0			95-100 Ft.: DOLOMITE, as above.
96			25			
98						
100		68.2			100-105 Ft.: DOLOMITE, as above, and very pale orange (10yr 8/2) SANDSTONE, dolomitic, dense, fine- to coarse-grained, subrounded to angular, well-sorted, poorly cemented, calcareous, dy, no hydrocarbon odor.	
102			25			
104						
106		210.0			105-110 Ft.: Pale yellowish brown (10yr 6/2) DOLOMITE, hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.	
108			23			
110		977.1			110-115 Ft.: DOLOMITE, as above, and dolomitic SANDSTONE, as above.	
112		21				
114	6.9					
116			115-120 Ft.: Pale yellowish orange (10yr 8/6) SANDSTONE, moderately dense, very fine-grained, subrounded, well-sorted, poorly cemented, calcareous, moist, no hydrocarbon odor.			
118		50				
120	41.6					

Drilling Log





Vapor Point VE-20

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft/min)	Graphic Log	USCS Class.	Description <small>(Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%</small>
120	[Well Completion Diagram]	41.6		[Graphic Log Diagram]		120-125 Ft.: SANDSTONE, as above.
122		33				
124						
126		103.1				125-130 Ft.: SANDSTONE, as above.
128		50				
130		1999+				130-135 Ft.: SANDSTONE, as above, strong hydrocarbon odor.
132		60				
134						
136		359.0				135-140 Ft.: SANDSTONE, as above, strong hydrocarbon odor.
138		60				
140		296.2				140-145 Ft.: SANDSTONE, as above, no hydrocarbon odor.
142		60				
144						
146	237.3			145-150 Ft.: SANDSTONE, as above, no hydrocarbon odor.		
148	38					
150	145.1			▽	150-155 Ft.: Water at 150 ft. SANDSTONE, as above, no hydrocarbon odor.	
152	43					

Project Indian Basin Remediation Owner Marathon Oil Company
 Location Eddy County, New Mexico Proj. No. 023350213.60

Depth (ft.)	Well Completion	PID (ppm)	Drill Rate (ft./min)	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152			43			155-160 Ft.: SANDSTONE, as above, no hydrocarbon odor.
154		0				
156			43			
158						
160		0				Total depth: 160 ft.
162						
164						
166						
168						
170						
172						
174						
176						
178						
180						
182						
184						

BORING RECORD


GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.0										SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH			
		Start: 16:11 Stop: 16:32 GROUND SURFACE: 3804.8																		BACKGROUND OVM READING: SOIL: <u>0.0</u> PPM AIR: <u>0.0</u> PPM
	0	ALLUVIUM BOULDERY COBBLELY SILT; UNCON SOLIDATED, COBBLES AND BOULDERS FROM 1.0 CM TO 3 M., RNDLD., DOLOMITIZED, DRY, GRAYSH BROWN, 10 YR 7/2, TO PALE BROWN, 5 YR 5/2	GW	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0												NS			2.5	0
																1	0.1	0.8	3.3	
																NR			4.0	
	5	BORING TERMINATED AT 5.0'														2	0.1	1.1	5.1	5
		GROUNDWATER NOT OBSERVED DURING BORING														NR			9.3	
		BOREHOLE OVM READING: 4.0 PPM																		
	10	SOIL VENT OVM READING AFTER 24 HOURS: 4.6 PPM																		10
	15																			15
	20																			20
	25																			25
	30																			30
	35																			35








<ul style="list-style-type: none"> SPLIT-SPOON SAMPLER STANDARD PENETRATION TEST UNDISTURBED SAMPLE WATER TABLE (24 HOURS) 	<ul style="list-style-type: none"> WATER TABLE (TIME OF BORING) LABORATORY TEST LOCATION PENETROMETER (TONS/SQ. FT.) NR: NO RECOVERY NS: NOT SAMPLED
--	--

JOB NAME/NUMBER MARATHON/91029
BORING NUMBER BH-1
DATE DRILLED <u>4/18/91</u>
DRILLING METHOD <u>HSA</u>
DRILLED BY <u>SHB</u>
LOGGED BY <u>M.L.</u>
CHECKED BY <u>BJS</u>
DRAWN BY: <u>SAR</u>

ROBERTS/SCHORNICK
 & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-3895

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOL GAS PPM x 1.0									SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH		
		Start: 10:00 Stop: 10:25																	BACKGROUND OVM READING SOIL: 0.3 AIR: 0.2 PPM
	0	GROUND SURFACE: BOULDERY COBBLELY GRAVELLY SILT: NONIMBRICATED, UNCONSOLIDATED, BOULDERS-COBLES FROM 10CM - 3M, DOLOMITE, WELL RNDED., PEBBLES AND GRAVEL	GW												NS				0
	3.0	AUGER REFUSAL AT 3.0' GROUNDWATER NOT OBSERVED													1	1.0	1.2	3.7	2.5
	5	SOIL VENT AT 2.37' BOREHOLE OVM READING: 0.3 PPM BACKGROUND: 0.3 PPM SOIL VENT OVM READING AFTER 24 HOURS: 0.1 PPM													NR			4.0	5
	10																		
	15																		
	20																		
	25																		
	30																		
	35																		

<p> SPLIT-SPOON SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY NS: NOT SAMPLED</p>
---	---

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-2**

DATE DRILLED 4/19/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MAJ

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.0							SAMPLE				REMARKS						
					2	4	6	8	10	12	14	16	18	NUMBER	OMV READING		RECOVERY	DEPTH				
		Start: 14:45 Stop: 18:19															BACKGROUND OVM READING: SOIL: <u>0.1</u> PPM AIR: <u>0.1</u> PPM					
	0	GROUND SURFACE:																				
	0	BOULDERY COBBLELY SILT: UNCONSOLIDATED, COBBLES AND BOULDERS FROM 10CM TO 3M., RNDED., DOLOMITIZED, DRY, GRAYISH BROWN, 10 YR 5/2	SW													1	0.1		1.5	0		
					NS																2.5	
					2	1.8	0.8														3.3	
					NR																4.0	
					3	4.8	1.1														5.1	5
	5														NR			5.5				
															NS							
	10														4	0.3	1.2	9.0				
															NR			10.2	10			
															NS			10.5				
	12.7	AUGER REFUSAL AT 12.0'													5	0.2	0.4	12.0				
		GROUNDWATER NOT OBSERVED DURING DRILLING													NR			12.4				
		BOREHOLE OVM READING: 0.21 PPM																12.7	15			
	15																					
	20																					
	25																					
	30																					
	35																					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)

- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-3**

DATE DRILLED 4/19/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY ML

CHECKED BY BJS

DRAWN BY: SAR

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 & ASSOCIATES, INC.
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 NORMAN, OKLAHOMA 73072
 (405) 321-3885

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM X 1.0								SAMPLE			REMARKS	
					2 4 6 8 10 12 14 16 18								NUMBER	OVM READING	RECOVERY		DEPTH
		Start: 10:45 Stop: 11:30															BACKGROUND OVM READING SOIL: <u>0</u> AIR: <u>0.4</u> PPM
	0	GROUND SURFACE: BOULDERY COBBLELY GRAVELLY SILT: UNCONSOLIDATED, LIGHT BROWNISH GRAY TO GRAYISH BROWN, 10 YR 6/2 TO 5/2, DRY, VERY HARD DRILLING, COBBLES-BOULDERS FROM 10CM - 2M, GRAVELLY, RNDED., POORLY SORTED	GW	[Handwritten Symbols]									1	0.2	1.0	0	
													NS		2.5		
													2	0.4	1.5	4.0	
													3	0.4	1.5	5.5	
	5												NS				
													4	0.2	0.8	9.0	
													NR		9.8	10.5	
	10																
	11.0 11.2	DOLOMITE: GRAYISH BROWN, 10 YR 5/2, MASSIVE, HARD AUGER REFUSAL AT 11.2'	DOLOMITE	[Handwritten Symbols]													
		GROUNDWATER NOT OBSERVED DURING DRILLING															
	15	BOREHOLE OVM (THROUGH AUGERS): 0.1 PPM SOIL VENT INSTALLED TO 8.0' SOIL VENT HEADSPACE AFTER 24 HOURS: 0.1 PPM															
	20																
	25																
	30																
	35																

<div style="display: flex; flex-direction: column; gap: 5px;"> <div> SPLIT-SPOON SAMPLER</div> <div> STANDARD PENETRATION TEST</div> <div> UNDISTURBED SAMPLE</div> <div> WATER TABLE (24 HOURS)</div> </div>	<div style="display: flex; flex-direction: column; gap: 5px;"> <div> WATER TABLE (TIME OF BORING)</div> <div> LABORATORY TEST LOCATION</div> <div> PENETROMETER (TONS/SQ. FT.)</div> <div>NR: NO RECOVERY</div> <div>NS: NOT SAMPLED</div> </div>
---	---

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-4**

DATE DRILLED 4/22/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR

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 NORMAN, OKLAHOMA 73072
 (405) 321-3888

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x <u>1.0</u>										SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH			
		Start: 8:55 Stop: 10:10 GROUND SURFACE:																		BACKGROUND OVM READING SOIL: <u>0</u> AIR: <u>0.1</u> PPM
	0	BOULDERY COBBLELY GRAVELLY SILT: LIGHT GRAYISH BROWN, 10 YR 6/2, POORLY SORTED, GRAVEL FROM 1.0CM TO 10CM, COBBLES-BOULDERS FROM 10CM TO 1M., RNDGD., DOLOMITIZED	GW													NS				0
	4.0	DOLOMITE: LIGHT BROWN, 10 YR 5/2, MASSIVE, JOINTED, FRACTURED															0.1	0.5		2.5
	5	AUGER REFUSAL AT 4.0' GROUNDWATER NOT OBSERVED DURING DRILLING																		3.0
	10	BOREHOLE OVM THROUGH AUGERS: 0.1 PPM SOIL VENT TUBE AT 2.5' SOIL VENT OVM READING AFTER 24 HOURS: 0.1 PPM																		3.5
	15																			4.0
	20																			
	25																			
	30																			
	35																			

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)

- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-6**

DATE DRILLED 4/21/91

DRILLING METHOD HSA

DRILLED BY HSB

LOGGED BY MLL

CHECKED BY BJS

DRAWN BY: SAR

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 (405) 321-3892

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.0										SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH			
		Start 10:30 Stop 11:45 GROUND SURFACE:																		BACKGROUND OVM READING: SOIL: <u>0.1</u> PPM AIR: <u>0.1</u> PPM
	0	BOULDERY COBBLELY GRAVELLY SILT: LIGHT GRAYISH BROWN TO GRAYISH BROWN, 10 YR 6/2 TO UNCONSOLIDATED, DRY, COBBLES-BOULDERS FROM 10CM - 3M, RND., DOLOMITE, POORLY SORTED	GW													NS			2.5	0
	4.0																			
	4.1	DOLOMITE: GRAYISH BROWN, 10 YR 6/2, MASSIVE, FRACTURED, JOINTED	DOLOMITE													NR	0.1	1.4	3.9	4.0
	5	AUGER REFUSAL AT 4.0'																		5
		GROUNDWATER NOT OBSERVED DURING DRILLING																		
		BOREHOLE OVM READING (THROUGH AUGERS): 0.1 PPM																		
	10	SOIL VENT TUBE INSTALLED TO 2.0'																		10
		SOIL VENT HEADSPACE READING AFTER 24 HOURS: 0.1 PPM																		
	15																			15
	20																			20
	25																			25
	30																			30
	35																			35

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)

- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-7**

DATE DRILLED 4/21/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR PAGE 1 OF 1

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 3709 W. ROBINSON
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 (405) 321-3823

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.0								SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY		DEPTH
		Start: 16:31 Stop: 17:03															BACKGROUND OVM READING: SOIL: 0.2 PPM AIR: 0.4 PPM	
		GROUND SURFACE:																
	0	BOULDERY COBBLELY SILT: UNCONSOLIDATED, GRAYISH BROWN, 10 YR 5/2, POORLY SORTED, RND., COBBLES-BOULDERS FROM 10CM TO 2M., GRAVELLY, VERY HARD DRILLING	GW														1 0.7 1.0 NS	0
	5																2 0.4 0.8 4.0 NR 4.8 NS 5.5	5
	10																3 1.0 0.9 9.0 NR 9.9 NR 10.5 NR 11.0	10
	11.0	DOLOMITE: GRAYISH BROWN, 10 YR 5/2, MASSIVE, VERY HARD	DOLOMITE															
	11.2	AUGER REFUSAL AT 11.0'																
	15	BOREHOLE OVM READING (THROUGH AUGERS): 0.1 PPM GROUNDWATER NOT OBSERVED DURING DRILLING SOIL VENT TUBE INSTALLED TO 8.0' SOIL VENT HEADSPACE 24 HOURS:																
	20																	
	25																	
	30																	
	35																	

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-8**

DATE DRILLED 4/22/91
 DRILLING METHOD HSA
 DRILLED BY SHB
 LOGGED BY MJL
 CHECKED BY BJS
 DRAWN BY: SAR

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 NORMAN, OKLAHOMA 73072
 (405) 321-3895

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.0										SAMPLE			REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH		
		Start: 12:20 Stop: 13:12 GROUND SURFACE:																	BACKGROUND OVM READING: SOIL: <u>0.1</u> PPM AIR: <u>0.2</u> PPM
	0	CLAYEY SILT: YELLOWISH BROWN, 10 YR 5/4, DRY, UNCONSOLIDATED, ROOTLETS TO 1.0', CALICHE VEINS BELOW 1.7', VERY FINE QUARTZ, 60% SILT, 40% CLAY, VERY LOW PLASTICITY	CL													1	0.4	2.6	0
	2				0.2	2.0	2.0												
	NR					3.0													
	5																		5
	6.0	COBBLELY BOULDERY SILT: GRAYISH BROWN, 10 YR 5/2, WELL RNDED., POORLY SORTED UNCONSOLIDATED	GW													NR		5.0	5
	9.0																		
	10	AUGER REFUSAL AT 9.0'														NR		9.0	10
	15	GROUNDWATER NOT OBSERVED DURING DRILLING BOREHOLE OVM READING: SOIL VENT TUBE INSTALLED TO 7.5' SOIL VENT OVM READING AFTER 24 HOURS: 0.9 PPM BACKGROUND: 0.5 PPM																9.5	
	20																		20
	25																		25
	30																		30
	35																		35

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)

- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-9**

DATE DRILLED 4/23/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY M.J.

CHECKED BY BJS

DRAWN BY: SAR

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BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM X 21.0								SAMPLE				REMARKS					
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY		DEPTH				
		Start: 11:17 Stop: 12:04																BACKGROUND OVM READING: SOIL: <u>0.1</u> PPM AIR: <u>0.1</u> PPM				
	0	GROUND SURFACE: 3801.2																				
	0	CLAYEY SILT: BROWN, 2.5 YR 5/2, DRY, MOD. COMPACTED, VERY LOW PLASTICITY, CAHLICHE VEINS BELOW 3.0', 60% SILT, 40% CLAY, VERY FINE QUARTZ	P														1	0.3		1.0		
																			NS			2.5
																			2	0.1	1.5	4.0
	5																		3	0.1	1.2	5.5
																			NR			5.5
	6.5	BOULDERY COBBLELY SILT: GRAYISH BROWN, 10 YR 5/2, UNCONSOLIDATED, POORLY SORTED. COBBLES/BOULDERS FROM 10CM TO 0.5M, GRAVELLY, ROUNDED	GW																	9.0		
	10																	4	0.1	1.1	10.1	
																		NR			10.5	
	13.0	DOLOMITE: GRAY, 5 Y 6/1, CRYSTALLINE, MASSIVE. VERY HARD, NONEFFERVESENT ON SURFACE, EFFERVESENT OR SCRATCHED SURFACE WITH HCl	DOLOMITE																	13.0		
	13.1																	5	420.0	0.1	13.1	
	15	BORING TERMINATED AT 13.1'																				
		GROUNDWATER NOT OBSERVED DURING DRILLING																				
		BOREHOLE OVM READING AT 13.0' THROUGH AUGERS: 152 PPM																				
		BOREHOLE OVM READING THROUGH AUGERS (14:20): 156 PPM																				
	20	NO FREE PRODUCT																				
	25																					
	30																					
	35																					

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-11**

DATE DRILLED 4/24/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL

CHECKED BY BJS

DRAWN BY: SAR

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BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 16.0								SAMPLE				REMARKS						
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY		DEPTH					
		Start: 10:15 Stop: 11:55 GROUND SURFACE: 3790.6																BACKGROUND OVM READING: SOIL: 0.2 PPM AIR: 1.5 PPM					
	0	CLAYEY SILT: BROWN, 7.5 YR 5/2, DRY, VERY LOW PLASTICITY, UNCONSOLIDATED FROM 0.0-1.5', MOD. COMPACTED BELOW 1.5', CALICHE VEINS, 60% SILT, 40% CLAY, VERY FINE QUARTZ	CL														1	0.6		1.0	0		
					NS																		2.5
					2	0.2													NR			1.2	3.7
					3	0.2																	4.0
	5				NS																		5.5
	8.0	BOULDERY COBBLELY SILT: GRAYISH BROWN, 10 YR 5/2, UNCONSOLIDATED TO MOD. COMPACTED, GRAVELLY, COBBLES/BOULDERS FROM 5 CM TO 20 CM, GRAVEL TO 5 CM., RND-SUBRND.	GW																	9.0	5		
					4	0.2														1.5		10.5	
	10				NS																		
	14.0	SANDY CLAY: GRAYISH BROWN, 10 YR 5/2, WET WITH HYDROCARBON, STRONG ODOR, FINE QUARTZ DOLOMITE: LIGHT GRAYISH BROWN, 10 YR 6/2, MASSIVE	CL																	14.0	15		
	14.1				5	NR													320.0	0.1		14.1	
	14.2	AUGER REFUSAL AT 14.2', BOREHOLE OVM THROUGH AUGERS AT 13.5': 220 PPM 12:55 NO BOREHOLE FLUID OBSERVED																		14.2			
	20																				20		
	25																				25		
	30																				30		
	35																				35		

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-13**

DATE DRILLED 4/25/91
 DRILLING METHOD HSB
 DRILLED BY HSB
 LOGGED BY M.J.
 CHECKED BY BJS
 DRAWN BY: SAR

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BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.0										SAMPLE				REMARKS		
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH				
		Start: 16:40 Stop: 17:40 GROUND SURFACE: 3794.1																			
	0	CLAYEY SILT: BROWN, 7.5 YR 5/2, DRY, VERY LOW PLASTICITY, UNCONSOLIDATED FROM 0.0-1.5', CALICHE DEPOSITS, 60% SILT, 40% CLAY	CL												1	0.2		1.0			
					NS																
					2	0.8	0.8	3.3													
	4.2				NR			4.0													
					3	1.0	0.9	4.9													
	5	GRAVELLY COBBLELY SILT: UNCONSOLIDATED TO MOD. CONSOLIDATED, PEBBLES TO 2 CM., COBBLES TO 10 CM., ROUND	GW												NR			5.0			
					NS																
					4	2.6	0.6	9.6													
	10				NR			10.5													
					NS																
	13.1	AUGER REFUSAL AT 13.1'													5	2.0	1.0	13.0			
	15	GROUNDWATER NOT OBSERVED DURING DRILLING BOREHOLE OVM READING THROUGH AUGER: 0.6 PPM																			
	20																				
	25																				
	30																				
	35																				

BACKGROUND
OVM READING:
SOIL: 0.1 PPM
AIR: 0.8 PPM

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-15**

DATE DRILLED 4/25/91
 DRILLING METHOD HSA
 DRILLED BY SHB
 LOGGED BY MJL
 CHECKED BY BJS
 DRAWN BY: SAR

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BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM						SAMPLE			REMARKS				
					2	4	6	8	10	12	14	16	18		NUMBER	HNU READING	RECOVERY	DEPTH
		Start: 10:08 Stop: 12:37 B.L. Elev.																
	0	Silty clay, dark yellowish brown, 15% 1/2, dry, v. low plasticity, v. fine quartz, 60% clay, 40% silt	CL									1			0.0	3.2 ppm		
	3.5				2		0.8	2.5										
					3				4.0									
					4													
					5													
	5.0	Boundary - Cobblely silt, grayish brown, 10% 1/2, poorly sorted, med. to poorly consolidated, cobbles/boulders from 5-cm to 15-cm. porous	GW															
	8.0				2													
	9.0				3													
	10.0				4													
	14.0	Auger Refusal at 14.0' Groundwater Not observed during drilling NR: No Recovery NS: Not Sampled Backhoe HNU through Augers: 22 ppm																

	CME CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)	JOB NAME / NUMBER <u>Manhattan/91029</u>	
	WATER TABLE (24 HOURS)			BH-16	
ROBERTS/SCHORNICK ASSOCIATES, INC.				DATE DRILLED <u>04-26-91</u>	
				DRILLING METHOD <u>HGA</u>	
				DRILLED BY <u>SHB</u>	
				LOGGED BY <u>TJL</u>	
				<u>BJS</u>	

Location: S 1313
W 600

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM						SAMPLE			REMARKS				
					2	4	6	8	10	12	14	16	18		NUMBER	HNU READING	RECOVERY	DEPTH
		Start: 13:30 Stop: 14:22														BACKGROUND HNU READING: SOIL: _____ PPM AIR: _____ PPM		
	0	B.L. Elev.																
	1	Silty clay, brown, 10 YR 5/3, V. low plasticity, dry, V. fine grained, 60% clay, 40% silt	CL															
	3.0																	
	4.0																	
	5.0																	
	5.0	Boundary - Cobbly silt, grayish brown, 10 YR 5/2. Poorly sorted, cobbles from 5-cm to 15-cm, round	BW															
	10.0																	
		Auger refusal at 10'																
		Groundwater not observed during drilling																
		Benchless HNU Reading through Augers: 66 ppm																
		NA: No Recovery NS: Not Sampled																

CME CONTINUOUS AUGER SAMPLER

WATER TABLE (TIME OF BORING)

JOB NAME / NUMBER Monahan/91029
BH-17

WATER TABLE (24 HOURS)

DATE DRILLED 04-26-91
DRILLING METHOD HSA
DRILLED BY SHB
LOGGED BY MJL
BS

ROBERTS/SCHORNICK
ASSOCIATES, INC.

Location: S 1400
E 100

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM						REMARKS					
					2	4	6	8	10	12		14	16	18		
		Start: 16:14 Stop: 17:02 G.L. Elev.											BACKGROUND HNU READING: SOIL: _____ PPM AIR: _____ PPM			
	0	Silty clay, Brown, 7.5 YR 54. dry, v. low plasticity, Coarse veins. Dark brown, 10YR 4/3 Below 4.0'	CL										1		1.0	1.0
	NS														2.5	
	2															3.5
	NR															4.0
	3															4.5
	50												5.5			
	10.0	Clayey silt, dark brown, 10YR 4/3, v. fine quartz, flint, low plasticity, iron chromite, sandy, v. fine quartz, calcite veins. 60% silt, 40% clay	CL										4		1.5	9.0
	14.0	Granular clay, Brown, 10YR 4/3, pebbles to 3-cm. sand, 60% clay, 20% silt, 20% pebbles. Dolomite, grayish brown, 10YR 7/2, massive	CL										5		1.5	14.0
	14.5															15.5

Auger Refused
at 14.5'

Groundwater Not
Discovered During
Boring

Benched HNU
through Auger:
0.6ppm

NR: No Recovery
NS: Not Sampled

<p> CME CONTINUOUS AUGER SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/FT.²)</p>	<p>JOB NAME / NUMBER <u>Manhattan A1029</u></p> <p>BORING NUMBER <u>BH-18</u></p> <p>DATE DRILLED <u>04-26-91</u></p> <p>DRILLING METHOD <u>HSA</u></p> <p>DRILLED BY <u>SHB</u></p> <p>LOGGED BY <u>FUL</u></p> <p>CHECKED BY <u>EJS</u></p>
<p>ROBERTS / SCHORNICK ASSOCIATES, INC. Environmental Consultants 3700 W. Robinson Norman, Oklahoma 73072 (405) 321-3895</p>		<p>Page of </p>

RSA FORM 10/84 Rev. 2 Location: E 2000 S 570 Original Location: E 2000 S 600
 Moved 30' N Due to Pipeline from 2000 S 600

BORING RECORD








GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x <u>1.0</u>								SAMPLE				REMARKS
					2		4		8		16		NUMBER	OVM READING	RECOVERY	DEPTH	
					2	4	8	16	18								
	0	GROUND SURFACE:															
	1.0	SANDY SILT: VERY FINE GRAIN SAND, 10% SAND, 90% SILT, NO PLAST., 10 YR 6/3, PALE BROWN, DRY, UNCONSOLIDATED	SM														
		COBBLELY GRAVELLY SILT: SUBRND., DOLOMITE GRAVEL AND COBBLES, 10 YR 6/2, LIGHT GRAYISH BROWN, DRY, UNCONSOLIDATED	GM														
	5																
	10																
	11.5																
	12.0	DOLOMITE: 10 YR 6/1, GRAY TO LIGHT GRAY, VERY HARD	DOLOMITE														
		AUGER REFUSAL 12.0'															
		NO GROUNDWATER AT TIME OF BORING															
		BOREHOLE OVM READING 0.0 PPM															
	15																
	20																
	25																
	30																
	35																

<p> SPLIT-SPOON SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/SQ. FT.)</p> <p>NR: NO RECOVERY NS: NOT SAMPLED</p>	<p>JOB NAME/NUMBER MARATHON/91029</p> <p>BORING NUMBER BH-20</p> <p>DATE DRILLED <u>4/28/91</u></p> <p>DRILLING METHOD <u>hso</u></p> <p>DRILLED BY <u>SHB</u></p> <p>LOGGED BY <u>WEP</u></p> <p>CHECKED BY <u>BJS</u></p> <p>DRAWN BY: <u>SAR</u></p>
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ROBERTS/SCHORNICK
 & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS
 3700 W. ROBINSON
 NORMAN, OKLAHOMA 73072
 (405) 321-3895

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x .10									SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY	DEPTH		
		GROUND SURFACE: 3789.8																BACKGROUND OVM READING: SOIL: <u>0.0</u> PPM AIR: <u>0.0</u> PPM	
	0	SANDY CLAYEY SILT: VERY FINE GRAIN SAND, 10% SAND, 10% CLAY, 80% SILT, 10 YR 6/3, PALE BROWN, DRY, UNCONSOLIDATED AFTER 0.3', 10 YR 7/2, LIGHT GRAY	ML	/										NS				0	
	2.6																1	3.5	0.6
	2.6	AUGER REFUSAL 2.6' NOT ABLE TO SAMPLE BEDROCK NO GROUNDWATER ENCOUNTERED BOREHOLE OVM: 1.1 PPM																	
	5																		
	10																		
	15																		
	20																		
	25																		
	30																		
	35																		

-  SPLIT-SPOON SAMPLER
-  STANDARD PENETRATION TEST
-  UNDISTURBED SAMPLE
-  WATER TABLE (24 HOURS)
-  WATER TABLE (TIME OF BORING)
-  LABORATORY TEST LOCATION
-  PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-25**

DATE DRILLED 5/3/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR

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NORMAN, OKLAHOMA 73072
(405) 321-3895

BORING RECORD

GEOLOG. UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	OVM SOIL GAS PPM x 1.9								SAMPLE				REMARKS	
					2	4	6	8	10	12	14	16	18	NUMBER	OVM READING	RECOVERY		DEPTH
	0	GROUND SURFACE: 3793.1																BACKGROUND OVM READING: SOIL: <u>0.0</u> PPM AIR: <u>0.0</u> PPM
	0	SANDY CLAYEY SILT: NO PLAST., VERY FINE GRAIN SAND, 10 YR 6/3, 80% SILT, 10% SAND, 10% CLAY, PALE BROWN, DRY, MINOR SUBRND. DOLOMITE GRAVEL, UNCONSOLIDATED	SM											NS			0	
	3.4															1	37.0	0.9
	3.4	AUGER REFUSAL 3.4' NO GROUNDWATER ENCOUNTERED															3.4	
	5																5	
	10																10	
	15																15	
	20																20	
	25																25	
	30																30	
	35																35	

- SPLIT-SPOON SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/SQ. FT.)
- NR: NO RECOVERY
- NS: NOT SAMPLED

JOB NAME/NUMBER **MARATHON/91029**

BORING NUMBER **BH-27**

DATE DRILLED 5/4/91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY WEP

CHECKED BY BJS

DRAWN BY: SAR

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NORMAN, OKLAHOMA 73072
(405) 321-3895

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS						SAMPLE				REMARKS
					SURVEY PPM: <u>0.5</u> 2 4 6 8 10 12 14 16 18						NUMBER	HNU READING	RECOVERY	DEPTH	BACKGROUND HNU READING: SOIL: <u>0.0</u> PPM AIR: <u>0.0</u> PPM
		Start: 07:40 Stop: 09:35 G.L. Elev.													
	0	Clayey silt, brown, 10YR 5/3, dry, v. low plasticity, 70% silt, 30% clay	CL												
	1.5														
	2.5														
	3.6														
	4.5														
	5.5														
	7.0														
		Sandstone, white to pale yellow, 2.5y 8/2 to 8/4, quartzous, fine grain, well sorted, flintbedded, interbedded with mudstone seams, 2-0.5' thick, thinbedded													
		Dolomite, light brown-ish gray, 10YR 4/2, massive, v. hard													
		Auger Refused at 7.0' groundwater not observed during drilling NR: No Recovery NS: Not Sampled													

<p> CME CONTINUOUS AUGER SAMPLER</p> <p> STANDARD PENETRATION TEST</p> <p> UNDISTURBED SAMPLE</p> <p> WATER TABLE (24 HOURS)</p>	<p> WATER TABLE (TIME OF BORING)</p> <p> LABORATORY TEST LOCATION</p> <p> PENETROMETER (TONS/FT.²)</p>	<p>JOB NAME / NUMBER <u>Marathon/91029</u></p> <p>BORING NUMBER <u>BH-51</u></p> <p>DATE DRILLED <u>05-20-91</u></p> <p>DRILLING METHOD <u>HSA</u></p> <p>DRILLED BY <u>SHB</u></p> <p>LOGGED BY <u>MJL</u></p> <p>CHECKED BY <u>SJS</u></p>
<p>ROBERTS / SCHORNICK ASSOCIATES, INC. Environmental Consultants 3700 W. Robinson Norman, Oklahoma 73072 (405) 321-3893</p>		

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE				REMARKS
					NUM. REC'D	NUM. RECD	RECOVERY	DEPTH	
	0	silt, 7.5YR 6/4, light brown, loose, soft, dry,	ML		1	0	100	1.0	6/1/91
	2.7	clayey silt, 7.5YR 5/4, brown, non-plastic, dry, friable, caliche nodules, 15% clay, 10% caliche, 75% silt	ML		NS	-	-	2.5	
	5				2	0	100	4.0	
	9.3				3	0	100	5.5	
	10	600cton, 2.5Y 8/4, pale yellow, moderately hard, slightly cemented, Ca grnd, silty			NS	-	-	7.5	
	15	- color changes to 2.5Y 5/6 light olive brown with increased moisture			4	0	100	7.0	
	20	2.5Y 4/4 olive brown and 2.5Y 5/6 light olive brown at 17.5, cemented, hard to 18.5 wet at 18.5	GI		5	0	100	7.7	
	24.0	TD → 24			NS	-	-	12.5	
					NS	-	-	14.0	
					NS	-	-	17.0	
					7	0	100	12.6	
					NS	-	-	17.0	
					8	9.9	100	9.6	
					NS	-	-	22.5	
					9	28	100	22.9	
					NS	-	-	24.0	

	CUE CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)
	STANDARD PENETRATION TEST		LABORATORY TEST LOCATION
	UNDISTURBED SAMPLE		PENETROMETER (TONS/FT. ²)
	WATER TABLE (24 HOURS)		

JOB NAME / NUMBER: Marathon (ISGA) 91029.01

BORING NUMBER: BH-68

DATE DRILLED: 6-1-91 + 6-2-91

DRILLING METHOD: ISA

DRILLED BY: SHAB

LOGGED BY: JMB

CHECKED BY: _____






ROBERTS-SCHORNICK & ASSOCIATES, INC.
 Environmental Geotechnical
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GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE				REMARKS	
					NUM	MMU READING	RECOVER	DEPTH		
	0	silt, 7.5YR6/4, light brown, dry, loose, soft,	ML		1	0		10		
					NS	-	-	25		
	30	clayey silt, 7.5YR5/4, brown, dry, friable, caliche nodules and precipitations, 15% clay, 10% caliche, 75% silt	ML		2	0		3.5		
4.0					NS	-	-	4.0		
5					3	47		5.1		
		silty gravel, and cobbles, 7.5YR7/2, pinkish gray, gravel: fine to coarse, dry, dolomitic limestone and cherty gravels + cobbles	GM		NS	-	-	7.5		
						4	49		8.6	
		wet at 12.5' dk gray sludge at 11.0 ↓			NS	-	-	9.0		
						5	120		9.4	
12.5						NS	-	-	10.5	
						6	764		11.0	*
		wet at 12.5' dk gray sludge at 11.0 ↓			NS	-	-	12.5		
						7	575		13.3	
						NS	-	-	14.0	
15		sandstone, 2.5Y5/4, light olive brown, in gravel, hard,	SS		8	305		15.0		
						NS	-	-	17.5	
	17.9				9	556		18.2		
	18.2									

DRAFT

BACKGROUND
MUD READING
SOIL: _____ PPM
AIR: _____ PPM

* sampled 10.5-11.0' to break up rock for drilling








	CHE CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)	JOB NAME / NUMBER: Marathon (SBCP) 71027.01	
	STANDARD PENETRATION TEST	L	LABORATORY TEST LOCATION	BORING NUMBER: BH-69	
	UNDISTURBED SAMPLE	+	PENETROMETER (TONS / FT. ²)	DATE DRILLED: 6-2-91	
	WATER TABLE (24 HOURS)	D E-W, 025 N		DRILLING METHOD: HSA	
ROBERTS-SCHORNICK & ASSOCIATES, INC. Environmental Consultants				DRILLED BY: S. H. & B.	
				LOGGED BY: JMB	
				CHECKED BY: _____	

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE				REMARKS
					NUMBER	WU RECOVERED	RECOVERED	DEPTH	
	0	silt, 7.5 YR 6/4, light brown, dry, loose, silt	ML		1	0	1.0		
	30	clayey silt, 7.5 YR 5/4, brown, hard, dry, calcareous, 1-2% clay, 25% calc. - 20% silt	ML		2	0	3.5		
	3.7				15	-	4.0		
	5	silt, gravel, cobbles, 7.5 YR 7/0, pinkish gray, dolomitic limestone, v. hard, dry, black hydrocarbon sludge at 4.5 ft., cobbles + gravel are 10x2 7/1, light gray at 6.5-7.0	GM		3	33	5.0		
					16	-	7.5		
					4	11.5	9.0		
					NS	-	9.0		
	10				5	23.1	9.0		
					NS	-	12.5		
					6	32.0	13.5		
					NS	-	14.0		
	15				7	76.7	16.0		
					NS	-	17.5		
					8	56.0	18.5		
					NS	-	19.0		
	19.7				9	54.0	19.5		
		TO - 19.7 Auger Refused Borehole OVM's							

DRAFT

PMU SOIL GAS SURVEY PPM
2 4 6 8 10 12 14 16 18

REMARKS
BACKGROUND
HIU READING:
SOIL: _____ PPM
AIR: _____ PPM

 ONE CONTINUOUS AUGER SAMPLER	 WATER TABLE (TIME OF BORING)
 STANDARD PENETRATION TEST	 LABORATORY TEST LOCATION
 UNOBTAINED SAMPLE	 PENETROMETER (TONS/FT. ²)
 WATER TABLE (24 HOURS)	






Marathon (IBGA)
 JOB NAME / NUMBER: 91029.01
 BORING NUMBER: BH-70
 DATE DRILLED: 6-3-91
 DRILLING METHOD: I+SA
 DRILLED BY: SHB
 LOGGED BY: JMB
 CHECKED BY: _____

ROBERTS-SCHORNICK
 & ASSOCIATES, INC.
 Environmental Consultants
 2000 West 10th Street
 Tulsa, Oklahoma 74107
 918-438-1111

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	LOG GRAPHIC	MMU SOIL GAS SURVEY PPM X		SAMPLE		REMARKS	
					2	4	NUMBER	DEPTH		
	0	silt, 7.5YR 6/4, light brown loose, salt, dry	ML				1	0	1.0	
	30	clayey silt, 7.5YR 5/4, brown, non-plastic, dry, friable, caliche present, 15% clay, 10% caliche	ML				2	0	3.5	
	5						2.5	-	4.0	
							3	0	5.0	
							NS	-	7.5	
							4	0	8.0	
							NS	-	10	
	10	silt, granules, cobbles, silt is 7.5YR 7/2, pinkish gray, granules & cobbles are 10YR 7/1 light gray to 7.5YR 6/4 light brown, granules are dolomitic limestone, loose, caliche in silt	ML				5	0	10	
							6	0	12.5	
							NS	-	14.0	
	15						7	10	15.0	
							NS	-	17.5	
							8	15	17.5	
							NS	-	20	
	20	sandstone, 2.5Y 5/6, light olive brown, moderately hard, fn grains, slight hydrocarbon odor, moist at 22.0' color changes to 2.5Y 4/4, due brown at 22.0' ↓	SS				9	19	21.3	
							NS	-	22.5	
							10	22	23.8	
							NS	-	24.0	
	25						11	21.6	24.3	
							NS	-	27.5	
							12	11	26.0	
							NS	-	25.0	
	250	sandstone, 2.5Y 6/10 to 7/10, gray to light gray, dry, hard, fn grains	SS				13	16	26.5	
	32	7.0 → 32.0"					NS	-	32.0	

DRAFT

BACKGROUND:
 MRL: _____ PPM
 SOIL: _____ PPM
 AIR: _____ PPM

 ONE CONTINUOUS AUGER SAMPLER	 WATER TABLE (TIME OF BORING)
 STANDARD PENETRATION TEST	L LABORATORY TEST LOCATION
 UNDISTURBED SAMPLE	+ PENETROMETER. (TONS/FT. ²)
 WATER TABLE (24 HOURS)	

D.E.U., 2003

ROBERTS-SCHORNICK & ASSOCIATES, INC.

Environmental Consultants
 10000 E. 1st Ave., Suite 100
 Denver, CO 80231
 303.755.1000

JOB NAME / NUMBER: Marathon (IRGA) 91029.01

BORING NUMBER: 3H-71

DATE CALLED: 6-4-91

DILLING METHOD: ISA







DRILLED BY: JMB

LOGGED BY: JMB

CHECKED BY: _____

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE			REMARKS
					NUMBER	MHU READING	DEPTH	
	0	silt, 10YR 7/3, v. pale brown, loose, dry, soft,	ML		1	8	1.0	BACKGROUND MHU READING: SOIL: PPM AIR: PPM No Recovery
					NS	-	2.5	
	5	Sandstone, 2.5Y 8/2, white friable, highly weathered, soft to moderately hard			2	0	4.0	
		slightly moist at 4.0, 2.5Y 7/4, pale yellow			3	0	4.5	
		slightly cemented at 7.5 moderately hard, & hard, color changes to 2.5Y 7/2, light gray			NS	-	7.5	
	10	- 2.5Y 6/8, olive yellow at 9.5'			NS	-	7.0	
					NS	-	12.5	
					NS	-	14.0	
					NS	-	14.5	
	15	Cemented hard layer at 17.0-17.3', 17.8'-18.0'			NS	-	17.5	
					NS	-	19.0	
					NS	-	19.5	
					NS	-	22.5	
	240	TD → 240 Borehole OUM → 59.0 PPM Note: No recovery from the split spoon sample at 22.5'			NS	-	24.0	

DRAFT

-  ONE CONTINUOUS AUGER SAMPLER
-  STANDARD PENETRATION TEST
-  UNDISTURBED SAMPLE
-  WATER TABLE (TIME OF BORING)
-  LABORATORY TEST LOCATION
-  PENETROMETER (TONS / FT.²)

JOB NAME / NUMBER: Marathon (IRGP)
 91029.01

BORING NUMBER: BH-72

DATE DRILLED: 6-5-91

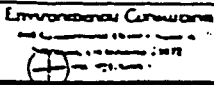
DRILLING METHOD: HSA

DRILLED BY: SHB





LOGGED BY: JMB




CHECKED BY: _____

ROBERTS-SCHORNICK & ASSOCIATES, INC.



GEOLOG. UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE			REMARKS
					NUMBER	HRL. READING	DEPTH	
	0	silty 10YR7/3, v pale brown, loose, dry, salt	ML		10		10	
	2.5	same as above, 2.5Y 8/3, with v dry, moderately hard, v. fine grained, silty, weathered			NS		2.5	
	5	2.5Y 7/4 pale yellow at 4.0' moist at 9.0'			20	0.3	3.8	
	10	2.5Y 6/8; olive yellow at 8.5' - cemented layer at 13.0' - 17.5'			NS		7.0	No Recovery
	15				NS		14.0	No Recovery
	20	v. moist to wet at 19.0' 2.5Y 4/4, olive brown at 20.0'			NS	0.6	17.5	
	25	v. hard & cemented at 24.0'-25.0'			NS		18.1	
	30				NS		19.0	
	35				NS		21.0	No Recovery
	40				NS		27.5	No Recovery
	45				NS		28.5	
	50				NS		31.0	
	55				NS		33.0	
	60				NS		34.0	
	65				NS		35.0	

 ONE CONTINUOUS AUGER SAMPLER
 STANDARD PENETRATION TEST
 UNDISTURBED SAMPLE
 WATER TABLE (24" CURS)

 WATER TABLE (TIME OF BORING)
 LABORATORY TEST LOCATION
 + PENETROMETER. (TONS / FT.²)

200 E, 1000 N








ROBERTS-SCHORNICK & ASSOCIATES, INC.
 Environmental Consultants
 1000 E. 10th St., Suite 100
 Denver, Colorado 80202
 Phone: 303.733.1111

Merathon (586A)
 JOB NAME / NUMBER: 91029.01
 BORING NUMBER: BH-73
 DATE DRILLED: 6-5-91
 DRILLING METHOD: HSA
 DRILLED BY: SJ+B
 LOGGED BY: JMB
 CHECKED BY:

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE				REMARKS
					NUMBER	HRU REGION	RECOVER	DEPTH	
	0	silt, 7.5 YR 6/4, light brown, loose, dry, soft	ML		1	0	1.0		
	2.8	clayey silt, 7.5 YR 5/4, brown, firm, brittle, dry, calcite, 15% clay, 10% calcite	ML		2	0	2.5		
	5				3	0	3.5		
	8.5				4	0	4.9		
	10	silt, gravel, cobbles, silt is 10 YR 6/4 to 5/4, light yellowish brown to yellowish brown, dry, gravel - cobbles are 2.54 5/10 to 4/10, gray to dk gray and are dolomitic limestone, vuggy porosity, limestone is also 2.54 6/10 light brownish gray	GM		5	0	7.5		
	15				6	0	8.5		
	16.5				7	0	9.0		
	17.9				8	0	9.6		
	18.5	sandstone, d. 54 6/6, olive yellow, hard, fm grain, silty	SS				10.5		
		JD → 18.5'					13.1		
		Booth 04H - 0 PPM					14.0		
							14.7		
							17.5		
							18.0		

DRAFT

BACKGROUND
HRU READING:
SOIL: PPM
AIR: PPM

-  ONE CONTINUOUS AUGER SAMPLER
-  STANDARD PENETRATION TEST
-  UNDISTURBED SAMPLE
-  WATER TABLE (24 HOURS)
-  WATER TABLE (TIME OF BORING)
-  LABORATORY TEST LOCATION
-  PENETROMETER (TONS/FT²)

JOB NAME / NUMBER: Marathon (1786A) 91029.01

BORING NUMBER: BH-74

DATE DRILLED: 6-6-91

DRILLING METHOD: HSA

DRILLED BY: SHB

LOGGED BY: JMB

CHECKED BY:

ROBERTS-SCHORNICK & ASSOCIATES, INC.
Environmental Consultants
and Geotechnical Engineers
10000 130th Avenue, NE
Bellevue, WA 98005-3177
206-471-1000

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE				REMARKS
					NUMBER	DEPTH	RECOVERY	DEPTH	
	0	Silt, 7.5YR 6/4, light brown, cobbles top 3.0", loose, soft, dry	ML		1	0	1.0		No Recovery
	2.8	Clayey silt, 7.5YR 5/4, brown, friable, firm, non-plastic, dry, calc. 15% clay, 10% calcite	ML		NS	-	2.5		
	5				2	6	3.7		
	4.7				NS	-	4.0		
					3	0	4.9		
					NS	-			
					4	0	7.5		
					NS	-	8.1		
					5	0	9.0		
					NS	-	10.1		
	10	Silt, gravel, cobbles, silt is 110YR 6/4 to 5/4, light yellowish brown, to yellowish brown, dry, gravel - cobbles are 2.5Y 5/6 to 4/0, gray to dk gray to 2.5Y 6/2, light brown, gravel, gravel are dolomitic limestone, vuggy porosity	GM		NS	-	12.5		
					NS	-	14.0		
	15				6	0	15.0		
					NS	-			
					7	0	17.5		
					NS	-	18.0		
	17.0				8	0	18.5		
	17.5	dolomitic limestone, 7.5YR 6/2 pinkish gray, v. hard, vuggy porosity, moist	S						
		TD → 19.25'							
		Boehde OUM → OPM							

DRAFT

BACKGROUND
 SHU READING
 TITLE: _____ PPM
 DR: _____ PPM

- ONE CONTINUOUS AUGER SAMPLE
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS / FT.²)

ROBERTS-SCHORNICK & ASSOCIATES, INC.
 Environmental Consultants

JOB NAME / NUMBER: Marathon (IRGA) 91029.01

BORING NUMBER: BH-75

DATE DRILLED: 6-6-91 + 6-7-91

DRILLING METHOD: HSA

DRILLED BY: SHB

LOGGED BY: JMB








CHECKED BY: _____

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	SAMPLE			REMARKS
					NUMBER	RECOVERY	DEPTH	
	0	silt, 10 YR 4/3, brown to dk brown, loose, solid , dry	ML		10			
	3.0	silt, gravels - 5 YR 7/1, light gray, gravel is limestone, jagged, porous, dry	GM		NS		25	
	5	dolomite, 2.5 Y 6/2, light brownish gray, v. hard			247	X	32	
	10	TD → 3.5' Auger Refused on the Dolomite at 3.5'						
	15							

DRAFT

UNO SOIL GAS SURVEY PPM X
2 4 6 8 10 12 14 16 18 20

REMARKS
H₂O: _____
H₂S: _____
SOIL: _____ PPM
AIR: _____ PPM

-  ONE CONTINUOUS AUGER SAMPLER
-  STANDARD PENETRATION TEST
-  UNDISTURBED SAMPLE
-  WATER TABLE (24 - 04/31)
-  WATER TABLE (TIME OF BORING)
-  LABORATORY TEST LOCATION
-  PENETROMETER (TONS / FT.²)

JOB NAME / NUMBER: Marathon (ISGP) 91029.01

BORING NUMBER: BH-76

DATE DRILLED: 6-7-91

DRILLING METHOD: HSA

DRILLED BY: SWB

LOGGED BY: JMB

CHECKED BY: _____

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants
and Geotechnical Engineers
1800 W. 2100 S.

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	MNU SOIL GAS SURVEY PPM				REMARKS
					2	4	8	10 12	
		Start: 08:35 Stop: 09:05			DR				BACKGROUND MNU READING: SOIL: 0-0 PPM AIR: 0-0 PPM
	0	G.L. Elev.							
		Cobbly Silty Sand, brown, 10% R ₃ , dry, v. low plasticity, v. fine quartz, cobbles from 3 cm to 10 cm, subangular	G ₂						
	6.4	Auger Refusal at 6.4'							
		Groundwater Not Observed During Drilling							
		NR: No Recovery NS: Not Sampled							

- CME CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)

- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/FT.²)

JOB NAME / NUMBER Marathon/91029

BORING NUMBER BH-78

DATE DRILLED 06-08-91

DRILLING METHOD HSS

DRILLED BY SHB

LOGGED BY FUL

CHECKED BY BJS

Page 1 of 1

ROBERTS / SCHORNICK
ASSOCIATES, INC.
 Environmental Consultants
 3700 W. Robinson
 Norman, Oklahoma 73072
 (405) 321-3000

Location N 1406
S 1047

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM				SAMPLE			REMARKS		
					2	4	6	8	10	12	16	NUMBER	HNU READING	RECOVERY
		Start: 13:00 Stop: 13:25 B.L. Elev.												
	0 - 2.0	Clayey silt, yellowish brown, 10% 25% quartz, v. fine grain, grassy, dry	ML								1	0.0	1.0	
	2.0 - 3.8	Sandstone, pale to v. pale brown, 10% 6% to 7% quartz, v. fine grain, weathered from 2.5 to 3.0', competent - hard below 3.0', CaCO3 present Dolomite, light brownish gray, 10% 1/2, sandy, massive, v. hard	SS Dol.								NS		2.5	
											NA		3.1	
											NS		3.8	
													3.9	
		Auger Refused at 3.8'												
		Groundwater Not Observed During Drilling												
		NR: NO Recovery NS: Not Sampled												

DRAFT

- CME CONTINUOUS AUGER SAMPLER
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- WATER TABLE (24 HOURS)
- WATER TABLE (TIME OF BORING)
- LABORATORY TEST LOCATION
- PENETROMETER (TONS/FT.²)

JOB NAME / NUMBER Marathon/91029

BORING NUMBER BH-79

DATE DRILLED 06-08-91

DRILLING METHOD HSB

DRILLED BY SHB

LOGGED BY FUL

CHECKED BY BJS

Page 1 of 1

ROBERTS / SCHORNICK
ASSOCIATES, INC.
Environmental Consultants
2700 W. Robinson
Norman, Oklahoma 73072
(405) 321-3693

Location E 200
N 1305

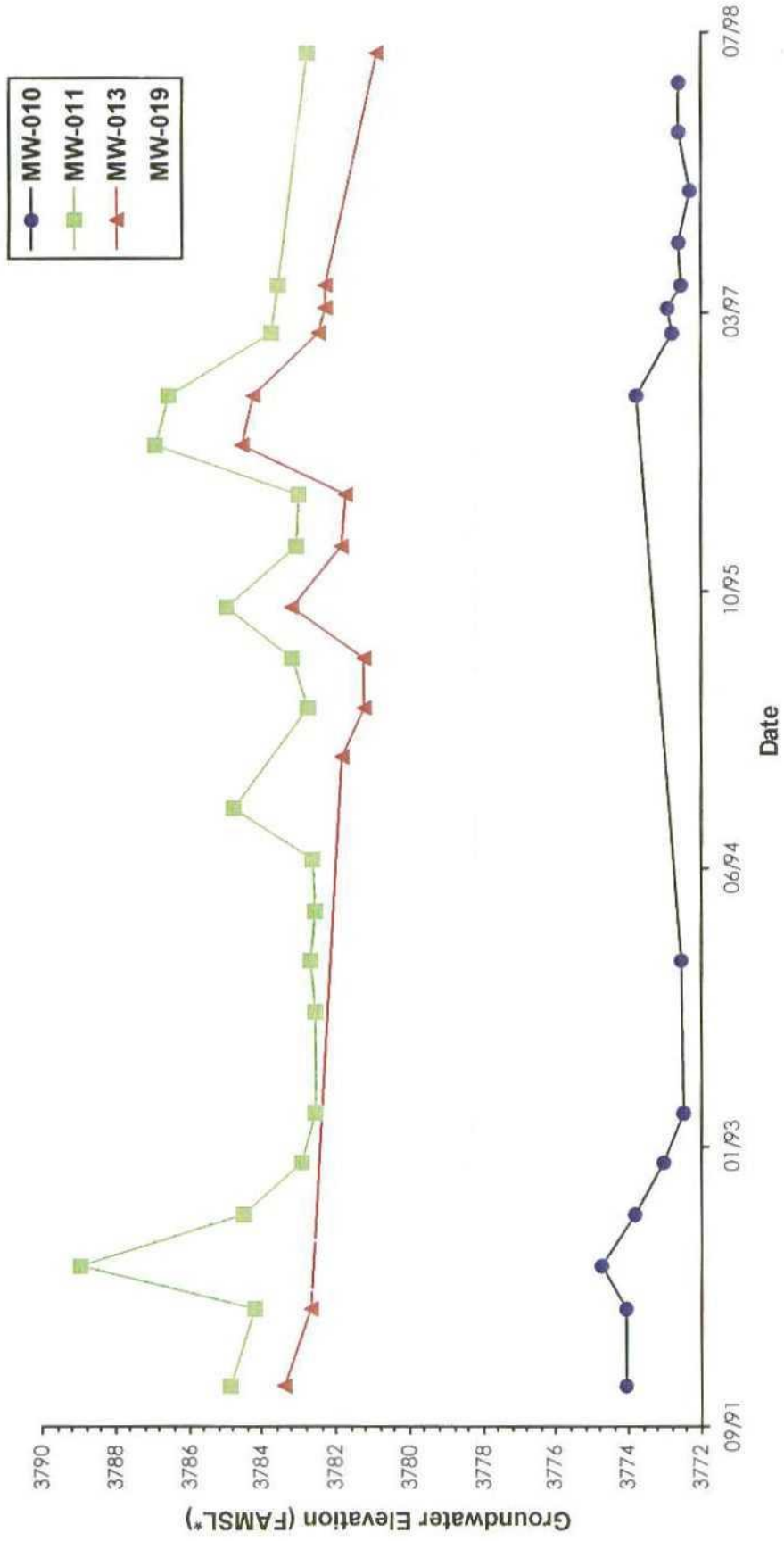
APPENDIX B

Hydrographs for Selected Wells

GROUNDWATER ELEVATION HYDROGRAPH

Wells MW-010, MW-011, MW-013, and MW-019

Indian Basin Remediation Project
Eddy County, NM

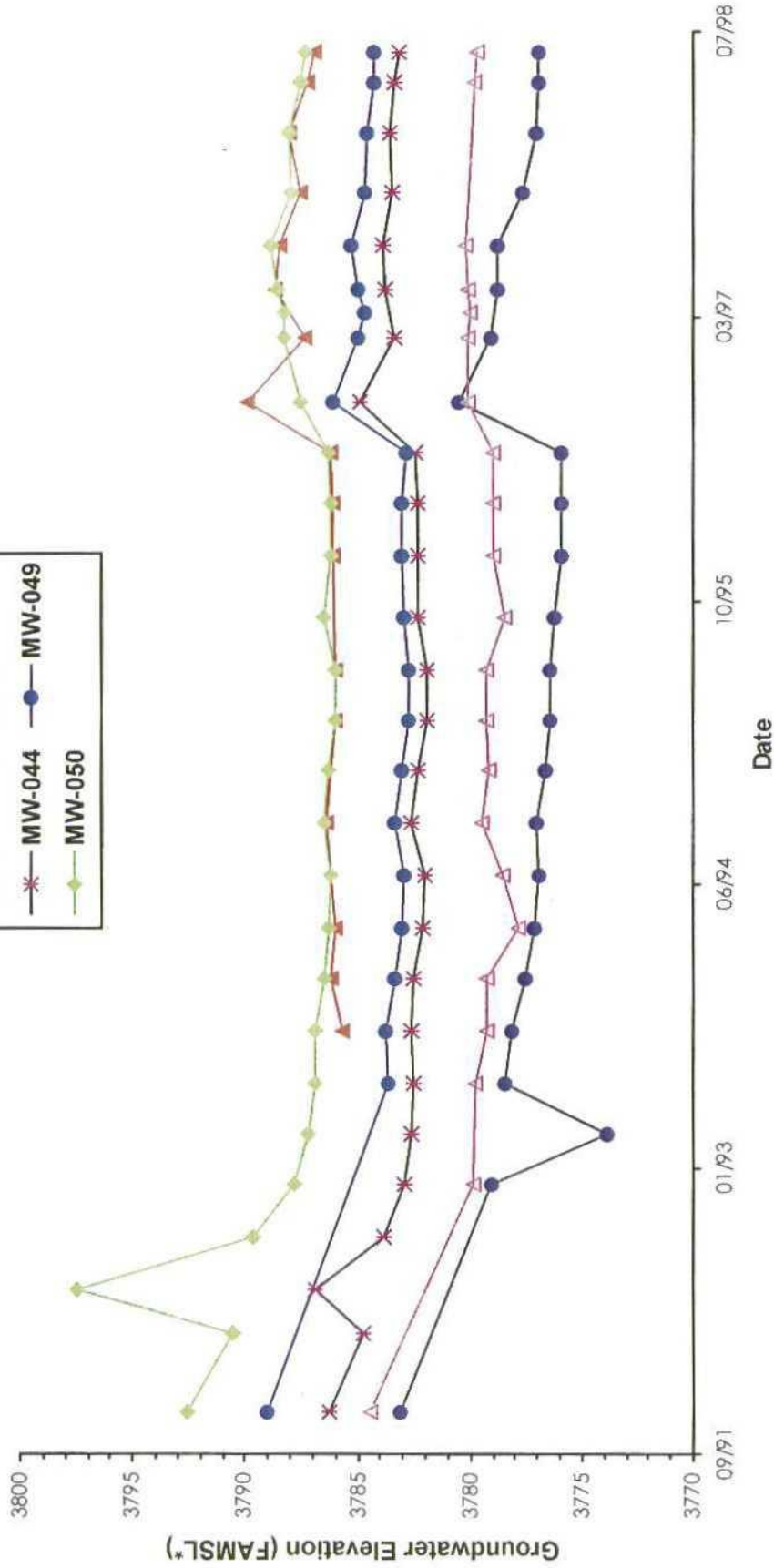
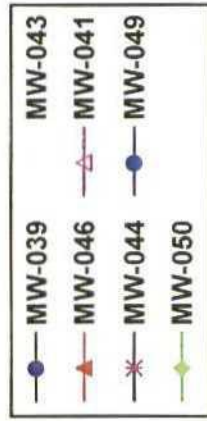


Note: * Elevations are in Feet Above Mean Sea Level (FAMSL) based on survey data supplied by Marathon

GROUNDWATER ELEVATION HYDROGRAPH

Wells MW-039, MW-041, MW-043, MW-044, MW-046, MW-049, and MW-050

Indian Basin Remediation Project
Eddy County, NM

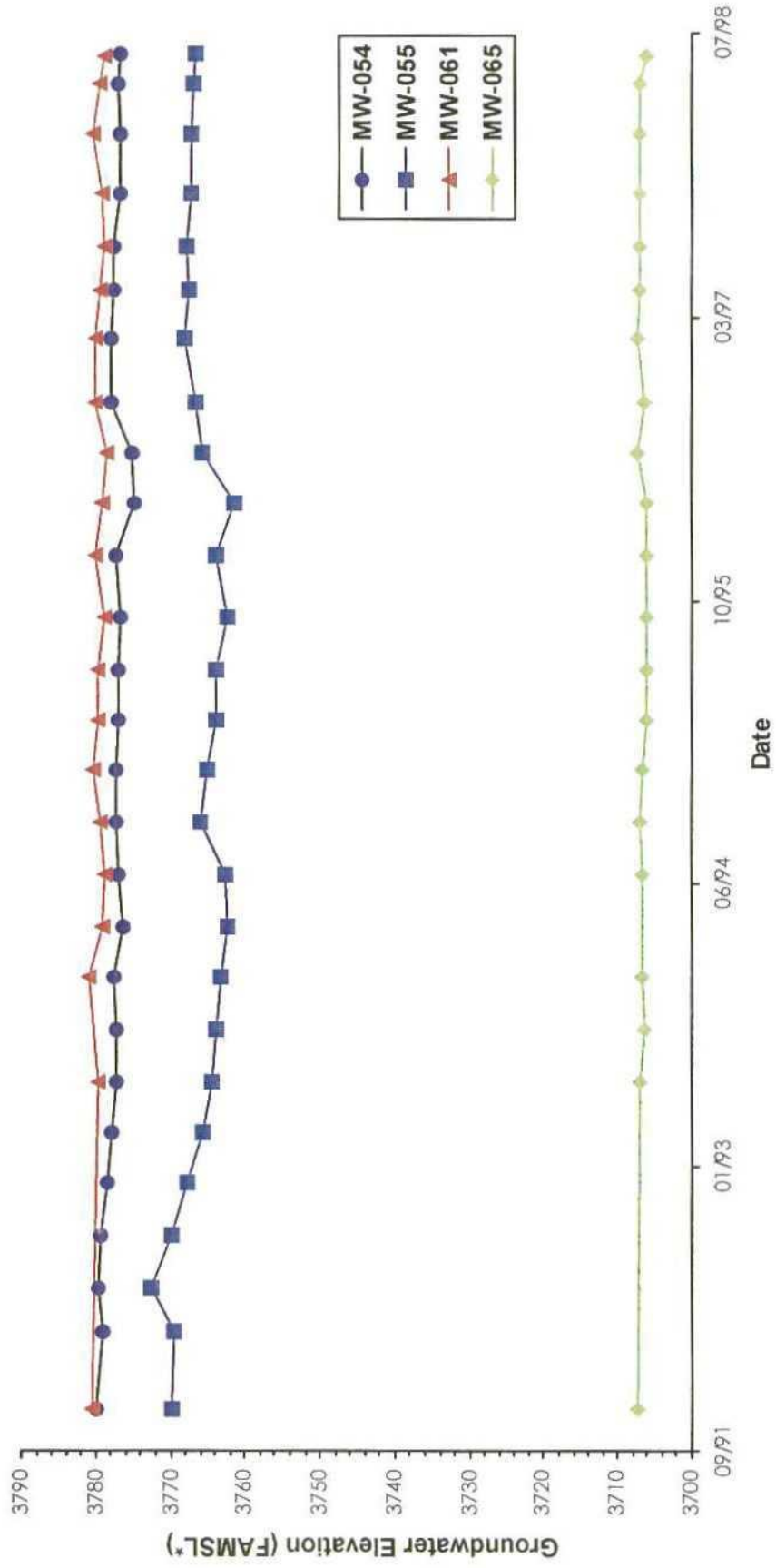


Note: * Elevations are in Feet Above Mean Sea Level (FAMSL) based on survey data supplied by Marathon

GROUNDWATER ELEVATION HYDROGRAPH

Wells MW-054, MW-055, MW-061, and MW-065

Indian Basin Remediation Project
Eddy County, NM

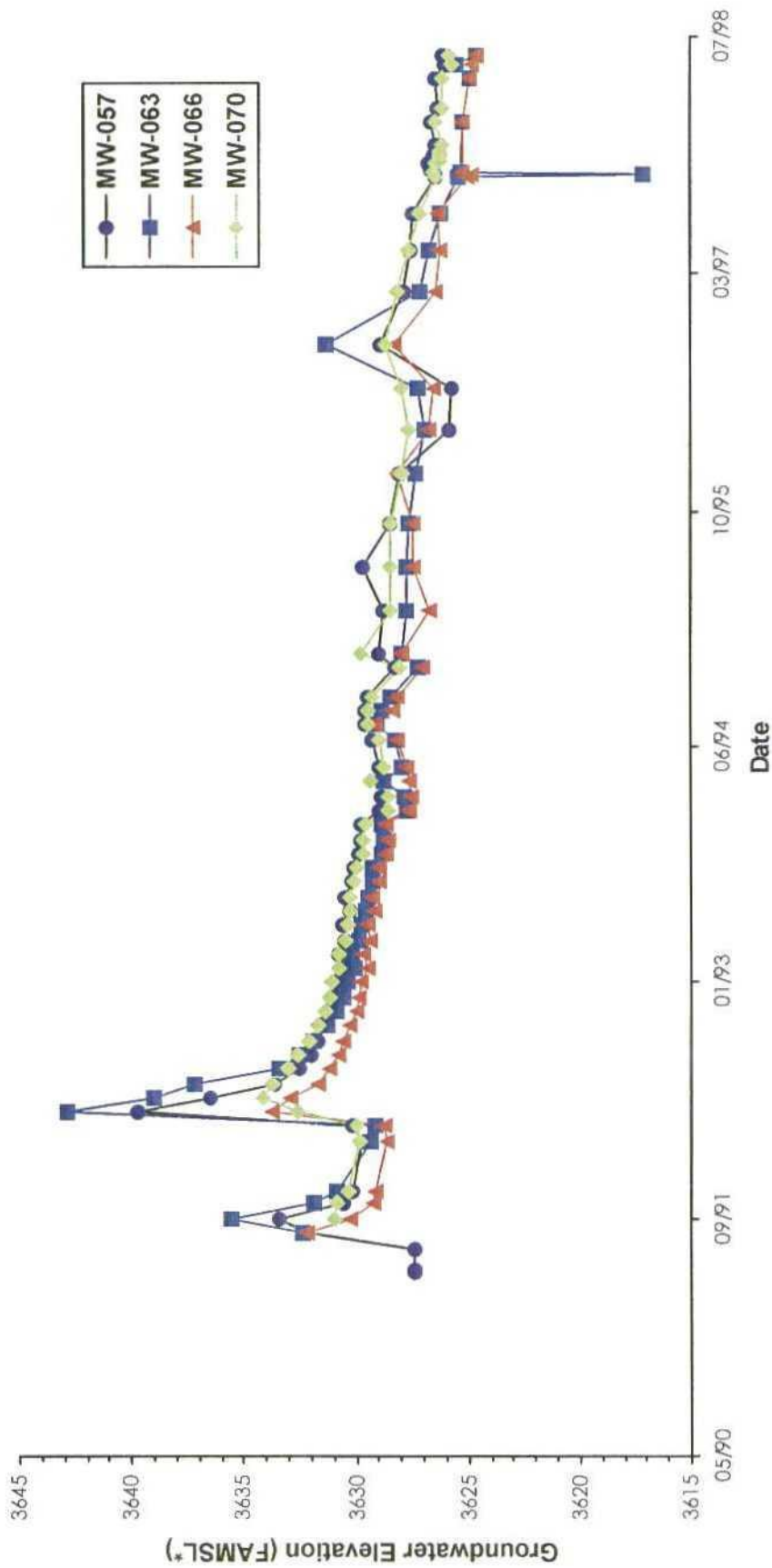


Note: * Elevations are in Feet Above Mean Sea Level (FAMSL) based on survey data supplied by Marathon

GROUNDWATER ELEVATION HYDROGRAPH

Wells MW-057, MW-063, MW-066, and MW-070

Indian Basin Remediation Project
Eddy County, NM

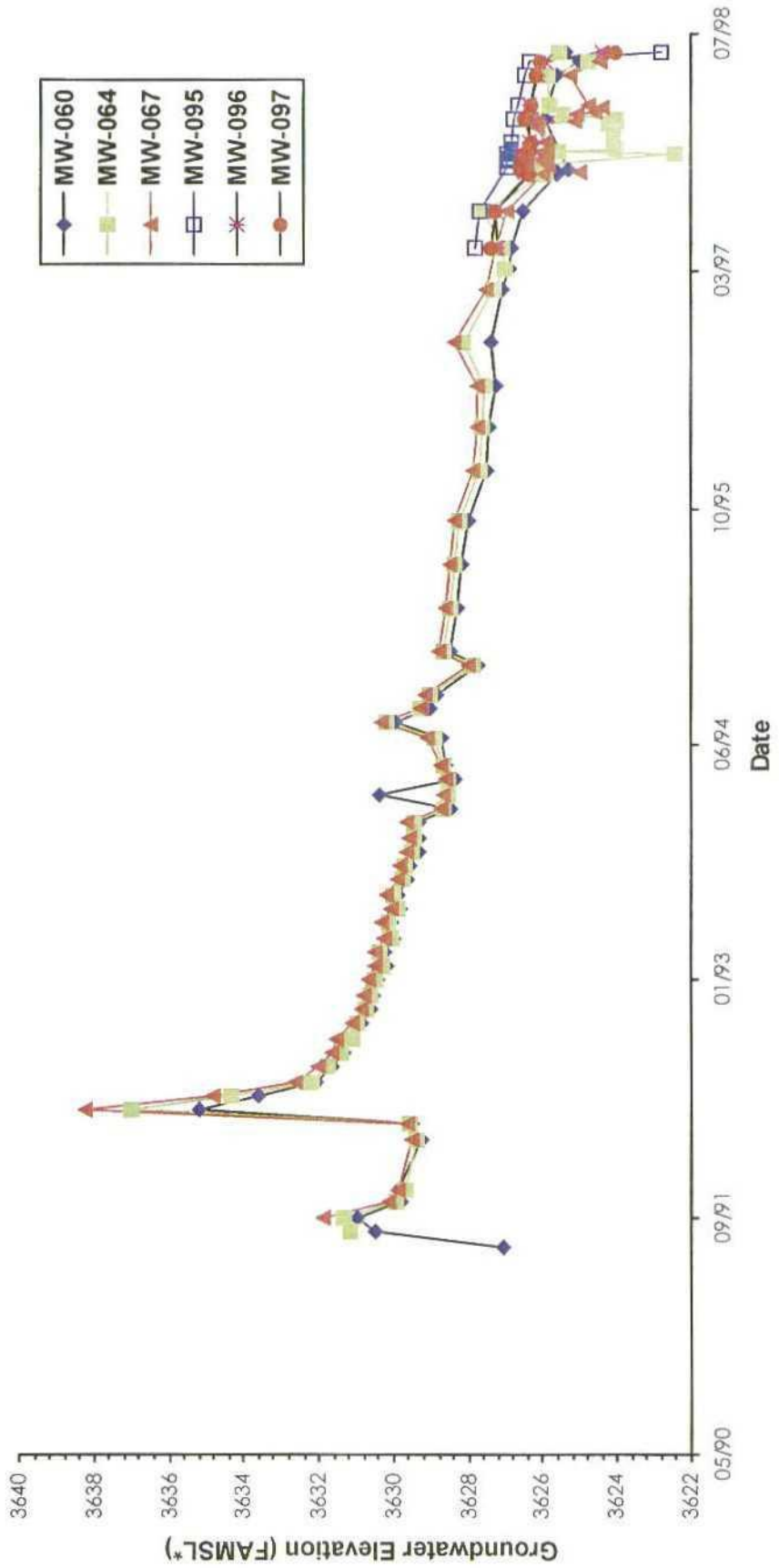


Note: * Elevations are in Feet Above Mean Sea Level (FAMSL) based on survey data supplied by Marathon

GROUNDWATER ELEVATION HYDROGRAPH

Wells MW-060, MW-064, MW-067, MW-095, MW-096, and MW-097

Indian Basin Remediation Project
Eddy County, NM



Note: * Elevations are in Feet Above Mean Sea Level (FAMSL) based on survey data supplied by Marathon