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ARCADIS GERAGHTY & MILLER

Annual Groundwater Monitoring Report, January - December 1999 Volume I

Indian Basin Remediation Project
Eddy County, New Mexico

PREPARED FOR

Marathon Oil Company

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Executive Summary

The Indian Basin Gas Plant (site) is located approximately 20 miles northwest of Carlsbad, in Eddy County, New Mexico. Cleanup efforts at the site, collectively known as the Indian Basin Remediation Project (IBRP), were initiated in April 1991 to recover free phase petroleum hydrocarbons related to the release of a liquid by-product of natural gas production known as "condensate". The subsurface at the site includes two distinct geologic zones known as the "Shallow Zone" and the "Lower Queen", both with saturated and unsaturated strata. Currently, there are a total of 147 wells present at the site related to the IBRP. These wells are used for a combination of groundwater monitoring, groundwater and condensate recovery, treated groundwater infiltration, and condensate vapor extraction.

During 1999, Marathon initiated a plan to expand the ongoing groundwater and condensate recovery activities at the site. This plan included the installation of 21additional monitoring/remediation wells, extensive soil vapor extraction testing, modification of vapor extraction wells to focus on discrete intervals, a study of aerobic biodegradation of condensate ongoing in the subsurface, and additional geophysical characterization of the Lower Queen.

In correspondence dated March 4, 1999, the OCD specifically requested that Marathon submit a work plan to complete the delineation of groundwater impacts south of Lower Queen Well MW-98. In response to the OCD request, Marathon initiated active condensate recovery at Well MW-98. Following these activities, weekly fluid level gauging was conducted from April 8, 1999 until December 10, 1999. In that time period, no condensate was detected. Subsequent collection and laboratory analysis of a groundwater sample from Well MW-98 did not identify any BTEX compounds at concentrations above their respective regulatory standards. In light of the above, delineation of the southern extent of groundwater impacts in the Lower Queen has been completed.

In order to determine and evaluate the groundwater flow conditions and separate-phase condensate occurrences, site-wide well gauging events were performed in January and April 1999, and January 2000. The liquid level measurements obtained from each well and the surveyed well elevations were used to calculate groundwater elevations, with density corrections where condensate was present. The resulting elevation data were used to generate groundwater flow contour maps. Review of these maps and the elevation data indicate Shallow Zone and Lower Queen groundwater flow were consistent with patterns observed in previous years. Flow in the Shallow Zone is to the southeast at an approximate gradient of 0.015 feet per foot and flow in the Lower

Queen is slightly radial and to the north at an approximate gradient of 0.002 feet per foot.

Groundwater samples were also collected from selected wells during each of the gauging events to evaluate groundwater quality at the site. Groundwater samples were primarily analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX). The analytical results indicate that total BTEX concentrations in both water-bearing units have remained consistent or declined slightly in most wells. Fluctuations in dissolved BTEX concentrations observed in some wells may be attributable to seasonal fluctuations in water levels.

Remediation efforts completed at the site in 1999 included pumping and treatment (including dual pump recovery) of groundwater in the Lower Queen and vapor extraction in both the Shallow Zone and the Lower Queen (primarily the Lower Queen). The pump and treat remedy was operated to both recover and control potential migration of condensate in both the liquid and dissolved phase. Recovered groundwater was treated and then infiltrated in upgradient wells. Vapor extraction was operated to enhance the recovery (in the vapor phase) and aerobic biodegradation of condensate.

During 1999, a total of approximately 1,828 barrels of condensate were recovered at the site, as follows:

- Approximately 618 barrels of condensate were removed in the liquid phase through pump and treat efforts in the Lower Queen;
- The equivalent of approximately 414 barrels of condensate were removed in the vapor phase by vapor extraction system (VES) wells in the Shallow Zone and Lower Queen; and,
- The equivalent of approximately 796 barrels of condensate were removed by aerobic biodegradation enhanced by the use of vapor extraction.

Cumulatively, from the initiation of remedial efforts in April 1991 through December 1999, a total of approximately 12,478 barrels of condensate have been recovered.

Through the operation of the VES and groundwater recovery systems, Marathon has maintained hydraulic control of the condensate and dissolved hydrocarbons in groundwater at the site. Ongoing remediation efforts in the year 2000 and beyond will include the following:

- Operation of the groundwater recovery system to contain the extent of the condensate plume;

- Compliance monitoring and reporting, regular groundwater monitoring; and,

- Expanded application of focused vapor extraction to provide aggressive mass removal. This will include vapor extraction from existing wells and the new Phase I and Phase II wells installed in 1999.

No changes to the current Groundwater Monitoring Plan are proposed at this time. However, during each gauging event, liquid level measurements (depth to water and condensate thickness) will be collected from each accessible monitoring well. This will include each of the 21 new infill wells installed in 1999.

1. Introduction

ARCADIS Geraghty & Miller, Inc. has prepared this Annual Groundwater Monitoring report on behalf of Marathon Oil Company (Marathon). This report presents the results of the cleanup activities conducted between January and December 1999 at the Indian Basin Gas Plant located in Eddy County, New Mexico. These activities are collectively known as the Indian Basin Remediation Project (IBRP). This report has been prepared in accordance with the groundwater monitoring work plan approved by the New Mexico Energy, Minerals, and Natural Resources Department, Oil Conservation Division (OCD) in correspondence to Marathon dated March 4, 1999.

The following section presents a brief summary of the project background. The remaining sections discuss activities conducted during 1999, including investigation activities, monitoring well gauging, groundwater sampling, and operation and maintenance of the remediation system.

2. Background

The Indian Basin Gas Plant (site) and IBRP are located approximately 20 miles northwest of Carlsbad, New Mexico, as shown on Figure 1. The site is situated in Township 21 South, in Eddy County, and occupies portions of Range 23 East (sections 13, 23, 24, 25, and 26) and Range 24 East (sections 19 and 30). Remediation efforts at the site have been ongoing since April 1991 and are designed to remove separate phase petroleum hydrocarbons present in the subsurface, primarily condensate, the liquid by-product of natural gas production.

The geology underlying the site is comprised of two distinct zones, both with saturated and unsaturated strata. The geologic units are known as the Shallow Zone and the Lower Queen. As of the end of 1998 there were a total of 75 monitoring wells and 1 infiltration well present in the Shallow Zone. Similarly, as of the end of 1998 there were a total of 38 monitoring wells, 2 infiltration wells, 10 vapor extraction wells, and 3 supply wells in the Lower Queen.

In an effort by Marathon to expand the ongoing remediation activities at site, 21 new wells were installed during 1999. This included two new Shallow Zone wells (MW-117 and MW-126) and 19 new Lower Queen wells (MW-112 through MW-116, MW-117A, MW-118 through MW-125, and MW-127 through MW-131). Section 3.4 provides details regarding installation of these wells. A summary of the completion details for all of the wells installed at the site is provided in Tables 1A and 1B. Figure 2 depicts the site layout, including the locations of each Shallow Zone and Lower

Queen well. Additional details regarding local and regional geology and hydrogeology are presented in the report titled *Comprehensive Site Characterization Report for the IBRP*, submitted to the OCD on behalf of Marathon by IT Corporation in December 1998.

3. Investigation Activities

As previously discussed, during 1999 Marathon initiated a plan to expand the ongoing groundwater and condensate recovery activities at the site. This plan included the installation of 21 additional monitoring/remediation wells collectively known as "infill" wells: 19 in the Lower Queen and two in the Shallow Zone. Installation of the infill wells was initiated by Marathon in accordance with the Remediation Workplan dated March 30, 1999 as approved by the OCD on May 26, 1999 (see Appendix A). The infill wells were installed in two Phases; Phase I in July of 1999, and Phase II in December of 1999. The new wells were positioned in areas of the site known or suspected to contain condensate accumulations in order to increase the number of wells from which condensate could be actively recovered in the Year 2000 and beyond.

In addition to the installation of the infill wells, Marathon also undertook a fairly extensive program of soil vapor extraction testing work in 1999. The goal of these testing efforts was to further evaluate the feasibility of using vapor extraction as an efficient and effective means to recover condensate either as a stand-alone technique or in concert with groundwater recovery. Vapor phase mass removal is normally an efficient and economical method of free product recovery, especially when the free product is very volatile in nature, as is the natural gas condensate at the site. In addition, there has been evidence in past vapor extraction work at the site that a significant amount of aerobic biodegradation of condensate has been ongoing in the subsurface. In fact, data suggests that the mass destruction due to degradation may be limited by a lack of sufficient oxygen in the subsurface to support the aerobic respiration. Therefore, use of vapor extraction at the site would be expected to be even more favorable due to it's ability to add oxygen to the subsurface and increase degradation as well as provide evaporative mass recovery (this is discussed further in Section 6.3.3).

The vapor extraction testing work completed included packer testing, i.e., isolation of specific bore-hole intervals to evaluate the discrete airflow and hydrocarbon mass removal characteristics from isolated portions of the bedrock at the site. Based on the favorable results of this packer testing (see Section 3.2) many wells at the site were re-completed with PVC casing and screen as to isolate the zones in which condensate was known to be present to allow for greatly enhanced rates of condensate removal. In

fact, the isolation of only a few wells and the subsequent focused vapor extraction (in addition to conventional recovery) allowed for a significant increase in the total amount of condensate removed in 1999 as compared to 1998.

Finally, during 1999 Marathon also undertook additional geophysical characterization of the Lower Queen. This work included the collection of both videotape logs and natural gamma ray logs of many of the Lower Queen wells at the site. The purpose of this data collection was two-fold; to help identify discrete zones in the bedrock which may contain condensate for the packer testing outlined above, and to collect more overall data regarding the geologic setting and how it may affect the fate and transport and remediation of condensate in the subsurface.

The results of these investigation activities are presented in the following sections.

3.1 Down-Well Video and Natural Gamma Logging

In March 1999, ARCADIS Geraghty & Miller contracted Southwest Geophysical Services of Farmington, New Mexico to conduct borehole video and natural gamma logging in many of the Lower Queen wells. This additional geophysical data was collected in an effort to determine if geophysical methods could help in correlating lithologic units between boreholes. This information would be useful in targeting certain lithologic sequences or depth horizons for condensate recovery. The natural gamma logs are presented in Appendix B. Copies of the borehole video tapes are being supplied under separate cover.

Natural gamma logging was completed in 20 Lower Queen wells, namely: VE-4, VE-5, VE-19, VE-20, MW-57, MW-71, MW-74, MW-76, MW-83, MW-84, MW-85, MW-86, MW-87, MW-88, MW-94, MW-95, MW-96, MW-97, MW-98, and MW-108. Natural gamma logs depict measurement of the natural gamma ray radiation being emitted by the rock layers. The logs are useful for distinguishing between fine-grained shale/mud-dominated layers and coarse grained sand-dominated layers, thereby identifying lithologic sequences. Coarse grained lithologic strata are typically characterized by low natural gamma activity, while finer grained strata are typically characterized by higher natural gamma activity due to the greater prevalence of radioactive mineral isotopes.

Review of the natural gamma logs shows that the rock sequences at the site are complex with inter-bedding and structural controls, making correlation difficult. Some gamma signatures were identified which aided in correlation between boreholes, but in general the gamma signatures were not evident across the entire site. The generally low gamma count for most boreholes confirms that the underlying geology is primarily

comprised of coarse-grained formations (such as sandstone), and rocks which contain little clay (such as limestone and dolomite).

Down-well video taping was completed in six Lower Queen wells, MW-83, MW-84, MW-85, MW-86, VE-19, and VE-20. The video taping was conducted primarily to evaluate if condensate was entering the open boreholes of the selected wells. To a lesser extent, the videotapes were intended to make correlations in lithology, fractures, and fracture orientation in the underlying geology.

In general, the videotapes confirmed that the presence of condensate is in the lower portion of the boreholes, corresponding with the Lower Queen geologic unit. Correlation of lithology and other features between the six wells utilizing the videotapes was difficult.

3.2 Packer Testing and SVE Studies

As part of the planned expansion of remediation activities at the site, a more critical evaluation of data from ongoing and past vapor extraction work was performed. Based on the results of this evaluation it was considered that the use of vapor extraction at the site for condensate recovery may be more successful if the vapor extraction was focused only in those zones containing condensate. Therefore, two phases of vapor extraction pilot studies using down-hole packers were undertaken to evaluate the performance of this focused extraction. The results of the SVE and packer testing were summarized in two separate letter reports: *Pre-Phase I SVE/Packer Testing Summary Report*, dated April 26, 1999 and *Additional Pre-Phase I SVE/Packer Testing Summary Report*, dated September 29, 1999. These summary reports are provided in Appendix C.

The first phase of packer testing was conducted from March 16 through 19, 1999 at Wells MW-83, MW-84, VE-19, and VE-20. As outlined, the goal of this packer testing was to evaluate the discrete airflow and hydrocarbon mass removal characteristics from isolated portions of the bedrock at the site. A two-part packer assembly, consisting of two inflatable well packers (each capable of sealing the existing 7-7/8-inch diameter well boreholes) and an adjustable length inner pipe, was used during the testing. The inner piping was perforated to allow vacuum application to the interval between the two packers via additional down-well piping. The existing 25 horsepower positive displacement SVE blower was utilized to perform the tests. The blower was manifolded to the four test wells via a network of 4-inch high density polyethylene (HDPE) piping. Additionally, control valves were present at each individual well.

Tests were conducted at each well by deploying the packer assembly at various 20-foot intervals, starting at the base of the upper well casing (i.e., at the top of the open-hole). Each interval was tested for a minimum of 1 hour, during which time operation data was monitored and recorded every 15 minutes. Additionally, vapor samples were collected and submitted to Microseeps Laboratories, located in Pittsburgh, Pennsylvania. Vapor samples were analyzed for Total $C_4 - C_{12}$ hydrocarbons.

Based on the testing results, it was determined that isolated extraction zones can yield significant air flows, equivalent to approximately 400 cubic feet per minute (cfm) in each testing interval. Extraction flow rates varied slightly with varying depths, however, flow variations were typically on the order of ±15% between intervals. Additionally, increased mass removal was observed in distinct fracture zones, particularly identified zones containing condensate, or in locations with condensate present on the water table.

In summary, it was established that although the isolation of discrete intervals did not significantly increase the overall air flow rates, it did significantly affect the hydrocarbon mass removal (see Appendix C).

3.3 Well Completion Modifications

Based on the results of the SVE/packer testing (see Section 3.2), seven existing site wells (VE-19, MW-75, MW-84, MW-85, MW-104, MW-110, and MW-112) were modified. The modifications generally consisted of the installation of a polyvinyl chloride (PVC) well casing and screen within the existing open-hole well. The objective of these modifications was to target the discrete intervals of the open boreholes of the wells containing free product and enhance the ability to achieve hydrocarbon mass removal via vapor extraction. Revised well completion details are provided in Appendix D. The well modifications are summarized as follows:

- **MW-110:** On May 24, 1999, West Texas Water Well Service (WTWWS) installed 60 feet of 6"diameter, 0.04-inch slot size, PVC screen and 170 feet of 6"diameter casing in the open borehole of well MW-110. The total depth of the well is 235 feet below the top of the steel casing. The top of the 6" PVC casing extends to 5 feet below the top of the steel casing. Gravel pack (size 6/9) was placed in the annulus of the well, to a depth of 172 feet from the top of the steel casing. The remainder of the annulus was filled with bentonite pellets to a depth of 7 feet below the top of the surface casing.

- **MW-85:** On August 16, 1999, WTWWS installed 80 feet of 6" diameter, 0.04-inch slot size, PVC screen and 155 feet of 6" diameter PVC casing in the open

borehole of well MW-85. The top of the 6" PVC casing extends to 7' below the top of the steel casing. The total depth of the well is 242 feet below the top of the 8" diameter steel surface casing. Gravel pack (size 6/9) was placed in the annulus of the well to a depth of 158 feet from the top of the surface casing (10 feet above the top of the screen). The remainder of the annulus was filled with bentonite pellets to a depth of 7 feet below the top of the surface casing.

- **MW-104:** On December 20, 1999, WTWWS installed 70 feet of 6" diameter, 0.04-inch slot size, PVC screen and 145 feet of 6" diameter PVC casing in the open borehole of well MW-104. The total depth of the well is 222 feet below the top of the 8" diameter steel surface casing. Gravel pack was placed in the annulus of the well to a depth of 148 feet from the top of the surface casing (10 feet above the top of the screen). The remainder of the annulus was filled with bentonite pellets to the top of the PVC casing.

- **MW-75:** On December 22, 1999, WTWWS installed 45 feet of 6" diameter, 0.04-inch slot size, PVC screen and 170 feet of 6" diameter PVC casing in the open borehole of well MW-75. The total depth of the well is 222 feet below the top of the 8" diameter steel surface casing. Gravel pack was placed in the annulus of the well to a depth of 167 feet from the top of the surface casing (10 feet above the top of the screen). The remainder of the annulus was filled with bentonite pellets to the top of the PVC casing.

- **VE-19:** On December 27, 1999, WTWWS installed 30 feet of 6" diameter, 0.04-inch slot size, PVC screen and 115 feet of 6" diameter PVC casing in the open borehole of well VE-19. The total depth of the well is 151 feet below the top of the 8" diameter steel surface casing. Gravel pack was placed in the annulus of the well to a depth of 111 feet from the top of the surface casing (10 feet above the top of the screen). The remainder of the annulus was filled with bentonite pellets to the top of the PVC casing.

- **MW-112:** On December 28, 1999, WTWWS installed 70 feet of 6" diameter, 0.04-inch slot size, PVC screen and 140 feet of 6" diameter PVC casing in the open borehole of well MW-112. Gravel pack was placed in the annulus of the well from the bottom of the well to 10 feet above the top of the PVC screen. The remainder of the annulus was filled with bentonite pellets to the top of the PVC casing.

3.4 Phase I and II Well Installations

As previously discussed, Marathon performed an extensive "infill" drilling program in 1999. As part of this program, twenty-one additional wells were installed at the site. The specific well locations are depicted on Figure 2. The well drilling logs and completion details for the Phase I and Phase II wells are presented in Appendix E. The infill wells were installed in two separate phases, as follows:

- **Phase I:** Installation of five wells (MW-112 through MW-116) in July 1999.
- **Phase II:** Installation of sixteen wells (MW-117, MW-117A and MW-118 through MW-131) in December 1999.

All of the infill wells were installed within the Lower Queen, with the exception of Wells MW-117 and MW-126, which were installed in the Shallow Zone. Similar to the modifications to the existing wells, the installation of the Phase I and Phase II wells was conducted in order to enhance mass removal at the site by targeting discrete zones impacted with condensate.

3.5 Well MW-98 Investigation Activities

Upon review of the site characterization report submitted in December 1998, the OCD submitted a response letter dated March 4, 1999 to Marathon. In their response, the OCD requested that Marathon submit a work plan by May 4, 1999 to complete the delineation of groundwater impacts south of Lower Queen Well MW-98. This well is located near the southern edge of the Rocky Arroyo and in the vicinity of Well MW-84 (Figure 2). During a subsequent meeting at the OCD offices in Santa Fe, New Mexico on April 27, 1999, the OCD granted Marathon an extension of the work plan deadline to allow Marathon to conduct remediation and monitoring activities at Well MW-98.

A summary of depth to water and condensate thicknesses associated with Well MW-98 is presented in Table 2. As the data in Table 2 show, condensate was first detected in Well MW-98 on October 14, 1997. In March of 1999, Marathon deployed a total liquids recovery pump in Well MW-98. The pump removed approximately 10 gallons of separate phase condensate during the first week of operation. When the condensate had been recovered to a point where no measurable thicknesses were present, the pump was shut down. Weekly fluid level gauging was conducted at Well MW-98 by Marathon personnel from April 8, 1999 until December 10, 1999. In that time period, no condensate was detected.

Groundwater samples were then collected from Well MW-98 on December 15, 1999, and submitted to a laboratory to be analyzed for BTEX compounds (benzene, toluene, ethylbenzene, and total xylenes) using United States Environmental Protection Agency Method 8021. The results of the analysis did not identify any BTEX compounds at concentrations above their respective regulatory standards.

In light of the above data, delineation of the southern extent of groundwater impacts in the Lower Queen has been completed.

4. Groundwater and Condensate Gauging

In order to determine and evaluate the groundwater flow conditions and separate-phase condensate occurrences at the site, as well as changes in these conditions, site-wide well gauging events were performed in January and April 1999, and January 2000. The gauging events consisted of collecting liquid level measurements from both the Shallow Zone and Lower Queen. The results of the 1999 gauging events as well as precipitation recharge (rainfall) are discussed in the following sections. A summary of historical liquid level data for the site is presented in Appendix F.

4.1 Shallow Zone

A total of 59 wells completed in the Shallow Zone were gauged during one or more gauging events in 1999. The liquid level measurements from each gauging event and the top of casing elevations for the wells were then used to calculate groundwater elevation at each well (density corrections were made as required where condensate was present).

As data in Table 2 indicate, 12 of the wells completed in the Shallow Zone did not contain groundwater for one or more of the 1999 gauging events. Total fluctuations in groundwater elevation throughout the Shallow Zone in 1999 ranged from 0.01 feet in Well MW-39, to 21.70 feet in Well MW-65, as indicated by the data presented in Appendix F.

Based on the groundwater elevation measurements from each gauging event, groundwater flow contour maps were generated for each event. These maps are included as Figures 3, 4, and 5. As shown on the figures, the observed groundwater flow direction tends to be to the southeast at an approximate gradient of 0.015 feet per foot. This flow direction and gradient is consistent with patterns observed in previous years.

During 1999, a measurable thickness of condensate was detected in Shallow Zone Wells MW-13, MW-14, MW-69, MW-78, and MW-90. The condensate levels ranged from 0.01 feet in Wells MW-78 and MW-90 in January 1999 to 0.27 feet in MW-13 in April 1999. Figures 6, 7, and 8 reflect the observed condensate distribution for the Shallow Zone during each monitoring event.

4.2 Lower Queen

A total of 68 wells completed in the Lower Queen were gauged during one or more gauging events in 1999. The liquid level measurements from each gauging event and the top of casing elevations for the wells were then used to calculate groundwater elevation at each well (density corrections were made as required where condensate was present).

As data in Table 2 indicate, total fluctuations in groundwater elevation throughout the Lower Queen aquifer in 1999 ranged from 0.05 feet in Well MW-111, to 66.99 feet in Well MW-83, as indicated by the data presented in Appendix F.

Based on the groundwater elevation measurements from each gauging event, groundwater flow contour maps were generated for each event. These maps are included as Figures 9, 10, and 11. As shown on the figures, the observed groundwater flow direction in the Lower Queen tends to be slightly radial and to the north at an approximate gradient of 0.002 feet per foot. This flow direction and gradient is consistent with patterns observed in previous years.

During one or more of the gauging events in 1999, condensate was observed in Lower Queen Wells MW-59, MW-65A, MW-67, MW-72, MW-75, MW-76, MW-84, MW-85, MW-104, MW-110, MW-120, MW-123, MW-125, MW-129, MW-130, and VE-19. Observed condensate thicknesses in these wells ranged from a low of 0.01 feet in Well MW-72 in January 1999, to a high of 4.47 feet in well MW-75 in January 2000. Figures 12, 13, and 14 depict the observed condensate distribution for the Lower Queen during each monitoring event.

4.3 Precipitation Recharge

The site has historically received the highest amounts of precipitation between June and October. The average annual rainfall measured at the site over the past five years is approximately 10 inches. During 1999, the rain gauge maintained at the site indicated that the highest amount of precipitation was received in May (1.8 inches), with a total of 4.7 inches for the year. This level of rainfall is significantly lower than

that observed in 1994 through 1997, but slightly more than was observed at the site in 1998. Table 3 summarizes monthly rainfall received at the site during 1999.

5. Groundwater Sampling and Analysis

Three groundwater sampling events were completed at the site in 1999 by personnel from ARCADIS Geraghty & Miller. The sampling events were performed according to the modified Groundwater Monitoring Plan, as approved by the OCD in March 1999. In addition, samples were also collected from the Phase I and Phase II "infill" wells upon installation. The sampling involved the following:

- In January 1999, groundwater samples were collected from 11 Lower Queen wells. These samples were submitted for BTEX analysis using United States Environmental Protection Agency (USEPA) Method 8021.
- In April 1999, groundwater samples were collected from 14 Shallow Zone and 23 Lower Queen wells. These samples were submitted to be analyzed for BTEX, total dissolved solids (TDS), and chloride using USEPA Methods 8021, 160.1, and 325.2, respectively.
- In December 1999, groundwater samples were collected from 15 Shallow Zone wells and 17 Lower Queen wells. These samples were submitted for BTEX analysis using USEPA Method 8021.
- In July and August 1999, groundwater samples were collected from four of the five Phase I infill wells. These samples were submitted for BTEX analysis using USEPA Method 8021.
- In December 1999, groundwater samples were collected from eight of the 16 Phase II infill wells. These samples were submitted for BTEX analysis using USEPA Method 8021.

In order to ensure the quality of the analytical data, trip and field blanks were collected for each event and submitted for analysis. Tables 4, 5, and 6 summarize the BTEX analytical results for each of the sampling events described above. Table 7 summarizes the analytical results for the initial sampling of the Phase I and II wells. Summaries of historical BTEX and general chemistry analytical data are presented in Appendix G. The complete laboratory analytical reports for each groundwater sampling event are presented in Appendix H, which can be found in Volume II of this report.

The groundwater monitoring analytical results (BTEX) for both the Shallow Zone and Lower Queen are discussed in the following sections.

5.1 Shallow Zone

During 1999, groundwater samples were collected from a total of 17 different wells completed in the Shallow Zone. These samples were collected in April and December 1999, no Shallow Zone wells were sampled in January 1999. The results of the laboratory analysis of these groundwater samples is summarized as follows:

- Of the 17 wells sampled, 10 did not contain any BTEX compounds at concentrations above the laboratory limits of detection for at least one of the two sampling events (April and December);
- Where detected, benzene concentrations ranged from a low of 12 micrograms per liter (ug/L) in MW-43 (April 1999) to 210 ug/L in MW-46 (April 1999);
- Toluene concentrations ranged from a low of 11 ug/L in MW-43 (December 1999) to 68 ug/L in MW-49 (December 1999);
- Ethylbenzene concentrations ranged from a low of 5.2 ug/L in MW-91 (December 1999) to 58 ug/L in MW-49 (December 1999); and,
- Total xylene concentrations ranged from a low of 20 ug/L in MW-46 (April 1999) to 420 ug/L in MW-78 (December 1999).

Figures 9, 10, and 11 illustrate the distribution of dissolved BTEX compounds in the Shallow Zone aquifer during 1999. As indicated by the data in Appendix H, BTEX concentrations in this water-bearing zone have generally remained stable or declined slightly over time.

5.2 Lower Queen

During 1999, groundwater samples were collected from a total of 26 different Lower Queen wells. The laboratory analysis of these samples is summarized as follows:

- Of the 26 wells sampled, 21 did not contain any BTEX compounds at concentrations above the laboratory limits of detection for at least one of the three sampling events (January, April, and December);
- Where detected, benzene concentrations ranged from a low of 1.6 ug/L in Well MW-88 (January 1999) to 100 ug/L in Well MW-74 (December 1999);
- Toluene concentrations ranged from a low of 0.8 ug/L in Well MW-111 (January 1999) to 3900 ug/L in Well MW-74 (December 1999);
- Ethylbenzene concentrations ranged from a low of 1.6 ug/L in Well MW-88 (January 1999) to 990 ug/L in Well MW-74 (December 1999); and,

- Total xylene concentrations ranged from a low of 4.8 ug/L in Well MW-88 (January 1999) to 6700 ug/L in Well MW-74 (December 1999).

Figures 12, 13, and 14 illustrate the distribution of dissolved BTEX compounds in the Lower Queen during 1999. Similar to that observed in the Shallow Zone, BTEX concentrations in this water-bearing zone have generally remained stable or declined slightly over time as indicated by the data in Appendix H.

5.3 Initial Sampling of Phase I and II Wells

Within 24 hours after the Phase I and II Wells were developed, groundwater samples were collected from 12 of the 21 wells. No condensate was present in the wells sampled. As indicated by the data in Table 7, each of the Phase I and II wells sampled were completed in the Lower Queen. The laboratory analysis of these samples is summarized as follows:

- Of the 12 wells sampled, 5 did not contain any BTEX compounds at concentrations above the laboratory limits of detection;
- Where detected, benzene concentrations ranged from a low of 11 ug/L in Wells MW-122 and MW-128 to 500 ug/L in Well MW-121;
- Toluene concentrations ranged from a low of 7.1 ug/L in Well MW-127 to 29 ug/L in Well MW-122;
- Ethylbenzene concentrations ranged from a low of 38 ug/L in Well MW-127 to 370 ug/L in Well MW-121; and,
- Total xylene concentrations ranged from a low of 16 ug/L in Well MW-127 to 1500 ug/L in Well MW-124.

6. Remediation System Operation and Maintenance

Remediation efforts completed at the site as part of the IBRP from April 1991 through December 1999 have included emergency excavation work; pumping in Rocky Arroyo sumps, open excavations, and Shallow Zone wells; condensate recovery from Shallow Zone Well MW-069; groundwater and condensate recovery (and treatment) including dual pump recovery from the Lower Queen; and vapor extraction in both the Shallow Zone and Lower Queen. The following sections discuss remedial activities conducted at the site during 1999.

6.1 Groundwater Recovery and Infiltration

Groundwater and total fluids (condensate and groundwater) recovery wells operating at the site currently include MW-58, MW-65A, MW-68, MW-72, MW-75, MW-76, MW-81, MW-82, MW-83, MW-84, MW-85, MW-86, MW-94, MW-104, and MW-110. Recovered groundwater is treated and then infiltrated in upgradient wells IW-01 and IW-02 in the Lower Queen .

During 1999, there was no active groundwater recovery from the Shallow Zone. Free product skimming was performed in wells MW-98 and MW-104 during 1999 (see Section 3.5). The total fluids recovery rate from the Lower Queen ranged from approximately 90.70 to 227.30 gallons per minute (gpm). Approximately 1,984,798 barrels of total fluids were recovered and treated, removing approximately 618 barrels of condensate. Subsequently, approximately 1,731,585 barrels of treated water were infiltrated in Lower Queen infiltration wells IW-01 and IW-02, and 44,919 barrels of untreated water and condensate were sent to the gas plant for disposal in the Class II injection wells. Typically, the amount infiltrated is less than the amount recovered due to the removal of condensate, evaporation, and meter error. The discrepancy in the 1999 data appears to be the result of meter error.

Operation of the recovery and infiltration wells is permitted by the New Mexico State Engineer's Office (NMSEO), which requires monthly reports of groundwater withdrawal and infiltration volumes. A summary of quarterly and cumulative recovery and infiltration data for 1999 is presented in Table 8.

6.2 Groundwater Treatment

Recovered groundwater at the site is treated by two air-strippers, designated "east" and "west". During 1999, monthly water samples were collected from the influent and effluent of the air strippers by Marathon personnel. The monthly sampling events were performed according to the Groundwater Discharge Plan GW-21. The monthly samples were submitted for BTEX analysis using USEPA Method 8021, and the quarterly samples were submitted for Polynuclear Aromatic Hydrocarbons analysis using USEPA 8270 and major cations and anions using USEPA approved methods. The complete laboratory analytical reports for each sampling event can be found in Appendix H (Volume II). Tables 9 and 10 summarize the air stripper influent and effluent analytical data during each sampling event for the east and west air strippers, respectively. As the tables show, the constituent concentrations in the effluent groundwater were consistently below the New Mexico Water Quality Control Commission groundwater quality standards.

6.3 Vapor Extraction

A vapor extraction system (VES) was first started at the site in March 1992, using Shallow Zone Wells MW-19, MW-20, MW-21, MW-35, and MW-56. The Shallow Zone VES operated from 1992 through 1994, removing the equivalent of 135 barrels of condensate in the vapor phase, as calculated from effluent vapor concentrations and vapor extraction flow rates. Vapor extraction in the Shallow Zone recommenced in August 1997, using Wells MW-11, MW-19, MW-26, and MW-41.

VES was initiated in the Lower Queen in January 1997, using Wells VE-1 through VE-5 and MW-61A. The system operated through June 1997, removing the equivalent of approximately 13 barrels of condensate in the vapor phase. Based on the low mass removal rates generated by this system it was decided to discontinue VES operation in this location. Five new vapor extraction wells (VE-16 through VE-20) were installed in 1997, and the system was then switched over to these new wells in June 1997 and operated through the end of 1998.

During 1999, three VES blowers were employed at the site (VES-100, VES-200, and VES-300). As previously discussed in Section 3, Marathon undertook a fairly involved program of soil vapor extraction testing in 1999. The goal of this testing was to maximize recovery of condensate in the vapor phase. A summary of VES operation at the site during 1999 is presented in Table 11.

VES emissions are regulated by the New Mexico Environment Department Bureau of Air Quality under Permit No. 1859-M-1. The permit requires monthly sampling and quarterly reporting to track mass removal and emissions concentrations. The following sections discuss VES performance in both hydrogeologic zones at the site during 1999.

6.3.1 Shallow Zone Vapor Extraction

During 1999, vapor extraction efforts were focused on the Lower Queen, where the greatest extent of condensate is known to be present. The only Shallow Zone wells included in vapor extraction efforts at the site during 1999 were MW-11, and MW-13. These wells were vented in concert with several Lower Queen wells, as reported below.

6.3.2 Lower Queen Vapor Extraction

During 1999, vapor extraction in the Lower Queen included Wells MW-65A, MW-68, MW-83, MW-84, MW-85, MW-110 and VE-19. The combined vapor extraction in

1999 ranged from the equivalent of 13.5 barrels of condensate in August, to the equivalent of 93.5 barrels of condensate in June. For the year, a total equivalent of approximately 414 barrels of condensate were removed from the Lower Queen in the vapor phase.

6.3.3 Aerobic Biodegradation

As previously mentioned, there has been evidence that a significant amount of aerobic biodegradation of condensate is occurring in the site subsurface. In fact, data suggests that the mass destruction due to aerobic biodegradation may be *limited* by a lack of sufficient oxygen in the subsurface to support the aerobic respiration. This indicates that more extensive use of vapor extraction at the site would not only significantly increase vapor-phase mass recovery, but would also increase aerobic biodegradation by adding oxygen to the subsurface.

When oxygen levels measured in soil gas are less than normal atmospheric oxygen levels, the observed reduction can be attributed to microbial aerobic respiration. Thus, aerobic biodegradation of hydrocarbons can be estimated by using the stoichiometry of hydrocarbon oxidation (*Test Plan and Technical Protocol for a Field Treatability Test for Bioventing*, Air Force Center for Environmental Excellence, May 1992) as follows:

$$C_6H_{14} + 9.5O_2 \rightarrow 6CO_2 + 7H_2O$$

This equation uses hexane as a representative hydrocarbon. Using the above equation, it takes approximately three and a half pounds of oxygen to degrade one pound of hydrocarbons. Assuming that some oxygen is utilized in reactions not associated with the degradation of hydrocarbons, it was assumed that five pounds of oxygen would be required to degrade one pound of hydrocarbons.

Table 12 presents a summary of estimated aerobic biodegradation of condensate at the site in 1999. As the data in Table 12 show, it can be estimated that approximately 796 barrels of condensate were degraded in 1999.

7. Summary and Conclusions

7.1 Condensate Mass Removal

During 1999, a total of approximately 1,032 barrels of condensate were removed at the site. Of the total recovery, approximately 618 barrels of condensate were removed in the liquid phase through pump and treat efforts in the Lower Queen, and

approximately 414 barrels of condensate were removed in the vapor phase by VES efforts.

Overall, the total condensate removed at the site in 1999 represents an increase of 362 barrels, or more than 50% as compared to that achieved in 1998. The majority of this increase, over 70%, is related to more effective use of vapor extraction at the site, specifically via focused vapor extraction efforts in discrete zones known to contain condensate.

In addition to the liquid phase and vapor phase recovery, it is estimated that an additional 796 barrels of condensate were removed via enhanced aerobic degradation in the subsurface. This estimate is based on the observed changes in the oxygen and carbon dioxide levels in the extracted off-gas from the various vapor extraction systems, as compared to normal atmospheric levels.

Therefore, the total amount of condensate removed and/or degraded by the active remediation efforts at the site in 1999 is estimated to be approximately 1,828 barrels. Cumulatively, from the initiation of remedial efforts in April 1991 through December 1999, a total of approximately 12,478 barrels of condensate have been recovered. Of the 12,478 barrels of condensate recovered to date, approximately 2,320 barrels have been removed in the liquid phase from recovery wells and sumps, and the equivalent of approximately 1,521 barrels have been removed or degraded in the vapor phase by VES operation. A summary of monthly and cumulative condensate removed from May 1991 through December 1999 is presented in Table 13.

7.2 Delineation

Following active condensate recovery at Well MW-98, weekly fluid level gauging was conducted from April 8, 1999 until December 10, 1999. In that time period, no condensate was detected. Subsequent collection and laboratory analysis of a groundwater sample from Well MW-98 did not identify any BTEX compounds at concentrations above their respective regulatory standards.

In light of the above data, delineation of the southern extent of groundwater impacts in the Lower Queen has been completed.

7.3 Planned Activities

Through the operation of VES and groundwater recovery systems, Marathon has provided hydraulic control of the condensate and dissolved hydrocarbons in groundwater at the site (as demonstrated by routine gauging and sampling data).

Routine operation and maintenance of the remediation systems, compliance monitoring and reporting, and semi-annual groundwater monitoring will continue at the site in 2000.

As indicated by the recovery data from 1999, the renewed focus on condensate recovery via vapor extraction through the use of focused extraction in discrete zones known to contain condensate allowed for a significant increase in overall recovery in 1999. Therefore, ongoing remediation efforts in the year 2000 and beyond will include the following;

- Operation of the groundwater recovery system to contain the extent of the condensate plume;
- Compliance monitoring and reporting, semi-annual groundwater monitoring; and,
- Expanded application of focused vapor extraction to provide aggressive mass removal. This will include vapor extraction from existing wells and the new Phase I and Phase II wells installed in 1999.

No changes to the current Groundwater Monitoring Plan are proposed at this time. However, during each gauging event, liquid level measurements (depth to water and condensate thickness) will be collected from each accessible monitoring well. This will include each of the 21 new infill wells installed in 1999.

7.4 Groundwater Monitoring Plan

The current groundwater monitoring plan was approved by the OCD (with conditions) in correspondence with Marathon dated March 4, 1999. No changes to the current Groundwater Monitoring Plan are proposed at this time. However, during each gauging event, liquid level measurements (depth to water and condensate thickness) will be collected from each accessible monitoring well. This will include each of the 21 new infill wells installed in 1999. A summary of the approved Groundwater Monitoring Plan is presented in Table 14.

Table 1A. Shallow Zone Monitoring Well Construction Details,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Well ID	Well Type	Measuring Point Elevation (feet amsl)	Total Depth (feet btoc)	Top of Screen/ OpenHole Interval (feet btoc)	Screen/Open Hole Depth (feet)	Casing Diameter (inches)
MW-1	monitoring	3792.50	15.00	9.00	6.00	2
MW-2	monitoring	3788.72	14.00	4.00	10.00	2
MW-3	monitoring	3787.50	15.00	5.00	10.00	2
MW-4	monitoring	3785.88	17.00	8.00	9.00	2
MW-5	monitoring	3801.69	11.00	6.00	5.00	2
MW-6	monitoring	3785.17	12.00	7.00	5.00	2
MW-7	monitoring	3784.46	16.00	6.00	10.00	2
MW-8	monitoring	3795.04	15.50	5.00	10.50	2
MW-9	monitoring	3807.85	11.00	6.00	5.00	2
MW-10	monitoring	3790.78	17.00	7.00	10.00	4
MW-11	monitoring	3806.96	22.00	12.00	10.00	4
MW-12	monitoring	3809.86	23.00	13.00	10.00	2
MW-13	monitoring	3801.58	20.00	10.00	10.00	2
MW-14	monitoring	3803.61	22.00	12.00	10.00	4
MW-15	monitoring	3803.59	17.00	7.00	10.00	2
MW-16	monitoring	3801.04	20.00	10.00	10.00	4
MW-17	monitoring	3799.55	18.00	8.00	10.00	2
MW-18	monitoring	3795.82	15.00	5.00	10.00	4
MW-19	monitoring	3797.21	17.00	7.00	10.00	4
MW-20	monitoring	3797.59	14.00	4.00	10.00	2
MW-21	monitoring	3798.21	21.00	11.00	10.00	2
MW-22	monitoring	3799.20	16.00	6.00	10.00	2
MW-23	monitoring	3794.48	10.00	5.00	5.00	2
MW-24	monitoring	3794.09	11.00	6.00	5.00	2
MW-25	monitoring	3786.97	8.00	3.00	5.00	2
MW-26	monitoring	3793.01	19.00	9.00	10.00	2
MW-27	monitoring	3790.93	15.00	10.00	5.00	2
MW-28	monitoring	3797.03	16.00	6.00	10.00	2
MW-29	monitoring	3794.06	12.00	7.00	5.00	2
MW-30	monitoring	3788.30	12.00	7.00	5.00	2
MW-31	monitoring	3791.15	16.50	7.00	9.50	4
MW-32	monitoring	3797.47	14.00	9.00	5.00	2
MW-33	monitoring	3802.48	18.00	9.00	9.00	4
MW-34	monitoring	3806.00	17.00	8.00	9.00	2
MW-35	monitoring	3800.81	19.00	14.00	5.00	4
MW-36	monitoring	3792.94	7.00	5.00	2.00	2
MW-37	monitoring	3795.03	19.00	9.00	10.00	4
MW-38	monitoring	3797.32	19.00	9.00	10.00	4
MW-39	monitoring	3796.20	19.00	9.00	10.00	4
MW-40	monitoring	3803.12	12.00	7.00	5.00	2
MW-41	monitoring	3799.04	22.00	12.00	10.00	4
MW-42	monitoring	3804.73	22.00	12.00	10.00	2
MW-43	monitoring	3802.05	22.00	12.00	10.00	4
MW-44	monitoring	3804.14	22.00	12.00	10.00	4

Notes:
feet amsl Feet above mean sea level
feet btoc Feet below top of casing
-- Data not available

Table 1A. Shallow Zone Monitoring Well Construction Details,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Well ID	Well Type	Measuring Point Elevation (feet amsl)	Total Depth (feet btoc)	Top of Screen/ OpenHole Interval (feet btoc)	Screen/Open Hole Depth (feet)	Casing Diameter (inches)
MW-45	monitoring	3808.68	24.00	9.50	14.50	2
MW-46	monitoring	3805.54	18.00	8.00	10.00	4
MW-47	monitoring	3805.09	19.00	9.00	10.00	2
MW-48	monitoring	3806.18	18.00	8.00	10.00	2
MW-49	monitoring	3805.61	24.00	14.00	10.00	2
MW-50	monitoring	3813.35	35.00	20.00	15.00	2
MW-51	infiltration	3810.86	18.00	8.00	10.00	2
MW-52	monitoring	3817.49	19.00	9.00	10.00	2
MW-53	monitoring	3809.92	13.00	6.00	7.00	2
MW-54	monitoring	3823.86	76.00	41.00	35.00	4
MW-55	monitoring	3794.40	65.00	20.00	45.00	4
MW-56	monitoring	3782.45	42.00	27.00	15.00	4
MW-61	monitoring	3816.20	55.00	45.00	10.00	4
MW-65	monitoring	3763.31	55.00	35.00	20.00	4
MW-69	recovery	3805.11	48.00	13.00	35.00	4
MW-77	monitoring	3775.48	80.00	17.50	62.50	8
MW-78	monitoring	3785.82	85.00	13.00	72.00	8
MW-79	monitoring	3788.39	80.00	8.00	72.00	8
MW-80	monitoring	3821.64	90.00	19.00	71.00	8
MW-90	monitoring	3781.73	60.00	12.50	47.50	4
MW-91	monitoring	3783.07	70.00	12.50	57.50	4
MW-92	monitoring	3785.29	70.00	12.50	57.50	4
MW-93	monitoring	3817.50	70.00	12.50	57.50	4
MW-99	monitoring	3770.05	70.00	12.50	57.50	4
MW-100	monitoring	3773.31	70.00	12.50	57.50	4
MW-101	monitoring	3762.71	70.00	12.50	57.50	4
MW-102	monitoring	3753.69	80.00	12.50	67.50	4
MW-103	monitoring	3743.14	70.00	12.50	57.50	4
MW-105	monitoring	3736.93	80.00	12.50	67.5	4
MW-106	monitoring	3721.97	92.00	12.50	79.5	4
MW-107	monitoring	3726.27	70.00	12.50	57.5	4
MW-109	monitoring	3809.53	--	--	--	--
MW-117*	phase II infill	3807.86	240.00	20.00	220.00	6
MW-126	phase II infill	3795.58	70.00	30.00	40.00	7
Sump A10	monitoring	3800.99	--	--	--	--
Sump 16A	monitoring	3785.14	--	--	--	--

Notes:
feet amsl Feet above mean sea level
feet btoc Feet below top of casing
-- Data not available

Table 1B. Lower Queen Monitoring Well Construction Details,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Well ID	Well Type	Measuring Point Elevation (feet amsl)	Total Depth (feet btoc)	Top of Screen/ OpenHole Interval (feet btoc)	Screen/Open Hole Depth (feet)	Casing Diameter (inches)
MW-57	monitoring	3787.70	175.00	155.00	20.00	4
MW-58	recovery	3824.07	216.00	191.00	25.00	4
MW-59	monitoring	3819.59	--	--	--	--
MW-60	monitoring	3815.28	220.00	170.00	50.00	4
MW-61A	monitoring	3819.97	214.00	173.50	40.50	4
MW-62	monitoring	3819.90	223.00	177.00	46.00	4
MW-63	monitoring	3826.16	220.00	174.00	46.00	4
MW-64	monitoring	3798.57	200.00	154.00	46.00	4
MW-65A	recovery	3763.26	166.00	115.00	51.00	4
MW-66	monitoring	3828.98	232.50	182.00	50.50	4
MW-67	monitoring	3765.87	163.00	112.00	51.00	4
MW-68	recovery	3797.83	200.00	149.00	51.00	4
MW-70	monitoring	3822.57	222.00	172.00	50.00	4
MW-71	monitoring	3778.05	233.00	165.00	68.00	4
MW-72	dual recovery	3819.32	241.50	177.00	64.50	8
MW-73	monitoring	3820.09	220.00	10.00	210.00	8
MW-74	monitoring	3820.82	220.00	9.50	210.50	8
MW-75	dual recovery	3816.12	220.00	170.00	50.00	6
MW-76	recovery	3796.01	220.00	9.00	211.00	8
MW-81	dual recovery	3817.03	225.00	71.00	154.00	8
MW-82	recovery	3825.07	250.00	67.50	182.50	8
MW-83	recovery	3794.12	202.00	39.00	163.00	8
MW-84	recovery	3759.60	170.00	120.00	50.00	6
MW-85	dual recovery	3824.93	235.00	162.00	73.00	6
MW-86	recovery	3823.99	225.00	75.00	150.00	8
MW-87	monitoring	3740.50	170.00	145.00	25.00	4
MW-87A	monitoring	3739.53	130.00	10.00	120.00	8
MW-88	monitoring	3789.7	175.00	142.50	32.50	8
MW-89	monitoring	3827.68	232.00	188.50	43.50	4
MW-94	recovery	3821.48	230.00	65.00	165.00	8
MW-95	monitoring	3746.26	145.00	111.00	34.00	4
MW-96	monitoring	3739.80	135.00	97.50	37.50	4
MW-97	monitoring	3750.16	148.00	107.50	40.50	4
MW-98	monitoring	3770.15	165.00	127.50	37.50	4
MW-104	monitoring	3793.64	220.00	145.00	75.00	6
MW-108	monitoring	3747.13	--	--	--	--
MW-110	recovery	3812.61	235.00	175.00	60.00	6
MW-111	monitoring	3824.44	230.00	190.00	40.00	4
MW-112	phase I infill	3780.11	211.00	140.00	71.00	6
MW-113	phase I infill	3772.67	200.00	26.00	174.00	8
MW-114	phase I infill	3805.32	220.00	111.00	109.00	8
MW-115	phase I infill	3804.69	224.00	35.00	189.00	8
MW-116	phase I infill	3792.11	220.00	34.60	185.40	8
MW-117A	phase II infill	3808.24	225.00	46.00	179.00	8
MW-118	phase II infill	3762.88	202.00	36.50	165.50	6
MW-119	phase II infill	3824.74	245.00	78.00	167.00	8
MW-120	phase II infill	3820.65	240.00	75.00	165.00	8

Notes:
feet amsl Feet above mean sea level
feet btoc Feet below top of casing
-- Data not available

Table 1B. Lower Queen Monitoring Well Construction Details,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Well ID	Well Type	Measuring Point Elevation (feet amsl)	Total Depth (feet btoc)	Top of Screen/ OpenHole Interval (feet btoc)	Screen/Open Hole Depth (feet)	Casing Diameter (inches)
MW-121	phase II infill	3820.88	225.00	36.00	189.00	7
MW-122	phase II infill	3822.79	225.00	36.00	189.00	7
MW-123	phase II infill	3768.77	225.00	35.00	190.00	7
MW-124	phase II infill	3777.83	225.00	17.00	208.00	7
MW-125	phase II infill	3790.61	225.00	30.00	195.00	7
MW-127	phase II infill	3825.17	245.00	70.00	175.00	7
MW-128	phase II infill	3786.08	225.00	37.50	187.50	7
MW-129	phase II infill	3800.82	245.00	37.50	207.50	8
MW-130	phase II infill	3775.54	225.00	40.00	185.00	8
MW-131	phase II infill	3784.23	245.00	27.00	218.00	8
IW-1	infiltration	3808.55	230.00	73.00	157.00	12
IW-2	infiltration	3835.86	300.00	159.00	141.00	12
SW-1	monitoring	3808.19	--	--	--	--
SW-2	monitoring	3808.79	--	--	--	--
SW-3	monitoring	3842.29	230.00	81.50	148.50	8
VE-1	vapor extraction	--	214.00	80.00	134.00	8
VE-2	vapor extraction	--	210.00	75.00	135.00	8
VE-3	vapor extraction	--	202.00	75.00	127.00	8
VE-4	vapor extraction	--	183.00	60.00	123.00	8
VE-5	vapor extraction	--	168.00	60.00	108.00	8
VE-16	vapor extraction	3750.96	150.00	42.50	107.50	8
VE-17	vapor extraction	3756.73	130.00	40.00	90.00	8
VE-18	vapor extraction	3756.82	163.00	37.50	125.50	8
VE-19	vapor extraction	3761.18	150.00	115.00	35.00	6
VE-20	vapor extraction	3768.41	160.00	37.50	122.50	8

Notes:
feet amsl Feet above mean sea level
feet btoc Feet below top of casing
-- Data not available

Table 2. Groundwater and Condensate Gauging Data for MW-98
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Date	Depth to Water (feet bmp)	Condensate Thickness (feet)
04/29/97	142.42	0.00
07/15/97	142.51	0.00
10/14/97	143.55	0.29
10/29/97	143.43	0.23
11/04/97	143.50	0.25
11/12/97	143.35	0.17
11/19/97	143.48	0.22
11/24/97	143.54	0.26
12/10/97	143.52	0.12
01/28/98	143.53	0.22
02/25/98	143.77	0.19
04/27/98	143.73	0.15
05/28/98	143.80	0.00
06/16/98	143.87	0.05
10/10/98	144.32	0.08
01/27/99	144.39	0.00
04/08/99	148.78	0.00
04/15/99	148.02	0.00
04/19/99	148.78	0.00
04/29/99	148.81	0.00
05/06/99	148.75	0.00
05/13/99	147.32	0.00
05/20/99	148.80	0.00
05/27/99	148.53	0.00
06/03/99	148.30	0.00
06/10/99	148.66	0.00
06/25/99	147.00	0.00
07/01/99	147.52	0.00
07/08/99	148.20	0.00
07/15/99	147.44	0.00
07/22/99	148.58	0.00
08/05/99	148.76	0.00
08/12/99	148.20	0.00
08/19/99	148.90	0.00
08/26/99	148.58	0.00
09/02/99	148.10	0.00
09/09/99	148.64	0.00
09/16/99	148.82	0.00
09/23/99	148.52	0.00
09/30/99	149.02	0.00
10/07/99	149.16	0.00
10/14/99	148.88	0.00
10/21/99	149.00	0.00
10/28/99	149.10	0.00
11/04/99	149.40	0.00
11/11/99	149.00	0.00
11/18/99	148.50	0.00
12/02/99	148.22	0.00
12/10/99	148.70	0.00
01/05/00	143.88	0.00

Notes:
feet bmp Feet below measuring point

Table 3. Summary of Historical Rainfall with Monthly Rainfall During 1999, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Historical Totals

Year	Rainfall (inches)
1994	9.31
1995	7.84
1996	16.60
1997	10.65
1998	3.95

Monthly/1999

Month	Rainfall (inches)
January	0.00
February	0.00
March	0.00
April	0.20
May	1.80
June	0.80
July	0.20
August	0.70
September	1.00
October	0.00
November	0.00
December	0.00
1999 Annual Total	4.70

Source: Rain gauge at Indian River Gas Plant

Table 4. Summary of BTEX Analytical Results,January 1999 Groundwater Sampling Event, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Lower Queen

Well ID	MW-60	MW-61A	MW-66	MW-71	MW-87	MW-87A	MW-88	MW-89	MW-96
Sample Date	2/1/99	2/1/99	2/1/99	2/1/99	2/2/99	2/2/99	2/1/99	2/1/99	2/2/99
Parameter									
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.6	11	<0.5
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.8	1.3	<0.5
Ethylbenzene	<0.5	12	<0.5	<0.5	<0.5	<0.5	1.6	<0.5	<0.5
Total Xylenes	<0.5	54	<0.5	<0.5	<0.5	<0.5	4.8	<0.5	<0.5

Well ID	MW-97	MW-111
Sample Date	2/2/99	2/1/99
Parameter		
Benzene	<0.5	<0.5
Toluene	<0.5	0.8
Ethylbenzene	<0.5	<0.5
Total Xylenes	<0.5	<0.5

Notes:

Concentrations listed in micrograms per liter (µg/L)

Results listed for BTEX only, results for other parameters (if any) are included in Appendix D

Table includes monitoring wells and supply wells, results for other sampling points (sumps) are included in Appendix D

<0.05 Constituent not detected above noted laboratory detection limit

Table 5. Summary of BTEX Analytical Results, April 1999 Groundwater Sampling Event, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Shallow Zone

Well ID	MW-41	MW-43	MW-44	MW-46	MW-49	MW-50	MW-54	MW-55	MW-61
Date Sampled	4/20/99	4/20/99	4/20/99	4/20/99	4/20/99	4/20/99	4/22/99	4/22/99	4/20/99
Parameter									
Benzene	150	12	91	210	81	<5	<5	100	100
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	16	11	32	<5	<5	13	13
Total Xylenes	<10	<10	<10	20	<10	<10	<10	<10	<10

Well ID	MW-78	MW-79	MW-90	MW-91	MW-106
Date Sampled	4/22/99	4/22/99	4/23/99	4/23/99	4/29/99
Parameter					
Benzene	<5	<5	<5	19	<5
Toluene	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	8	<5
Total Xylenes	<10	<10	<10	<10	<10

Lower Queen

Well ID	MW-57	MW-60	MW-61A	MW-62	MW-63	MW-64	MW-66	MW-67	MW-70
Date Sampled	4/20/99	4/20/99	4/20/99	4/21/99	4/22/99	4/21/99	4/21/99	4/22/99	4/22/99
Parameter									
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	15	18	<5	<5	<5	<5	<5
Total Xylenes	<10	<10	40	20	<10	<10	<10	<10	<10

Well ID	MW-71	MW-87	MW-87A	MW-88	MW-89	MW-94	MW-95	MW-96	MW-97
Date Sampled	4/21/99	4/20/99	4/20/99	4/21/99	4/21/99	4/22/99	4/22/99	4/22/99	4/22/99
Parameter									
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Xylenes	<10	<10	<10	<10	<10	<10	<10	<10	<10

Well ID	MW-108	MW-111	SW-1	SW-2	SW-3
Date Sampled	4/22/99	4/21/99	4/23/99	4/23/99	4/23/99
Parameter					
Benzene	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5
Total Xylenes	<10	<10	<10	<10	<10

Notes:

Concentrations listed in micrograms per liter (ug/L)

Results listed for BTEX only, results for other parameters (if any) are included in Appendix D

Table includes monitoring wells and supply wells, results for other sampling points (sumps) are included in Appendix D

<5 Constituent not detected above noted laboratory detection limit

Table 6. Summary of BTEX Analytical Results, December 1999 Groundwater Sampling Event, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Shallow Zone

Well ID	MW-43	MW-46	MW-49	MW-50	MW-54	MW-55	MW-61	MW-65	MW-77
Date Sampled	12/8/99	12/8/99	12/8/99	12/8/99	1/6/00	12/9/99	12/9/99	12/9/99	12/9/99
Parameter									
Benzene	<5	50	32	<5	<5	90	<5	<5	<5
Toluene	11	43	68	<5	<5	19	<5	<5	<5
Ethylbenzene	6.2	34	58	<5	<5	15	<5	<5	<5
Total Xylenes	46	129	380	<10	<10	<10	<10	<10	<10

Well ID	MW-78	MW-79	MW-90	MW-91	MW-105	MW-106
Date Sampled	12/9/99	12/9/99	12/9/99	12/9/99	12/9/99	12/8/99
Parameter						
Benzene	<5	<5	<5	140	<5	<5
Toluene	44	<5	<5	15	<5	<5
Ethylbenzene	55	<5	<5	5.2	<5	<5
Total Xylenes	420	<10	<10	19	<10	<10

Lower Queen

Well ID	MW-60	MW-61A	MW-64	MW-66	MW-71	MW-73	MW-74	MW-87	MW-87A
Date Sampled	12/13/99	12/16/99	12/13/99	12/10/99	12/10/99	12/14/99	12/14/99	12/13/99	12/13/99
Parameter									
Benzene	<5	<5	<5	<5	<5	5.7	100	<5	<5
Toluene	<5	6.3	<5	<5	<5	<5	3900	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	990	<5	<5
Total Xylenes	<10	27	<10	<10	<10	8.9	6700	<10	<10

Well ID	MW-88	MW-89	MW-95	MW-96	MW-97	MW-98	MW-108	MW-111
Date Sampled	12/10/99	12/10/99	12/14/99	12/14/99	12/14/99	12/15/99	12/14/99	12/13/99
Parameter								
Benzene	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	13	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5
Total Xylenes	<10	<10	<10	<10	<10	63	<10	<10

Notes:

Concentrations listed in micrograms per liter (ug/L)

Results listed for BTEX only, results for other parameters (if any) are included in Appendix D

Table includes monitoring wells and supply wells, results for other sampling points (sumps) are included in Appendix D

<5 Constituent not detected above noted laboratory detection limit

Table 7. Summary of Initial BTEX Analytical Results, Phase I and Phase II Wells, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Lower Queen - Phase I

Well ID	MW-113	MW-114	MW-115	MW-116
Date Sampled	8/11/99	7/26/99	7/26/99	7/26/99
Parameter				
Benzene	**140**	<5	<5	<5
Toluene	<5	<5	<5	<5
Ethylbenzene	59	<5	<5	<5
Total Xylenes	390	<10	10	<10

Lower Queen - Phase II

Well ID	MW-117A	MW-118	MW-119	MW-121	MW-122	MW-124	MW-127	MW-128
Date Sampled	12/16/99	12/15/99	12/28/99	12/16/99	12/16/99	12/14/99	12/28/99	12/28/99
Parameter								
Benzene	<5	<5	16	500	11	79	190	11
Toluene	<5	<5	<5	10	29	<50	7.1	<5
Ethylbenzene	<5	<5	<5	370	<5	210	38	<5
Total Xylenes	<10	<10	<10	20	22	1500	16	<10

Results listed for BTEX only, results for other parameters (if any) are included in Appendix D
Table includes monitoring wells and supply wells, results for other sampling points (sumps) are included in Appendix D
<5 Constituent not detected above noted laboratory detection limit

Table 8. Summary of 1999 Groundwater Recovery and Infiltration Data, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Month	Shallow Zone		Lower Queen	
	Recovery	Infiltration (MW-51)	Recovery	Infiltration (IW-2 & IW-1)
January	0	0	159,033	165,364
February	0	0	159,372	151,255
March	0	0	159,884	155,801
April	0	0	152,131	150,985
May	0	0	124,032	124,819
June	0	0	171,081	152,556
July	0	0	153,394	122,148
August	0	0	154,743	129,527
September	0	0	144,405	144,344
October	0	0	272,813	141,468
November	0	0	181,079	151,440
December	0	0	141,965	129,096
Totals	0	0	1,973,932	1,756,564

Notes:
Amounts listed in barrels, one barrel is the equivalent of 42 gallons

Table 9. Summary of 1999 Analytical Results, East Air Stripper,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

	WQCC Standards	01/29/99		02/25/99		03/24/99		04/29/99		05/28/99		06/28/99	
		Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
VOCs (ug/L):													
Benzene	10	160	24	69	<5	28	<5	<5	<5	<5	<5	<5	<5
Toluene	750	75	120	<5	<5	12	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	750	270	29	91	<5	36	<5	<5	<5	<5	<5	<5	<5
Total Xylenes	620	500	470	150	<20	62	<10	<10	<10	<10	<10	<10	<10
PAHs (ug/L):													
Acenaphthene	--	--	--	--	--	--	<10	--	--	--	--	--	<5
Acenaphthylene	--	--	--	--	--	--	<10	--	--	--	--	--	<5
Anthracene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Benzo(b)fluoranthene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(k)fluoranthene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(a)anthracene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(a)pyrene	0.7	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(ghi)perylene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Chrysene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Dibenzo(ah)anthracene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Fluoranthene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Fluorene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Naphthalene	--	--	--	--	--	--	<10	--	--	--	--	--	<5
Phenanthrene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Pyrene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Total Naphthalene plus monomethylnaphthalene	30	--	--	--	--	--	ND	--	--	--	--	--	ND
General Chemistry (mg/L):													
Bromide	--	--	--	--	--	--	<0.5	--	--	--	--	--	<0.5
Chloride	250	--	--	--	--	--	53.2	--	--	--	--	--	38.2
Fluoride	1.6	--	--	--	--	--	0.69	--	--	--	--	--	0.6
Sulfate	600	--	--	--	--	--	212	--	--	--	--	--	215
Metals (mg/L):													
Calcium	--	--	--	--	--	--	131	--	--	--	--	--	115
Magnesium	--	--	--	--	--	--	61.4	--	--	--	--	--	51.4
Potassium	--	--	--	--	--	--	1.7	--	--	--	--	--	1.6
Sodium	--	--	--	--	--	--	30.3	--	--	--	--	--	27.3

Notes:

mg/L	Milligrams per liter, equivalent to parts per million.
ug/L	Micrograms per liter, equivalent to parts per billion.
<10	Indicates that the parameter was not identified above the noted laboratory detection limit.
--	Indicates that no standard has been published or that analysis was not run
ND	Indicates that no such parameters were detected
WQCC	New Mexico Water Quality Control Commission.

Table 9. Summary of 1999 Analytical Results, East Air Stripper,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

	WQCC	07/29/99		08/26/99		09/30/99		10/28/99		11/15/99		12/14/99	
	Standards	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
VOCs (ug/L):													
Benzene	10	<5	<5	<5	<5	6	<5	<5	<5	<20	<5	<5	<5
Toluene	750	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Ethylbenzene	750	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Total Xylenes	620	<10	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
PAHs (ug/L):													
Acenaphthene	--	--	--	--	--	--	--	--	--	--	<5	--	--
Acenaphthylene	--	--	--	--	--	--	--	--	--	--	<5	--	--
Anthracene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(a)pyrene	0.7	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(ghi)perylene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Chrysene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Dibenzo(ah)anthracene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Fluoranthene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Fluorene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Naphthalene	--	--	--	--	--	--	--	--	--	--	<5	--	--
Phenanthrene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Pyrene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Total Naphthalene plus monomethylnaphthalene	30	--	--	--	--	--	--	--	--	--	ND	--	--
General Chemistry (mg/L):													
Bromide	--	--	--	--	--	--	--	--	--	--	<0.5	--	--
Chloride	250	--	--	--	--	--	--	--	--	--	49.6	--	--
Fluoride	1.6	--	--	--	--	--	--	--	--	--	0.71	--	--
Sulfate	600	--	--	--	--	--	--	--	--	--	197	--	--
Metals (mg/L):													
Calcium	--	--	--	--	--	--	--	--	--	--	114	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	53.5	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	1.7	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	33.8	--	--

Notes:

mg/L	Milligrams per liter, equivalent to parts per million.
ug/L	Micrograms per liter, equivalent to parts per billion.
<10	Indicates that the parameter was not identified above the noted laboratory detection limit.
--	Indicates that no standard has been published.
ND	Indicates that no such parameters were detected
WQCC	New Mexico Water Quality Control Commission.

Table 10. Summary of 1999 Analytical Results, West Air Stripper,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

	WQCC Standards	01/29/99		02/25/99		03/24/99		04/29/99		05/28/99		06/28/99	
		Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
VOCs (ug/L):													
Benzene	10	160	19	68	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene	750	53	77	<5	<5	28	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	750	270	11	100	<5	30	<5	<5	<5	<5	<5	<5	<5
Total Xylenes	620	440	22	170	<20	54	<10	<10	<10	<10	<10	<10	<10
PAHs (ug/L):													
Acenaphthene	--	--	--	--	--	--	<10	--	--	--	--	--	<5
Acenaphthylene	--	--	--	--	--	--	<10	--	--	--	--	--	<5
Anthracene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Benzo(b)fluoranthene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(k)fluoranthene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(a)anthracene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(a)pyrene	0.7	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Benzo(ghi)perylene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Chrysene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Dibenzo(ah)anthracene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Fluoranthene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Fluorene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	<10	--	--	--	--	--	<0.1
Naphthalene	--	--	--	--	--	--	<10	--	--	--	--	--	<5
Phenanthrene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Pyrene	--	--	--	--	--	--	<10	--	--	--	--	--	<1
Total Naphthalene plus monomethylnaphthalene	30	--	--	--	--	--	ND	--	--	--	--	--	ND
General Chemistry (mg/L):													
Bromide	--	--	--	--	--	--	<0.5	--	--	--	--	--	<0.5
Chloride	250	--	--	--	--	--	53.3	--	--	--	--	--	35.4
Fluoride	1.6	--	--	--	--	--	0.69	--	--	--	--	--	0.55
Sulfate	600	--	--	--	--	--	212	--	--	--	--	--	229
Metals (mg/L):													
Calcium	--	--	--	--	--	--	136	--	--	--	--	--	116
Magnesium	--	--	--	--	--	--	63.6	--	--	--	--	--	51.7
Potassium	--	--	--	--	--	--	1.6	--	--	--	--	--	1.5
Sodium	--	--	--	--	--	--	29.5	--	--	--	--	--	27.6

Notes:

mg/L	Milligrams per liter, equivalent to parts per million.
ug/L	Micrograms per liter, equivalent to parts per billion.
<10	Indicates that the parameter was not identified above the noted laboratory detection limit.
--	Indicates that no standard has been published or that analysis was not run
ND	Indicates that no such parameters were detected
WQCC	New Mexico Water Quality Control Commission.

Table 10. Summary of 1999 Analytical Results, West Air Stripper,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

	WQCC Standards	07/29/99		08/26/99		09/30/99		10/28/99		11/15/99		12/14/99	
		Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent
VOCs (ug/L):													
Benzene	10	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Toluene	750	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Ethylbenzene	750	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Total Xylenes	620	<10	<10	<10	<10	<10	<10	<10	<10	<100	<10	<10	<10
PAHs (ug/L):													
Acenaphthene	--	--	--	--	--	--	--	--	--	--	<5	--	--
Acenaphthylene	--	--	--	--	--	--	--	--	--	--	<5	--	--
Anthracene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(a)pyrene	0.7	--	--	--	--	--	--	--	--	--	<0.1	--	--
Benzo(ghi)perylene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Chrysene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Dibenzo(ah)anthracene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Fluoranthene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Fluorene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	<0.1	--	--
Naphthalene	--	--	--	--	--	--	--	--	--	--	<5	--	--
Phenanthrene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Pyrene	--	--	--	--	--	--	--	--	--	--	<1	--	--
Total Naphthalene plus monomethylnaphthalene	30	--	--	--	--	--	--	--	--	--	ND	--	--
General Chemistry (mg/L):													
Bromide	--	--	--	--	--	--	--	--	--	--	<0.5	--	--
Chloride	250	--	--	--	--	--	--	--	--	--	49.5	--	--
Fluoride	1.6	--	--	--	--	--	--	--	--	--	0.7	--	--
Sulfate	600	--	--	--	--	--	--	--	--	--	199	--	--
Metals (mg/L):													
Calcium	--	--	--	--	--	--	--	--	--	--	114	--	--
Magnesium	--	--	--	--	--	--	--	--	--	--	54.5	--	--
Potassium	--	--	--	--	--	--	--	--	--	--	1.7	--	--
Sodium	--	--	--	--	--	--	--	--	--	--	32.9	--	--

Notes:

mg/L	Milligrams per liter, equivalent to parts per million.
ug/L	Micrograms per liter, equivalent to parts per billion.
<10	Indicates that the parameter was not identified above the noted laboratory detection limit.
--	Indicates that no standard has been published.
ND	Indicates that no such parameters were detected
WQCC	New Mexico Water Quality Control Commission.

Table 11. Summary of SVE Operation and Vapor-Phase Mass Removal, Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

VES-100

Date	Description	Condensate Recovered (bbl)
12/30/98	System running (VE-19, MW-83, MW-84 & MW-65A)	
03/20/99	Blower shut down for repair	
03/26/99	System restart (MW-84)	
03/31/99	System running (MW-84)	
	1st Quarter 1999 Estimated Subtotal	**51.1**
04/01/99	System running (MW-84)	
04/02/99	Blower shut down for repair	
04/15/99	System restart (MW-84)	
05/14/99	Blower shut down and relocated to MW-110	
05/25/99	System running (MW-110)	
06/10/99	Blower shut down, NMED notified	
	2nd Quarter 1999 Estimated Subtotal	**134.0**
07/01/99	VES-100 not operated during the 3rd quarter	
09/30/99	VES-100 not operated during the 3rd quarter	
	3rd Quarter 1999 Estimated Subtotal	**0**
12/31/99	VES-100 not operated during the 4th quarter	
	4th Quarter 1999 Estimated Subtotal	**0**
	1999 Subtotal, VES-100	**185.0**

VES-200

Date	Description	Condensate Recovered (bbl)
12/30/98	System running (MW-11, 13 & 68)	
02/10/99	Blower shut down	
02/19/99	System restart (MW-11, 13 & 68)	
03/31/99	System running (MW-11, 13 & 68)	
	1st Quarter 1999 Estimated Subtotal	**24.6**
04/01/99	System running (MW-11, 13 & 68)	
04/22/99	Blower shut down	
	2nd Quarter 1999 Estimated Subtotal	**0.7**
08/12/99	System restart (MW-110)	
09/10/99	Blower shut down	
	3rd Quarter 1999 Estimated Subtotal	**1.2**
11/02/99	System restart (MW-110)	
12/31/99	System running (MW-110)	
	4th Quarter 1999 Estimated Subtotal	**37.6**
	1999 Subtotal, VES-200	**64.1**

VES-300

Date	Description	Condensate Recovered (bbl)
12/30/98	VES-300 not operated in the 1st quarter	
03/31/99	VES-300 not operated in the 1st quarter	
	1st Quarter 1999 Estimated Subtotal	**0**
06/16/99	System restart (MW-84)	
06/30/99	System running (MW-84)	
	2nd Quarter 1999 Estimated Subtotal	**17.6**
07/01/99	System running (MW-84)	
09/10/99	Blower shut down	
09/17/99	System restart (MW-85)	
09/30/99	System running (MW-85)	
	3rd Quarter 1999 Estimated Subtotal	**52.4**
10/01/99	System running (MW-85)	
12/31/99	System running (MW-85)	
	4th Quarter 1999 Estimated Subtotal	**95.2**
	1999 Subtotal, VES-300	**165.3**

1999 TOTAL	**414.4**

Notes:

Condensate recovery and operational data provided by Marathon Oil.

bbl Barrels of condensate recovered in the vapor phase, one barrel is the equivalent of 42 gallons.

Table 12. Aerobic Biodegradation of Condensate,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

VES-100

Date	Activity/description	Days operating (incremental)	Days operating (cumulative)	Extracted O_2 (%)	Extracted CO_2 (%)	Air Flow Rate (cfm)	O_2 Uptake (lbs per day)	HC Degradation (lbs per day)	HC Degradation (bbl per day)	Total HC Degradation (bbl, incremental)
01/01/99	System running (VE-19, MW-83, MW-84, MW-65A)	0	0	--	--	--	--	--	--	--
01/28/99		27	27	21.78	1.38	479	1377	275	1.0	28
02/26/99		29	56	14.00	3.95	444				
03/20/99	Blower shut down	22	78	--	--	--	3779	756	2.9	147
03/26/99	System restart (MW-84)	--	--	15.08	0.40	393	--	--	--	--
04/02/99	Blower shut down	7	85	--	--	--	2829	566	2.2	15
04/15/99	System restart (MW-84)	--	--	--	--	--	--	--	--	--
04/30/99		15	100	23.19	0.03	393				
05/14/99	Blower shut down and relocate to MW-110	14	114	--	--	--	N/A	N/A	N/A	N/A
05/14/99	System restart (MW-110)	--	--	--	--	--	--	--	--	--
05/25/99		11	125	21.11	2.47	528				
06/10/99	Blower shut down	16	141	--	--	--	2801	560	2.1	58
Subtotal, Estimated Condensate Degradation (bbl)										**248**

VES-200

Date	Activity/description	Days operating (incremental)	Days operating (cumulative)	Extracted O_2 (%)	Extracted CO_2 (%)	Air Flow Rate (cfm)	O_2 Uptake (lbs per day)	HC Degradation (lbs per day)	HC Degradation (bbl per day)	Total HC Degradation (bbl, incremental)
01/01/99	System running (MW-11, MW-13, MW-68)	0	0	--	--	--	--	--	--	--
01/28/99		27	27	17.71	2.73	131				
02/10/99	Blower shut down	13	40	--	--	--	524	105	0.4	16
02/19/99	System restart (MW-11, MW-13, MW-68)	--	--	--	--	--	--	--	--	--
02/26/99		7	47	14.90	2.22	116	860	172	0.7	5
03/26/99		28	75	16.58	0.14	105				
04/22/99	Blower shut down	27	102	--	--	--	564	113	0.4	24
08/12/99	System restart (MW-110)	--	--	--	--	114				
09/10/99		29	131	--	--	109				
11/16/99		67	198	--	--	116				
12/02/99		16	214	10.2	--	--				
12/31/99	System running (MW-110)	29	243	--	--	--	1478	296	1.1	159
Subtotal, Estimated Condensate Degradation (bbl)										**203**

VES 300

Date	Activity/description	Days operating (incremental)	Days operating (cumulative)	Extracted O_2 (%)	Extracted CO_2 (%)	Air Flow Rate (cfm)	O_2 Uptake (lbs per day)	HC Degradation (lbs per day)	HC Degradation (bbl per day)	Total HC Degradation (bbl, incremental)
06/16/99	System startup (MW-84)	0	0	8.86	13.34	200				
07/16/99		30	30	--	--	232				
08/16/99		31	61	--	--	241				
09/10/99	Blower shut down	25	86	--	--	--	2949	590	2.2	193
09/17/99	System restart (MW-85)	--	--	--	--	230				
12/02/99		76	162	14.2	--	--				
12/31/99	System running (MW-85)	29	191	--	--	--	1904	381	1.5	152
Subtotal, Estimated Condensate Degradation (bbl)										**346**

Total Estimated Condensate Degradation (bbl), 1999	**796**

Notes:
Operational data provided by Marathon Oil.
Rates calculated based on oxygen uptake (reduction from normal atmospheric weight percent of 21). Where measured weight percent of oxygen in recovered vapors was at or greater than 21, carbon dioxide was used to estimate actual uptake.

cfm Cubic feet per minute
lbs Pounds
bbl Barrels, one barrel is the equivalent of 42 gallons

Table 13. Summary of Historical Condensate Recovery Data,
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Date	Emergency Reponse Pumping	Vacuum Truck Recovery	Open Pit Volatilization	Open Frac Tank Volatilization	Shallow Zone Sump 16A	Shallow Zone Sump A-11	Shallow Zone MW-69	Shallow Zone MW-86	Lower Queen Pump and Treat	Vapor Extraction Shallow Zone	Vapor Extraction Lower Queen	Total Condensate Recovery
Apr-91	**717.3**	**33.0**	**465.0**	**4,447.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**5,662.3**
May-91	**2,041.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2,041.0**
Jun-91	**714.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**714.0**
Jul-91	**220.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**220.0**
Aug-91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Sep-91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Oct-91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Nov-91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**26.0**	0.0	0.0	**26.0**
Dec-91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**12.5**	0.0	0.0	**12.5**
Subtotal 1991	**3,692.3**	**33.0**	**465.0**	**4,447.0**	**0.0**	**0.0**	**0.0**	**0.0**	**38.5**	**0.0**	**0.0**	**8,675.8**
Jan-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**13.0**	0.0	0.0	**13.0**
Feb-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.5**	0.0	0.0	**1.5**
Mar-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3.1**	**5.1**	0.0	**8.2**
Apr-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.8**	**4.9**	0.0	**9.7**
May-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**8.5**	**5.1**	0.0	**13.6**
Jun-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.2**	**4.9**	0.0	**6.1**
Jul-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**7.3**	**5.1**	0.0	**12.4**
Aug-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**7.9**	**5.1**	0.0	**13.0**
Sep-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.5**	0.0	**0.5**
Oct-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.8**	**5.1**	0.0	**9.9**
Nov-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.6**	**4.9**	0.0	**5.5**
Dec-92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.8**	**5.1**	0.0	**5.9**
Subtotal 1992	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**53.5**	**45.8**	**0.0**	**99.3**
Jan-93	0.0	0.0	0.0	0.0	0.0	**1.2**	0.0	0.0	0.0	**4.2**	0.0	**5.4**
Feb-93	0.0	0.0	0.0	0.0	0.0	**2.6**	0.0	0.0	**0.3**	0.0	0.0	**2.9**
Mar-93	0.0	0.0	0.0	0.0	0.0	**2.8**	0.0	0.0	**1.9**	0.0	0.0	**4.7**
Apr-93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3.7**	0.0	**3.7**
May-93	0.0	0.0	0.0	0.0	**3.4**	0.0	0.0	0.0	**1.1**	**5.1**	0.0	**9.6**
Jun-93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.8**	**4.6**	0.0	**5.4**
Jul-93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.6**	0.0	0.0	**1.6**
Aug-93	0.0	0.0	0.0	0.0	0.0	0.0	**1.8**	0.0	**4.7**	0.0	0.0	**6.4**

Date	Emergency Reponse Pumping	Vacuum Truck Recovery	Open Pit Volatilization	Open Frac Tank Volatilization	Shallow Zone Sump 16A	Shallow Zone Sump A-11	Shallow Zone MW-69	Shallow Zone MW-86	Lower Queen Pump and Treat	Vapor Extraction Shallow Zone	Vapor Extraction Lower Queen	Total Condensate Recovery
Sep-93	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	3.7	0.0	0.0	8.3
Oct-93	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	5.5	10.6	0.0	22.3
Nov-93	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0	1.6	12.2	0.0	22.6
Dec-93	0.0	0.0	0.0	0.0	0.0	0.0	15.3	0.0	1.8	12.7	0.0	29.8
Subtotal 1993	**0.0**	**0.0**	**0.0**	**0.0**	**3.4**	**6.6**	**36.7**	**0.0**	**22.9**	**53.1**	**0.0**	**122.7**
Jan-94	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	2.5	10.1	0.0	18.0
Feb-94	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	4.2	9.6	0.0	20.5
Mar-94	0.0	0.0	0.0	0.0	0.0	0.0	17.8	0.0	3.2	9.0	0.0	30.0
Apr-94	0.0	0.0	0.0	0.0	0.0	0.0	10.8	0.0	2.3	8.0	0.0	21.1
May-94	0.0	0.0	0.0	0.0	0.0	0.0	30.1	0.0	2.6	0.0	0.0	32.7
Jun-94	0.0	0.0	0.0	0.0	0.0	0.0	23.8	0.0	2.9	0.0	0.0	26.7
Jul-94	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	4.1	0.0	0.0	11.0
Aug-94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.9
Sep-94	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	1.6	0.0	0.0	7.7
Oct-94	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	1.5	0.0	0.0	4.6
Nov-94	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	3.9	0.0	0.0	7.0
Dec-94	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	3.8	0.0	0.0	4.5
Subtotal 1994	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**114.5**	**0.0**	**34.6**	**36.7**	**0.0**	**185.8**
Jan-95	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	5.1	0.0	0.0	6.2
Feb-95	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	2.6	0.0	0.0	10.2
Mar-95	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	2.1	0.0	0.0	7.1
Apr-95	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	5.3	0.0	0.0	6.8
May-95	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	2.5	0.0	0.0	4.1
Jun-95	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	2.3	0.0	0.0	3.8
Jul-95	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	4.1	0.0	0.0	5.1
Aug-95	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	9.9	0.0	0.0	10.9
Sep-95	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	3.9	0.0	0.0	4.0
Oct-95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	6.3
Nov-95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	5.3
Dec-95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0	0.0	8.8
Subtotal 1995	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**20.4**	**0.0**	**58.1**	**0.0**	**0.0**	**78.5**
Jan-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	7.9
Feb-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.9	0.0	0.0	65.9
Mar-96	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	56.0	0.0	0.0	57.2
Apr-96	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	45.5	0.0	0.0	53.4

Date	Emergency Reponse Pumping	Vacuum Truck Recovery	Open Pit Volatilization	Open Frac Tank Volatilization	Shallow Zone Sump 16A	Shallow Zone Sump A-11	Shallow Zone MW-69	Shallow Zone MW-86	Lower Queen Pump and Treat	Vapor Extraction Shallow Zone	Vapor Extraction Lower Queen	Total Condensate Recovery
May-96	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	64.8	0.0	0.0	64.9
Jun-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	139.0	49.0	0.0	0.0	188.0
Jul-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	27.5	0.0	0.0	52.5
Aug-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.3	0.0	0.0	22.3
Sep-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	0.0	0.0	16.4
Oct-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.7
Nov-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	2.6
Dec-96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	4.0
Subtotal 1996	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**9.2**	**164.0**	**362.7**	**0.0**	**0.0**	**535.9**
Jan-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.1	1.3
Feb-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	3.9	11.1
Mar-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.2	0.0	2.1	34.3
Apr-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.0	3.1	12.8
May-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.8	0.0	2.4	40.2
Jun-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.3	0.0	1.2	29.5
Jul-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.0	0.0	0.3	44.3
Aug-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5	1.7	0.4	28.6
Sep-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3
Oct-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.8	0.0	0.1	31.9
Nov-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	0.0	0.1	20.6
Dec-97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.4	0.0	0.1	26.5
Subtotal 1997	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**265.6**	**1.9**	**14.0**	**281.5**
Jan-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.5	0.0	0.3	23.8
Feb-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.5	0.0	0.1	83.6
Mar-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.7	0.1	0.4	38.2
Apr-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.5	0.5	1.6	29.6
May-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.4	0.0	1.3	39.7
Jun-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.9	2.8	0.1	46.8
Jul-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	8.7	16.6	43.0
Aug-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	5.2	14.7	37.6
Sep-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.1	5.5	10.2	87.8
Oct-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.0	7.7	18.9	79.6
Nov-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.0	10.8	12.5	65.3
Dec-98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.3	24.3	16.9	95.5
Subtotal 1998	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**511.3**	**65.5**	**93.6**	**670.4**

Date	Emergency Reponse Pumping	Vacuum Truck Recovery	Open Pit Volatilization	Open Frac Tank Volatilization	Shallow Zone Sump 16A	Shallow Zone Sump A-11	Shallow Zone MW-69	Shallow Zone MW-86	Lower Queen Pump and Treat	Vapor Extraction Shallow Zone	Vapor Extraction Lower Queen	Total Condensate Recovery
Jan-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**32.1**	0.0	**27.2**	**59.3**
Feb-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**41.4**	0.0	**18.7**	**60.1**
Mar-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**39.0**	0.0	**29.8**	**68.8**
Apr-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**47.2**	0.0	**18.7**	**65.9**
May-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**18.7**	0.0	**40.2**	**58.9**
Jun-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**8.8**	0.0	**93.5**	**102.3**
Jul-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**8.6**	0.0	**15.7**	**24.3**
Aug-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**8.4**	0.0	**13.5**	**21.9**
Sep-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**76.2**	0.0	**24.3**	**100.5**
Oct-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**124.0**	0.0	**32.5**	**156.5**
Nov-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**107.6**	0.0	**44.9**	**152.5**
Dec-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**105.6**	0.0	**55.4**	**161.0**
Subtotal 1999	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**617.6**	**0.0**	**414.4**	**1,032.0**
TOTALS	**3,692.3**	**33.0**	**465.0**	**4,447.0**	**3.4**	**6.6**	**180.8**	**164.0**	**1,964.8**	**203.0**	**522.0**	**11,681.8**

Notes:
Amounts listed in barrels, one barrel is the equivalent of 42 gallons

Table 14. Groundwater Monitoring Plan
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Shallow Zone

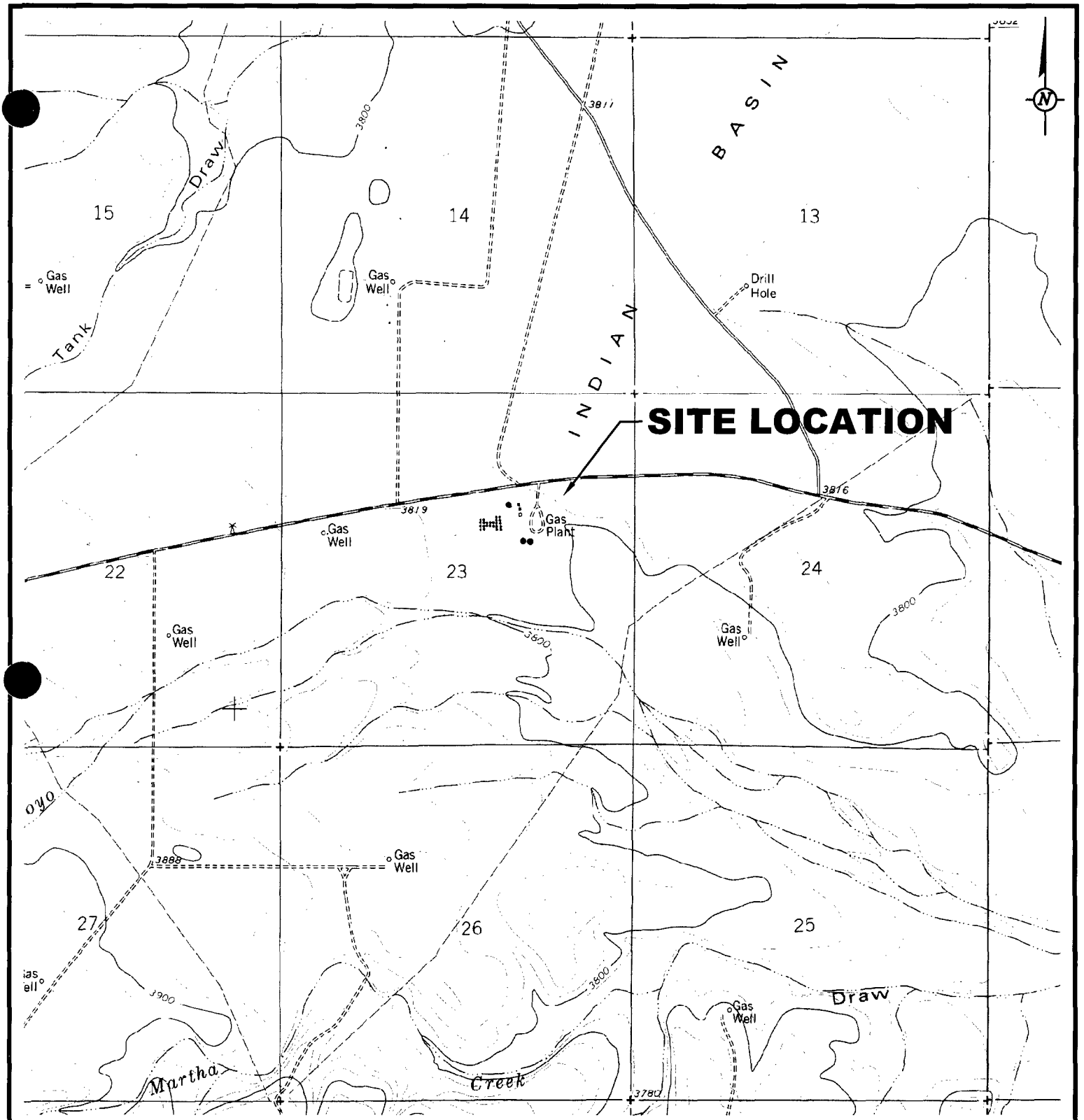
	Sampling Schedule					
Well ID	Month April	Analytical Paramenters semi-annual	annual	e/o year	Month October	Analytical Paramenters semi-annual
MW-14	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-39	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-43	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-46	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-49	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-50	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-54	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-55	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-61	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-65	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-69	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-77	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-78	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-79	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-90	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-91	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-105	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-106	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX

Lower Queen

	Sampling Schedule					
Well ID	Month April	Analytical Paramenters semi-annual	annual	e/o year	Month October	Analytical Paramenters semi-annual
MW-57	X	BTEX	Chloride, TDS	SVOCs, WQCC metals		BTEX
MW-59	X	BTEX	Chloride, TDS	SVOCs, WQCC metals		BTEX
MW-60	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-61A	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-62	X	BTEX	Chloride, TDS	SVOCs, WQCC metals		BTEX
MW-63	X	BTEX	Chloride, TDS	SVOCs, WQCC metals		BTEX
MW-64	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-66	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-67	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-70	X	BTEX	Chloride, TDS	SVOCs, WQCC metals		BTEX
MW-71	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-73	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-74	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-87	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-87A	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-88	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-89	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-94	X	BTEX	Chloride, TDS	SVOCs, WQCC metals		BTEX
MW-95	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-96	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-97	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-98	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-104	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-108	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX
MW-111	X	BTEX	Chloride, TDS	SVOCs, WQCC metals	X	BTEX

Notes:
SVOC and WQCC metals analysis will fall on even years (i.e., 2000, 2002, etc.)

SVOCs	Semi-Volatile Organic Compounds
WQCC metals	New Mexico Water Quality Control Commission metals
TDS	Total Dissolved Solids
e/o year	Every other year



SOURCE: USGS 7.5 MIN. TOPOGRAPHICAL QUADRANGLE:
MARTHA CREEK, N. MEX., 1978

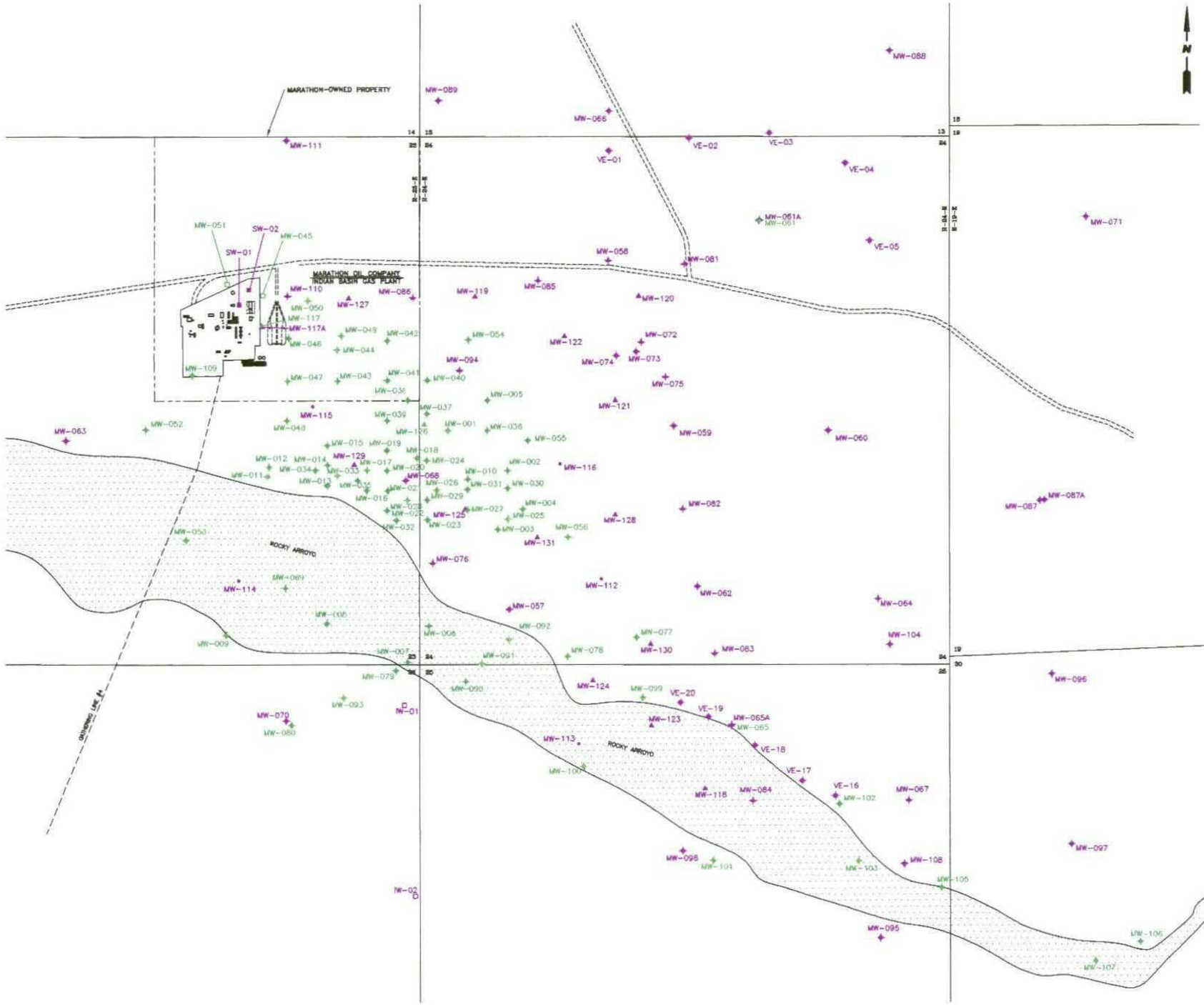
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G:\APROJECT\MOC\INDIAN BASIN\NP0483.0001\CADD\FIGURE-1.DWG

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SITE LOCATION		LEAD DESIGN PROF.	CHECKED
			J. HORST
MARATHON OIL COMPANY INDIAN BASIN REMEDIATION PROJECT EDDY COUNTY, NEW MEXICO		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	1



LEGEND

- MONITORING WELL
- INFILTRATION WELL
- RECOVERY WELL
- VAPOR EXTRACTION WELL
- INDUSTRIAL SUPPLY WELL
- PHASE I INFILL WELLS INSTALLED DURING JULY 999
- PHASE II INFILL WELLS INSTALLED DURING AUGUST 1999

COLOR DENOTES WELL COMPLETION AS FOLLOWS:

GREEN COMPLETED IN SHALLOW ZONE
PURPLE COMPLETED IN LOWER QUEEN

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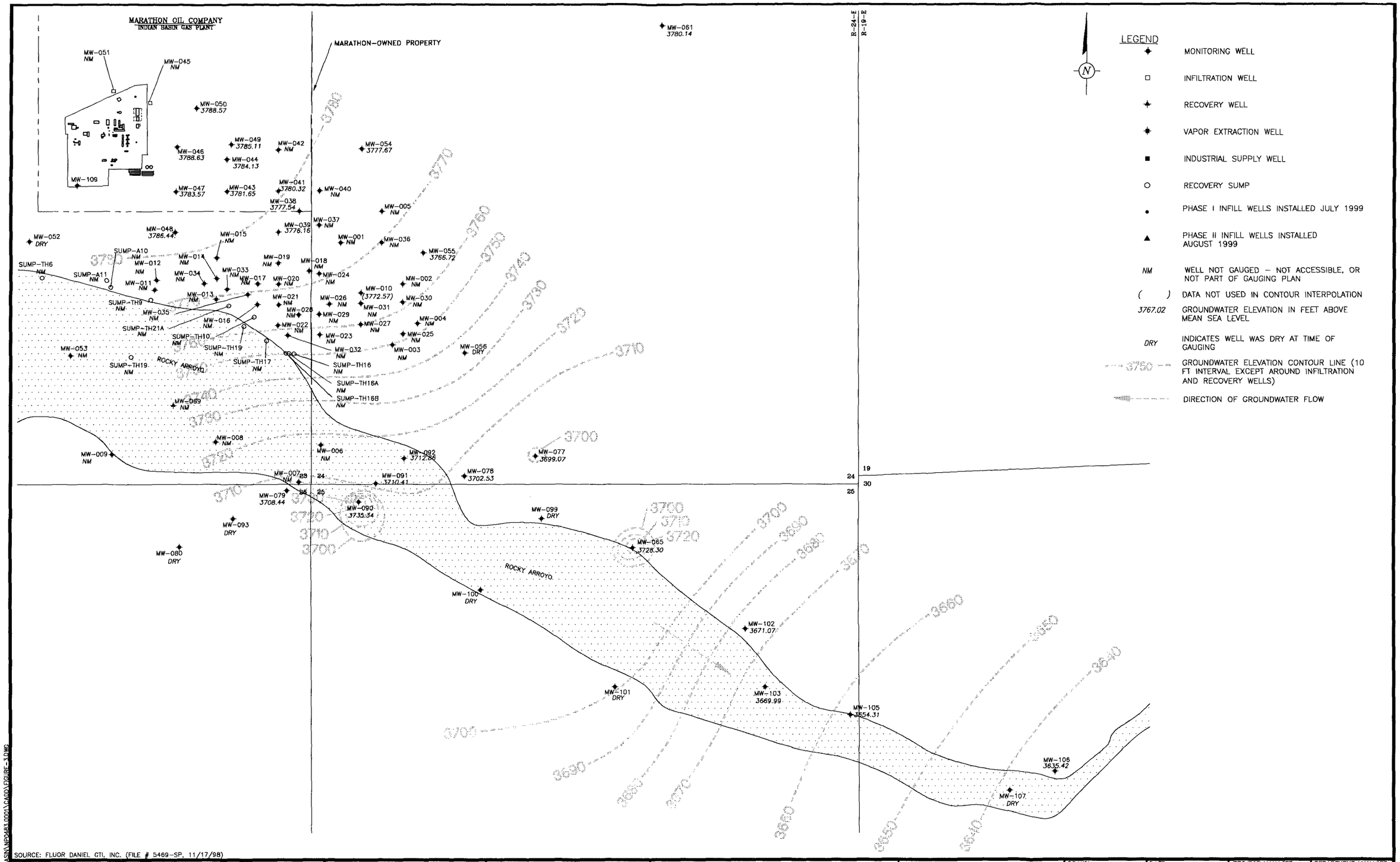
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Tel: 215/752-6840 Fax: 215/752-6879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

SITE LAYOUT

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		PROJECT NUMBER	DRAWING NUMBER
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G:\PROJECT\MOC\INDIAN_BASIN\NP000483.0001\CADD\FIGURE-3.DWG

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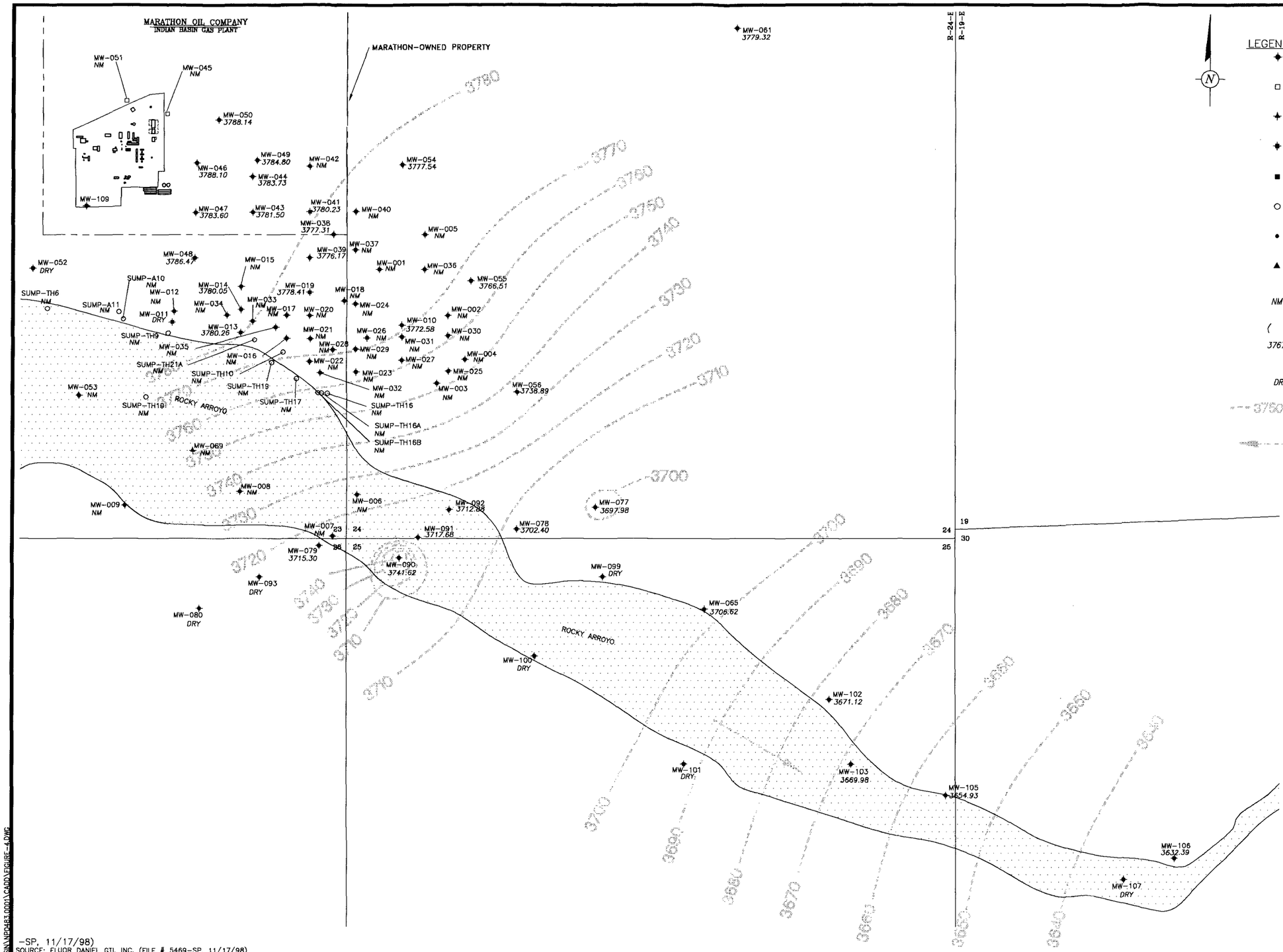
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MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

SHALLOW ZONE GROUNDWATER ELEVATION CONTOURS
JANUARY 1999

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		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	3



-SP, 11/17/98)
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G:\PROJECT\MOC\INDIAN BASIN\NP000483.0001\CAD\FIGURE-4.DWG

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MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

SHALLOW ZONE GROUNDWATER ELEVATION CONTOURS
APRIL 1999

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			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	4

MARATHON OIL COMPANY
INDIAN BASIN GAS PLANT

MARATHON-OWNED PROPERTY

R-24-E
R-19-E

MW-051 NM
MW-045 3789.80
MW-050 3788.96
MW-117 NM
MW-049 3785.54
MW-042 3781.23
MW-054 3778.31
MW-046 3788.78
MW-044 3784.18
MW-109 3792.11
MW-047 3783.47
MW-043 3781.47
MW-041 3780.43
MW-040 NM
MW-038 3777.91
MW-005 NM
MW-037 3777.45
MW-039 DRY
MW-052 NM
MW-048 3786.41
MW-015 3784.22
MW-126 (3742.50)
MW-001 NM
MW-036 DRY
MW-055 3766.48
SUMP-A10 NM
MW-014 3781.39
MW-019 3778.46
MW-018 DRY
SUMP-TH6 NM
MW-012 NM
MW-033 3782.54
SUMP-A11 NM
MW-034 3786.19
MW-017 3780.45
MW-020 3781.51
MW-024 NM
MW-002 NM
MW-011 3782.66
MW-010 3772.54
MW-013 3781.51
MW-021 3775.32
MW-026 3772.24
MW-030 NM
SUMP-TH9 NM
MW-035 3781.03
MW-028 3777.92
MW-031 3772.09
MW-029 NM
MW-004 3767.10
SUMP-TH21A NM
MW-016 3778.66
MW-027 NM
MW-022 3782.01
SUMP-TH10 NM
MW-023 NM
MW-025 NM
MW-053 NM
SUMP-TH19 NM
SUMP-TH19 NM
MW-032 NM
MW-003 NM
MW-056 3740.66
SUMP-TH17 NM
SUMP-TH16 NM
ROCKY ARROYO
SUMP-TH16A NM
SUMP-TH16B NM
MW-069 3769.37
MW-008 NM
MW-009 NM
MW-006 NM
MW-092 NM
MW-077 3696.12
MW-007 NM
MW-091 3712.34
MW-078 3703.33
MW-079 3711.40
MW-090 3736.92
MW-099 NM
MW-093 NM
MW-065 3706.60
MW-080 DRY
ROCKY ARROYO
MW-100 NM
MW-102 NM
MW-101 NM
MW-103 NM
MW-105 3654.51
MW-106 3632.92
MW-107 NM
MW-061 3779.65

3770 3760 3750 3740 3730 3720 3710 3700 3690 3680 3670 3660 3650 3640

19 24 30 25

LEGEND

- MONITORING WELL
- INFILTRATION WELL
- RECOVERY WELL
- VAPOR EXTRACTION WELL
- INDUSTRIAL SUPPLY WELL
- RECOVERY SUMP
- PHASE I INFILL WELLS INSTALLED JULY 1999
- PHASE II INFILL WELLS INSTALLED AUGUST 1999
- *NM* — WELL NOT GAUGED – NOT ACCESSIBLE, OR NOT PART OF GAUGING PLAN
- ( ) — DATA NOT USED IN CONTOUR INTERPOLATION
- *3767.02* — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- *DRY* — INDICATES WELL WAS DRY AT TIME OF GAUGING
- 3750 — GROUNDWATER ELEVATION CONTOUR LINE (10 FT INTERVAL EXCEPT AROUND INFILTRATION AND RECOVERY WELLS)
- DIRECTION OF GROUNDWATER FLOW

-SP, 11/17/98)
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G:\PROJECT\MOA\INDIAN BASIN\MP04R3.0001\CADD\FIGURE-5.DWG

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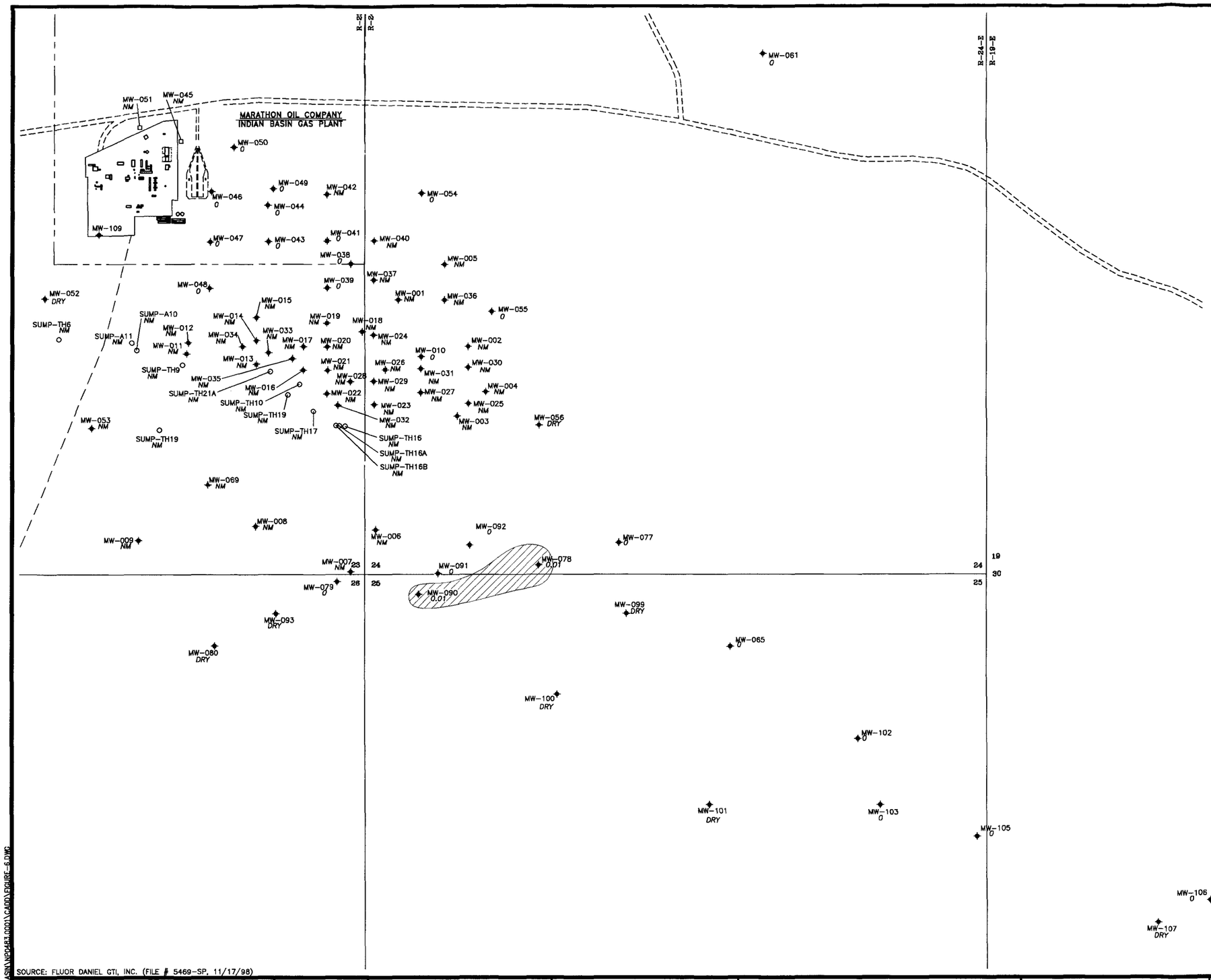
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MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

SHALLOW ZONE GROUNDWATER ELEVATION CONTOURS

JANUARY 2000

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	5



LEGEND

- MONITORING WELL
- INFILTRATION WELL
- RECOVERY WELL
- VAPOR EXTRACTION WELL
- INDUSTRIAL SUPPLY WELL
- RECOVERY SUMP
- PHASE I INFILL WELLS INSTALLED DURING JULY 999
- PHASE II INFILL WELLS INSTALLED DURING AUGUST 1999
- *COP* — CONDENSATE ON PROBE AT TIME OF GAUGING
- *0.01* — THICKNESS OF SEPARATE-PHASE CONDENSATE IN FEET
- *DRY* — INDICATES WELL WAS DRY AT TIME OF GAUGING
- *NM* — WELL NOT GAUGED; NOT ACCESSIBLE, OR NOT PART OF GAUGING PLAN
- INFERRED BOUNDARY OF CONDENSATE PLUME

MW-55	
Benzene	100
Toluene	<5
Ethylbenzene	13
Total Xylenes	<10

WELL ID

BOLD INDICATES BTEX CONSTITUENTS PRESENT AT CONCENTRATIONS ABOVE REGULATORY LIMITS.

INDICATES CONSTITUENT NOT DETECTED ABOVE NOTED LABORATORY DETECTION LIMIT.

CONCENTRATION (ug/L)

CONSTITUENT

OCD CLEANUP GOALS/REGULATORY LIMITS

Benzene	10 ug/L
Toluene	750 ug/L
Ethylbenzene	750 ug/L
Total Xylenes	620 ug/L

NOTES:

OCD NEW MEXICO ENERGY , MINERALS AND NATURAL RESOURCES DEPARTMENT, OIL CONSERVATION DIVISION

ug/L MICROGRAMS PER LITER

NO SHALLOW WELLS WERE SAMPLED IN JANUARY 1999.

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G:\PROJECT\MOD\INDIAN BASIN\NP000483.0001\CADD\FIGURE-6.DWG

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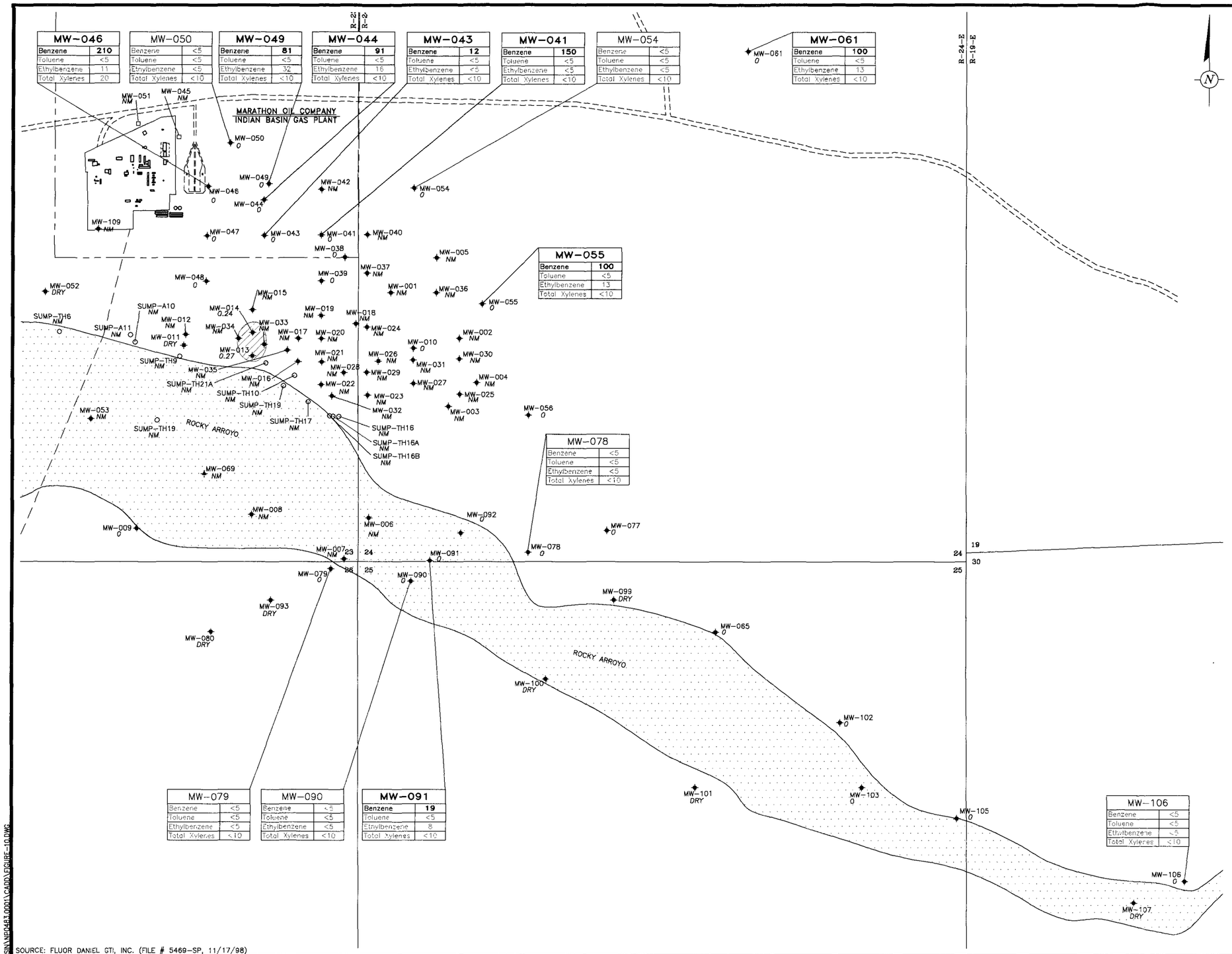
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ARCADIS GERAGHTY & MILLER
3000 Cabot Blvd West
Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

BTEX AND SEPARATE-PHASE CONDENSATE DISTRIBUTION SHALLOW ZONE JANUARY 1999

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	6



LEGEND

- MONITORING WELL
- INFILTRATION WELL
- RECOVERY WELL
- VAPOR EXTRACTION WELL
- INDUSTRIAL SUPPLY WELL
- RECOVERY SUMP
- PHASE I INFILL WELLS INSTALLED DURING JULY 999
- PHASE II INFILL WELLS INSTALLED DURING AUGUST 1999
- COP — CONDENSATE ON PROBE AT TIME OF GAUGING
- 0.01 — THICKNESS OF SEPARATE-PHASE CONDENSATE IN FEET
- DRY — INDICATES WELL WAS DRY AT TIME OF GAUGING
- NM — WELL NOT GAUGED; NOT ACCESSIBLE, OR NOT PART OF GAUGING PLAN
- INFERRED BOUNDARY OF CONDENSATE PLUME

MW-55	
Benzene	**100**
Toluene	<5
Ethylbenzene	13
Total Xylenes	<10

- WELL ID
- BOLD INDICATES BTEX CONSTITUENTS PRESENT AT CONCENTRATIONS ABOVE REGULATORY LIMITS.
- INDICATES CONSTITUENT NOT DETECTED ABOVE NOTED LABORATORY DETECTION LIMIT.
- CONCENTRATION (ug/L)
- CONSTITUENT

OCD CLEANUP GOALS/REGULATORY LIMITS

Benzene	10 ug/L
Toluene	750 ug/L
Ethylbenzene	750 ug/L
Total Xylenes	620 ug/L

NOTES;

OCD NEW MEXICO ENERGY , MINERALS AND NATURAL RESOURCES DEPARTMENT, OIL CONSERVATION DIVISION

ug/L MICROGRAMS PER LITER

SOURCE: FLUOR DANIEL GTI, INC. (FILE # 5469-SP, 11/17/98)

G:\PROJECT\MOC\INDIAN_BASIN\NP0483.0001\CADD\FIGURE-10.DWG
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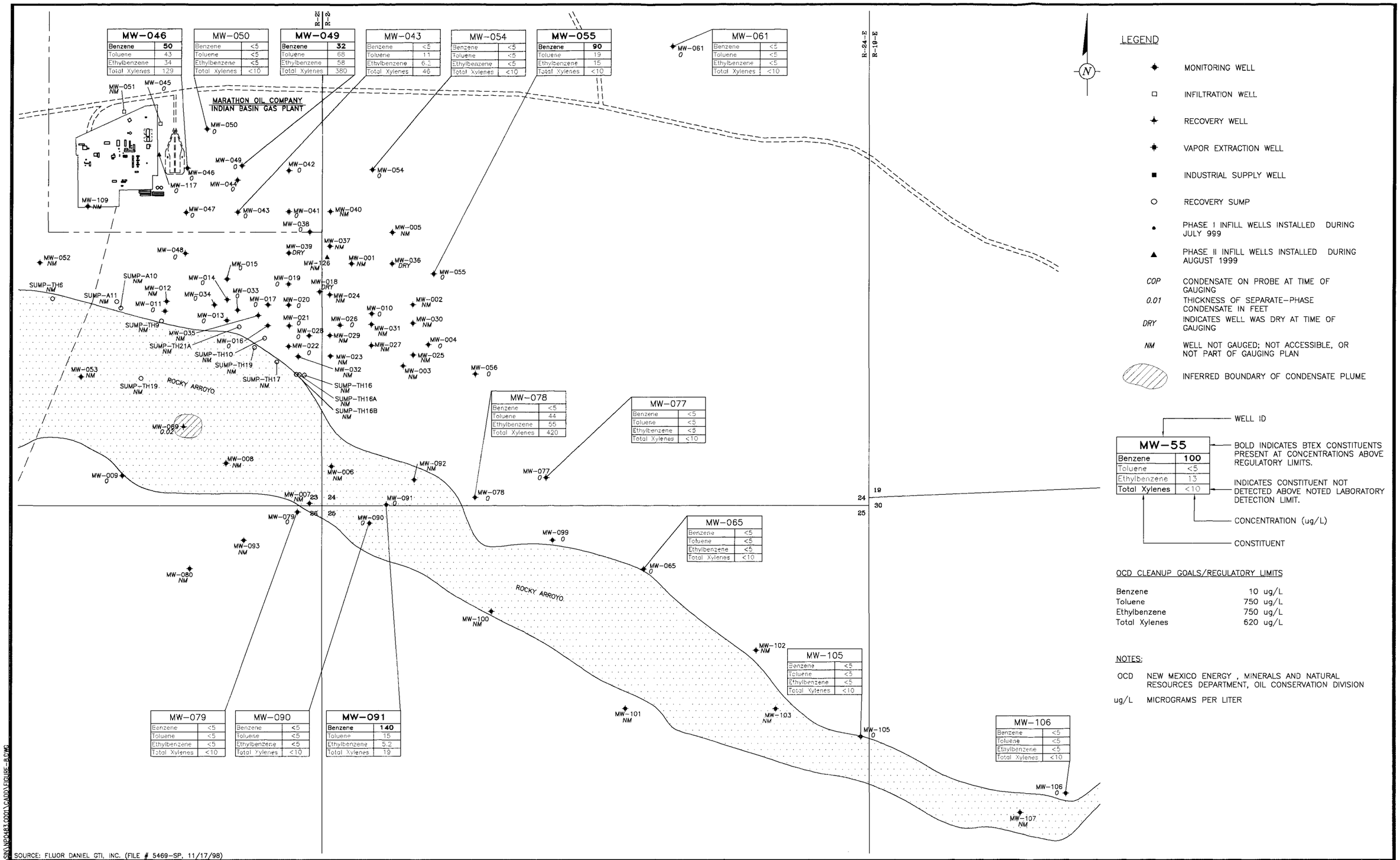
NO.	DATE	REVISION DESCRIPTION	BY / CKD

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Suite 3004, Langhorne, Pa 19047
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MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

BTEX AND SEPARATE-PHASE CONDENSATE DISTRIBUTION SHALLOW ZONE APRIL 1999

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	7



OCD CLEANUP GOALS/REGULATORY LIMITS

Benzene	10 ug/L
Toluene	750 ug/L
Ethylbenzene	750 ug/L
Total Xylenes	620 ug/L

NOTES:

OCD NEW MEXICO ENERGY , MINERALS AND NATURAL RESOURCES DEPARTMENT, OIL CONSERVATION DIVISION

ug/L MICROGRAMS PER LITER

SOURCE: FLUOR DANIEL GTI, INC. (FILE # 5469-SP, 11/17/98)

C:\PROJECT\MOC\INDIAN_BASIN\NP0483.0001\CADD\FIGURE-8.DWG

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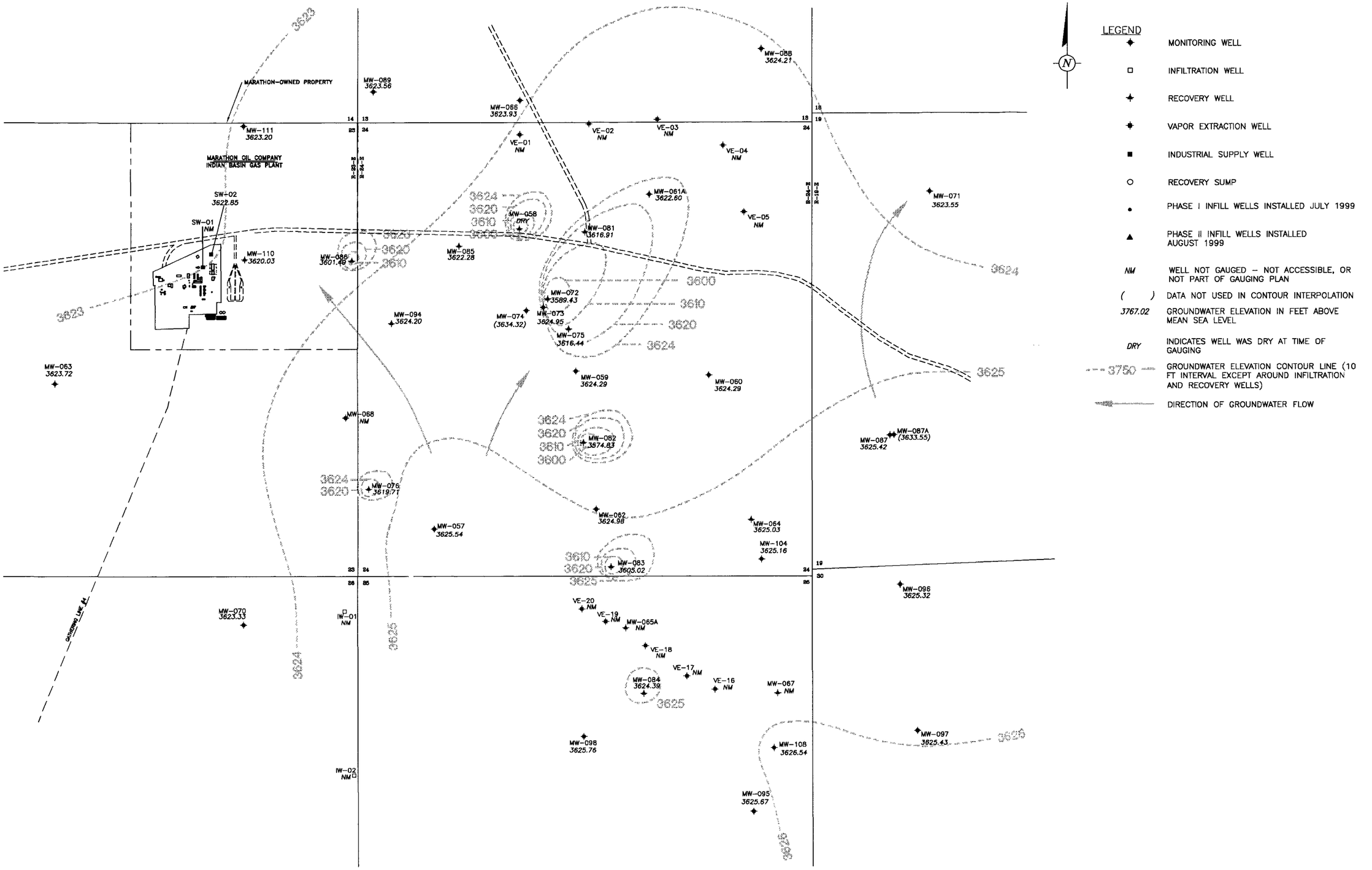
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Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

DRAWN: M. WASILEWSKI	DATE: 02/07/00
PROJECT MANAGER: M. HANSEN	DEPARTMENT MANAGER: D. SOUSA
LEAD DESIGN PROF.	CHECKED: J. HORST
PROJECT NUMBER: NP000483.0001	DRAWING NUMBER: 8

BTEX AND SEPARATE-PHASE CONDENSATE DISTRIBUTION SHALLOW ZONE
DECEMBER 1999 / JANUARY 2000



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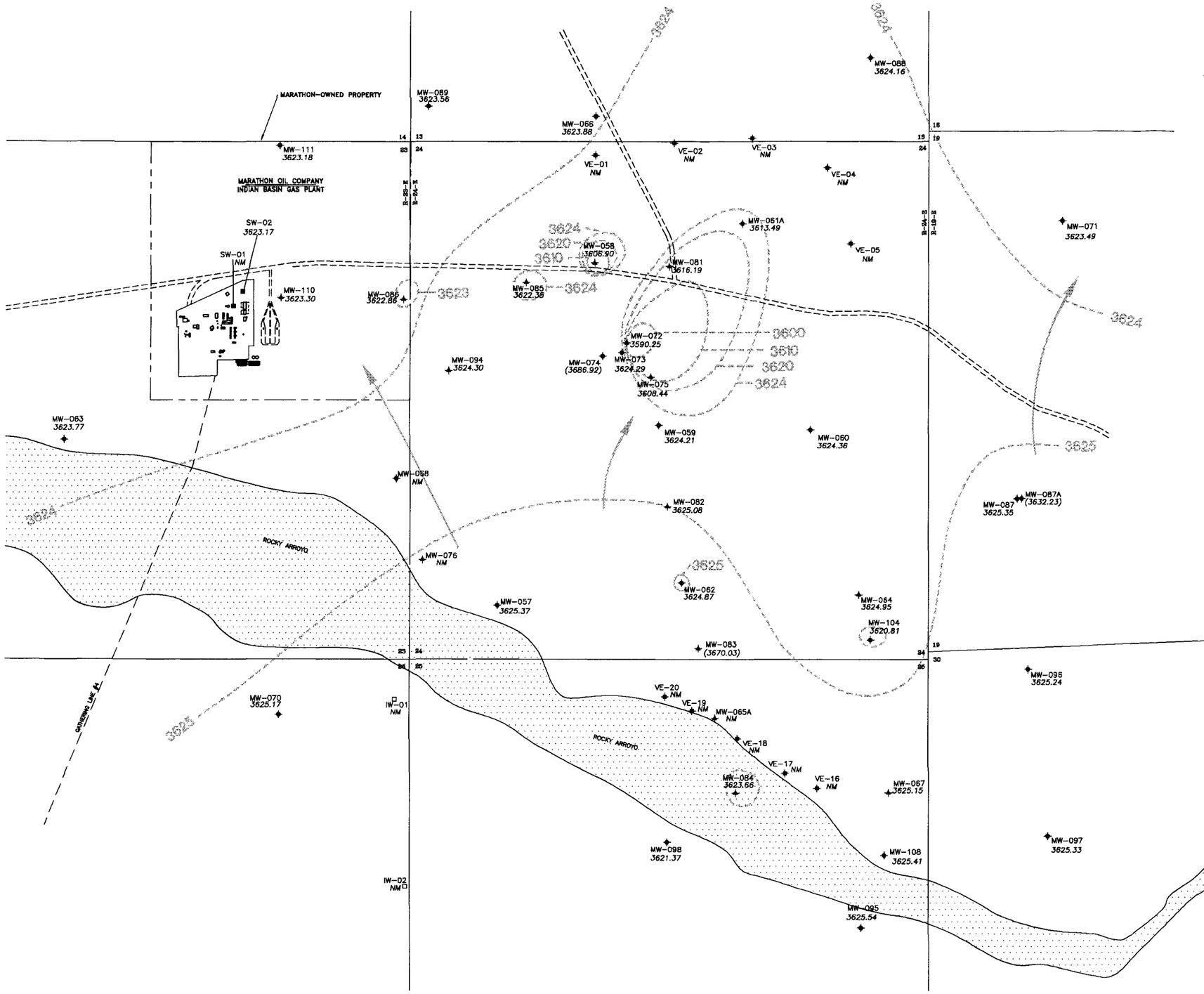
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MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

LOWER QUEEN GROUNDWATER ELEVATION CONTOURS
JANUARY 1999

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	9

Q:\NP\PROJECTS\MOC\INDIAN_BASIN\NP000483.0001\CAD\FIGURE-9.DWG



LEGEND

- MONITORING WELL
- INFILTRATION WELL
- RECOVERY WELL
- VAPOR EXTRACTION WELL
- INDUSTRIAL SUPPLY WELL
- RECOVERY SUMP
- PHASE I INFILL WELLS INSTALLED JULY 1999
- PHASE II INFILL WELLS INSTALLED AUGUST 1999
- *NM* — WELL NOT GAUGED – NOT ACCESSIBLE, OR NOT PART OF GAUGING PLAN
- ( ) — DATA NOT USED IN CONTOUR INTERPOLATION
- *3767.02* — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- *DRY* — INDICATES WELL WAS DRY AT TIME OF GAUGING
- 3750 — GROUNDWATER ELEVATION CONTOUR LINE (10 FT INTERVAL EXCEPT AROUND INFILTRATION AND RECOVERY WELLS)
- DIRECTION OF GROUNDWATER FLOW

SOURCE: FLUOR DANIEL GTI, INC. (FILE # 5469-SP, 11/17/98)

C:\APROJECT\WORK\INDIAN_BASIN\NP483.0001\CADD\FIGURE-10.DWG

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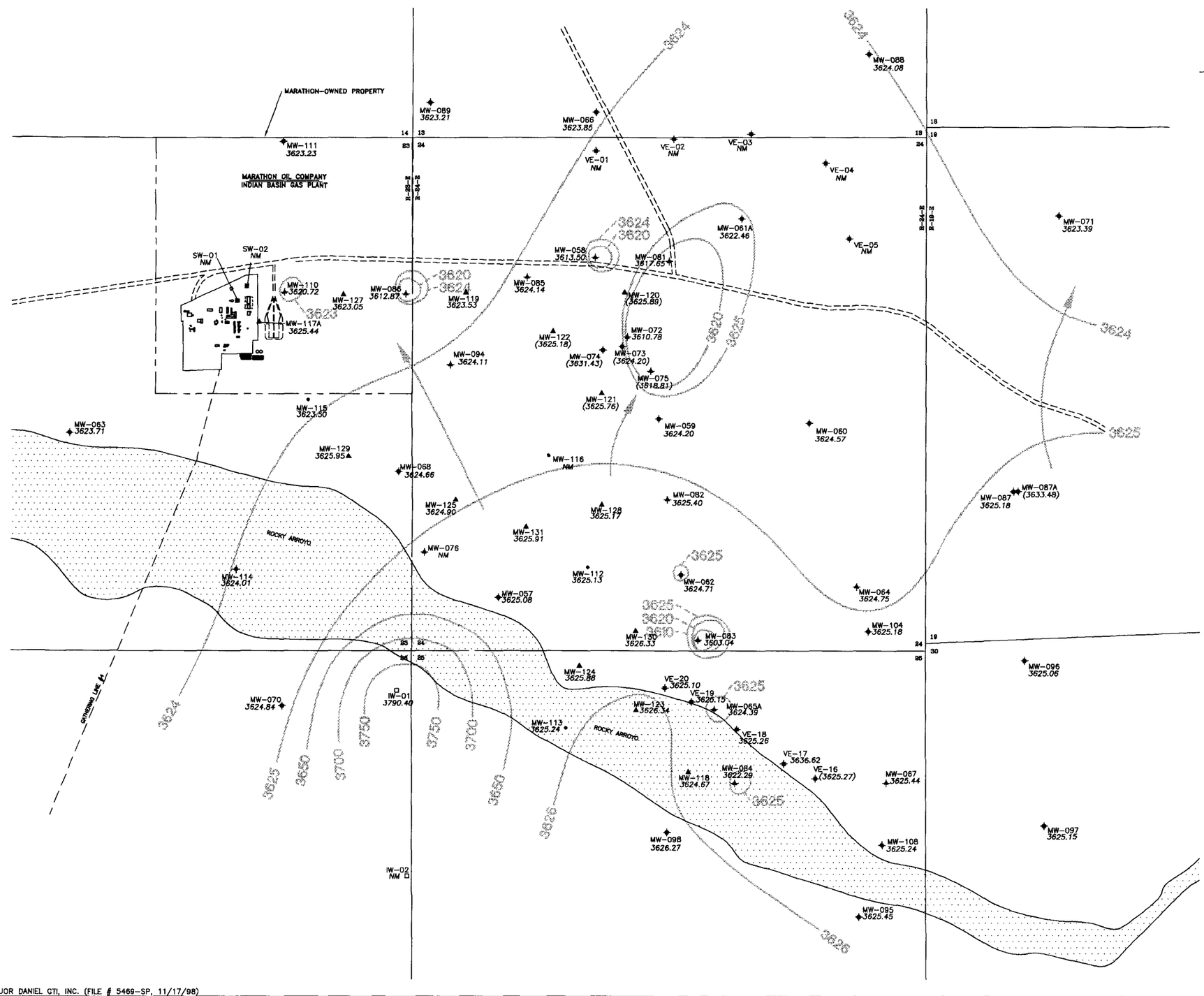
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Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

LOWER QUEEN GROUNDWATER ELEVATION CONTOURS
APRIL 1999

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	10



LEGEND

- MONITORING WELL
- INFILTRATION WELL
- RECOVERY WELL
- VAPOR EXTRACTION WELL
- INDUSTRIAL SUPPLY WELL
- RECOVERY SUMP
- PHASE I INFILL WELLS INSTALLED JULY 1999
- PHASE II INFILL WELLS INSTALLED AUGUST 1999
- *NM* — WELL NOT GAUGED – NOT ACCESSIBLE, OR NOT PART OF GAUGING PLAN
- ( ) — DATA NOT USED IN CONTOUR INTERPOLATION
- *3767.02* — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- *DRY* — INDICATES WELL WAS DRY AT TIME OF GAUGING
- 3750 — GROUNDWATER ELEVATION CONTOUR LINE (10 FT INTERVAL EXCEPT AROUND INFILTRATION AND RECOVERY WELLS)
- DIRECTION OF GROUNDWATER FLOW

SOURCE: FLUOR DANIEL GTI, INC. (FILE # 5469-SP, 11/17/98)

P:\PROJECTS\MOC\INDIAN BASIN\NP0483.0001\CAD\FIGURE-11.DWG

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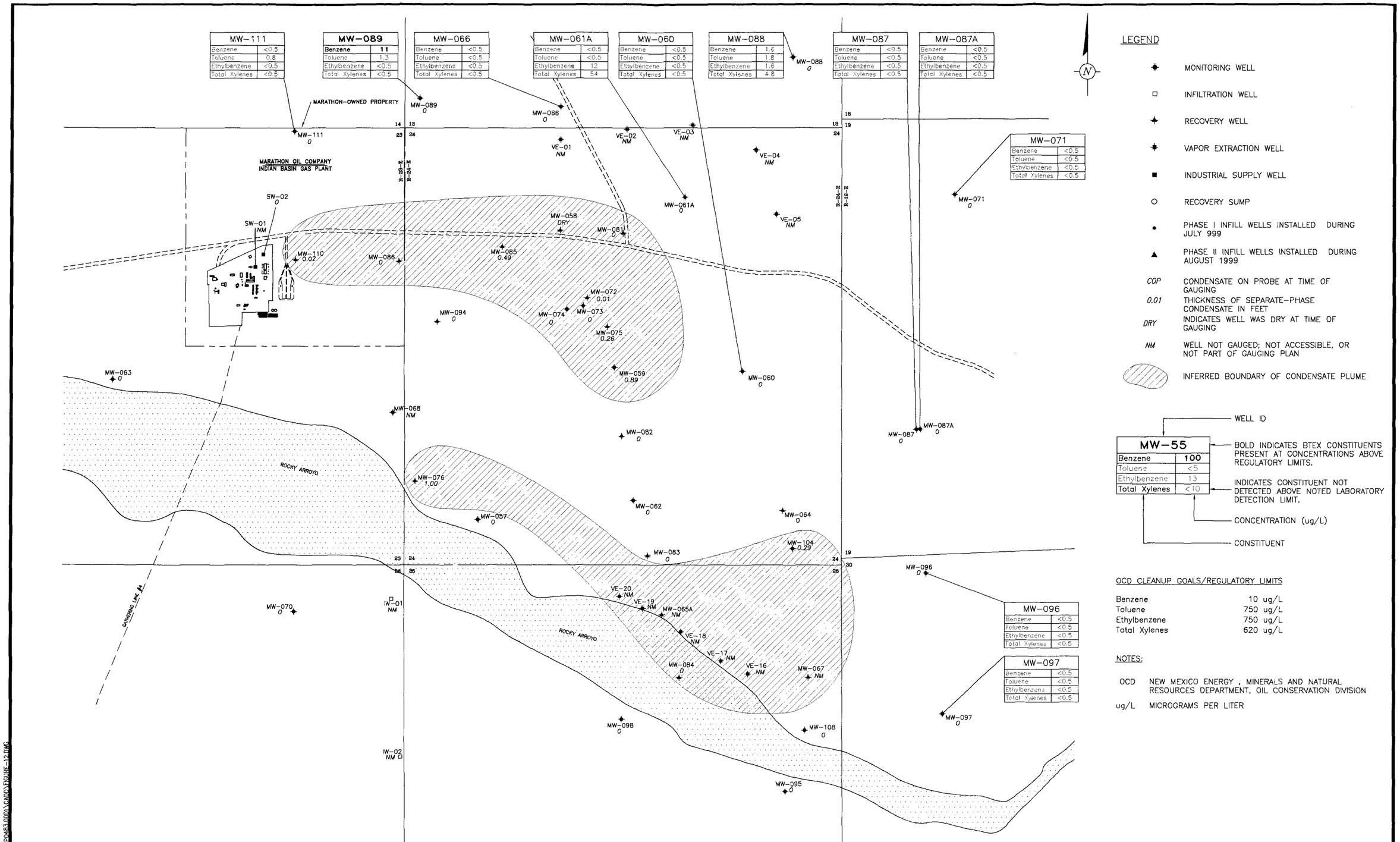
NO.	DATE	REVISION DESCRIPTION	BY / CKD

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Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

LOWER QUEEN GROUNDWATER ELEVATION CONTOURS
JANUARY 2000

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	11



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G:\PROJECT\MOC\INDIAN_BASIN\NP483.0001\CAD\FIGURE-12.DWG

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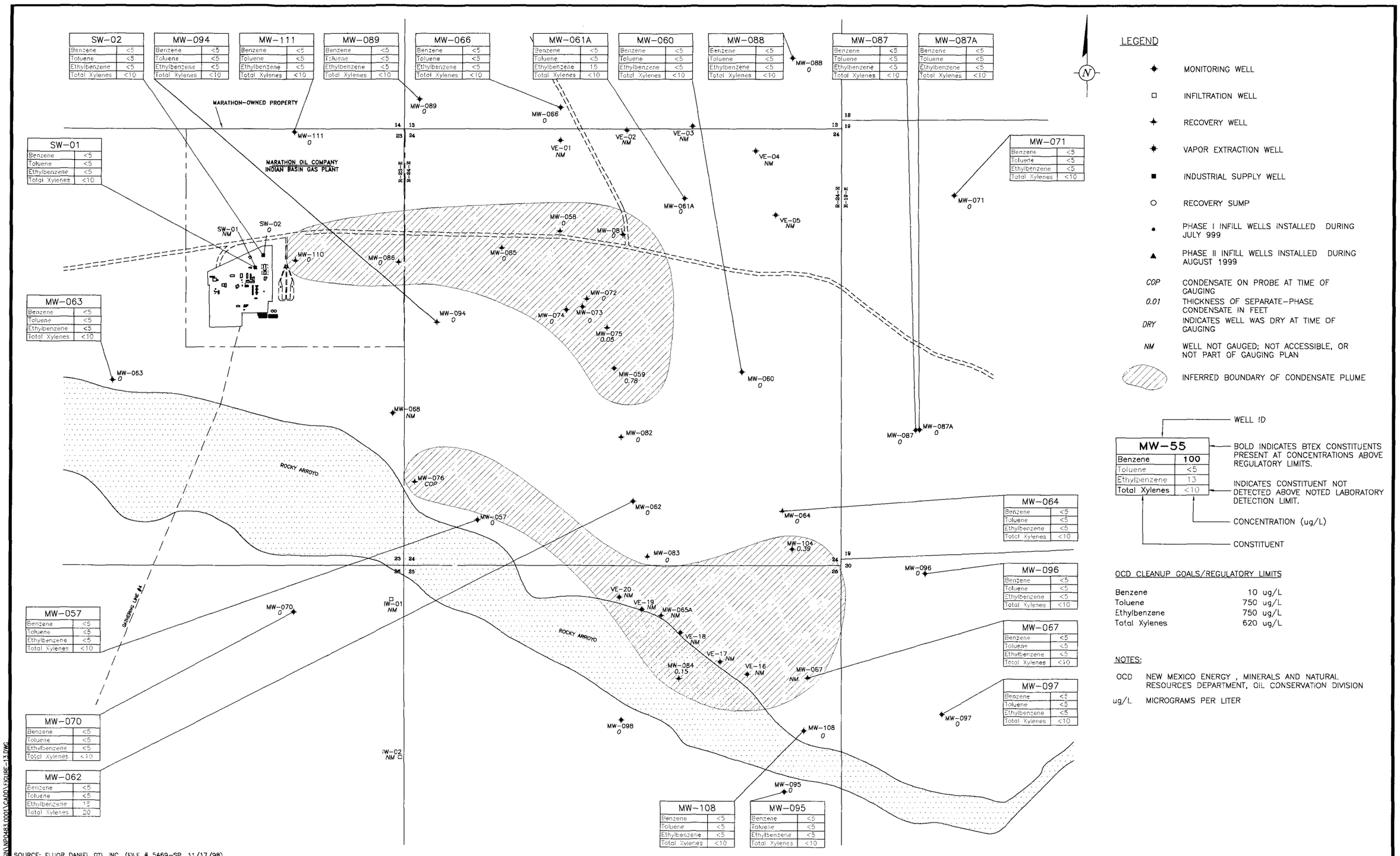
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Suite 3004, Langhorne, Pa 19047
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MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

BTEX AND SEPARATE-PHASE CONDENSATE DISTRIBUTION
LOWER QUEEN
JANUARY 1999

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	12



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G:\PROJECT\MOC\INDIAN_BASIN\NP2483.0001\CAD\FIGURE-13.DWG

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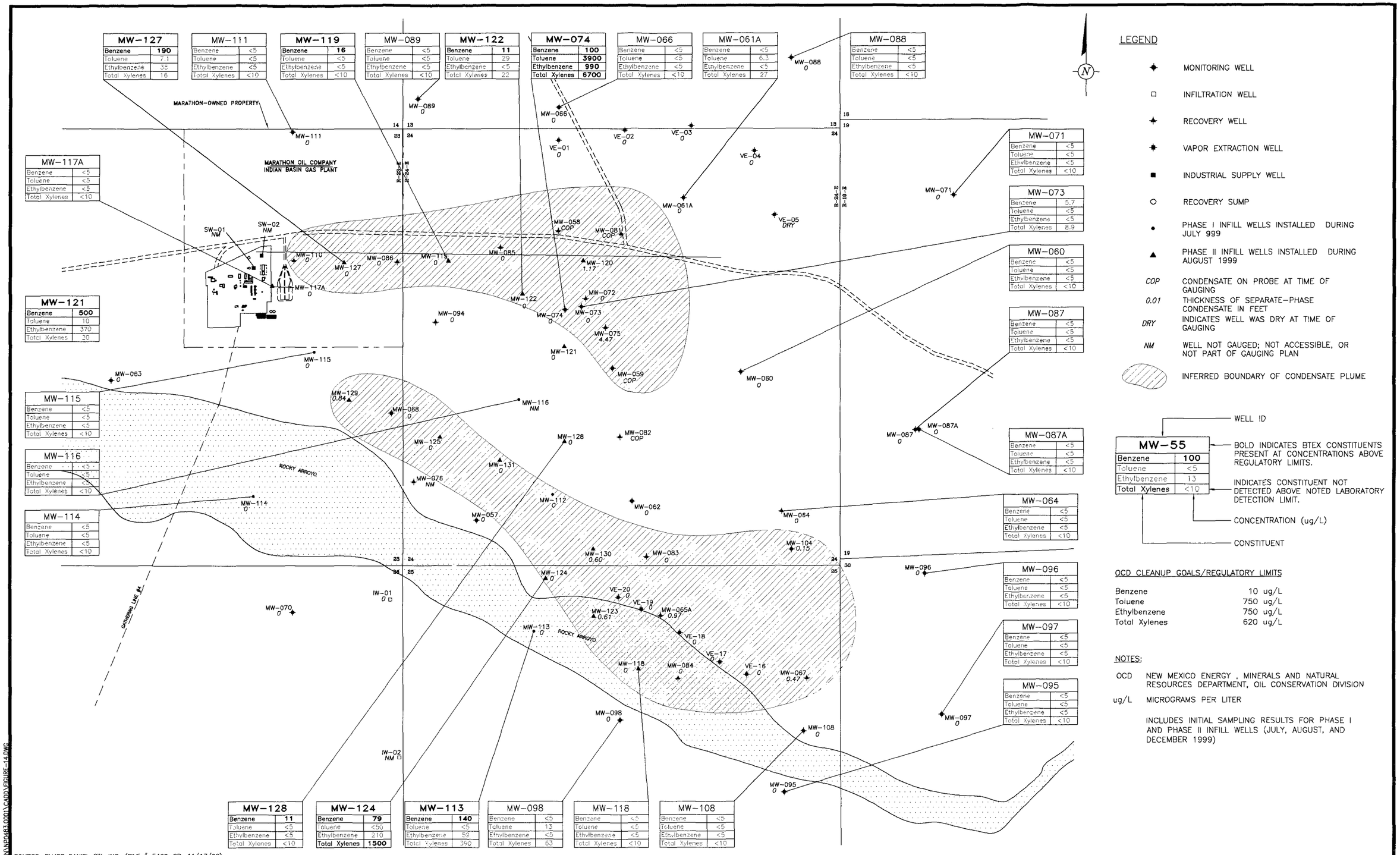
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Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-8879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

BTEX AND SEPARATE-PHASE CONDENSATE DISTRIBUTION LOWER QUEEN APRIL 1999

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
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		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	13



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G:\PROJECT\MOC\INDIAN BASIN\NP483.0001\CADD\FIGURE-14.DWG

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NO.	DATE	REVISION DESCRIPTION	BY / CKD

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3000 Cabot Blvd West
Suite 3004, Langhorne, Pa 19047
Tel: 215/752-6840 Fax: 215/752-6879

MARATHON OIL COMPANY
INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

BTEX AND SEPARATE-PHASE CONDENSATE DISTRIBUTION LOWER QUEEN DECEMBER 1999 / JANUARY 2000

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	02/07/00	M. HANSEN	D. SOUSA
		LEAD DESIGN PROF.	CHECKED
			J. HORST
		PROJECT NUMBER	DRAWING NUMBER
		NP000483.0001	14

Appendix A

Remediation Workplan and OCD Approval Letter

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

May 26, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. Z-274-520-667

Mr. Paul Peacock
Marathon Oil Company
P.O. Box 552
Midland, Texas 79702-0552

RE: REMEDIATION WORK PLAN
MARATHON INDIAN BASIN GAS PLANT

Dear Mr. Peacock:

The New Mexico Oil Conservation Division (OCD) has reviewed Marathon Oil Company's (MOC) March 30, 1999 "REMEDIATION WORKPLAN, INDIAN BASIN REMEDIATION PROJECT, MARATHON OIL COMPANY". This document contains MOC's proposal to install and sample additional ground water monitoring wells within the hydrocarbon plume at MOC's Indian Basin Gas Plant. The plan also proposes to conduct a video survey, pump tests, gamma ray logs and vapor extraction tests on each well.

The above referenced work plan **is approved.** Please be advised that OCD approval does not relieve MOC of liability if the plan fails to adequately monitor contamination related to MOC's activities or if contamination exists which is outside the scope of the work plan. In addition, OCD approval does not relieve MOC of responsibility for compliance with any other federal, state or local laws and regulations.

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

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Tim Gum, OCD Artesia District Supervisor

MCR

JUN 01 1999

Environmental & Safety

Mid-Continent Region
Production United States

Marathon Oil Company

P.O. Box 552
Midland, TX 79702-0552
Telephone 915/682-1626

March 30, 1999

Mr. William C. Olson
Hydrogeologist
Environment Bureau
Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

RE: Remediation Workplan
Indian Basin Remediation Project
Marathon Oil Company

Dear Mr. Olson:

Marathon Oil Company (Marathon) is requesting approval of this workplan to conduct remediation activities for the Indian Basin Remediation Project. The remediation activities include the installation and testing of additional Lower Queen aquifer monitoring wells within the hydrocarbon plume as described in detail below.

Lower Queen Aquifer Remediation Activities
Drill and complete approximately five Lower Queen aquifer monitoring wells (MW-112, 113, 114, 115 and 116) within the hydrocarbon plume as shown on the attached Figure 1-3. The wells will be constructed as shown on the attached typical well completion diagram. The wells will be developed as detailed in the Monitoring Well Development section of the work plan. If hydrocarbons are present in the well, then groundwater samples will not be collected. Otherwise, each well will be sampled as detailed in the Groundwater Sampling and Analysis section of the workplan. Upon completion of the sampling activities, a video camera survey, a Natural Gamma Ray log, a short term vapor extraction test and a short term pumping rate test will be performed on the open borehole section of each well. Based on the data collected during the testing activities, well screen may be installed in each well.

Monitoring Well Development
The monitoring wells will be developed by purging until the groundwater is clear and field measurements of pH, conductivity, temperature and turbidity have stabilized. The extracted fluids will be pumped or bailed into a trailer-mounted fiberglass tank and transported to the Indian Basin Gas Plant for disposal in one of the double-lined sumps of the plant's wastewater collection system.

Groundwater Sampling and Analysis
Upon completion of the development and purging activities, groundwater samples will be collected using a disposable bailer. The groundwater samples will be placed in appropriate containers, stored on ice, and shipped to Core Laboratories in Valpariso, Indiana for analysis. The groundwater samples will be analyzed for benzene, toluene, ethyl benzene and xylenes by USEPA Method 8020.

The proposed investigations activities are scheduled to begin on or about April 26, 1999. The remediation activities will be reported in the Annual Monitoring Report and submitted to your office by March 1, 2000. If you have any questions or comments, then please call me at (915) 687-8312.

Sincerely,

M. Paul Pearch

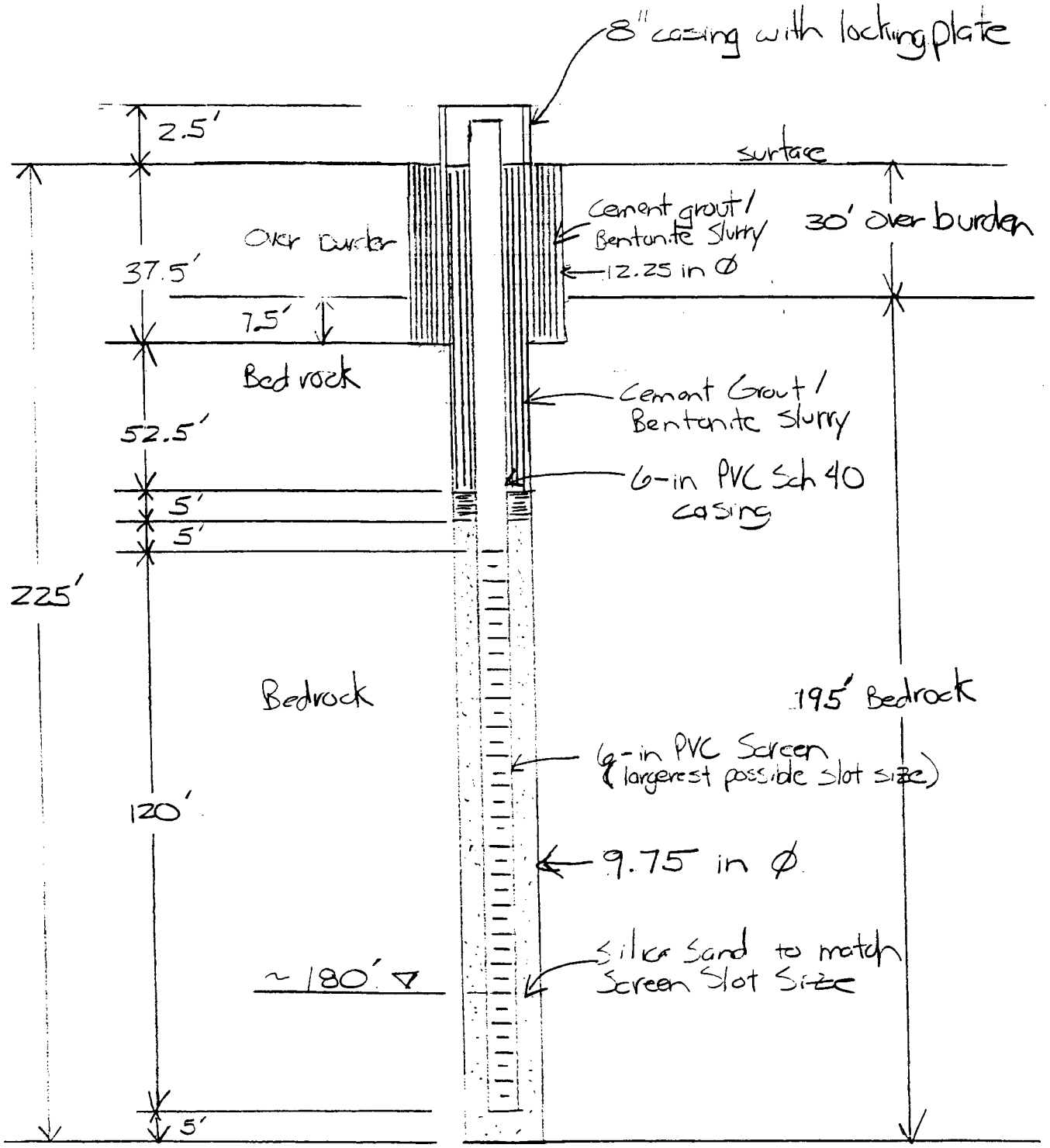
[redacted]
Advanced Environmental & Safety Engineer

attachments
MPP\wellwkpl.wpd

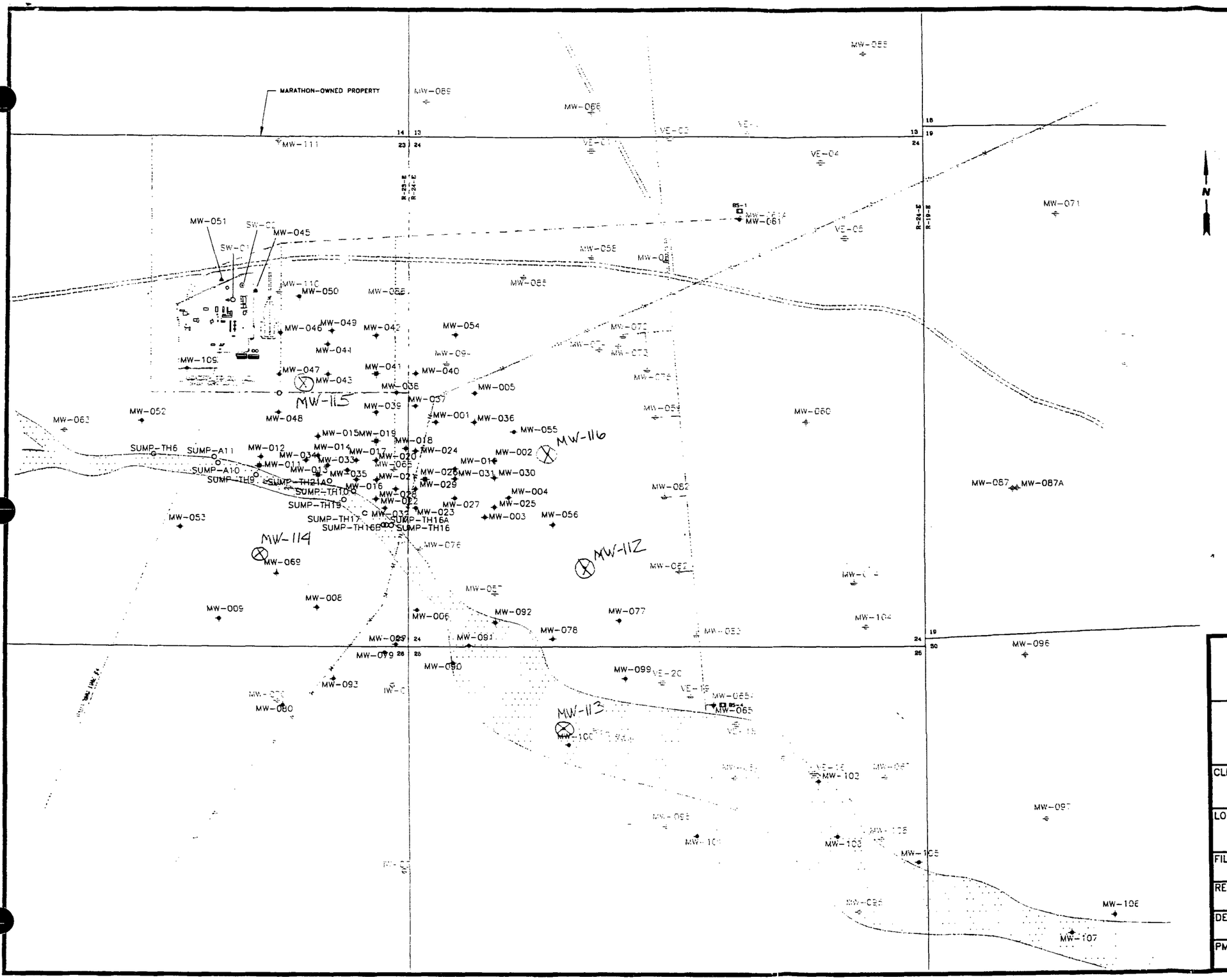
pc: Michael Hansen of ARCADIS Geraghty & Miller w/attachments
T. C. Lowry w/o attachments
F. D. Searle w/o attachments
K. W. Tatarzyn w/o attachments

Subject Proposed Infill Well Completion MW-(112-116) Page No. 1 Of 1

File Indian Basin Remediation Project By M.P. Peacock Date 4/1/98



Scale: NTS



FLUOR DANIEL GTI

0 FEET 1000
SCALE

WELL LOCATION MAP

CLIENT: MARATHON OIL COMPANY

LOCATION: INDIAN BASIN REMEDIATION PROJECT
EDDY COUNTY, NEW MEXICO

FILE:	PROJECT NO.:
5469-SP (1:1000)	105469

REV.:

DES.:	DET.:	DATE:	FIGURE:
CL	DH	11/17/98	1-3

PM: PE/RG:

Appendix B

Natural Gamma Logs

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG: GAMMA RAY	PERM. DATUM: GROUND LEVEL LOG MEASURED FROM: TOP CASING ELEVATION:	OTHER SERVICES:

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: VE-4
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

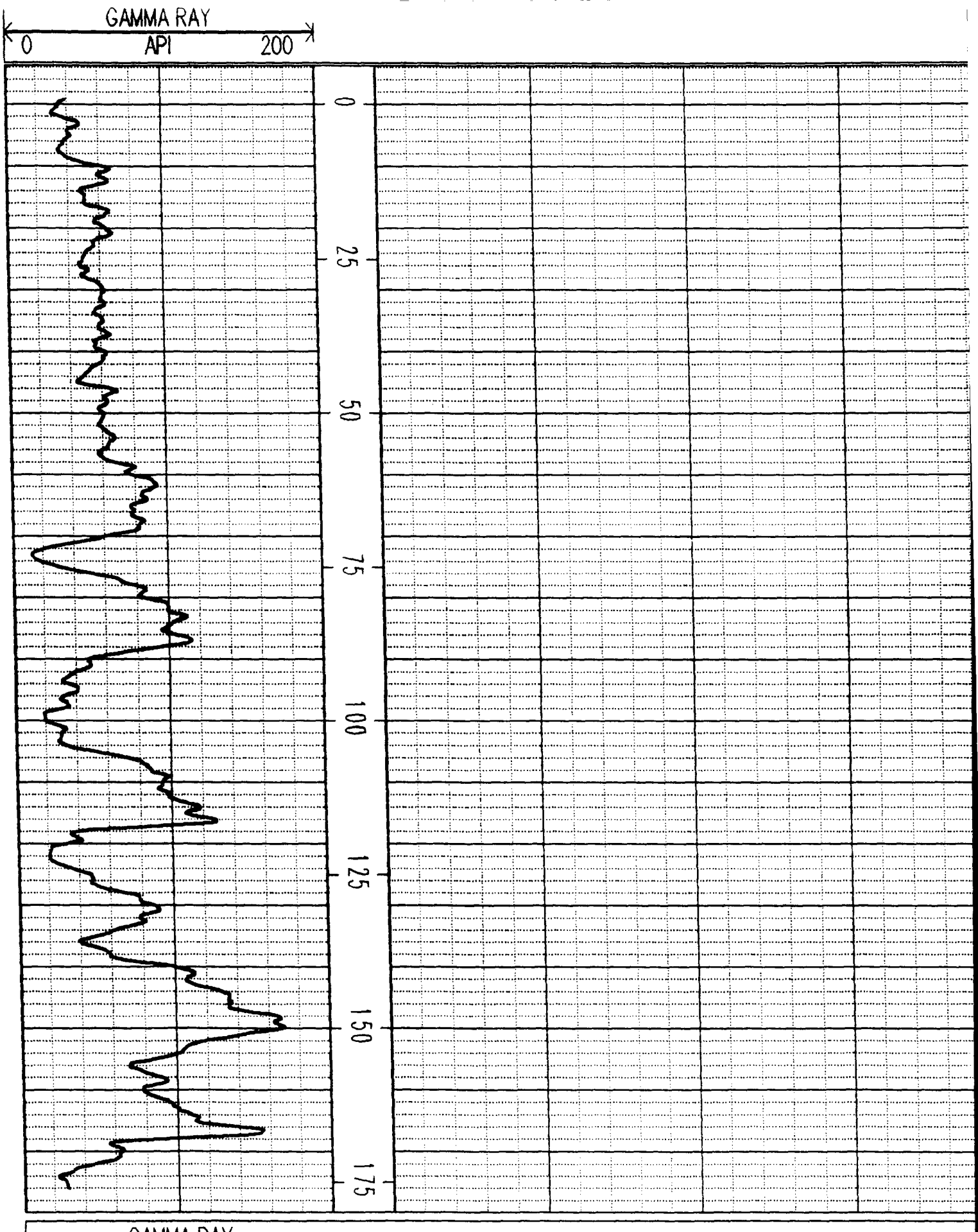
ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	180 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	176 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: VE-4



(\acq\ve4.gp0)

SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: VE-5
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

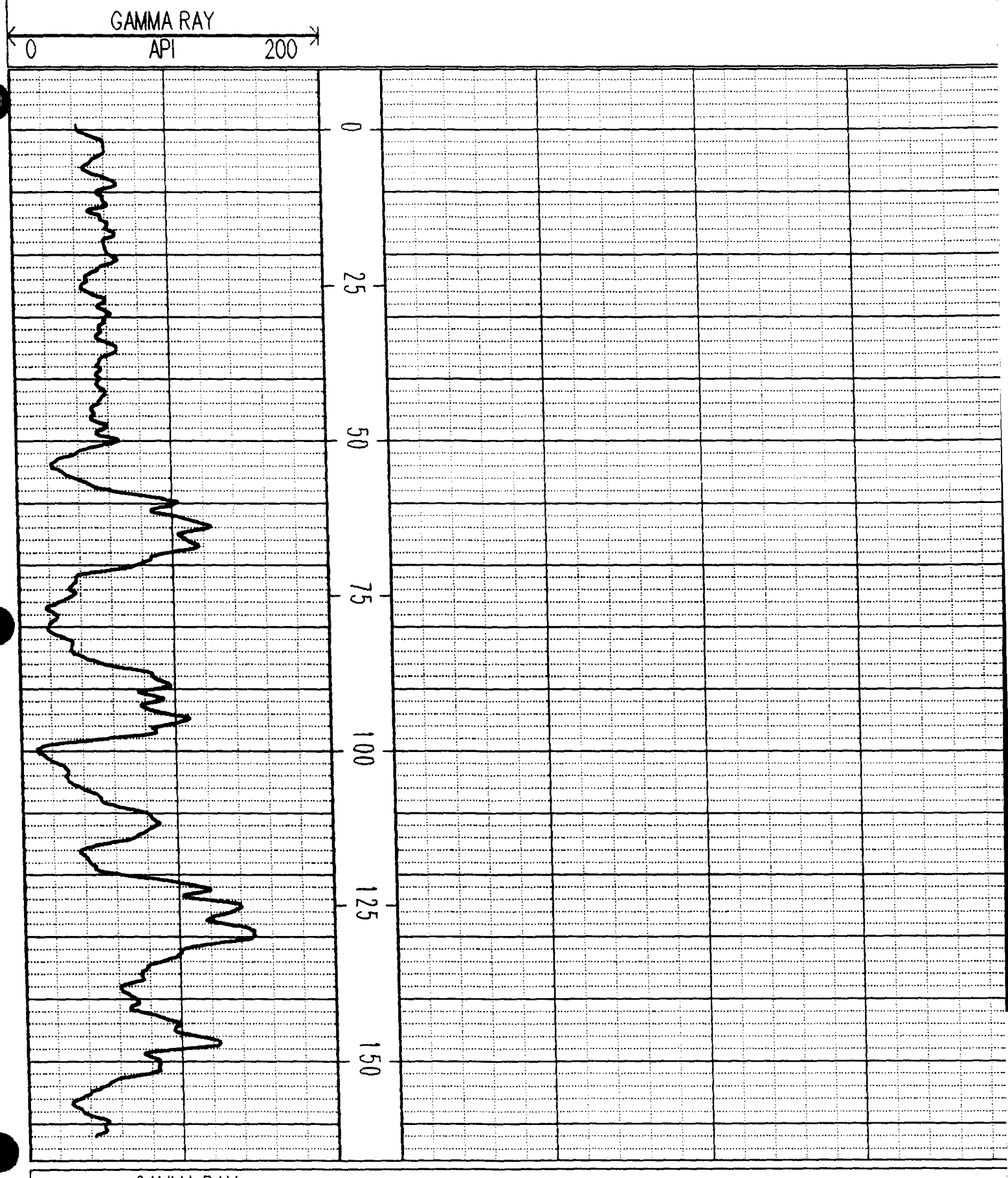
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	166 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	162 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: VE-5

(\acq\ve5.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.



(\acq\ve5.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	VIDEO
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: VE-19
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

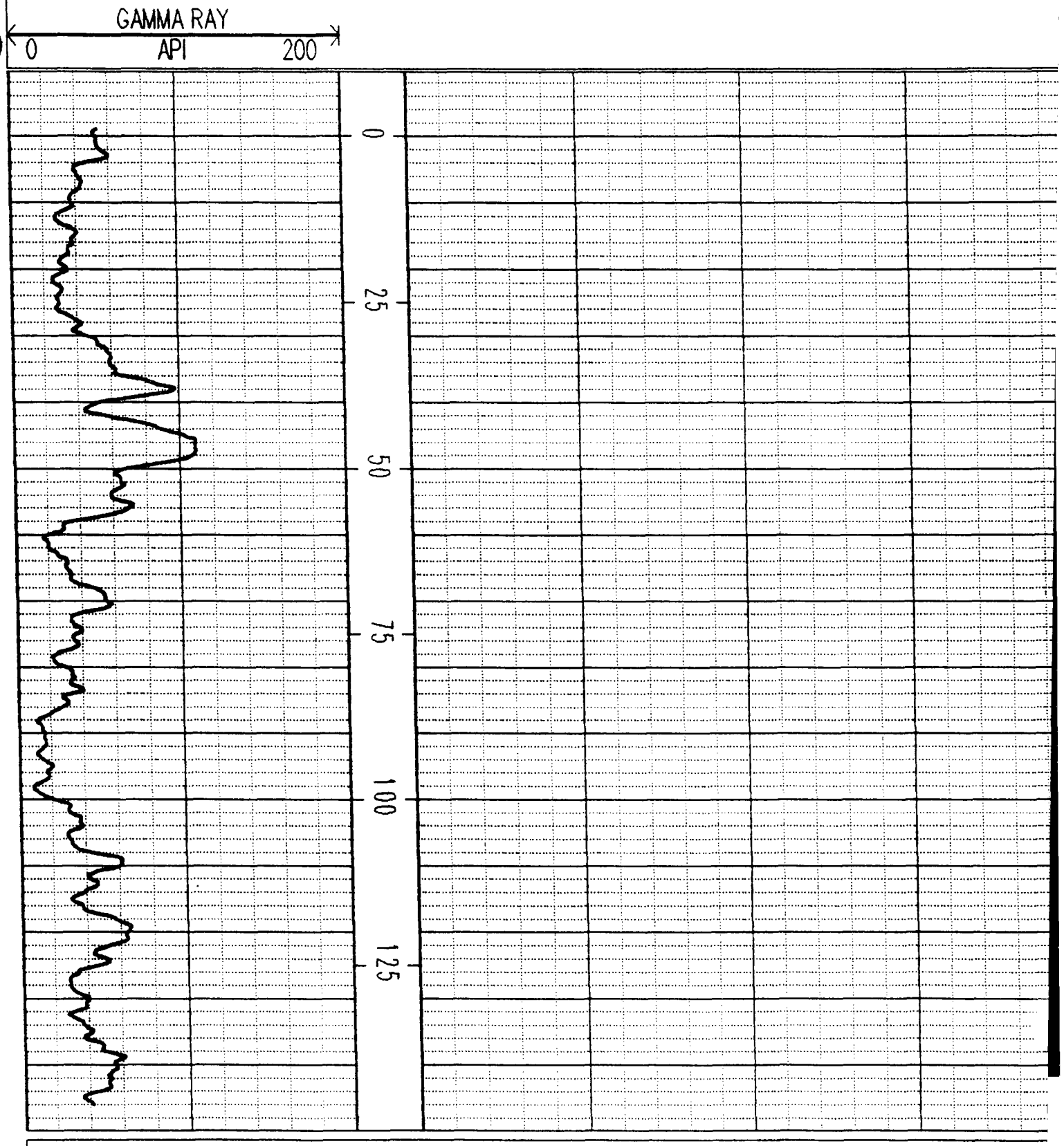
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	136 ft.
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	151 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	147 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	37 ft.	CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE	7 & 7/8 in.	LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: VE-19

(\acq\ve19.gp2) SOUTHWEST GEOPHYSICAL SERVICES,INC.



(\acq\ve19.gp2) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	VIDEO
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: VE-20
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

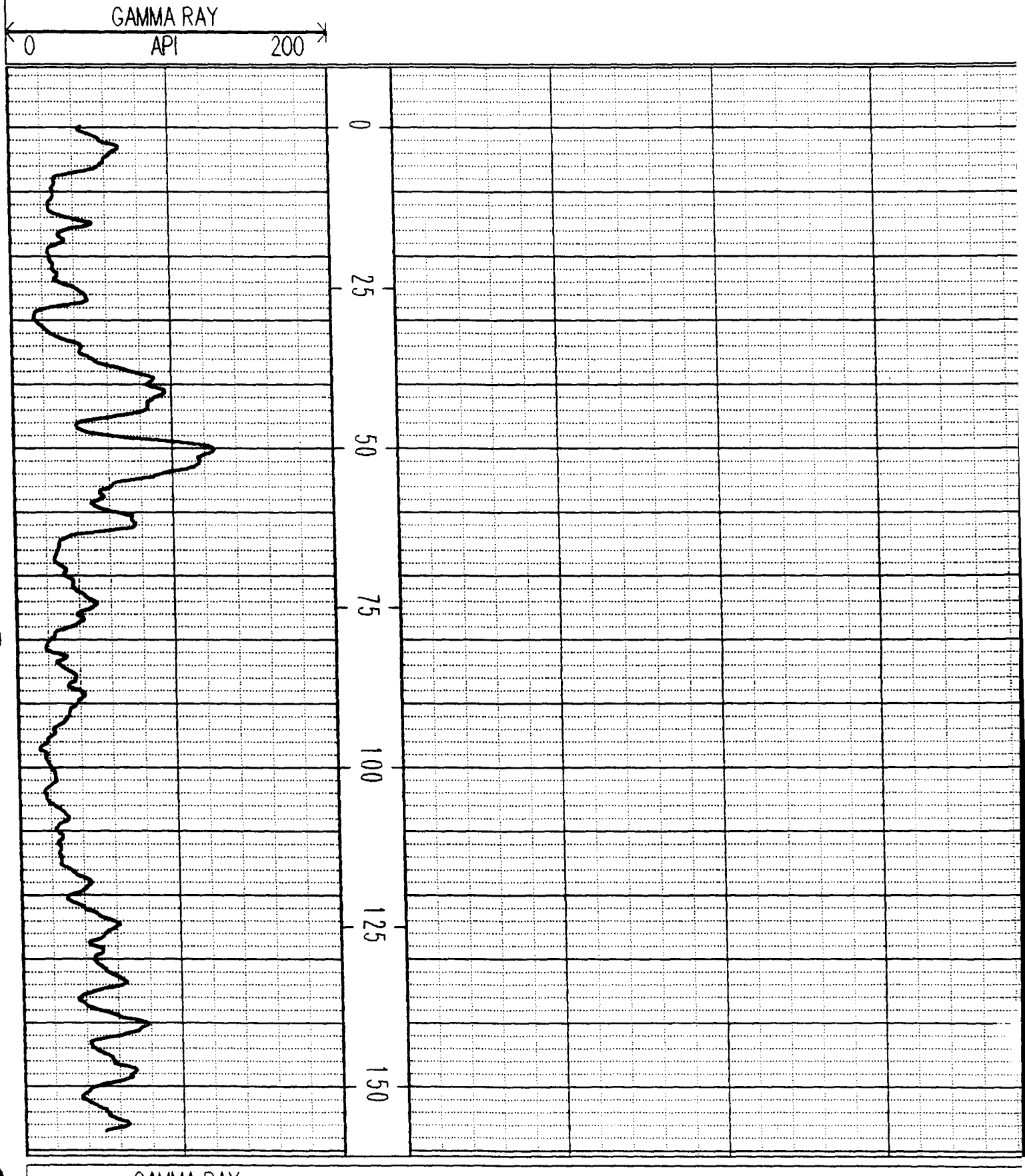
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	143 ft.
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	162 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	158 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	37 ft.	CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE	7 & 7/8 in.	LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: VE-20

(\acq\ve20.gp3) SOUTHWEST GEOPHYSICAL SERVICES,INC.



(\acq\ve20.gp3) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-57
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

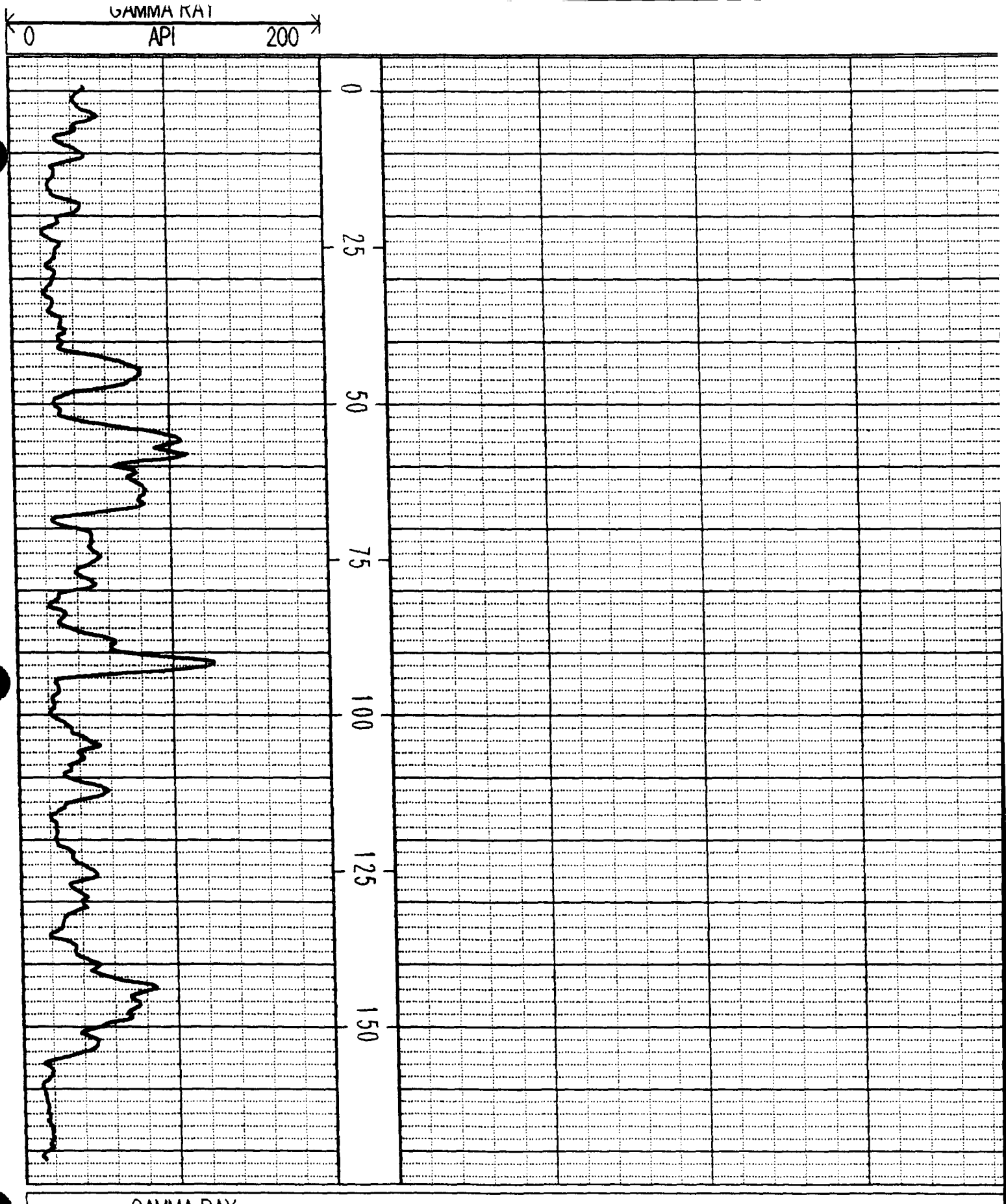
ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	5/18/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	176 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	172 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	All	CIRCULATION TEMP.	
CASING SIZE	4 in. PVC	BOT HOLE TEMP.	
CASING SIZE	8 in. Steel	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-57



GAMMA RAY
0 API 200

(\acq\mw57.gp0)

SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-74
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

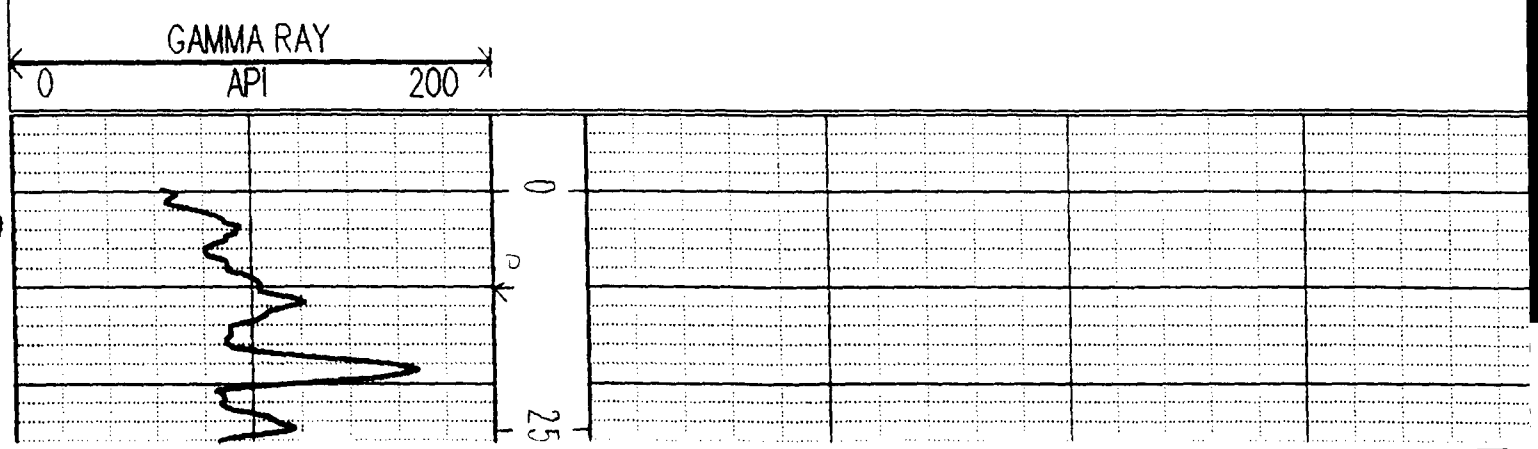
COMPANY: MARATHON OIL COMPANY
WELL: MW-74

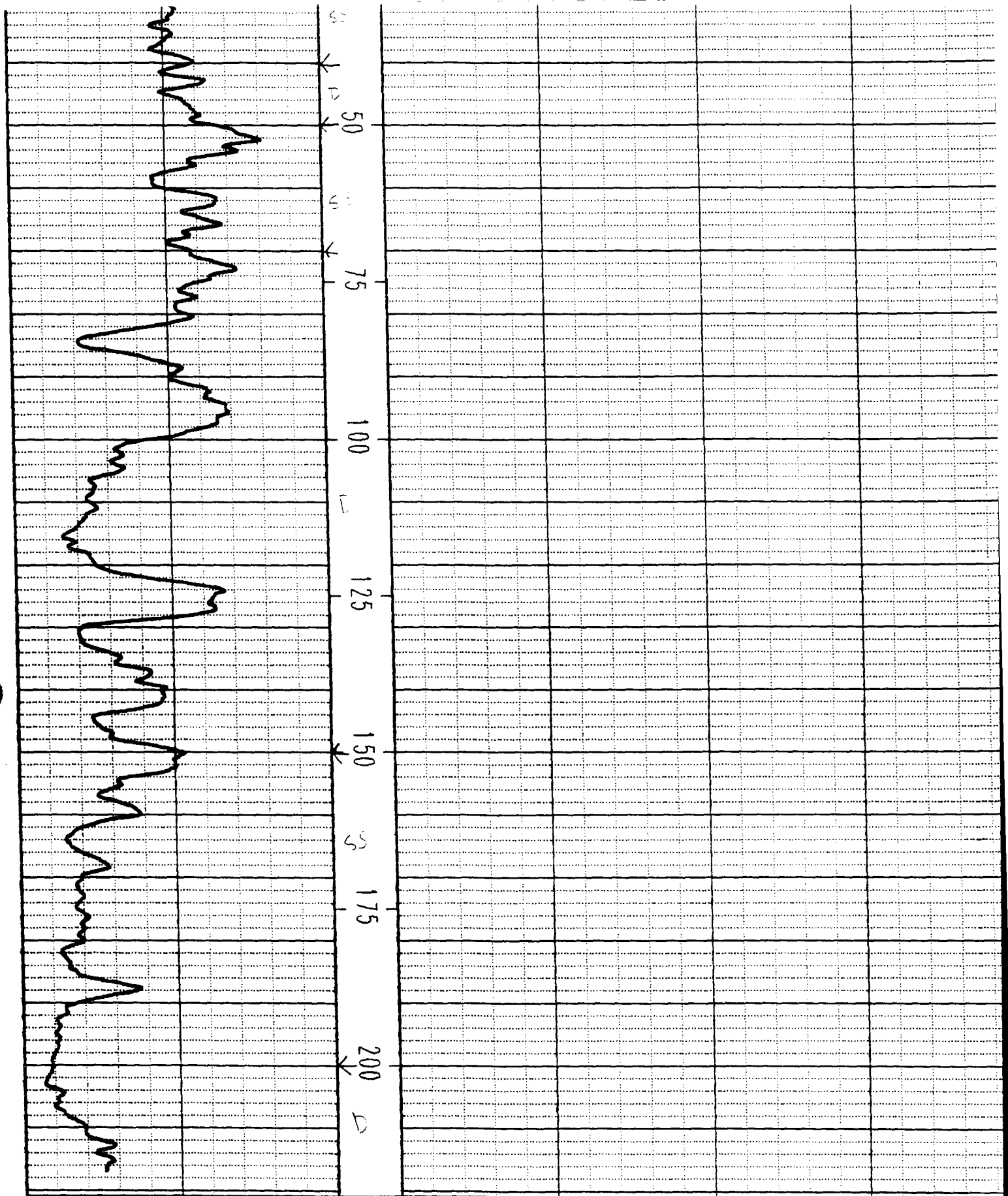
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	221 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	217 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

(\acq\mw74.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.





GAMMA RAY

0 API 200

(\acq\mw74.gp0)

SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-71
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

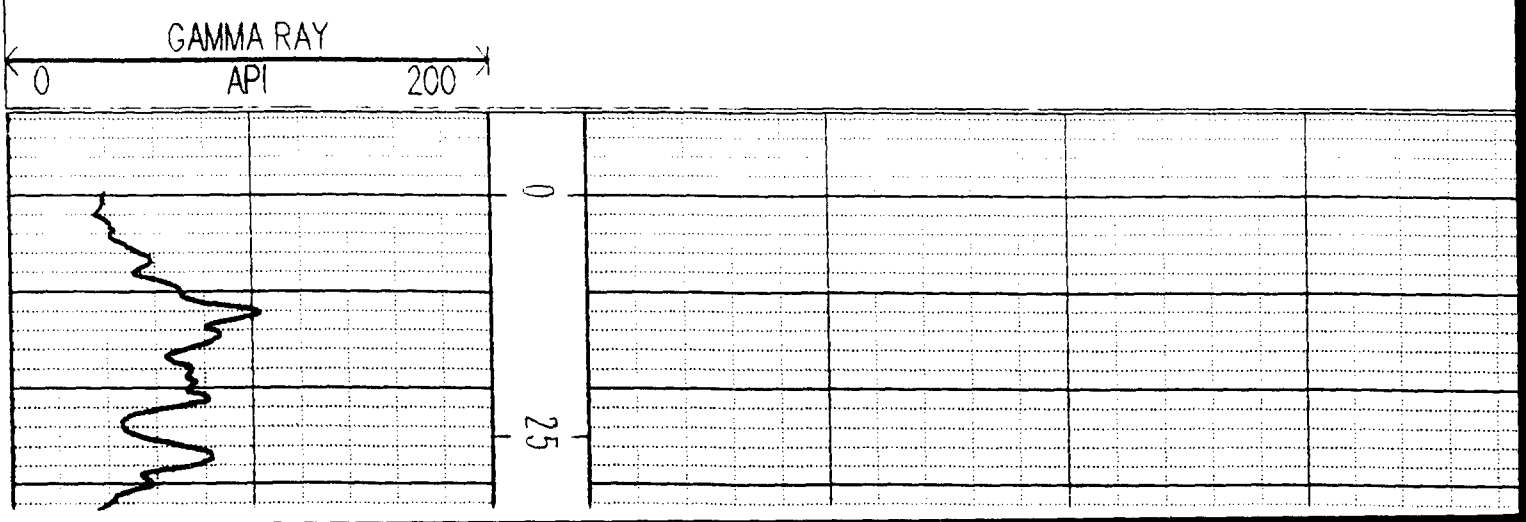
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	231 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	227 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in.PVC	TOOL #	gr450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

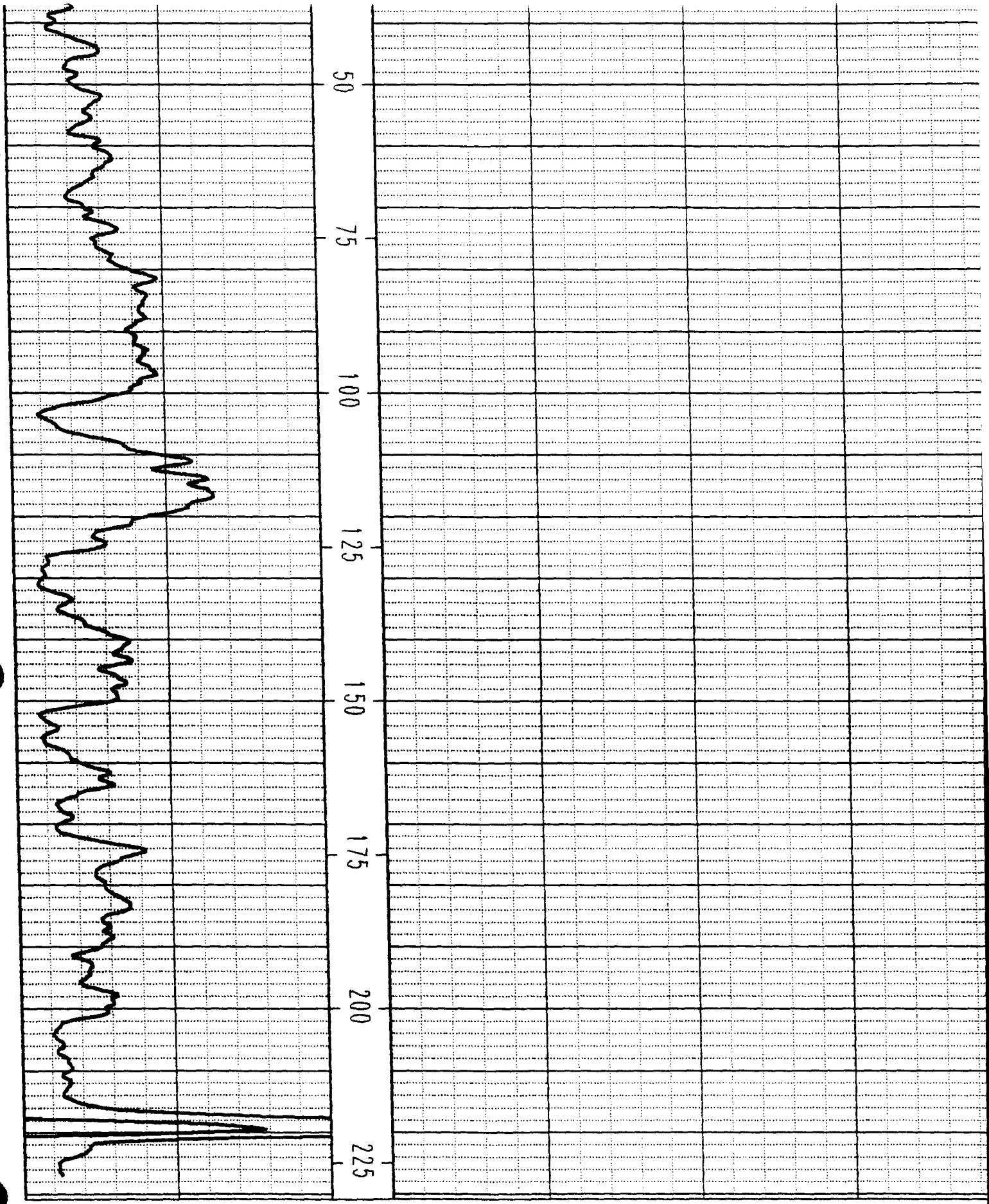
REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-71

(\acq\mw71.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.





GAMMA RAY

0 API 200

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SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-76
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	ft.
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	222 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	218 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	ft.	CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

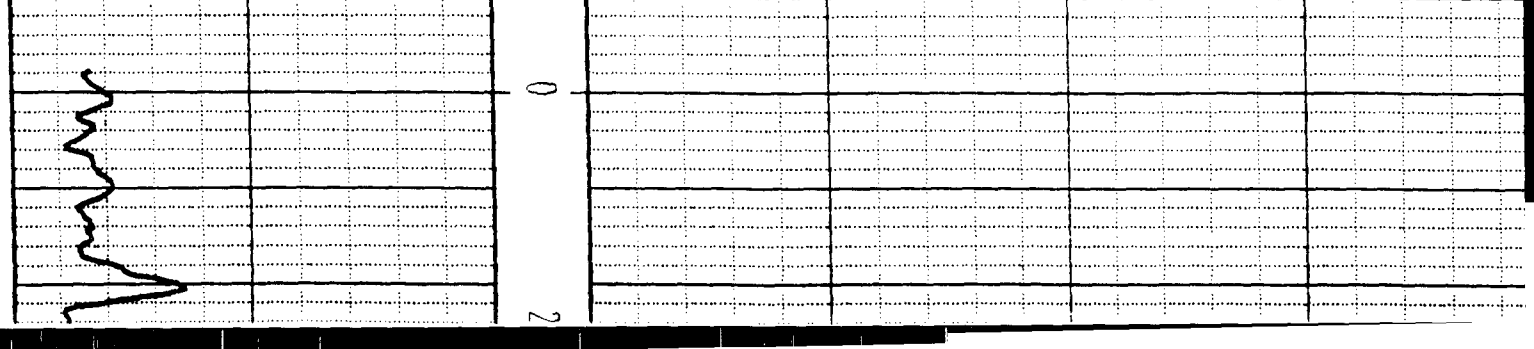
REMARKS:

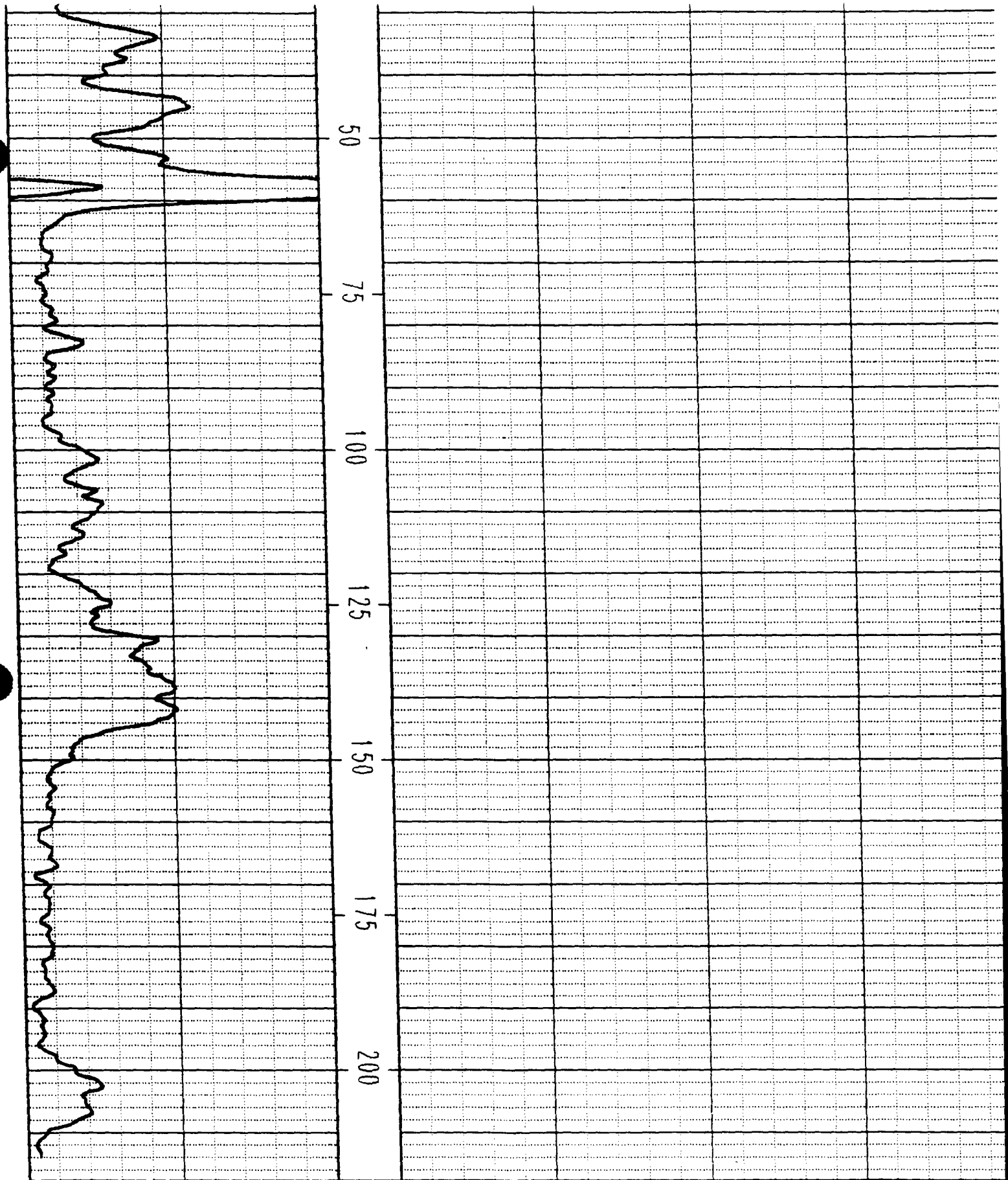
THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-76

(\acq\mw76.gp2) SOUTHWEST GEOPHYSICAL SERVICES,INC.

GAMMA RAY
0 API 200





GAMMA RAY

0 API 200

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SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	VIDEO
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-83
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY **STATE:** NEW MEXICO

ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	3/16/99	FLUID LEVEL	168 ft.
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	205 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	201 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	40 ft.	CIRCULATION TEMP.	
CASING SIZE	8 in.	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE	7 & 7/8 in.	LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

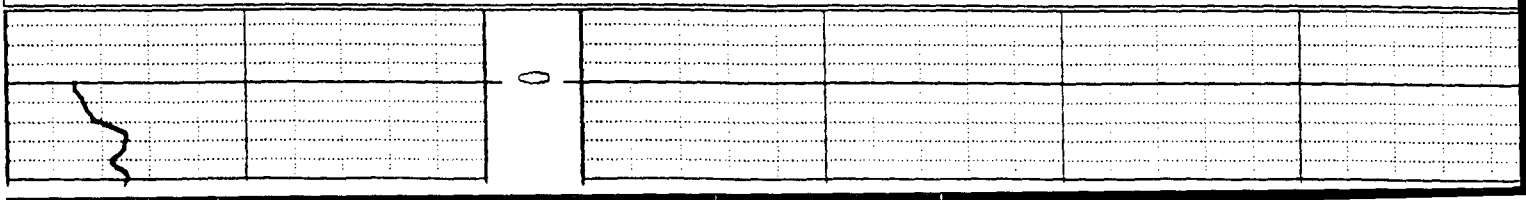
REMARKS:

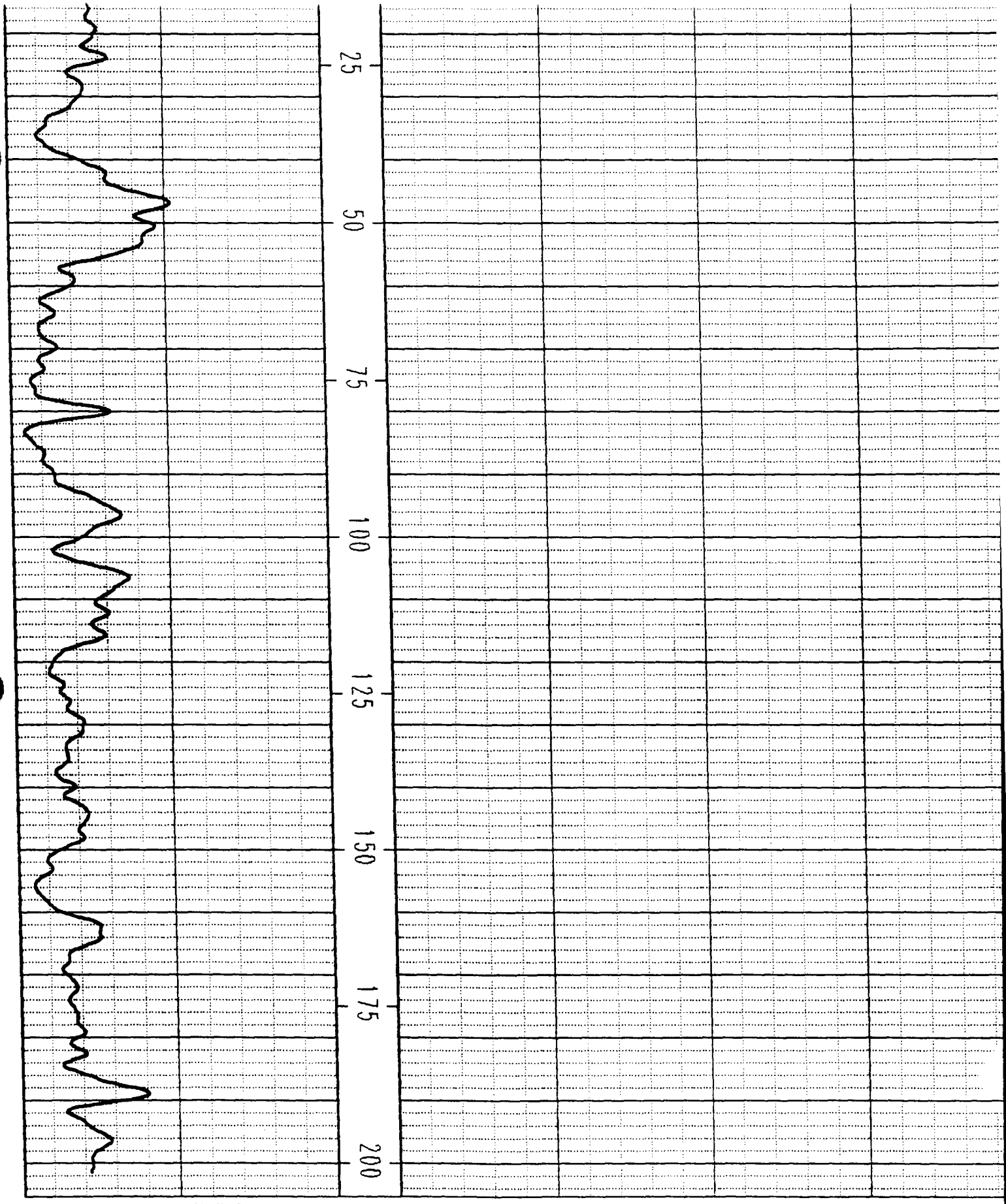
THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-83

(\acq\mw83.gq1) SOUTHWEST GEOPHYSICAL SERVICES,INC.

GAMMA RAY
0 API 200




25
50
75
100
125
150
175
200
GAMMA RAY
0
API
200
(\acq\mw83.gql)
SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	VIDEO
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-84
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY **STATE:** NEW MEXICO

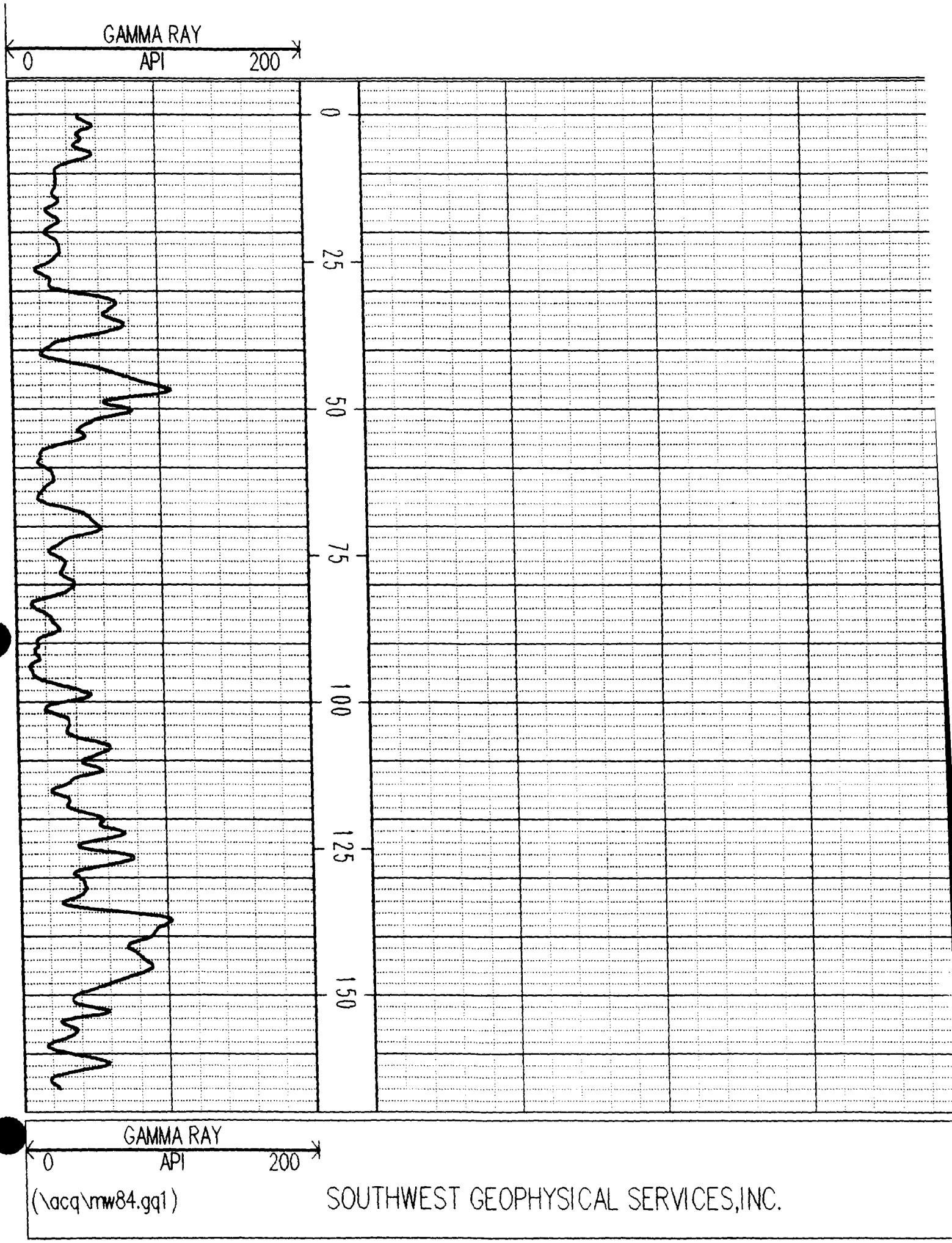
ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	3/15/99	FLUID LEVEL	133 ft.
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	170 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	166 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	67 ft.	CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE	7 & 7/8 in.	LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:
*Recalibrated log.

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-84



(\acq\mw84.gq1)

SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-85
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

COMPANY: MARATHON OIL COMPANY
WELL: MW-85

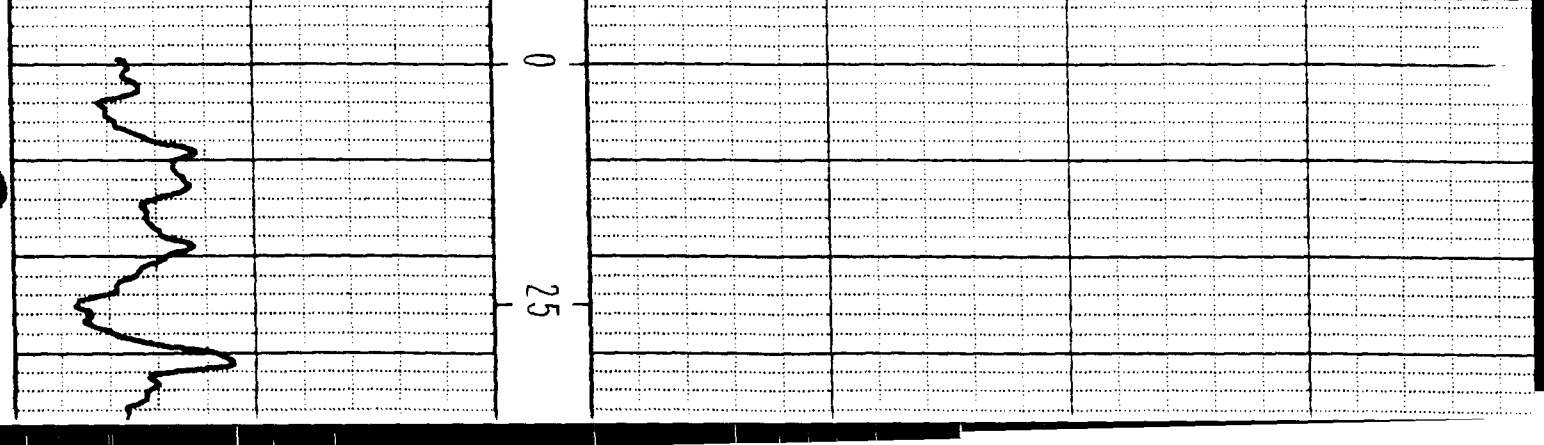
	RUN NO. 1		RUN NO. 1
DATE	5/18/99	FLUID LEVEL	200 ft.
DEPTH DRILLER	235 ft.	FLUID NATURE	Water
DEPTH LOGGER	238 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	234 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	77 ft.	CIRCULATION TEMP.	
CASING SIZE	8 in.	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE	7 & 7/8 in.	LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

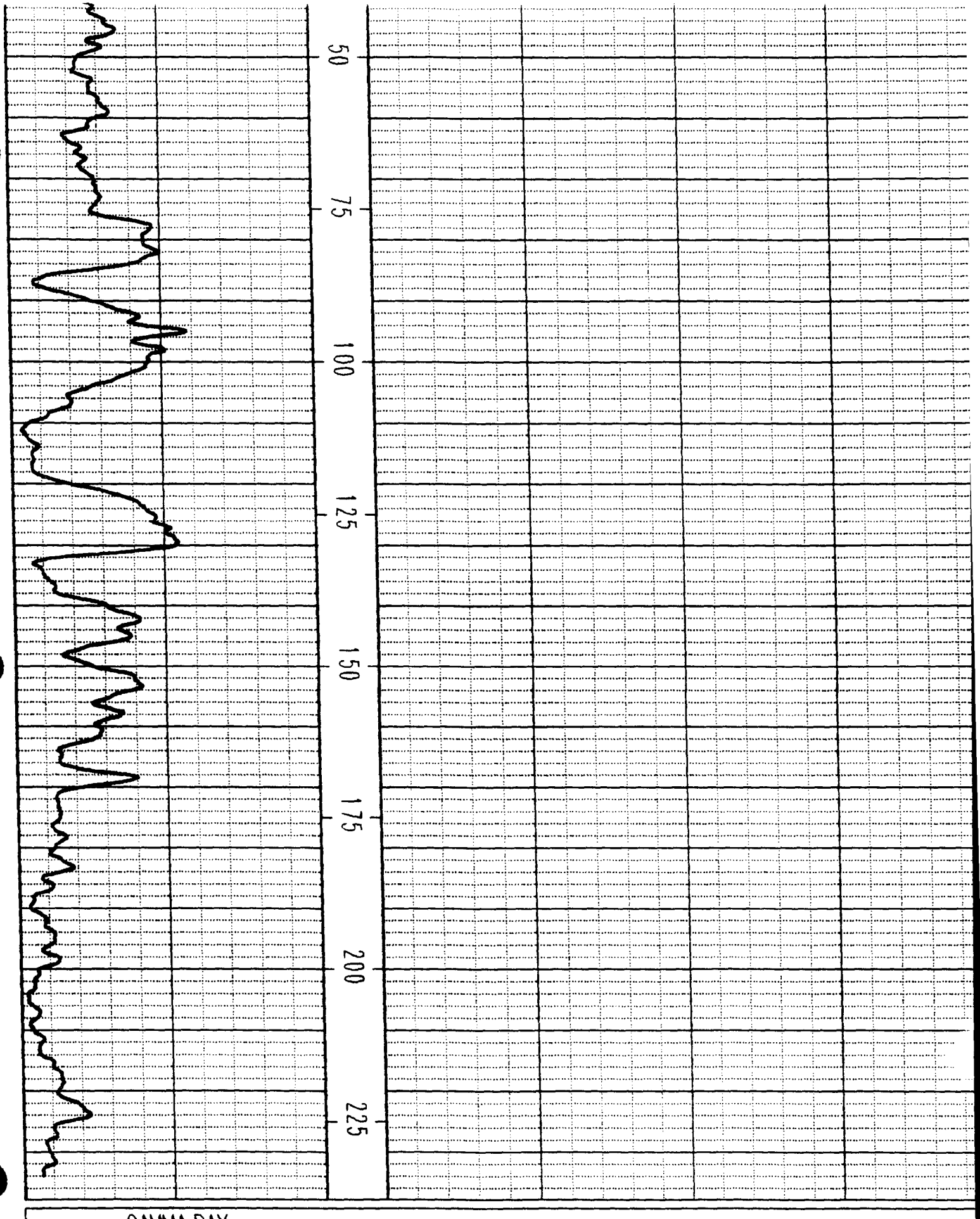
REMARKS:

THANK YOU

(\acq\mw85.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.

GAMMA RAY
0 API 200





(\acq\mw85.gp0)

SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY 3–ARM CALIPER	LOG MEASURED FROM: TOP CASING ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW–86
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

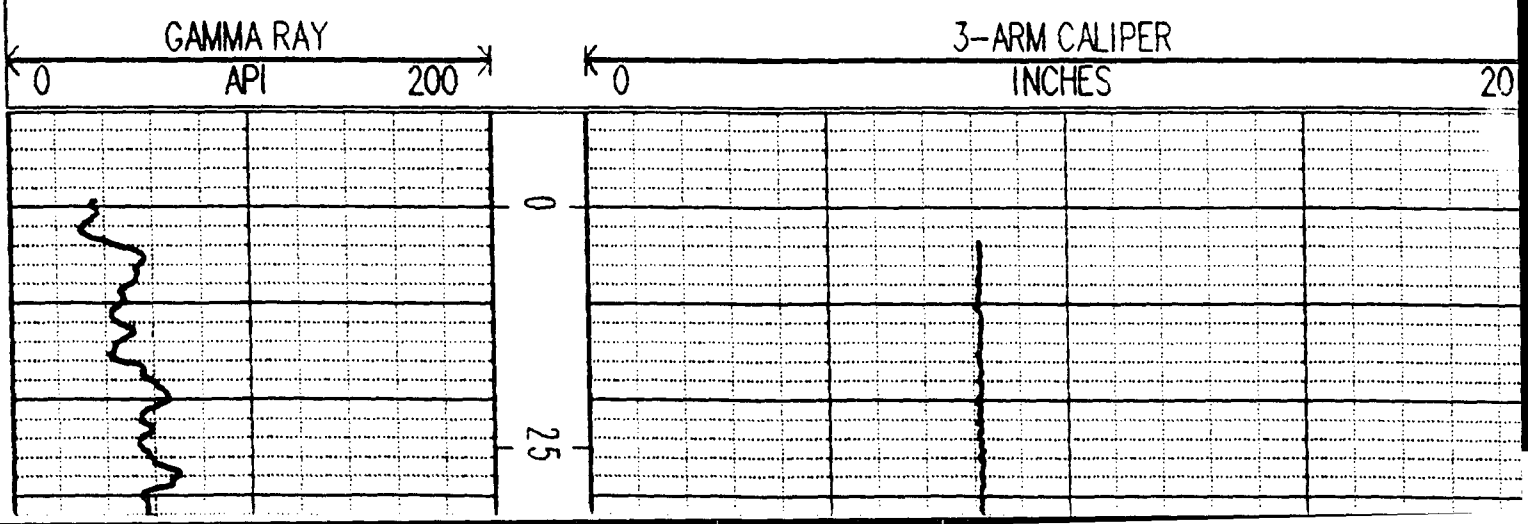
	RUN NO. 1		RUN NO. 1
DATE	5/18/99	FLUID LEVEL	195 ft.
DEPTH DRILLER	225 ft.	FLUID NATURE	Water
DEPTH LOGGER	226 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	222 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	75 ft.	CIRCULATION TEMP.	
CASING SIZE	8 in.	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gr450
BIT SIZE	7 & 7/8 in.	LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

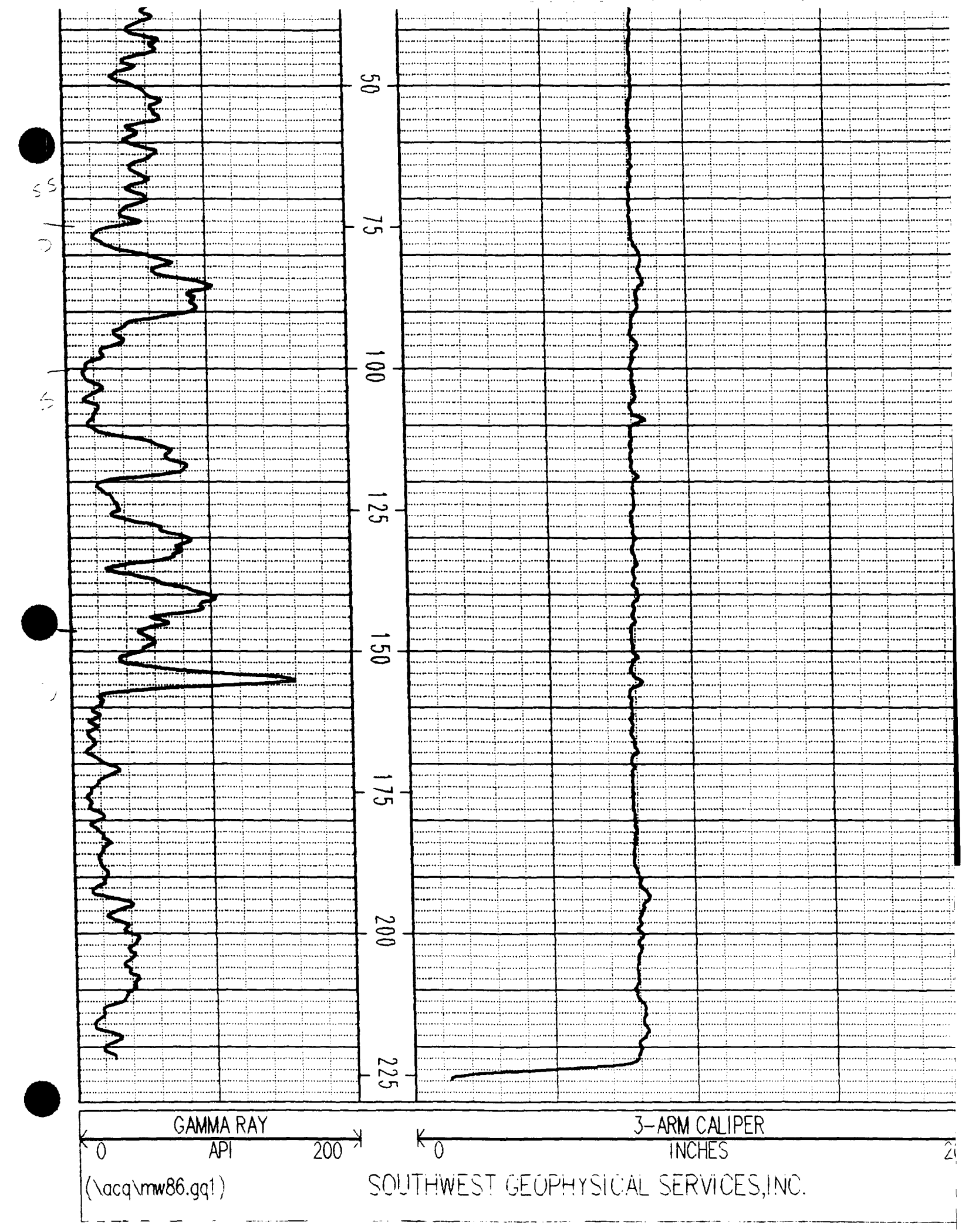
REMARKS:
*This is a merged log.

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW–86

(\acq\mw86.gq1) SOUTHWEST GEOPHYSICAL SERVICES,INC.




50
75
100
125
150
175
200
225
GAMMA RAY
0
API
200
3-ARM CALIPER
0
INCHES
(\acq\mw86.gq1)
SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG: GAMMA RAY	PERM. DATUM: GROUND LEVEL LOG MEASURED FROM: TOP CASING ELEVATION:	OTHER SERVICES:

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-87
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

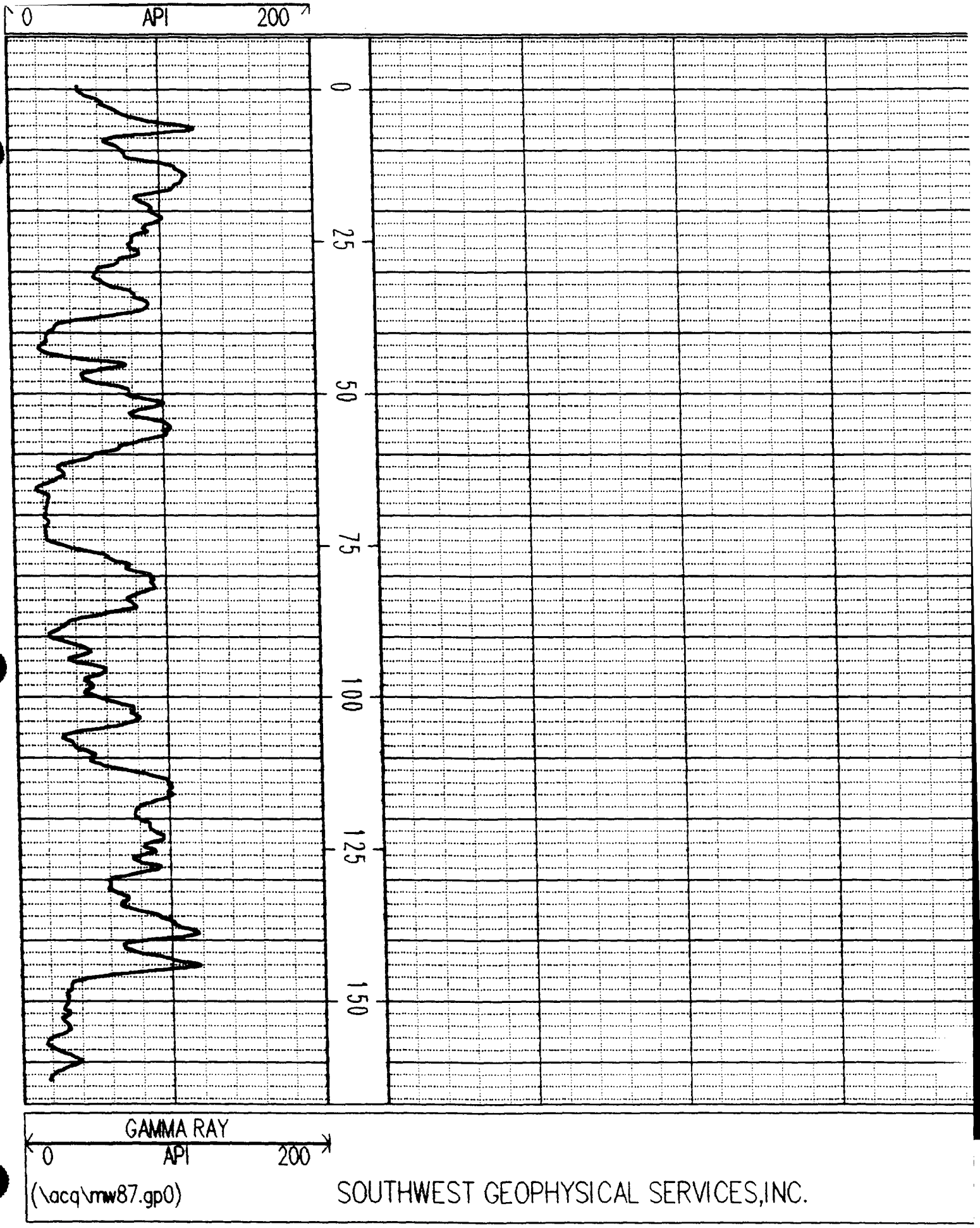
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	167 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	163 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in. PVC	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-87

(\acq\mw87.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.



(\acq\mw87.gp0)

SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-88
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

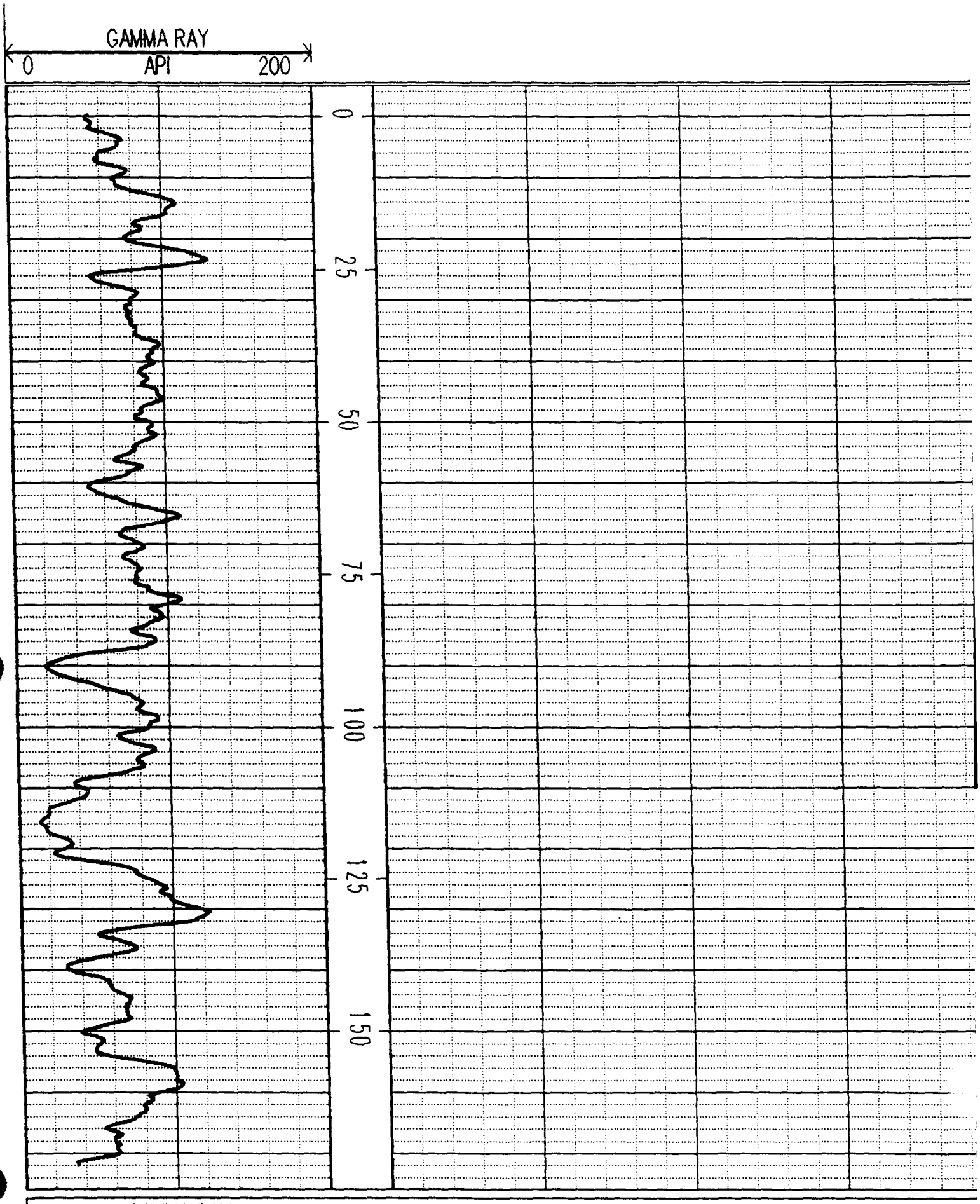
ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	176 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	172 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in. PVC	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-88



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SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-94
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

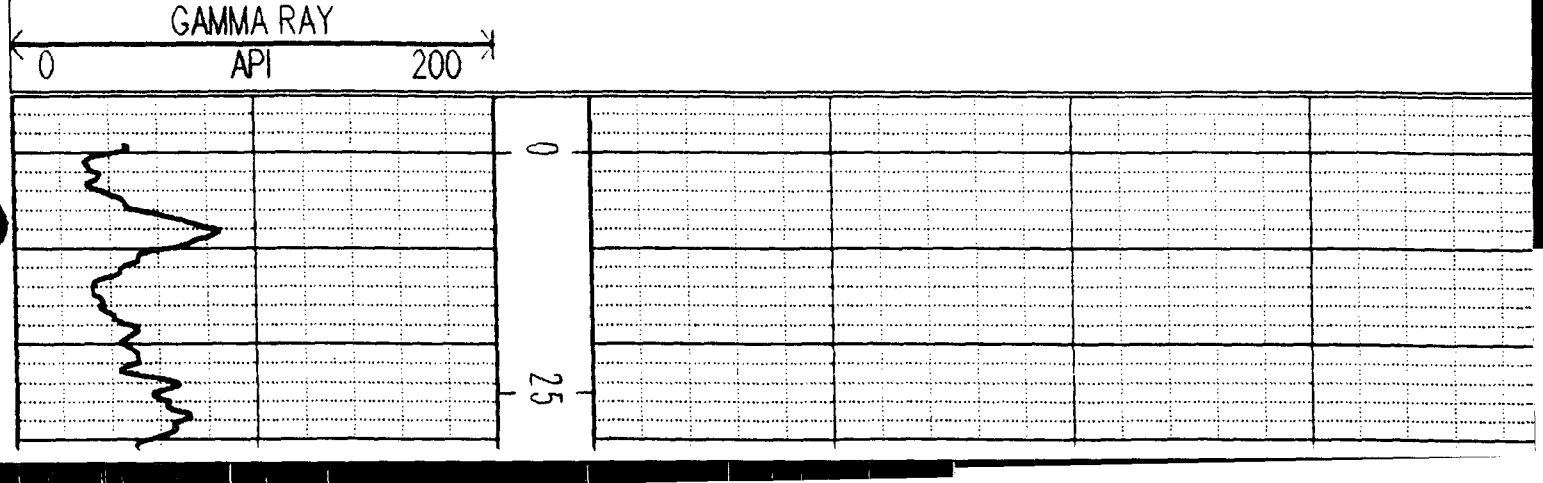
COMPANY: MARATHON OIL COMPANY
WELL: MW-94

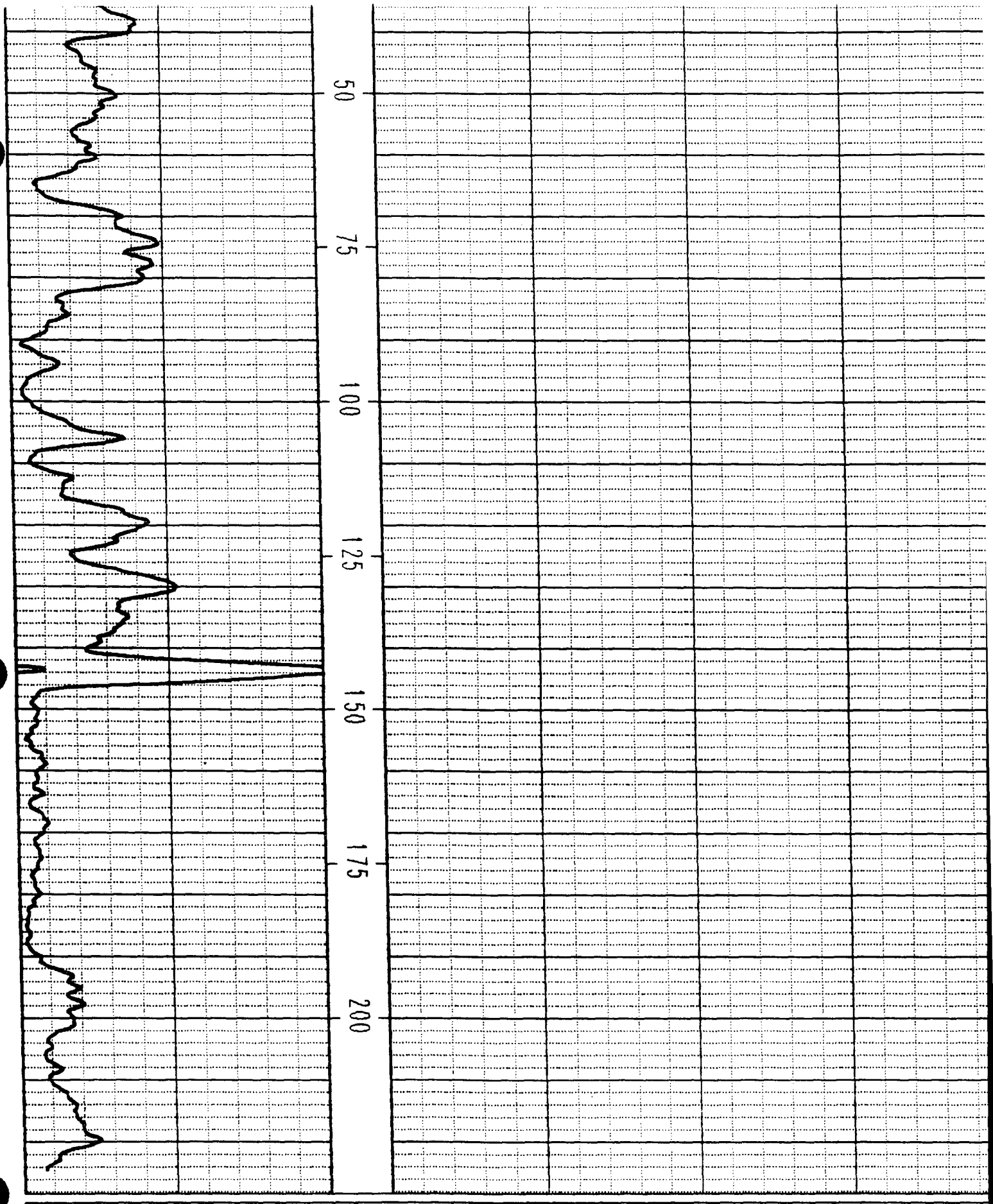
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DATE	5/18/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	229 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	225 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

(\acq\mw94.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.





GAMMA RAY

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SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-95
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

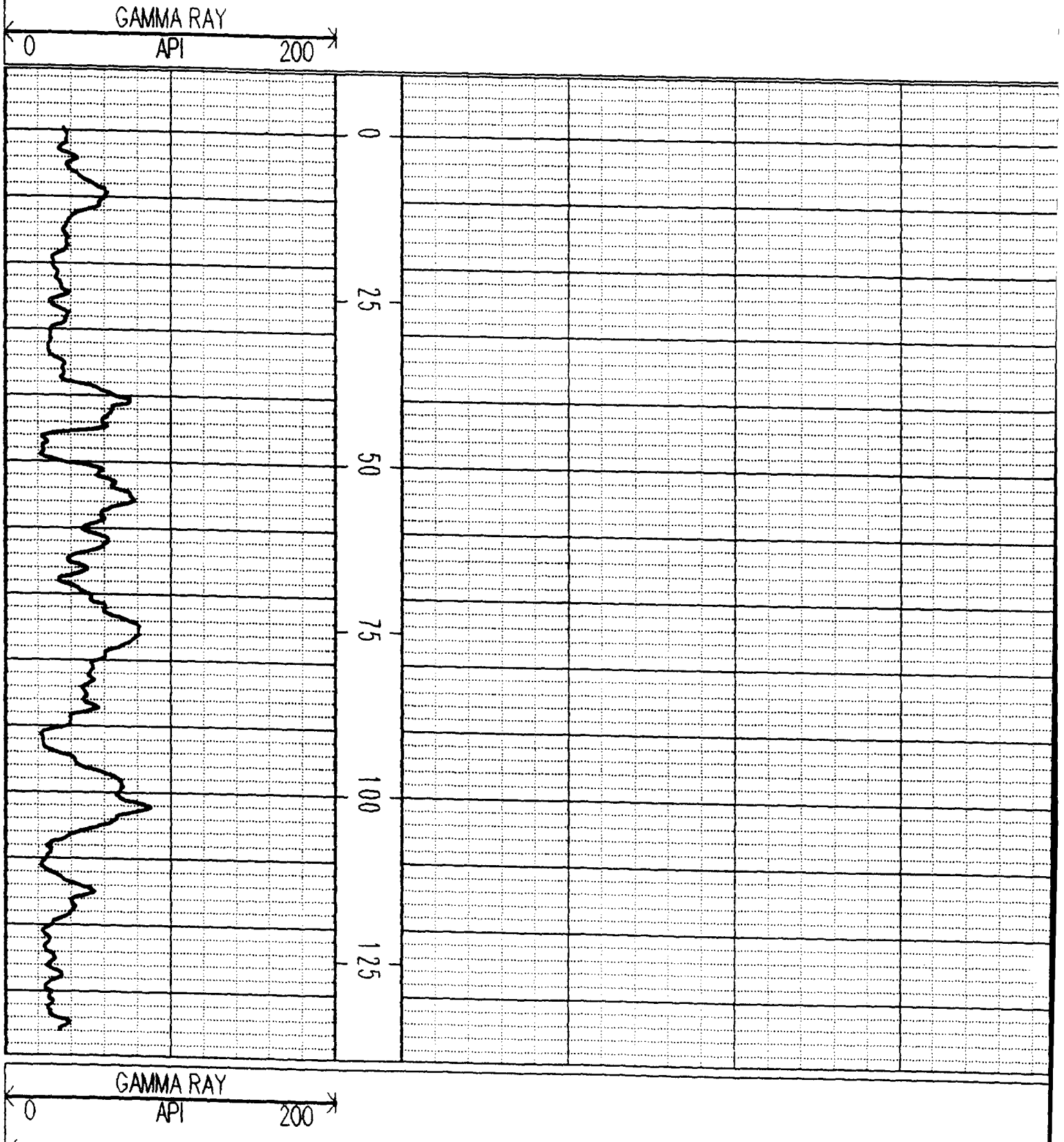
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DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	140 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	136 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	ft.	CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in. PVC	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-95

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(\acq\mw95.gq2) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-96
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

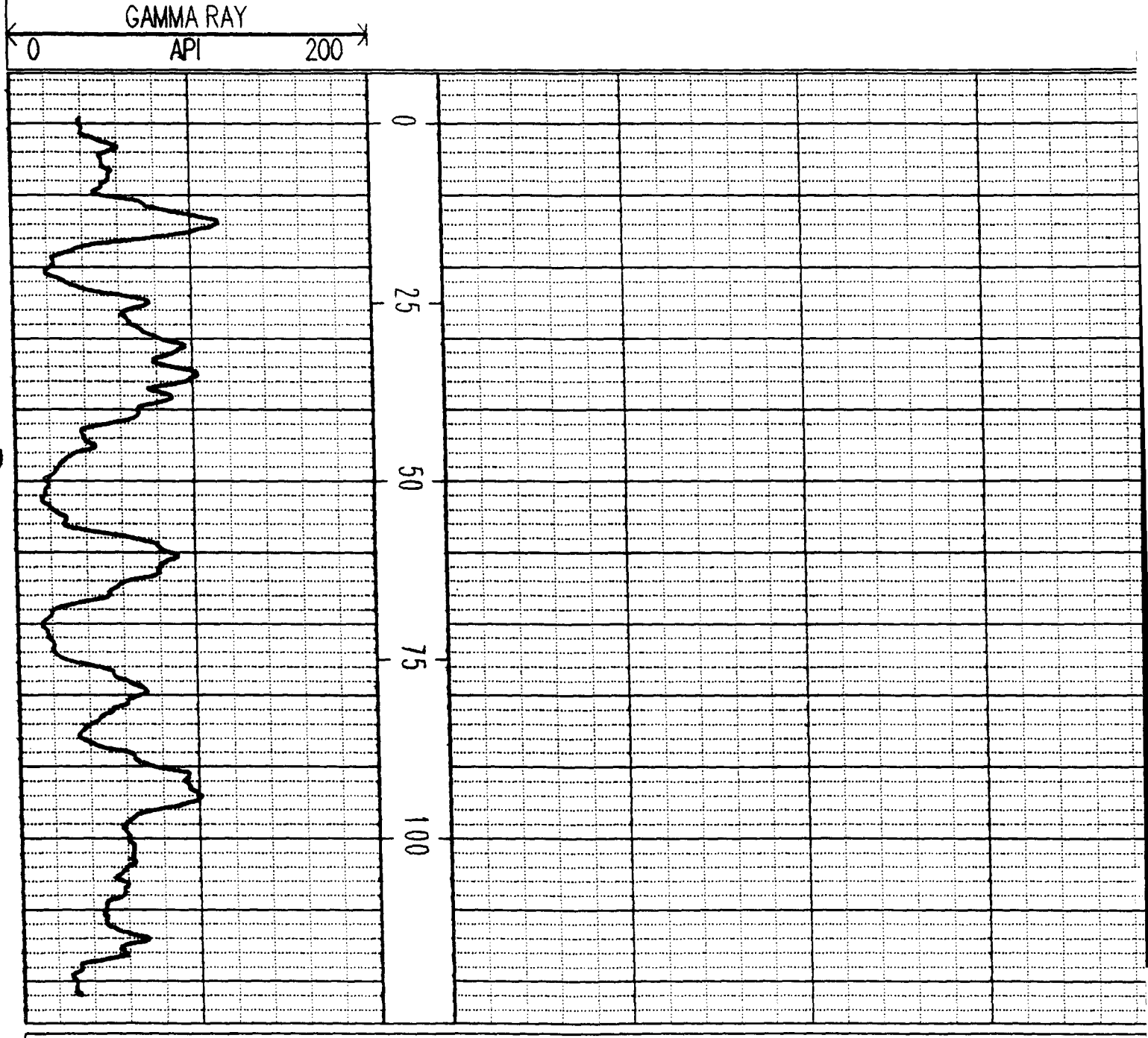
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DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	126 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	122 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in. PVC	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU!

COMPANY: MARATHON OIL COMPANY
WELL: MW-96

(\acq\mw96.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.



(\acq\mw96.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-97
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

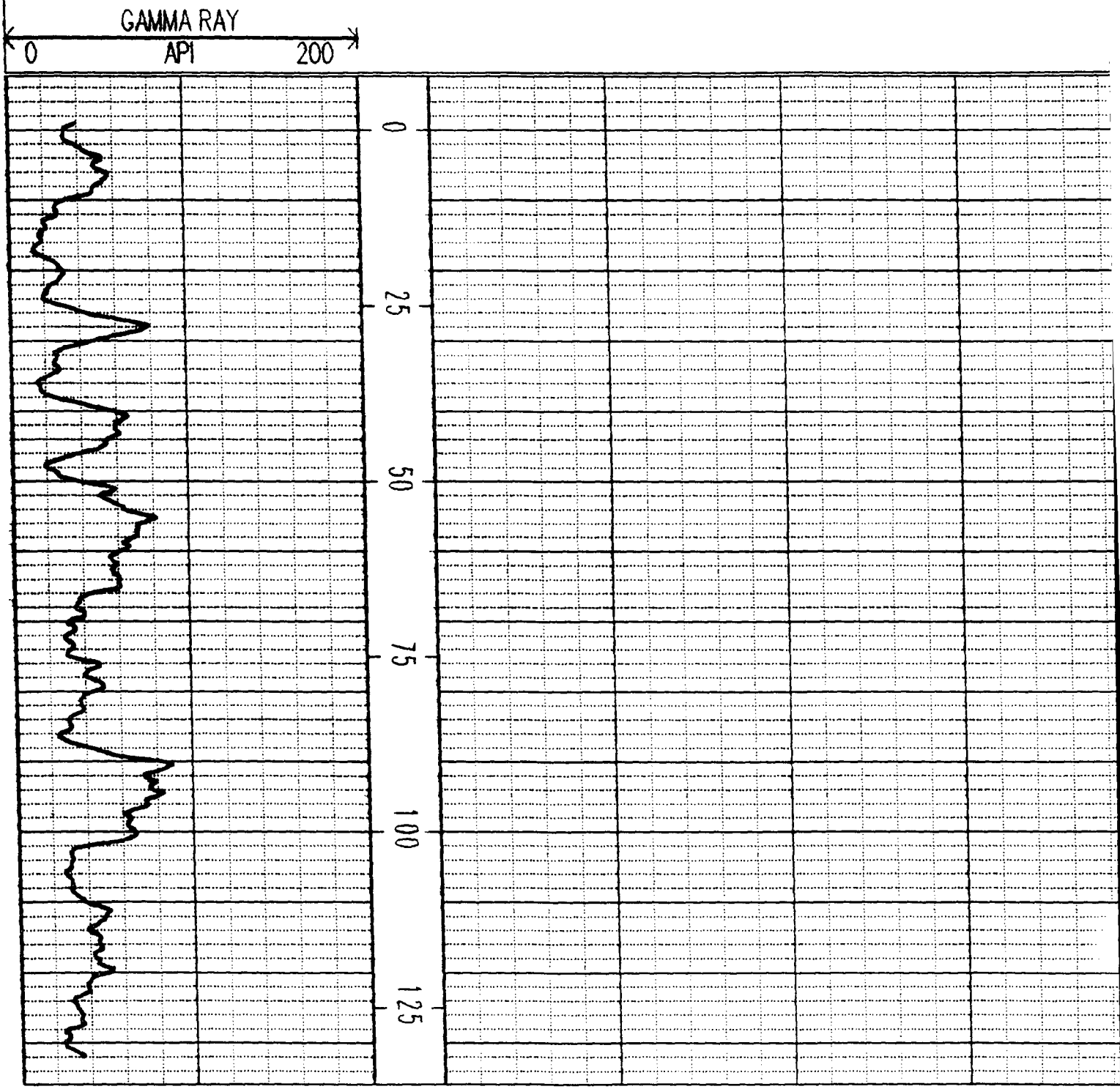
	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	136 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	132 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in. PVC	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-97

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(\acq\mw97.gp0) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-98
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

ELEVATION KB:
DF:
GL:

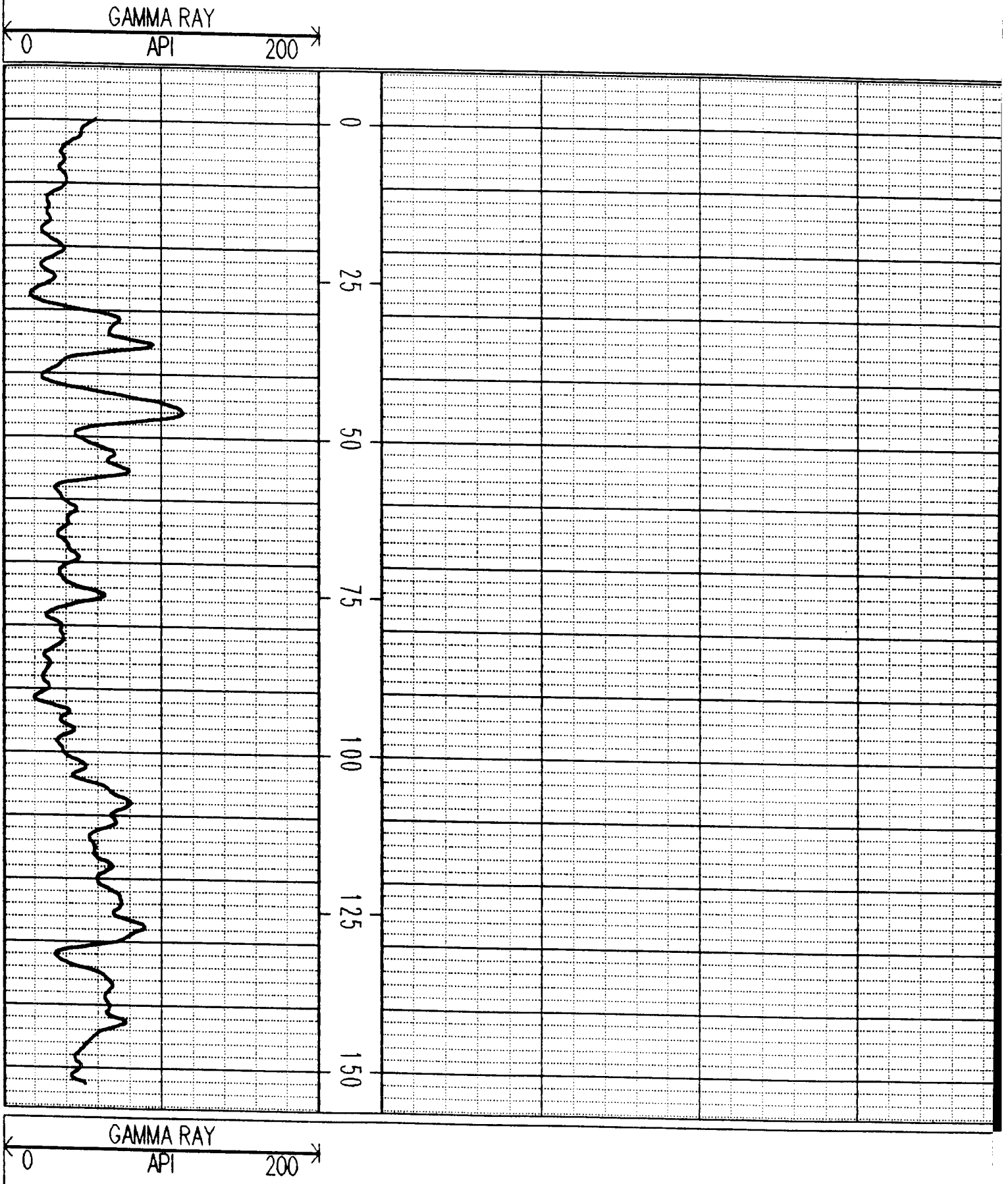
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DATE	3/16/99	FLUID LEVEL	ft.
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	157 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	153 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL	ft.	CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE	4 in. PVC	TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:
*Recalibrated log.

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-98

(\acq\mw98.gq0) SOUTHWEST GEOPHYSICAL SERVICES,INC.



(\acq\mw98.gq0) SOUTHWEST GEOPHYSICAL SERVICES,INC.

Southwest Geophysical Services, Inc.

GEOPHYSICAL WELL LOG:	PERM. DATUM: GROUND LEVEL	OTHER SERVICES:
GAMMA RAY	LOG MEASURED FROM: TOP CASING	
	ELEVATION:	

COMPANY: MARATHON OIL COMPANY
PROJECT/FIELD: INDIAN BASIN REMEDIATION PROJ
WELL: MW-108
LOCATION: SEC: T: R:
NORTH= EAST=
COUNTY: EDDY STATE: NEW MEXICO

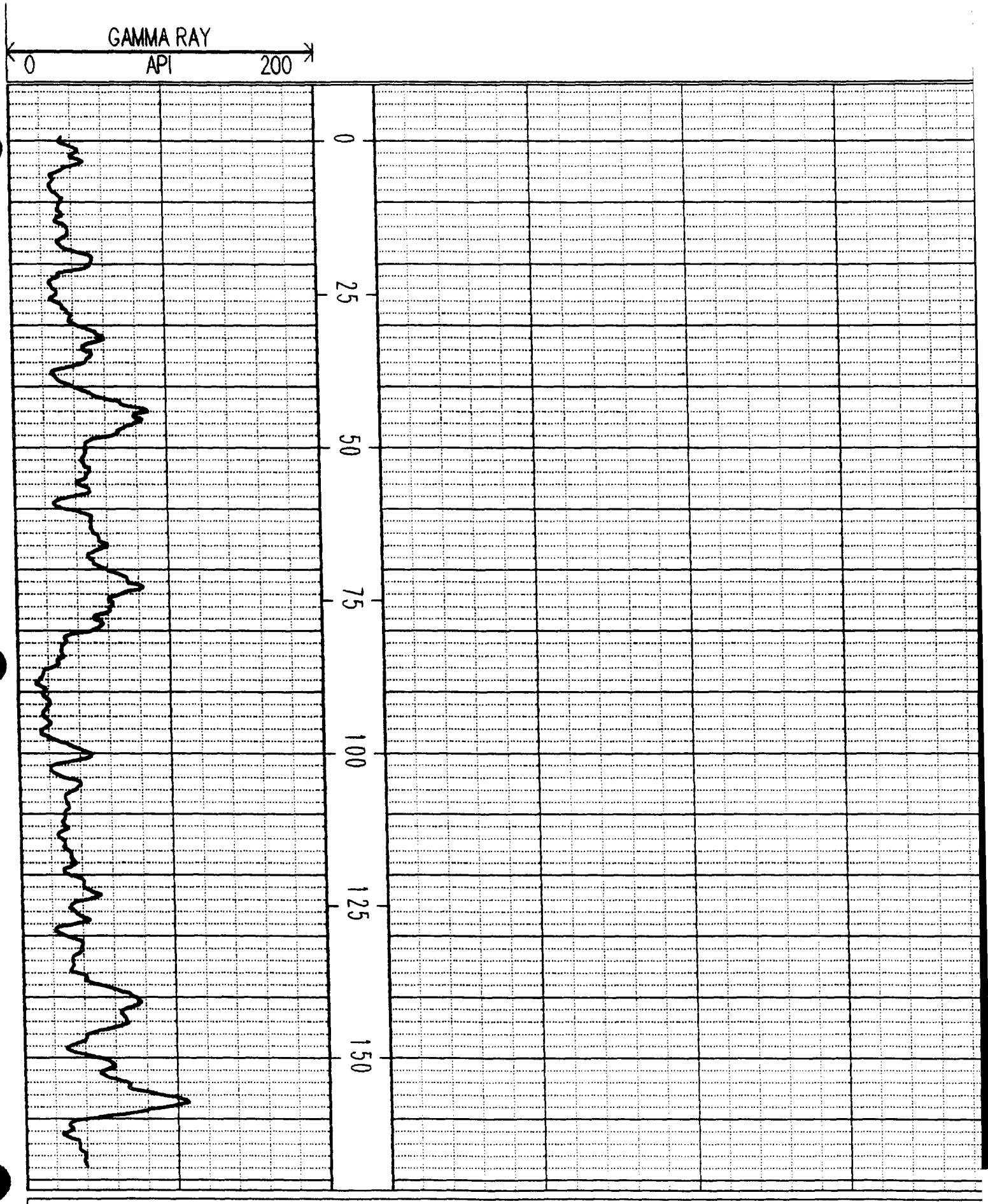
ELEVATION KB:
DF:
GL:

	RUN NO. 1		RUN NO. 1
DATE	5/19/99	FLUID LEVEL	
DEPTH DRILLER		FLUID NATURE	Water
DEPTH LOGGER	172 ft.	FLUID VISCOSITY	
BOTTOM LOGGED	168 ft.	FL. RESISTIVITY	
TOP LOGGED INT.	Top of Casing	FL. RES. @ B.H.T.	
CASING LEVEL		CIRCULATION TEMP.	
CASING SIZE	8 in. Steel	BOT HOLE TEMP.	
CASING SIZE		TOOL #	gn450
BIT SIZE		LOGGED BY:	M. Peterson
BIT SIZE		WITNESSED BY:	P. Peacock

REMARKS:

THANK YOU

COMPANY: MARATHON OIL COMPANY
WELL: MW-108



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SOUTHWEST GEOPHYSICAL SERVICES,INC.

Appendix C

Packer Testing/SVE Study Reports

ARCADIS GERAGHTY&MILLER

Pre-Phase I SVE/Packer Testing
Summary Report, April 26, 1999

ARCADIS GERAGHTY&MILLER

ARCADIS Geraghty & Miller, Inc.
3000 Cabot Boulevard West
Suite 3004
Langhorne
Pennsylvania 19047
Tel 215 752 6840
Fax 215 752 6879

M. Paul Peacock
Marathon Oil Company
125 West Missouri Street
Midland, Texas 79701

ENVIRONMENTAL

Subject:
Pre-Phase I SVE/Packer Testing Summary Report - Marathon Oil Company
Indian Basin Remediation Project, New Mexico
ARCADIS Geraghty & Miller Project No. NP000443.0002

Date:
26 April 1999

Contact:
Michael A. Hansen

Extension:
215 752 6860

Dear Mr. Peacock:

ARCADIS Geraghty & Miller is pleased to present the following letter summarizing the results of and evaluating the information collected during the recent soil vapor extraction (SVE)/packer testing at the Indian Basin site. Details regarding the testing are outlined in the following sections.

Introduction/Test Goals

The goal of the packer testing was to evaluate the discrete airflow and hydrocarbon mass removal characteristics from isolated portions of the bedrock at the site. Past operation and testing of SVE at the site, for the purpose of vapor phase condensate mass removal in support of the overall remedy, have yielded poor results in terms of mass removal efficiency. Sustained high levels of mass removal have not been achieved, and very high levels of airflow have been required for each well being employed. These factors are of significant concern given that vapor phase mass removal is normally an efficient and economical method of free product recovery, especially when the free product is very volatile in nature, as is the natural gas condensate at the site. Previous work at the site and analysis of data collected has yielded the conclusion that the poor vapor phase mass removal was due to diffusion-based mass transfer limitations (Feasibility Study for the IBRP, GTI, 1998).

Based on both analysis for the available data (i.e., past packer tests, past SVE tests, video logs, geologic data, etc.) and our experience in hydrocarbon recovery, it is our opinion that the efficient vapor phase mass removal of the condensate in the subsurface is likely not diffusion limited, but being hindered by the following two factors:

- The completion of the majority of the wells in the Lower Queen unit are as open bore-holes through the entire bedrock zone. Therefore, it is our opinion that air flow leakage or "short-circuiting" is likely occurring. Since in many portions of the site the upper portions of the bedrock likely do not contain condensate, this

leaking air will severely limit the mass removal efficiency by greatly increasing the required airflow per well while not contributing any hydrocarbons.

- Free phase condensate is likely present in some but not all bedrock bedding plane fractures above the water table. Based on this assumption, we may not be generating air flow in the features in which the predominant amount of condensate mass is present.

To evaluate these items, the planned approach was to isolate discrete depth intervals of several existing wells using a two-part packer system, and applying SVE to these intervals. This would in essence focus the induced airflow in individual zones and in turn allow for the evaluation of the mass removal and air flow characteristics in those discrete zones as well as allow for comparisons between zones and wells.

If the data collected supported our assumptions, future wells and extraction equipment could be designed such that leakage is limited and air flow is focused in zones containing recoverable condensate. This in turn would provide for much greater vapor phase mass removal (since extraction will be in areas only containing condensate) at lower costs (since less air flow will be needed then for the equivalent open bore-hole wells). More importantly, it is conceivable that if the focused extraction is successful, an SVE only approach to the infill portion of the remediation system can be employed - with the resultant cost savings and benefits over conventional pump and treat, or vacuum-enhanced pump and treat.

Methodology/Test Set-up

As outlined in the March 12, 1999 ARCADIS Geraghty & Miller proposal, SVE/Packer testing was performed on wells MW-83, MW-84, VE-19, and VE-20. In general these four wells were selected given their current placement in the blower station BS-4 SVE system network. Additional selection rationale included the presence of condensate on the water table in wells MW-83, MW-84, and VE-19, as well as past testing performed on VE-20 (long term SVE pilot testing by GTI in June of 1997), and MW-83 and MW-84 (vacuum-enhanced pumping tests by GTI in July and August of 1998).

The BS-4 SVE system consists of a 25 horsepower positive displacement blower with appurtenances. The blower is manifolded to the four test wells (as well as others) via a network of 4-inch HDPE piping. Control valves are present at each well.

A two-part packer assembly, consisting of two inflatable well packers each capable of sealing the existing 7-7/8-inch diameter well bore-holes and an adjustable length inner pipe, was used during the testing. The inner piping was perforated to allow vacuum application (from the existing SVE blower and piping) to the interval between the two packers via additional down-well piping.

During the tests for each well, the packer assembly was deployed at various intervals starting with the end of the well surface casing. Test intervals were generally to 20 feet in length.

Each depth interval was tested for a minimum of 1 hour. During that time various operational data including applied vacuum, extracted air flow rate, and hydrocarbon off-gas concentration were collected every 15 minutes. In addition, one vapor sample was collected for potential laboratory analysis.

Test Results

Background

The packer testing work was performed on March 16 - 19, 1999. Attached Table 1 contains a summary of the dates each of the wells were tested on, as well as the intervals tested. As indicated on Table 1, the lowest test interval in each well tested was less than 20 feet in length. In each case this was due the presence of the water table. In addition, only one interval, the one just above the water table, was tested in well VE-20. Since well VE-20 did not contain observable condensate on the water table (as indicated by gauging) or in upper bedding plane fractures (as indicated in the video log for the well) it was decided in the field that testing the entire length of VE-20 was not necessary.

Individual test data has been included on the field data summary sheets included as Appendix A. In addition, Table 2 contains a summary of the average field observations for each of the intervals tested.

Based on the results of the field testing, seven of the 17 discrete vapor samples collected were submitted for laboratory analysis. Samples were submitted to Microseeps Laboratories in Pittsburgh, Pennsylvania for a Total C_4-C_{12} hydrocarbon analysis. Table 3 contains a summary of the vapor sampling results, and a copy of the laboratory report is included in Appendix B. The following section will contain a discussion of the testing results at each well along with a background for the well and relevant information related to past work.

MW-84

MW-84 was the first of the four wells tested. This well is located within Rocky Arroyo and has historically produced a greater volume of groundwater and condensate than surrounding wells. Prior to July of 1998 this well had produced an assumed average of approximately 7 barrels of condensate per month (liquid phase only).

GTI performed an individual vacuum-enhanced pumping test on this well in July of 1998 for a period of two weeks. When focusing the entire BS-4 vacuum on this well and while pumping they were able to increase condensate production to approximately

29 barrels of condensate per month (16 in the liquid phase and 13 in the vapor phase). Following the July 1998 testing, MW-84 was converted to a full-time vacuum-enhanced pumping well. Since that time overall condensate recovery has increased to from approximately 7 barrels per month to approximately 18 barrels per month.

As outlined on Tables 1 and 2, packer testing was performed on four intervals in well MW-84. Applied vacuum levels tended to increase with increasing depth, thus supporting that some air flow leakage may be occurring in the upper portions of the bedrock. However, extracted airflow rate was generally consistent. Field screening of off-gas indicated the upper three intervals were producing similarly low levels of vapor phase hydrocarbons, however, this off-gas concentration increased dramatically when the interval at the water table was tested. This is evidenced by comparison of the discrete vapor sampling data shown on Table 3. As shown on Table 3, the middle interval sample yielded mass removal of only 0.5 pounds per day in the vapor phase. However, when the lowest interval was isolated the mass removal increased to over 900 pounds per day (or almost 3.5 barrels/day or 105 barrels/month).

MW-83

MW-83 was the second well tested. This well is located approximately 1200 feet north of MW-84, outside of Rocky Arroyo. This well has historically produced some condensate during its use as a recovery well, but not nearly to the extent of MW-84. Prior to July of 1998 this well had produced an assumed average of approximately 2 barrels of condensate per month (liquid phase only).

GTI also performed an individual vacuum-enhanced pumping test on this well in 1998. Similar to MW-84, when vacuum was applied to MW-83 the condensate recovery rate increased (to approximately 9 barrels of condensate per month - 3 in the liquid phase, 6 in the vapor phase). Following the July 1998 testing, MW-83 was also converted to a full-time vacuum-enhanced pumping well. Since that time overall condensate recovery has increased to from approximately 2 barrels per month to approximately 5 barrels per month.

Packer testing was performed on seven intervals in well MW-83. Conversely to the results from MW-84, the applied vacuum level in MW-83 was highest in the upper interval (Table 2). The extracted air flow rate was highest in the lowest three intervals. Field screening of off-gas indicated the upper four intervals were producing similarly low levels of vapor phase hydrocarbons. The off-gas concentration increased in the lower three intervals, with the lowest having the greatest concentration, but not nearly as high as observed in MW-84. As shown on Table 3, one of the middle interval samples yielded a mass removal of 1.4 pounds per day in the vapor phase. The sample from the lowest interval exhibited a mass removal increase to over 30 pounds per day (approximately 3.5 barrels per month), certainly significant, but not close to the performance of the lowest interval in MW-84 (over 900 pounds per day).

VE-19

VE-19 was the third well tested. This well is located approximately between MW-83 and MW-84, just outside Rocky Arroyo. This well was installed in 1997 as part of a five well "barrier" SVE system intended to control the migration of hydrocarbon vapors in the subsurface. This well has exhibited some condensate on the water table surface in the past, but has not generally been used for recovery.

During 1997, GTI performed a long-term SVE pilot test on all five of the barrier SVE wells, including VE-19. During this test, the maximum vapor phase recovery rates were measured (using field instruments) to be approximately 343 pounds/day (39 barrels/month), declining to approximately 168 pounds/day after two weeks of operation (19 barrels/month).

As outlined on Table 2, applied vacuum levels were generally consistent at all packer test intervals in VE-19, while airflow rates were slightly higher in the lower intervals tested. Field screening of off-gas indicated the upper four intervals were producing similarly low levels of vapor phase hydrocarbons. The off-gas concentration increased greatly in the lowest of the five intervals. As shown on Table 3, the laboratory vapor sampling data supports that the lowest interval tested yielded the only significant mass removal at an estimated rate of 26.7 pounds per day (approximately 3 barrels per month) in the vapor phase.

VE-20

VE-20 was the last well tested. This well is located approximately 200 feet west of VE-19, also just outside Rocky Arroyo. This well was installed in 1997 as part of the barrier SVE system. No condensate has been observed in this well historically.

Given the mass removal performance of the other three wells tested, it was decided to test only the lowest interval in well VE-20. As shown on Table 2, vacuum and air flow performance from well VE-20 was similar to the other wells. Mass removal rates from the VE-20 packer test were relatively low (3.0 pounds per day or approximately 0.3 barrels per month), not comparable to the lower intervals of the other three wells tested.

Observations & Conclusions

Air Flow Rate

Based on the testing performed, even small, isolated extraction zones can yield significant levels of extracted airflow. In fact these levels (approximately 400 cfm in each interval tested) are consistent with the total airflow from individual wells and groups of wells operating in the past. Extracted air flow rates did vary somewhat with

interval depth. However, no discernible pattern in these variations was observed, and the flow variations were typically less than 15% between intervals.

It was anticipated that the upper bedrock intervals tested would yield the highest air flow rates due to surface leakage. It was also expected that the isolation of small zones would limit the overall flow by a much greater amount.

Overall these data support the past full-scale observations by Marathon that vacuum application to more than one well using the existing extraction equipment is problematic because of vacuum-source limitations. It also indicates that contrary to past conclusions, the air permeability of the various bedrock zones is fairly high.

These results indicate that vacuum source selection and vacuum application may be a dominant factor in design and implementation of a cost effective full-scale recovery system.

Mass Removal

Based on the packer testing results from this area, it is clear that although zone isolation did not significantly affect the overall air flow rates, it did significantly affect the hydrocarbon mass removal. Poor mass removal performance during past SVE testing at the site was attributed to diffusion limitations to mass transfer. However, it is clear that if the airflow from SVE is isolated on zones containing condensate, mass removal will greatly increase.

Prior to the testing, it was expected that perhaps more than one zone would exhibit good vapor phase recovery. This was based on the presence of condensate both on the water table in many wells along with the visual observation of condensate in upper, unsaturated bedding plane fractures from video logs of other wells. The packer testing data for MW-83 and VE-19 yielded good mass removal from the intervals above the water table (3.5 and 3.1 barrels per month, respectively), while the same interval in well MW-84 yielded excellent mass removal (approximately 105 barrels per month). The large variation between the vapor phase mass removal rates in the lowest intervals in MW-83/VE-19 and the same interval in MW-84 is consistent with the higher liquid phase condensate recovery from MW-84 observed during past pumping, thus indicating more condensate is present in this area. This difference may be attributable to MW-84 being present within Rocky Arroyo. Almost no mass removal was observed from the similar interval tested in VE-20. This is likely due to the apparent absence of condensate either on the water table or in the bedding plane fractures within this well, the cause of which is unclear, but may be due to geologic conditions.

In all three wells in which upper intervals were tested (MW-83, MW-84, and VE-19) the mass removal was negligible from these intervals. This data indicates that in the test area, little to no recoverable hydrocarbons are present in the upper bedding plane

fractures, which is consistent with observations from video logs performed on the three wells.

Comparison with Past Data

As outlined previously, vapor phase mass removal results from the packer testing of wells VE-19 and VE-20 yielded some mass removal in the lowest test intervals (approximately 3.1 and 0.3 barrels/month, respectively). These levels are lower than that observed during the barrier SVE testing performed in 1997 (approximately 19 barrels per month after two weeks of operation). However, possible comparisons between the packer testing and barrier SVE testing are limited since the barrier SVE testing employed five extraction wells and mass removal estimates were also made using field instrument measurements only.

Comparisons between the Pre-Phase I packer testing, the July 1998 vacuum-enhanced pumping tests, and past operation of wells MW-83 and MW-84 are more appropriate. Attached Table 4 and Figure 1 contain a comparison of estimated condensate removal from wells MW-83 and MW-84 during four differing scenarios; pumping only (pre-July 1998), the vacuum-enhanced pumping tests performed by GTI in July-August 1998, vacuum-enhanced pumping since August 1998, and the recent Pre-Phase I packer testing (SVE only - no pumping). As the data included on Table 4 and depicted on Figure 1 indicate, in both cases vacuum-enhanced pumping increased condensate removal due to the vapor phase mass removal. However, in the case of MW-84, the focused application of SVE in the lowest zone yielded mass removal much greater than even the combined removal (liquid and vapor phase) of vacuum-enhanced pumping, at a much lower cost and level of effort. The results of the MW-83 packer testing were not as significant given that the mass removal via SVE only was slightly less than that for the vacuum-enhanced pumping. However, when the capital and operating cost of vacuum-enhanced pumping is factored into the evaluation, even in MW-83 the focused SVE becomes a much more efficient and economical alternative (unless pumping is required for hydraulic containment).

Summary

The data collected during the SVE/packer testing, particularly the data from well MW-84 is significant since it demonstrates that, as expected, properly applied SVE-only can equal or outperform SVE and/or vacuum-enhanced pumping from open bore holes on a mass removal basis, and do so at a much lower unit cost per mass removed. It should be noted that in some locations pumping may still be required to maintain hydraulic control of the groundwater, but this data supports the use of SVE-only for the proposed infill wells.

Additional information will need to be collected to further enhance our understanding of the subsurface and allow for design of an effective full-scale system. Some of these data include the following:

- Evaluation of longer-term removal rates of SVE from the isolated zones,
- Determination if similar mass removal rates are achievable using lower air flow rates,
- Evaluation of other portions of the site, especially with regards to mass removal from SVE in bedrock intervals above the water table.

If you have any questions regarding this report, please contact us.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

Michael A. Hansen
Senior Engineer

Michael M. Gates
Principal Hydrologist/Associate

Attachments

CC: David Vance - AG&M Austin

Table 1. Summary of Testing Dates and Test Intervals - Pre-Phase I SVE/Packer Testing
Marathon Oil Company, Indian Basin Remediation Project, New Mexico
March 16-19, 1999

Well	Test Date	Packer Test Intervals (feet bls)
MW-84	3/16/99	66-86
	3/16/99	86-106
	3/17/99	96-116
	3/17/99	122-134 (1)
MW-83	3/17/99	42-62
	3/17/99	62-82
	3/17/99	82-102
	3/18/99	102-122
	3/18/99	122-142
	3/18/99	142-168 (1)
	3/18/99	159-168 (1)
VE-19	3/18/99	42-62
	3/18/99	62-82
	3/18/99	82-102
	3/18/99	102-122
	3/19/99	122-135 (1)
VE-20	3/19/99	131-142 (1)

Notes:
bls - below land surface
(1) Lower elevation represents groundwater level in well.

Table 2. Summary of Test Field Data - Pre-Phase I SVE/Packer Testing
Marathon Oil Company, Indian Basin Remediation Project, New Mexico
March 16-19, 1999

Well	Test Interval (feet bls)	Applied Vacuum (in. Hg.)	Blower Vacuum (in. Hg.)	Extracted Air Flow (cfm)	Off-gas Conc. (1) (ppm)
MW-84	66-86	9.5	10	366	4
	86-106	8.5	9.5	390	9
	96-116	---	11	398	2.8
	122-134	---	12.5	388	550
MW-83	42-62	11	11	360	10
	62-82	8	9	412	9
	82-102	9	12	398	5
	102-122	7.5	8	440	13
	122-142	8	8	440	32
	142-168	8	8	440	68
	159-168	9	12	407	179
VE-19	42-62	12	9	405	2
	62-82	10	9	368	2.5
	82-102	10	8.5	393	3.5
	102-122	---	8.5	417	5
	122-135	8	9	417	250
VE-20	131-142	11	10	417	19

Notes:
bls - below land surface
ppm - parts per million
cfm - cubic feet per minute
in. Hg. - inches of mercury
--- - No data collected
(1) As measured via PID

Table 3. Summary of Vapor Phase Condesate Mass Removal - Pre-Phase I SVE/Packer Testing
Marathon Oil Company, Indian Basin Remediation Project, New Mexico
March 16-19, 1999

Well	Packer Test Interval (feet bls)	Extraction Airflow (cfm)	Total C4-C12 Hydrocarbon Conc. (ppmv)	Mass Removal (Pounds/Day)	Mass Removal (Barrels/Day)	Mass Removal (Barrels/Month)
MW-83	122-142	440	8.53	1.4	0.01	0.2
MW-83	159-168	440	194.62	30.8	0.12	3.5
VE-19	102-122	405	1.27	0.2	0.001	0.02
VE-19	122-135	400	185.39	26.7	0.10	3.1
VE-20	131-142	405	20.49	3.0	0.01	0.3
MW-84	86-106	390	3.49	0.5	0.002	0.1
MW-84	122-133	385	6617.6	917.3	3.49	105

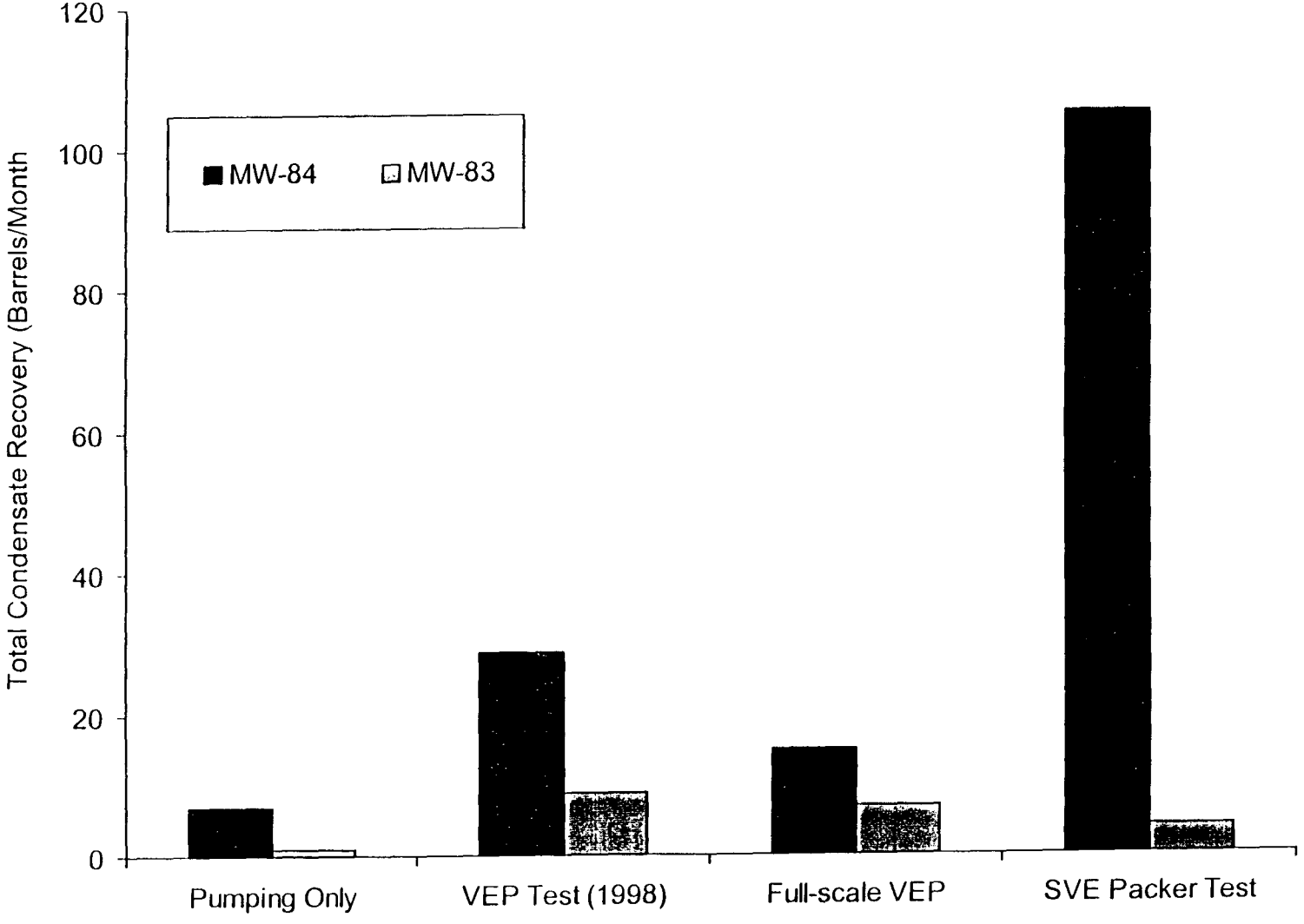
Notes:
bls - below land surface
cfm - cubic feet per minute
ppmv - parts per million by volume

Table 4. Comparison of Condesate Removal Rates - MW-83 and MW-84
Marathon Oil Company. Indian Basin Remediation Project, New Mexico

	Condensate Mass Removal Rate (barrels/month)			
Well	Pre-July 1998 (pumping only)	July-August 1998 (VEP Pilot Tests)	Post August 1998 (VEP)	Pre-Phase I Packer Testing
MW-83	2	9	5	4
MW-84	7	29	18	105

Notes:
VEP - vacuum enhanced pumping

Figure 1 - Comparison of Condesate Removal Rates - MW-83 and MW-84
Marathon Oil Company, Indian Basin Remediation Project, New Mexico



Appendix A

Operations Monitoring Data

MW-84 SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)	SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	TEC VOC (ppm)	TEC VOC (lb/day)	Gas Tech VOC (ppm)	Gas Tech VOC (lb/day)	Gas Tech Oxygen (%)
3/16/99	16:08	66' - 86'										
3/16/99	16:23	66' - 86'	4.5	206	367	10	9.5	8	0.99	260	32.07	21.4
3/16/99	16:38	66' - 86'	4.5	204	367	10	9.5	4	0.49	260	32.12	21.1
3/16/99	16:53	66' - 86'	4.5	212	365	10	9.5	2	0.25	380	46.67	21.1
3/16/99	17:08	66' - 86'	4.5	209	366	10	9.75	0.9	0.11	360	44.31	20.9
3/16/99	17:35	86' - 106'										
3/16/99	17:50	86' - 106'	5	191	391	9.5	8.5	12	1.58	500	65.76	20.8
3/16/99	18:05	86' - 106'	5	195	390	9.5	8.5	10.8	1.42	420	55.07	20.9
3/16/99	18:20	86' - 106'	5	198	389	9.5	8.5	7.1	0.93	500	65.41	20.9
3/16/99	18:35	86' - 106'	5	198	389	9.5	8.5	5.4	0.71	520	68.03	20.9
3/17/99	10:30	96' - 116'										
3/17/99	10:45	96' - 116'	5	160	400	11		2.7	0.36		0.00	
3/17/99	11:00	96' - 116'	5	168	398	10.5		2.9	0.39		0.00	
3/17/99	11:15	96' - 116'	5	172	397	11		2.7	0.36		0.00	
3/17/99	11:30	96' - 116'	5	172	397	11		2.9	0.39		0.00	
3/17/99	12:18	122' - 133.75' (gw)										
3/17/99	12:33	122' - 133.75' (gw)	4.75	178	385	12.25		554	71.74		0.00	
3/17/99	12:48	122' - 133.75' (gw)	4.75	180	384	12.25		530	68.52		0.00	
3/17/99	13:03	122' - 133.75' (gw)	4.75	180	384	13		578	74.73		0.00	
3/17/99	13:18	122' - 133.75' (gw)	5	180	394	13		471	62.48		0.00	

TEC means Thermo Environmental Instruments, Inc.

MW-83 SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)	SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	TEC VOC (ppm)	TEC VOC (lb/day)	Gas Tech VOC (ppm)	Gas Tech VOC (lb/day)	Gas Tech Oxygen (%)
3/17/99	14:59	42' - 62'										
3/17/99	15:14	42' - 62'	3.75	164	346	11.5	11	19	2.21		0.00	
3/17/99	15:29	42' - 62'	4	168	356	11.5	11	9	1.08		0.00	
3/17/99	15:44	42' - 62'	4 5	161	380	11	11.25	6	0.77		0.00	
3/17/99	15:59	42' - 62'	4	158	359	10.5	11	4.4	0.53		0.00	
3/17/99	16:22	62' - 82'										
3/17/99	16:37	62' - 82'	5	140	407	9	7.75	9.2	1.26		0.00	
3/17/99	16:52	62' - 82'	5	141	407	9	7.75	9	1.23		0.00	
3/17/99	16:07	62' - 82'	5.25	140	417	8.5	7.75	8	1.12		0.00	
3/17/99	16:22	62' - 82'	5.25	140	417	8.5	7.75	10	1.40		0.00	
3/17/99	17:40	82' - 102'										
3/17/99	17:55	82' - 102'	5	148	404	9.5	12	6.6	0.90		0.00	
3/17/99	18:10	82' - 102'	4.75	140	397	9	12	5.1	0.68		0.00	
3/17/99	18:25	82' - 102'	4.75	143	396	9	12	6	0.80		0.00	
3/17/99	18:40	82' - 102'	4.75	146	395	9	12	4.1	0.54		0.00	
3/18/99	7:28	102' - 122'										
3/18/99	7:43	102' - 122'	5.75	120	444	7.5	8	10	1.49			
3/18/99	7:58	102' - 122'	5.75	130	440	7.5	8	11	1.63			
3/18/99	8:13	102' - 122'	5.75	130	440	7.5	8	14	2.07			
3/18/99	8:28	102' - 122'	5.75	131	440	7.5	8	16	2.37			
3/18/99	8:44	122' - 142'										
3/18/99	8:59	122' - 142'	5.75	129	441	7.75	8	19	2.82			
3/18/99	9:14	122' - 142'	5.75	130	440	7.75	8	30	4.44			
3/18/99	9:29	122' - 142'	5.75	129	441	7.75	8	36	5.34			
3/18/99	9:44	122' - 142'	5.75	131	440	7.75	8	44	6.51			
3/18/99	10:25	142' - 168' (gw)										
3/18/99	10:40	142' - 168' (gw)	5.75	128	441	7.75	8	56	8.31			
3/18/99	10:55	142' - 168' (gw)	5.75	130	440	7.75	8	66	9.78			
3/18/99	11:10	142' - 168' (gw)	5.75	130	440	7.75	8	73	10.82			
3/18/99	11:25	142' - 168' (gw)	5.75	132	439	7.75	8	77	11.39			
3/18/99	11:43	159' - 168' (gw)										
3/18/99	11:58	159' - 168' (gw)	5	140	407	8.75	12	177	24.25		0.00	
3/18/99	12:13	159' - 168' (gw)	5	141	407	8.5	12	182	24.91		0.00	
3/18/99	12:28	159' - 168' (gw)	5	142	406	8.75	12	179	24.48		0.00	
3/18/99	12:43	159' - 168' (gw)	5	141	407	8.75	12	178	24.36		0.00	

TEC means Thermo Environmental Instruments, Inc.

VE-19 SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)	Exhaust Stack Air Flowrate (fpm)	Exhaust Stack Air Flowrate (cfm)	SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	TEC VOC (ppm)	TEC VOC (lb/day)
3/18/99	14:08	42' - 62'									
3/18/99	14:23	42' - 62'	5	140	407			9	12	3.2	0.44
3/18/99	14:38	42' - 62'	5	142	406			9	12	2.2	0.30
3/18/99	14:53	42' - 62'	5	148	404			9	12	2	0.27
3/18/99	14:08	42' - 62'	5	146	405			9	12	1.7	0.23
3/18/99	15:25	62' - 82'									
3/18/99	15:40	62' - 82'	5	143	406	7,500	368	9	10	2.2	0.30
3/18/99	15:55	62' - 82'	5	148	404	7,500	368	9	10	2.4	0.33
3/18/99	16:10	62' - 82'	5	148	404	7,500	368	9	10	2.9	0.39
3/18/99	16:25	62' - 82'	5	148	404	7,500	368	9	10	2.7	0.37
3/18/99	16:43	82' - 102'									
3/18/99	16:58	82' - 102'	5.5	141	427	8,000	393	8.5	9.75	3	0.43
3/18/99	17:13	82' - 102'	5.5	141	427	8,000	393	8.5	9.75	3.2	0.46
3/18/99	17:28	82' - 102'	5.5	145	425	8,000	393	8.5	9.75	4.1	0.59
3/18/99	17:43	82' - 102'	5.5	146	425	8,000	393	8.5	9.75	4.1	0.59
3/18/99	17:55	102' - 122'									
3/18/99	18:10	102' - 122'	5	145	405	8,500	417	8.5		7	0.96
3/18/99	18:25	102' - 122'	5	147	405	8,500	417	8.5		5.1	0.69
3/18/99	18:40	102' - 122'	5	150	404	8,500	417	8.5		4.4	0.60
3/18/99	18:55	102' - 122'	5	148	404	8,500	417	8.5		4.1	0.56
3/19/99	7:17	122' - 135' (gw)									
3/19/99	7:32	122' - 135' (gw)	4.5	137	387	8,500	417	7.75	8	194	25.28
3/19/99	7:47	122' - 135' (gw)	5	146	405	8,500	417	8.5	8	263	35.85
3/19/99	8:02	122' - 135' (gw)	5	151	403	8,500	417	9.5	8	288	39.10
3/19/99	8:17	122' - 135' (gw)	5	158	401	8,500	417	10	8.5	260	35.10

TEC means Thermo Environmental Instruments, Inc.

VE-20 SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)	Exhaust Stack Air Flowrate (fpm)	Exhaust Stack Air Flowrate (cfm)	SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	TEC VOC (ppm)	TEC VOC (lb/day)
3/19/99	9:18	131' - 142' (gw)									
3/19/99	9:33	131' - 142' (gw)	5	150	404	8,500	417	10	11	20	2.72
3/19/99	9:48	131' - 142' (gw)	5	156	402	8,500	417	10		22	2.97
3/19/99	10:03	131' - 142' (gw)	5.25	160	410	8,500	417	10.25		17	2.35
3/19/99	10:18	131' - 142' (gw)	5	160	400	8,500	417	10.25		18	2.43

TEC means Thermo Environmental Instruments, Inc.

Appendix B

Laboratory Analytical Data

MICROSEEPS

University of Pittsburgh Applied Research Center
220 William Pitt Way, Pittsburgh, PA 15238
(412) 826-5245
FAX (412) 826-3433

March 26, 1999

Mr. Mike Hansen
Geraghty & Miller, Inc.
1030 Andrews Highway
Suite 120
Midland, TX 79701

Dear Mr. Hansen:

Attached is the final data listing for the samples we received on March 24, 1999, your project #NP000443.0001.

Please give me a call if you have questions or I can be of further assistance. Thank you for using MICROSEEPS.

Sincerely,

Linda S. Tibensky

LST/lsp

Attachment: GM2441-992417

MICROSEEPS

GM2441-992417

----- ARCADIS GERAGHTY & MILLER -----
----- PROJECT LOC: MARATHON INDIAN BASIN -----
----- PROJECT NUM: NP000443.0001 -----
----- CONCENTRATIONS IN PPMV -----

SAMPLE IDENTIFICATION	TOTAL C4-C12	FILE NAME	DATE SAMPLED	DATE RECEIVED	DATE ANALYZED
MW-84 (86-106)	3.49	B23A112	03/16/99	03/24/99	03/24/99
MW-84 (122-133)	6617.60	B23A113	03/17/99	03/24/99	03/24/99
MW-83 (122-142)	8.53	B23A114	03/18/99	03/24/99	03/24/99
MW-83 (159-168)	194.62	B23A115	03/18/99	03/24/99	03/24/99
VE-19 (102-122)	1.27	B23A116	03/18/99	03/24/99	03/24/99
VE-19 (122-135)	185.39	B23A117	03/19/99	03/24/99	03/24/99
VE-20 (131-142)	20.49	B23A118	03/19/99	03/24/99	03/24/99
MDLs FOR ABOVE SAMPLES	0.07				

NOTE: TOTAL CALCULATED AS HEXANE

25-Mar-99

ANALYST INITIALS

REVIEW

MICROSEEPS

GM2441-992417

**** QUALITY CONTROL ****

----- ARCADIS GERAGHTY & MILLER -----
----- PROJECT LOC: MARATHON INDIAN BASIN -----
----- PROJECT NUM: NP000443.0001 -----
----- CONCENTRATIONS IN PPMV -----

CONTINUING CALIBRATION CHECK

STANDARDS: "220"
REFERENCE: B23A 97

COMPOUND	KNOWN	RESULT	PERCENT DIFFERENCE
HEXANE	100.00	105.51	5.51

LABORATORY BLANK RESULTS

BLANK: N2 IN VIAL
REFERENCE: B23A111

COMPOUND	BLANK	LOWER DETECTION LIMIT
HEXANE	ND	0.07

25-Mar-99

ANALYST INITIALS mk.

REVIEW M

MICROSEEPS, Inc.

220 William Pitt Way, Pittsburgh, PA 15238

Phone: (412) 826-5245 Fax: (412) 826-3433

992417-GM2441

CHAIN-OF-CUSTODY RECORD

Note: Enter proper letters in Requested Analyses columns below.

Analysis Options Note: If analysis D,E,or K is selected, scratch (option) NOT wanted.

* A	C1 -C4	G	Chlorinated HC
* B	Hydrogen & Helium	H	BTEX
* C	Permanent Gases (CH4, CO, CO2, N2, O2)	J	BTEX & C5 - C10
D	Mercury (Soil) or (Air **)	K	TPH (C5 - C10) or (C4 -C12)
E	TO-14 by GC/MS (Ambient) or (Source **)	L	C11 - C18
F	601 & 602 Compounds	Other	Specify below.

* An additional 22 ml vial of sample is required when requested in combination with another analysis.

** Available upon request.

Company Name: Arcadis Geraghty Miller

Address: 1230 Andrews Hwy #120 Midland Tx

Proj. Manager: Michael A. Hansen

Proj. Location: Marathon Indian Basin

Proj. Number: NP000443.0001

Phone # : 215-752-6840 Fax # : 215-252-6879

Sampler's signature :

Collection Date	Collection Time	Number of Containers	"Summa" # if Can. used	Sample Type	Sample Identification	Requested Analyses	Remarks
3-16-99	1845	1	—	Air	MW84 86-106	C1-C4 → C12 (Other)	Run all Samples
3-17-99	1318	1	—	Air	MW84 122-133	C4-C12	C4 thru C12
3-18-99	0944	1	—	Air	MW83 122-142	C4-C12	
3-18-99	1143	1	—	Air	MW83 159-168	C4-C12	
3-18-99	1855	1	—	Air	VE19 102-122	C4-C12	
3-19-99	0817	1	—	Air	VE19 122-135	C4-C12	
3-19-99	1018	1	—	Air	VE20 131-142	C4-C12	
Total		7					

Results to : Mike Hansen, 3000 Cabot Blvd West Suite 3004 Fax 215-752-6879

Invoice to : Paul Peacock Marathon Oil 915-682-1626

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
	Arcadis	3-23-99	1700		Microseeps	3-24-99	1000
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Laboratory to return. YELLOW COPY : Laboratory PINK COPY : Submitter

ARCADIS GERAGHTY & MILLER

Additional Pre-Phase I SVE/Packer
Testing Summary Report,
September 29, 1999

ARCADIS GERAGHTY & MILLER

ARCADIS Geraghty & Miller, Inc.
3000 Cabot Boulevard West
Suite 3004
Langhorne
Pennsylvania 19047
Tel 215 752 6840
Fax 215 752 6879

M. Paul Peacock
Marathon Oil Company
125 West Missouri Street
Midland, Texas 79701

ENVIRONMENTAL

Subject:
Additional Pre-Phase I SVE/Packer Testing Summary Report - Marathon Oil Company Indian Basin Remediation Project, New Mexico
ARCADIS Geraghty & Miller Project No. NP000443.0003

Date:
29 September 1999

Contact:
Michael A. Hansen

Extension:
215 752 6860

Dear Mr. Peacock:

ARCADIS Geraghty & Miller is pleased to present the following letter summarizing and evaluating the information collected during the two additional soil vapor extraction (SVE)/packer testing events recently performed at the Indian Basin site. Details regarding the testing are outlined in the following sections.

Introduction/Test Goals

The goals of the second and third SVE/packer testing events performed at the site were similar to those originally outlined for first event; to evaluate the discrete airflow and vapor phase hydrocarbon mass removal characteristics from isolated portions of the bedrock. Additional details and analysis regarding these issues, including the rationale behind the testing and the focus on vapor phase mass removal are outlined in the April 26, 1999 Pre-Phase I SVE/Packer Testing Summary Report prepared by ARCADIS Geraghty & Miller, Inc.

The data collected during the first SVE/packer testing event, particularly the data from well MW-84, was significant since it demonstrated that, as expected, properly applied SVE-only can equal or outperform SVE and/or vacuum-enhanced pumping from open bore holes on a mass removal basis. In addition, the properly applied SVE-only can provide the mass removal at a much lower unit cost per mass removed. Overall, the results obtained supported the use of SVE-only for the proposed infill well program and the future remediation expansion in the year 2000.

Although the results of the first testing event were significant, as outlined above, some concerns regarding the testing results were raised, including:

- The limited number of wells tested during the first packer testing event, and
- That the wells were all located in a small geographical location at the site (distant from both the plant and the gathering line leak site).

Therefore, it was decided to perform additional testing in other areas of the site to determine if the results were consistent and/or if new information could be obtained.

Methodology/Test Set-up

The additional testing work was performed on four Lower Queen wells MW-110, MW-85, MW-86 and MW-74. Wells MW-110, MW-85, and MW-86 were selected given there closer proximity to the gas plant as well as the noted presence of higher volumes of condensate in and around these wells (based on recovery results and gauging observations). Well MW-74 was selected for testing based on the past observation of condensate in the well and surrounding area, as well as the assumed presence of condensate in upper bedding plane fractures, as indicated by down-hole videotape logging results from the well.

The additional work had to be performed in two separate events due to equipment failure during the first event. These events were performed on May 18-19, 1999 and August 10, 1999, respectively.

As with the first packer testing event, the additional testing was performed using the BS-4 SVE system consisting of the 25 horsepower positive displacement blower (VES-100) and appurtenances. For each test the blower unit was temporarily relocated to the selected well area and manifolded to the test well. Power for the blower was supplied either from the gas plant or by generator.

Consistent with the first testing event, a two-part packer assembly, consisting of two inflatable well packers each capable of sealing the existing 7-7/8-inch diameter well boreholes and an adjustable length inner pipe, was used during the testing. The inner piping was perforated to allow vacuum application (from the existing SVE blower and piping) to the interval between the two packers via additional down-well piping.

During the tests for each well, the packer assembly was deployed at various intervals based on field and other observations. Test intervals were generally to 20 feet in length. Each depth interval was tested for between 15 minutes to one hour. During the testing, operational data including applied vacuum, extracted airflow rate and hydrocarbon off-gas concentration were collected every 15 minutes. In addition, one vapor sample was collected for potential laboratory analysis at each interval. In certain cases, if the hydrocarbon off-gas concentration after the initial 15 minutes was determined to be below the level of interest for the test (approximately 25 ppm_V), the test for that interval was stopped, and a new interval was begun.

Testing Results

As outlined, the two additional packer testing events were performed on May 18-19, 1999 and August 10, 1999. In both instances the total testing scope was shortened due

to packer damage caused by removal of the packers from the wells. Table 1 contains a summary of the testing dates and the intervals that were tested in each well.

Individual test data has been included on the field data summary sheets included as Appendix A. In addition, Table 2 contains a summary of the average field observations for each of the intervals tested.

Based on the results of the field testing, eight of the discrete vapor samples collected were submitted for laboratory analysis. Samples were submitted to Microseeps Laboratories in Pittsburgh, Pennsylvania for a Total C_4-C_{12} hydrocarbon analysis. Table 3 contains a summary of the vapor sampling results, and a copy of the laboratory report is included in Appendix B.

Observations & Conclusions

Air Flow Rate

Prior to performance of any testing it was anticipated that the upper bedrock intervals tested would yield the highest air flow rates (and/or lowest applied vacuums) due to surface leakage. It was also expected that the isolation of small zones would limit the overall air flow.

Similar to the first packer testing event, the air flow data from the second and third events indicated that even small, isolated extraction zones can yield significant levels of extracted airflow. In fact these levels (greater than 400 cfm in each interval tested) are consistent with the total airflow from individual wells and groups of wells operating in the past. Extracted air flow rates did vary somewhat with interval depth. The upper intervals yielded the lowest applied vacuum and highest air flow (presumably due to surface leakage). This effect was most pronounced in the 55-75 foot interval in well MW-110. However, the overall change in air flow rate with depth was generally less than 25%.

Hydrocarbon Mass Removal

Based on the results from the second and third packer events, it is clear that although zone isolation did not significantly affect the overall air flow rates, it did significantly affect the hydrocarbon mass removal. Poor mass removal performance during past SVE testing at the site was attributed to diffusion limitations to mass transfer. However, it is clear that if the airflow from SVE is isolated on zones containing condensate, mass removal will greatly increase.

Prior to the testing, it was expected that perhaps more than one zone would exhibit good vapor phase recovery. This was based on the presence of condensate both on the water table in many wells along with the visual observation of condensate in upper,

unsaturated bedding plane fractures from videotape logs of other wells (specifically MW-74).

As indicated by both the PID readings from the extracted off-gas (outlined on Table 2) and the mass removal estimated for selected intervals (Table 3), packer testing data for the four wells yielded good mass removal. Per well maximum removal results ranged from 16 barrels per month in well MW-86 to 87 barrels per month from well MW-110. Additional observations included the following:

- A comparison of the maximum vapor phase mass removal from wells MW-110, MW-86, and MW-85 indicated the greatest mass removal was obtained from well MW-110, while the lowest was observed in well MW-86. This relationship is consistent with observations of liquid phase condensate recovery from the three wells.

- In both wells MW-85 and MW-86, testing in the upper intervals yielded negligible mass removal. However, two of the five upper zones tested in well MW-110 (the 55-75 and 110-130 foot intervals) yielded significant vapor phase mass removal. These results indicate that in the northern portion of the site there are minimal recoverable hydrocarbons present in the upper bedding plane fractures as you move away from the site.

- An evaluation of the vapor phase mass removal from the upper portions of well MW-74 was originally planned based on the condensate that was observed in the upper fractures during videotape logging of the well. However, only the lowest interval of the well was tested prior to the damage of the packers.

- In the wells where oxygen levels were measured in the off-gas stream (MW-110 and MW-86), depleted oxygen reading were observed in the zones in which elevated hydrocarbon removal was obtained. Observed oxygen levels were as low as 15.85 (as compared to 21% expected in atmospheric air). This data indicates that significant levels of natural biodegradation of hydrocarbons are also likely ongoing in the subsurface.

Summary/Conclusions

Overall, the data collected during the second and third SVE/packer testing events is consistent with that data collected during the original testing. This data demonstrates that, as expected, properly applied SVE-only can equal or outperform SVE and/or vacuum-enhanced pumping from open bore holes on a mass removal basis, and do so at a much lower unit cost per mass removed.

Additional specific conclusions include the following:

- Air flow results continue to support the past full-scale observations by Marathon that vacuum application to more than one well using the existing extraction equipment is problematic because of vacuum-source limitations. It also indicates that contrary to past conclusions, the air permeability of the various bedrock zones is fairly high. These results indicate that vacuum source selection and vacuum application may be a dominant factor in design and implementation of a cost effective full-scale recovery system. In fact, the use of individual vacuum sources at each well (i.e., one blower per well) may ultimately provide the most efficient and flexible means of vacuum application.

- Although MW-74 is located over 3,000 feet from the plant and although the area does not typically produce a large volume of liquid phase condensate during pumping (wells MW-72 and MW-75), venting of the isolated lower interval yielded very high mass removal (67 barrel/month) – at least in the short-term. This indicates that recoverable condensate is still present in the area and further confirms the potential benefits on focused SVE over past SVE efforts and/or pumping based recovery.

- In at least some of the bedrock intervals containing condensate, a significant level of natural biodegradation of hydrocarbons is ongoing. This is an important observation as providing additional airflow in these zones, via SVE, will likely enhance this biodegradation, which will result in even more mass reduction over that ongoing and/or achieved by vapor phase removal.

We look forward to discussing these issues with your further as we proceed in planning the full-scale remedial activities for the year 2000. If you have any questions regarding this report, please contact us.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

Michael A. Hansen, P.E.
Senior Engineer

Michael M. Gates / ejw

Michael M. Gates
Principal Hydrologist/Associate

Appendices

Table 1. Summary of Testing Dates and Test Intervals - Additional SVE/Packer Testing
Marathon Oil Company, Indian Basin Remediation Project, New Mexico
May 18-19, 1999 and August 10, 1999

Well	Test Date	Packer Test Intervals (feet bls)
MW-110	5/18/99	55-75
	5/18/99	75-95
	5/18/99	95-115
	5/18/99	110-130
	5/18/99	130-150
	5/18/99	150-170
	5/18/99	170-190 (1)
MW-86	5/19/99	70-90
	5/19/99	90-110
	5/19/99	110-130
	5/19/99	130-150
	5/19/99	155-175 (2)
MW-85	8/10/99	80-100
	8/10/99	100-120
	8/10/99	120-140
	8/10/99	140-160
	8/10/99	160-180
	8/10/99	180-200
	8/10/99	160-200
MW-74	8/10/99	170-190 (3)

Notes:
bls - below land surface
(1) Lower elevation represents groundwater level in well.
(2) 175-195 foot interval was scheduled for testing, but was not tested due to packer damage.
(3) Additional intervals were scheduled for testing, but were not tested due to packer damage.

Table 2. Summary of Test Field Data - Additional SVE/Packer Testing
Marathon Oil Company, Indian Basin Remediation Project, New Mexico
May 18-19, 1999 and August 10, 1999

Well	Test Interval (feet bls)	Applied Vacuum (in. Hg.)	Blower Vacuum (in. Hg.)	Extracted Air Flow (cfm)	PID Off-gas Conc. (ppm) (1)	Gas-tech off-gas Conc. (LEL%) (1)	Gas-tech O2 Conc. (%) (1)
MW-110	55-75	8	10	640	939	30	19.5
	75-95	12	11	550	43	0	21
	95-115	12	9.5	540	26	0	21
	110-130	11	9.5	450	287	61	17.9
	130-150	12	12	460	91	1	21.3
	150-170	11	11	520	225	52	18.5
	170-190	10.5	11	520	338	55	15.8
MW-86	70-90	12	11	540	95	---	---
	90-110	12	11	480	123	1	20.9
	110-130	12	11	480	39	0	20.9
	130-150	12	11	500	22	0	20.9
	155-175	12	11	460	204	22	20.4
MW-85	80-100	12	12	490	25	---	---
	100-120	12	12	470	18	---	---
	120-140	12	12	450	11	---	---
	140-160	12	12	450	14	---	---
	160-180	12	12	450	890	---	---
	180-200	12	12	450	525	---	---
	160-200	12	12	450	777	---	---
MW-74	170-190	12	12	450	971	---	---

Notes:
bls - below land surface
ppm - parts per million
cfm - cubic feet per minute
in. Hg. - inches of mercury
--- - No data collected
(1) As measured at end of interval

Table 3. Summary of Vapor Phase Condensate Mass Removal - Additional SVE/Packer Testing
Marathon Oil Company, Indian Basin Remediation Project, New Mexico
May 18-19, 1999 and August 10, 1999

Well	Packer Test Interval (feet bls)	Extraction Airflow (cfm)	Total C4-C12 Hydrocarbon Conc. (ppmv)	Mass Removal (Pounds/Day)	Mass Removal (Barrels/Day)	Mass Removal (Barrels/Month)
MW-110	55-75	649	2284.94	533.9	2.03	61.0
MW-110	110-130	466	2524.29	423.5	1.61	48.4
MW-110	150-170	517	2755.96	513.0	1.954	58.6
MW-110	170-190	517	4112.45	765.5	2.92	87.5
MW-86	90-110	477	164.31	28.2	0.11	3.2
MW-86	155-175	454	874.77	143.0	0.54	16
MW-85	160-180	450	1931.42	312.9	1.19	35.8
MW-74	170-190	450	3631.79	588.4	2.24	67

Notes:
bls - below land surface
cfm - cubic feet per minute
ppmv - parts per million by volume
MW-110 and MW-86 testing performed on May 18-19, 1999
MW-85 and MW-74 testing performed on August 10, 1999

Appendix A

86

MW-~~40~~ SVE Packer Test
Indian Basin Remediation Project

5-19-99

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)		SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	PID TEC VOC (ppm)	TEC VOC (lb/day)	Gas Tech LEL VOC (ppm)	Gas Tech VOC (lb/day)	Gas Tech Oxygen (%)
5/18/99	15	70 - 90	1.0	172.4	6150		11	12	95				
5/18/99	15	90 - 110	1.3	178.3	5900	0	11	12	604	0.00		0.00	
5/18/99	30	"	1.3	184.1	5550	0	11	12	522	0.00	22	0.00	21.7
5/18/99	45	"	1.3	183.2	5200	0	11	12	290	0.00	8	0.00	20.9
5/18/99	60	"	1.3	183.4	5250	0	11	12	123	0.00	1	0.00	20.9
5/18/99	15	110 - 130	1.3	188.2	5450		11	12	39		0		20.9
5/18/99	15	130 - 150	1.3	188.3	5700	0	11	12	182	0.00	OBL Max	0.00	19.2
5/18/99	30	"	1.3	187.3	6050	0	11	12	165	0.00	81	0.00	19.7
5/18/99	45	"	1.3	191.5	5600	0	11	12	160	0.00	14	0.00	20.9
5/18/99	60	"	1.3	191.8	5450	0	11	12	22	0.00	0	0.00	20.9
5/18/99	15	155 - 175	1.3	192.2	5150		11	12	246				
5/18/99	30	"	1.3	191.4	5350	0	11	12	210	0.00	22	0.00	20.2
5/18/99	45	"	1.3	190.6	5100	0	11	12	206	0.00	22	0.00	20.4
5/18/99	60	"	1.3	193.6	5200	0			204	0.00	22	0.00	20.4
5/18/99						0				0.00		0.00	
5/18/99													
5/18/99						0				0.00		0.00	
5/18/99						0				0.00		0.00	
5/18/99						0				0.00		0.00	
5/18/99						0				0.00		0.00	

TEC means Thermo Environmental Instruments, Inc.

Sample
NS
1315
NS
1200
1250

MW-110 SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)		SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	PID TEC VOC (ppm)	PID TEC VOC (lb/day)	Gas Tech LEL VOC (ppm)	Gas Tech LEL VOC (lb/day)	Gas Tech Oxygen (%)	Sample time
5/18/99	15	55 - 75	—	158.1	7400		10	8	808		14%		20.9	
5/18/99	30	"	—	164.6	7650	0	10	8	872	0.00	21	0.00	20.5	1042
5/18/99	45	"	— 3.5	165.2	7200	0	10	8	915	0.00	20	0.00	20.9	
5/18/99	60	"	—	170.8	7500	0	10	8	934	0.00	30	0.00	19.5	
5/18/99	15	75 — 95	2.3	171.9	6050	0	10	8.5	1333	0.00	25	0.00	19.0	
5/18/99	30	"	2.0	173.1	6500		10	9.0	1168		33		18.3	1155
5/18/99	45	"	1.2	186.4	6400	0	11	12.0	851	0.00	12	0.00	20.5	
5/18/99	62	"	1.4	192.6	6100	0	11.5	12	43	0.00	0	0.00	21.2	
5/18/99	15	95 - 115	2.2	189.2	6300	0	9.5	12	10	0.00	0	0.00	21.0	
5/18/99	"		2.0	190.0	6100	0	9.5	12	15	0.00	0	0.00	21.0	
5/18/99	45	"	2.3	193.1	5450		9.5	12	23		0		20.9	1335
5/18/99	62	"	1.6	195.1	6022	0	9.5	12	26	0.00	0	0.00	21.0	
5/18/99	15	110 - 130	1.5	191.3	5650	0	9.5	11	410	0.00	56	0.00	18.4	
5/18/99	30	"	1.5	189.4	5050	0	9.5	11	376	0.00	56	0.00	18.2	1450
5/18/99	45	"	1.4	189.3	5350	0	9.5	11	338	0.00	57	0.00	18.2	
5/18/99	60	"	1.4	185.6	5350		9.5	11	287		61		17.9	
5/18/99	15	130 - 150	1.4	191.5	5400	0	11	11.75	54	0.00	0	0.00	21.1	
5/18/99	30	"	1.4	187.2	5700	0	11	11.75	71	0.00	001	0.00	21.2	
5/18/99	45	"	1.4	188.2	5000	0	11.75	12	84	0.00	001	0.00	21.4	1600
5/18/99	60	"	1.2	188.7	5350	0	11.75	12	91	0.00	001	0.00	21.3	

TEC means Thermo Environmental Instruments, Inc.

	15	150-170	1.2	181.0	5850		11	11	304		45		18.9	
	30		1.2	188.2	5750		11	11	290		50		18.8	
	45		1.2	190.2	6050		11	11	227		52		18.5	1725
	60		1.2	190.3	6050		11	11	225		52		18.5	
	15	170 (W.L.)	1.5	170.5	5700		11	10	376		44		16.9	
	30		1.5	171.0	5850		11	10	432		48		16.6	2000
	45		1.5	171.6	6100		11	10.5	305		55		15.8	
	60		1.5	171.8	6050		11	10.5	338		55		15.8	

MW-85 SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)	SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	TEC VOC (ppm)	TEC VOC (lb/day)	Gas Tech VOC (ppm)	Gas Tech VOC (lb/day)	Gas Tech Oxygen (%)
8/10/99												
8/10/99	15	80 - 100		184	4.2	0	12	12	25	0.00	0.00	
8/10/99		80 - 100				0				0.00	0.00	
8/10/99		80 - 100				0				0.00	0.00	
8/10/99		80 - 100				0				0.00	0.00	
8/10/99	15	100 - 120		200	3.8	0	12	12	18	0.00	0.00	
8/10/99		100 - 120				0				0.00	0.00	
8/10/99		100 - 120				0				0.00	0.00	
8/10/99		100 - 120				0				0.00	0.00	
8/10/99	15	120-140		210	3.4	0	12	12	11	0.00	0.00	
8/10/99		120-140				0				0.00	0.00	
8/10/99		120-140				0				0.00	0.00	
8/10/99		120-140				0				0.00	0.00	
8/10/99	15	140-160		216	3.6	0	12	12	14	0.00	0.00	
8/10/99		140-160				0				0.00	0.00	
8/10/99		~~140-160~~ 160-200	45	224	3.6	0	12	12	780	0.00	0.00	
8/10/99		~~140-160~~ 160-200		228	3.9	0	12	12	798	0.00	0.00	
				228	3.7		12	12	777			
8/10/99	15	160-180		218	3.8	0	12	12	681	0.00	0.00	
8/10/99	30	160-180		221	3.6	0	12	12	756	0.00	0.00	
8/10/99	45	160-180	Sample #107	226	3.6	0	12	12	240	0.00	0.00	
8/10/99	60	160-180	Sample Time	226	3.6	0	12	12	890	0.00	0.00	
8/10/99	15	180-200		216	3.8	0	12	12	739	0.00	0.00	
8/10/99	30	180-200		220	3.8	0	12	12	707	0.00	0.00	
8/10/99	45	180-200	Sample Time 1300	224	3.8	0	12	12	631	0.00	0.00	
8/10/99	60	180-200		224	3.6	0	12	12	525	0.00	0.00	

TEC means Thermo Environmental Instruments, Inc.

MW-74 SWL 189.90

SVE Packer Test
Indian Basin Remediation Project

Date	Time	Test Interval (feet)	Exhaust Stack Differential Pressure (in H2O)	Exhaust Stack Temperature (F)	Exhaust Stack Air Flowrate (cfm)		SVE Blower Vacuum (in Hg)	Well Vacuum (in Hg)	TEC VOC (ppm)	TEC VOC (lb/day)	Gas Tech VOC (ppm)	Gas Tech VOC (lb/day)	Gas Tech Oxygen (%)
8/5/99	15	170-190	1430	172	3.4	0	12	12	1140	0.00		0.00	
	30	"		178	3.8	0	12	12	1057	0.00		0.00	
	45	"		194	3.8	0	12	12	938	0.00		0.00	
	60			196	3.8	0	12	12	971	0.00		0.00	
						0				0.00		0.00	
						0				0.00		0.00	
						0				0.00		0.00	
						0				0.00		0.00	
						0				0.00		0.00	
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						0				0.00		0.00	
						0				0.00		0.00	
						0				0.00		0.00	
						0				0.00		0.00	

TEC means Thermo Environmental Instruments, Inc.

Appendix B

MICROSEEPS

University of Pittsburgh Applied Research Center
220 William Pitt Way, Pittsburgh, PA 15238
(412) 826-5245
FAX (412) 826-3433

June 1, 1999

Mr. Mike Hansen
Arcadis Geraghty & Miller, Inc.
3000 Cabot Blvd. West
Suite 3004
Langhorne, PA 19047

Dear Mr. Hansen:

Attached are the final data listings for the sample we received on May 25, 1999, your project #NP000443.0002.

Please give me a call if you have questions or I can be of further assistance. Thank you for using MICROSEEPS.

Sincerely,

Rebecca J. Hans

RJH/lsp

Attachment: GM2503-992741

MICROSEEPS

GM2503-992741

----- ARCADIS GERAGHTY & MILLER -----
----- PROJECT LOC: MARATHON INDIAN BASIN -----
----- PROJECT NO: NP000443.0002.MT0001 -----
----- CONCENTRATIONS IN PPMV -----

SAMPLE NAME	TOTAL C4-C12	FILE NAME	DATE SAMPLED	DATE RECEIVED	DATE ANALYZED
MW-110 55-75'	2284.94	W89A195	05/18/99	05/25/99	05/25/99
MW-110 110-130'	2524.29	W89A196	05/18/99	05/25/99	05/25/99
MW-110 150-170'	2755.96	W89A197	05/18/99	05/25/99	05/25/99
MW-110 170-190'	4112.45	W89A198	05/18/99	05/25/99	05/25/99
MW-86 90-110'	164.31	W89A199	05/19/99	05/25/99	05/25/99
MW-86 155-175'	874.77	W89A200	05/19/99	05/25/99	05/25/99
MDLs FOR ABOVE SAMPLES	0.07				

NOTE: TOTAL CALCULATED AS HEXANE

27-May-99

ANALYST INITIALS nl.

REVIEW M

MICROSEEPS

GM2503-992741

**** QUALITY CONTROL ****

----- ARCADIS GERAGHTY & MILLER -----
----- PROJECT LOC: MARATHON INDIAN BASIN -----
----- PROJECT NO: NP000443.0002.MT0001 -----
----- CONCENTRATIONS IN PPMV -----

CONTINUING CALIBRATION CHECK

STANDARDS: "220"
REFERENCE: W89A187

COMPOUND	KNOWN	RESULT	PERCENT DIFFERENCE
HEXANE	100.00	92.78	7.22

LABORATORY BLANK RESULTS

BLANK: N2 IN VIAL
REFERENCE: W89A194

COMPOUND	BLANK	LOWER DETECTION LIMIT
HEXANE	ND	0.07

27-May-99

ANALYST INITIALS nl.

REVIEW

GERAGHTY & MILLER, INC.
Environment and Infrastructure
a heidemij company

Laboratory Task Order No. _____

CHAIN-OF-CUSTODY RECORD

Page _____ of _____

992741-GM2503

Project Number NP000443.0002.MT0001

Project Location MARATHON Indian Basin

Laboratory Micro Seeps INC

Sampler(s)/Affiliation McNeese AGM
Midland, Tx

SAMPLE IDENTITY	Code	Date/~~Time~~ Sampled	Time ~~Lab ID~~	SAMPLE BOTTLE / CONTAINER DESCRIPTION: GAS total C4 - C12										TOTAL
MW 110, 55-75	A	5-18-99	1042	1										1
MW 110, 110-130	A	5-18-99	1450	1										1
MW 110, 150-170	A	5-18-99	1725	1										1
MW 110, 170-190	A	5-18-99	2000	1										1
MW 86, 90-110	A	5-19-99	1015	1										1
MW 86, 155-175	A	5-19-99	1250	1										1

Total No. of Bottles/ Containers: 6

Sample Code: L = Liquid; S = Solid; A = Air

Relinquished by: [signature]	Organization: ARCADIS G+M	Date 5/21/99	Time 1600	Seal Intact? Yes No N/A
Received by: _____	Organization: _____	Date / /	Time _____	
Relinquished by: [signature]	Organization: _____	Date / /	Time _____	Seal Intact? Yes No N/A
Received by: [signature]	Organization: Microseeps	Date 5/25/99	Time 1030	

Special Instructions/Remarks:
Note * Bill Paul Peacock w/ MARATHON Oil and Send Results to Mike Hanson (215) 752-6840

Delivery Method: ☐ In Person ☑ Common Carrier Fed Ex ☐ Lab Courier ☐ Other _____

MICROSEEPS

University of Pittsburgh Applied Research Center
220 William Pitt Way, Pittsburgh, PA 15238
(412) 826-5245
FAX (412) 826-3433

RECEIVED
AUG 3 0 1999

August 25, 1999

Mr. Allan Reed
Arcadis Geraghty & Miller, Inc.
1030 Andrews Highway
Suite 120
Midland, TX 79701

Dear Mr. Reed:

Attached is the final data listing for the samples we received on August 17, 1999, your project #NP000443.0002.MT001.

Please give me a call if you have questions or I can be of further assistance. Thank you for using MICROSEEPS.

Sincerely,

Linda S. Tibensky

LST/lsp

Attachment: GM2574-993174

MICROSEEPS

GK2574-993174

----- ARCADIS GERAGHTY & MILLER -----
----- PROJECT LOC: MARATHON INDIAN BASIN -----
----- PROJECT NO: MP000443.0002.MT001 -----
----- CONCENTRATIONS IN PPMV -----

SAMPLE NAME	TOTAL C4-C12	FILE NAME	DATE SAMPLED	DATE RECEIVED	DATE ANALYZED
MW-74 (170'-190')	3631.79	W91A119	08/10/99	08/17/99	08/19/99
MW-85 (160'-180')	1931.42	W91A120	08/10/99	08/17/99	08/19/99

MDLs FOR ABOVE SAMPLES 0.07

NOTE: TOTAL CALCULATED AS HEXANE

22-Aug-99

ANALYST INITIALS mb.

REVIEW

MICROSEEPS

GM2574-993174

**** QUALITY CONTROL ****

----- ARCADIS GERAGHTY & MILLER -----
----- PROJECT LOC: MARATHON INDIAN BASIN -----
----- PROJECT NO: MP000443.0002.MTD01 -----
----- CONCENTRATIONS IN PPMV -----

CONTINUING CALIBRATION CHECK

STANDARDS: "220"
REFERENCE: W91A114

COMPOUND	KNOWN	RESULT	PERCENT DIFFERENCE
HEXANE	100.00	90.28	9.72

LABORATORY BLANK RESULTS

BLANK: N2 IN VIAL
REFERENCE: W91A116

COMPOUND	BLANK	LOWER DETECTION LIMIT
HEXANE	ND	0.07

22-Aug-99

ANALYST INITIALS mk.

REVIEW

SEP-08-99 WED 10:21 AM FAX NO. P. 06/07

993174-GM2574

GERAGHTY & MILLER, INC.
Environment and Infrastructure
a heidemij company

Laboratory Task Order No. ______

CHAIN-OF-CUSTODY RECORD

Page ______ of ______

Project Number NP000443.0002.MT001

Project Location MARATHON Indian Basin

Laboratory Micro Seeps

Sampler(s)/Affiliation McNeese, AGM Midland, TX

SAMPLE IDENTITY	Code	Date/~~Time~~ Sampled	Time ~~Lab ID~~	SAMPLE BOTTLE / CONTAINER DESCRIPTION: Total (CH-C12)										TOTAL
MW 85 (160'-180')	A	8-10-99	1007	2										2
MW 74 (170'-190')	A	8-10-99	1430	2										2

Total No. of Bottles/Containers: 4

Sample Code: L = Liquid; S = Solid; A = Air

Relinquished by: [signature]	Organization: ARCADIS	Date 8/16/99	Time 1600	Seal Intact? (Yes) No N/A
Received by:	Organization:	Date / /	Time	
Relinquished by:	Organization:	Date / /	Time	Seal Intact? (Yes) No N/A
Received by: [signature]	Organization: Micrseeps	Date 8/17/99	Time 1100	

Special Instructions/Remarks:

Delivery Method: ☐ In Person ☑ Common Carrier Fed Ex (SPECIFY) ☐ Lab Courier ☐ Other ______ (SPECIFY)

Scott print 95-0761

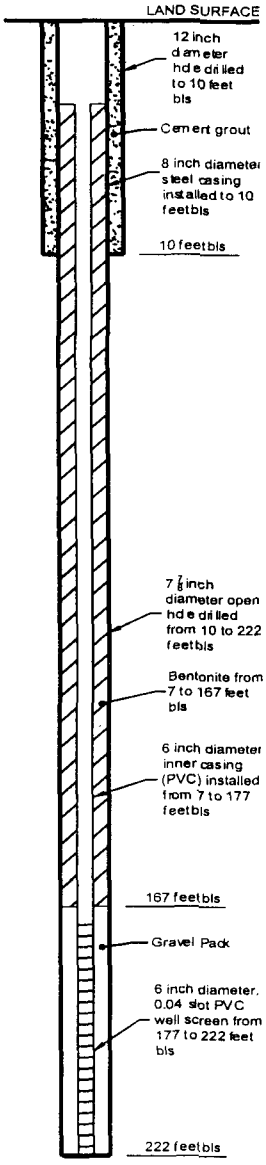
Appendix D

Modified Well Completion Details

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: MW-75

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: NA

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): December 2, 1994 (modified December 22, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

NA

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: NA feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: NA gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: 4-30 ft, 60-70 ft, 80-120 ft, 140-150 ft, 170-180 ft

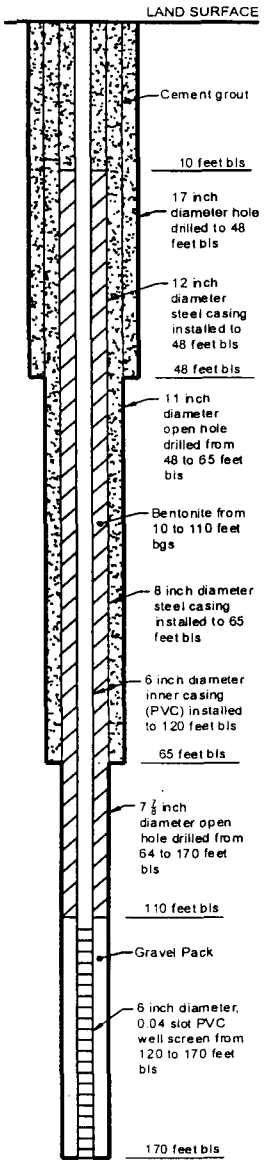
Remarks: On December 2, 1994, MW-75 was completed as an open hole to a depth of 222 feet bls. On December 22, 1999, MW-75 was completed with 45 feet of 6" diameter PVC 0.04 inch slot screen and 170 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: MW-84

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: RA-5131-S-22

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): August 4, 1996 - August 9, 1996 (modified March 24, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

August 4, 1996 - August 9, 1996

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: 30 feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: 15 gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: 20-25 ft, 25-55 ft, 65-90 ft, 93-95 ft, 100-115 ft,

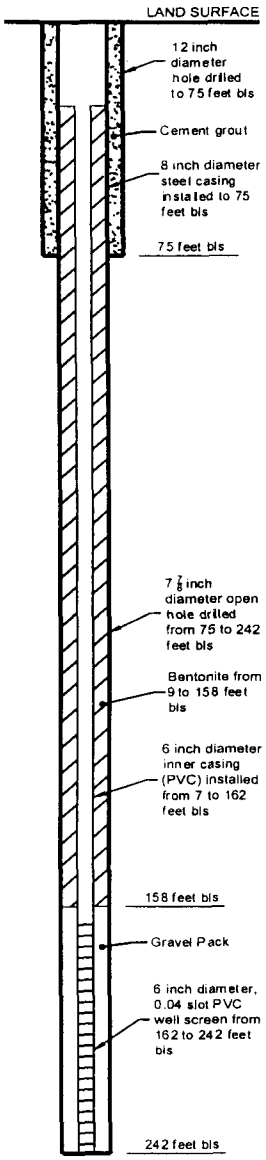
Remarks: On August 9, 1996, MW-84 was completed as an open hole to a depth of 170 feet bls. On March 24, 1999, MW-84 was completed with 50 feet of 6" diameter PVC 0.04 inch slot screen and 120 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: MW-85

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: RA-5131-S-23

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): June 4, 1996 (modified August 16, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

NA

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: 56 feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: NA gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: 75-85 ft, 95-110 ft, 125-130 ft, 140-145 ft, 165-220 ft.

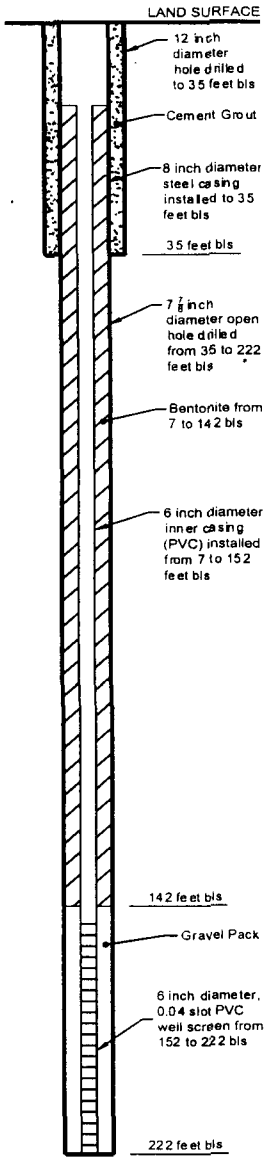
Remarks: On June 4, 1996, MW-85 was completed as an open hole to a depth of 242 feet bls. On August 16, 1999, MW-85 was completed with 80 feet of 6" diameter PVC 0.04 inch slot screen and 155 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: MW-104

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: NA

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): May 13, 1997 (modified December 20, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

NA

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: NA feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: NA gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: 15-20 ft, 50-55 ft, 70-105 ft, 110-120 ft, 135-140 ft, 170-175 ft

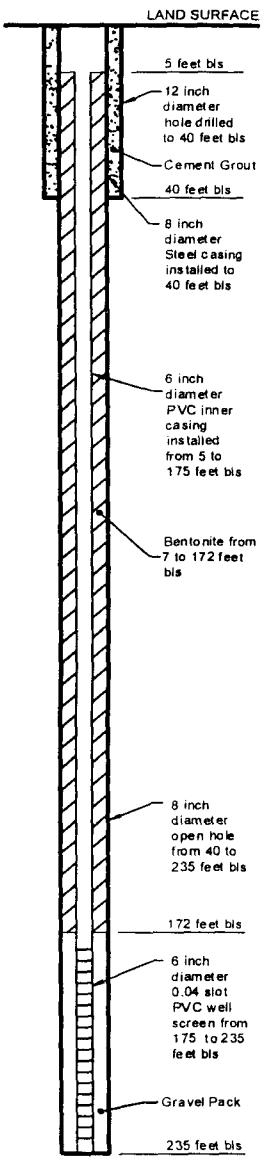
Remarks: On May 13, 1997, MW-104 was completed as an open hole to a depth of 222 feet bls. On December 20, 1999, MW-104 was completed with 70 feet of 6" diameter PVC 0.04 inch slot screen and 145 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: MW-110

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: NA

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): June 15 & 16, 1998 (modified May 24, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

NA

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: 182 feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: NA gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: NA

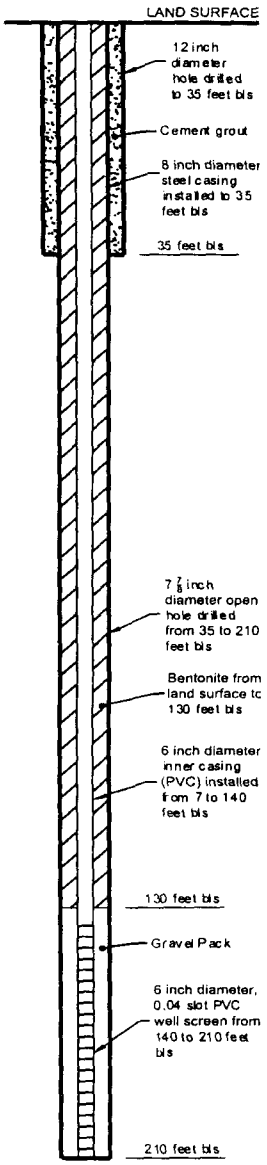
Remarks: On June 15 & 16, 1998, MW-110 was completed as an open hole to a depth of 235 feet bls. On May 24, 1999, MW-110 was completed with 60 feet of 6" diameter PVC 0.04 inch slot screen and 170 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: MW-112

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: NA

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): July 1999 (modified December 28, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

NA

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: NA feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: NA gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: 60-65 ft

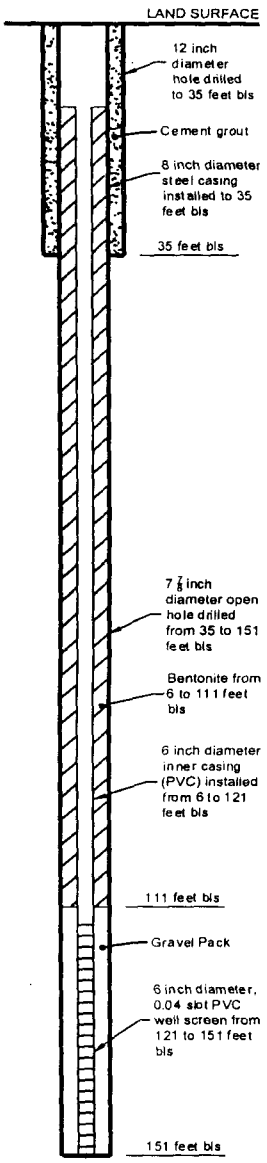
Remarks: In July 1999, MW-112 was completed as an open hole to a depth of 210 feet bls. On December 28, 1999, MW-112 was completed with 70 feet of 6" diameter PVC 0.04 inch slot screen and 140 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

ARCADIS GERAGHTY & MILLER

Well Construction Log

(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

bls = Depth below land surface

Project: Marathon Oil Company — Well: VE-19

Indian Basin Remediation Project

Town/City: Carlsbad — State: NM

County: Eddy County

Permit No.: NA

Land-Surface Elevation and Datum:

NA feet ☐ Surveyed ☐ Estimated

Installation Date(s): May 28, 1997 (modified December 27, 1999)

Drilling Method: Mud/Air Rotary

Drilling Contractor: West Texas Water Well Service

Drilling Fluid: Air

Development Technique(s) and Date(s)

NA

Fluid Loss During Drilling: NA gallons

Water Removed During Development: NA gallons

Static Depth to Water: NA feet below M.P.

Pumping Depth to Water: NA feet below M.P.

Pumping Duration: NA hours

Yield: NA gpm — Date: NA

Specific Capacity: NA gpm/ft

Well Purpose: Monitor groundwater quality in the bedrock.

Fracture Zones: 75-85 ft, 95-110 ft, 125-130 ft, 140-145 ft, 165-220 ft.

Remarks: On May 28, 1997, VE-19 was completed as an open hole to a depth of 151 feet bls. On December 27, 1999, VE-19 was completed with 30 feet of 6" diameter PVC 0.04 inch slot screen and 115 feet of 6" diameter PVC riser to the surface.

Prepared by: ARCADIS Geraghty and Miller

Appendix E

Phase I and II Well Logs and Completion Reports

WELL LOG

WELL NO. MW-112

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 211.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -211.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0										
		Shovel		Dry		—	SM		TOPSOIL: 2.5YR 4/4, dusky red, very silty soil with trace clay, trace roots, dry.	
-5		Shovel		Dry		—				
-10									LIMESTONE/DOLOMITE GRAVEL: very fine grained to crystalline, dense, cobbles, some chalky.	
		Shovel		Dry		—			DOLOMITE: 10YR 6/2, light gray to brown.	
-15										
		Shovel		Dry		—			DOLOMITE: 10YR 5/2, gray brown, very fine grained crystalline, dense, some chalky. Drilling became hard at 16'.	
-20										
		Shovel		Dry		—			INTERBEDDED SAND AND DOLOMITE: orange SAND, 4" thick; DOLOMITE as above.	
-25										
		Shovel		Dry		—			DOLOMITE: 10YR 6/2, light brown gray, very fine crystalline, dense, some siliceous, clean.	
-30										
		Shovel		Dry		—			DOLOMITE: 10YR 6/2, light brown gray, very fine crystalline, dense, very hard.	

WELL LOG

WELL NO. MW-112

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 211.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -211.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-35									DOLOMITE: as above.	
		Shovel		Dry		—				
-40									DOLOMITE: 10YR 6/2, light brown gray, very fine crystalline, dolomitic, dense, trace interbedded SAND with black stain, slight to moderate odor, trace LIMESTONE.	
		Shovel		Dry		202				
-45									DOLOMITE: 10YR 6/3, pale brown, very fine crystalline, slightly siliceous, clean.	
		Shovel		Dry		22				
-50									DOLOMITE: 10YR 5/2, gray brown, very fine crystalline, dense, some slightly mottled.	
		Shovel		Dry		58				
-55									DOLOMITE: as above, rig torqueing 56'-60'.	
		Shovel		Dry		13				
-60									DOLOMITE: 10YR 5/1, gray, very fine to fine crystalline, some sandy, trace conchoidal fractures.	
		Shovel		Dry		6.7				
-65									SAND: 5Y 6/2, light olive gray, very fine grained, some consolidated, some loose, clear grains, dolomitic.	
		Shovel		Dry		8.4				

WELL LOG

WELL NO. MW-112

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 211.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -211.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-70		Shovel		Dry		190			DOLOMITE: 10YR 4/1, dark gray, very fine crystalline; 5YR 6/3, light red brown, ver fine crystalline, very sandy.	
-75		Shovel		Dry		13			DOLOMITE: as above.	
-80		Shovel		Dry		11			DOLOMITE: 10YR 7/3, very pale brown, clean, dense.	
-85		Shovel		Dry		10			DOLOMITE: as above, rough drilling.	
-90		Shovel		Wet		15			DOLOMITE: 10YR 7/3, very pale brown, clean, dense, trace SAND.	
-95		Shovel		Damp		0.4			DOLOMITE: 10YR 7/3, very pale brown, clean, dense, trace black stain (asphaltic).	
-100		Shovel		Dry		0.0			DOLOMITE: as above, hole dried up with drilling, smooth easy drilling at 102'-103'.	
-105									DOLOMITE: 5B 7/2, pale green, trace glauconite.	

WELL LOG

WELL NO. MW-112

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 211.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -211.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
		Shovel		Dry		0.1				
-110									DOLOMITE: 10YR 7/2, pale brown, very fine crystalline, dense, clean, trace chalky, trace SAND.	
		Shovel		Dry		0.0				
-115									DOLOMITE: 10YR 7/2, pale brown, very fine crystalline, dense, clean, trace black stain, very powdery.	
		Shovel		Dry		0.3				
-120									DOLOMITE: as above.	
		Shovel		Dry		2.5				
-125									DOLOMITE: 10YR 7/3, very pale brown, very fine crystalline, dense, more black stain, trace glauconite.	
		Shovel		Sli Damp		2.0				
-130									DOLOMITE: 10YR 8/6, yellow, very fine crystalline, becoming softer, trace SAND, slightly damp.	
		Shovel		Sli Damp		1.3				
-135									DOLOMITE: as above.	
		Shovel		Damp		0.6				
-140									SAND: 10YR 7/6, yellow, very fine grained, poorly cemented, some quartz grains, slight odor, damp.	

WELL LOG

WELL NO. MW-112

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 211.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -211.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
		Shovel		Damp		3.0	SW			
-145									DOLOMITE: 10YR 7/6–7/5, very fine crystalline, very sandy.	
		Shovel		Damp		3.8				
-150									DOLOMITE: as above.	
		Shovel		Damp		2.8				
-155									SAND: 10YR 7/6, yellow, very fine grained, loose, well graded, slight to moderate odor, subrounded to subangular, some loose quartz grains.	
		Shovel		Damp		0.1	SW			
-160									SAND: as above.	
		Shovel		Wet		8.7				
-165									DOLOMITE AND SAND: 10YR 7/6, yellow, very fine crystalline, dense, sandy; SAND–very fine grained, well graded, loose, some quartz grains, dolomitic, slight odor.	
		Shovel		Wet		3.4				
-170									DOLOMITE AND SAND: as above.	
		Shovel		Wet		19				
-175									DOLOMITE AND SAND: as above, well estimated making 15 GPM of water.	
		Shovel		Wet		5.0				

WELL LOG

WELL NO. MW-112

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 211.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -211.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-180									DOLOMITE AND SAND: as above.	
		Shovel		Wet		11				
-185									DOLOMITE: 10YR 7/2, light gray, very fine to fine crystalline, very vugular, some pinpoint porosity.	
		Shovel		Wet		0.3				
-190									DOLOMITE AND SAND: 10YR 7/3, very pale brown, very fine crystalline, dense, very sandy; SAND–loose, unconsolidated, well to fairly graded, quartz grains.	
		Shovel		Wet		0.0				
-195									DOLOMITE: 10YR 7/3, very pale brown.	
		Shovel		Wet		0.0				
-200									DOLOMITE: 10YR 7/3, very pale brown, very fine crystalline, clean.	
		Shovel		Wet		0.0				
-205									DOLOMITE: as above.	
		Shovel		Wet		0.0				
-210										

WELL LOG

WELL NO.
MW-113

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 200.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -26.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -26.0'
	Open Hole	Surface to -200.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0		Shovel		Dry		0.0	GM		SILT: 7.5YR 4/3, brown, loose, dry, some organics, some dolomite.	
-5		Shovel		Dry		0.0	GW		LIMESTONE AND DOLOMITE COBBLES: 2.5Y 8/1 to 7.5YR 5/1, white to gray, very dense.	
-10		Shovel		Dry		0.0	GW		LIMESTONE AND DOLOMITE COBBLES: as above.	
-15		Shovel		Dry		0.0			LIMESTONE/DOLOMITE GRAVEL: coarse to medium, loose, easier drilling.	
-20		Shovel		Dry		0.0			DOLOMITE: 7.5YR 5/1, gray, very fine grained to crystalline, dense.	
-25		Shovel		Dry		0.0			LIMESTONE: 7.5YR 7/1, light gray, very fine grained to crystalline, dense; 30% 10YR 7/6 yellow SAND, very fine grained, consolidated, friable; 70% 2.5YR 7/1, reddish gray LIMESTONE, very fine grained to crystalline, dense, dolomitic cobbles.	
-30		Shovel		Dry		0.0			SANDSTONE: 5YR 5/1, gray, very fine grained, consolidated, slightly calcareous, dense.	

WELL LOG

WELL NO. MW-113

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 200.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -26.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -26.0'
	Open Hole	Surface to -200.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-35		Shovel		Dry		0.0			DOLOMITE: 5YR 6/2, pinkish gray, very fine grained to crystalline, dense, some sandy, trace conchoidal fractures; 10YR 5/8, yellow-brown, very fine grained to crystalline, sandy.	
-40		Shovel		Dry		74			DOLOMITE: 5YR 6/8 reddish yellow, very fine grained to crystalline, sandy, moderate odor; gray, very fine grained to crystalline, very sandy, hard.	
-45		Shovel		Dry		109			SANDSTONE: 10YR 7/2, light gray, very fine grained to crystalline, siliceous, dense, clean.	
-50		Shovel		Dry		1.6			SANDSTONE: 10YR 5/1, light gray, very fine grained, siliceous, hard.	
-55		Shovel		Dry		3.1			DOLOMITE: 10YR 7/4, very pale brown, very fine grained to crystalline, clean, trace black stain (asphaltic?), calcareous, dense, slow drilling; trace LIMESTONE–10YR 8/1, very fine grained to crystalline, chalky. Rig torquing from 57'-60'.	
-60		Shovel		Dry		21			DOLOMITE: 10YR 7/6, yellow, very fine grained to crystalline, siliceous, trace black stain, slight odor, trace light green glauconite; at 64', change to DOLOMITE–10yr 5/1, gray, very fine grained to crystalline, trace glauconite.	
-65		Shovel		Dry		64			DOLOMITE: 10YR 6/2, gray brown, very fine grained to crystalline, dense, trace glauconite, trace fossiliferous, trace oolitic, trace secondary crystalline, trace fractures (smooth, slow drilling), slight odor.	
-70									DOLOMITE: 10YR 5/2, gray brown, very fine grained to crystalline, dense, trace	

WELL LOG

WELL NO. MW-113

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 200.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -26.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -26.0'
	Open Hole	Surface to -200.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
		Shovel		Dry		17			brown-black stain.	
-75		Shovel		Dry		50			DOLOMITE: as above, brown to black stain in oolites, trace mottling, trace inter-crystalline porosity.	
-80		Shovel		Sli Damp		6.6			DOLOMITE: 10YR 6/2, light gray to brown, very fine grained to crystalline, dense; trace LIMESTONE–10YR 8/1, white, very fine grained to crystalline, chalky.	
-85		Shovel		Dry		7.7			DOLOMITE: as above.	
-90		Shovel		Dry		25			LIMESTONE: 10YR 8/1, chalky.	
-95		Shovel		Dry		5.0			DOLOMITE: 10YR 7/6, yellow, very fine grained to crystalline, some sandy.	
-100		Shovel		Damp		1.8	SP		SAND: 2.5Y 7/6, yellow, very fine grained, unconsolidated, loose, quartz grains, damp.	
-105		Shovel		Damp		1.4			SAND: as above.	

WELL LOG

WELL NO. MW-113

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 200.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -26.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -26.0'
	Open Hole	Surface to -200.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
							SP			
-110		Shovel		Sli Damp		1.4			DOLOMITE: 2.5Y 7/4, pale yellow, very fine grained to crystalline, chalky, trace LIMESTONE.	
-115		Shovel		Sli Damp		3.1			DOLOMITE: as above, trace SANDSTONE.	
-120		Shovel		Dry		0.2			DOLOMITE: 2.5Y 7/4, pale yellow, very fine grained to crystalline, chalky, sandy, slightly damp.	
-125		Shovel		Damp		0.2			DOLOMITE: 2.5Y 7/6, yellow, very fine grained to crystalline, sandy, clean.	
-130		Shovel		Wet		0.3			SAND: 2.5Y 7/8, yellow, very fine grained, unconsolidated to consolidated, firm, 10% quartz grains (orange), subrounded.	
-135		Shovel		Wet		0.3			Lost circulation — add foam and mist.	
-140		Shovel		Wet		—			No returns, fast drilling.	

WELL LOG

WELL NO. MW-113

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 200.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -26.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -26.0'
	Open Hole	Surface to -200.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-145		Shovel		Wet		—			No returns. Note: samples washed to remove soap before P.I.D. readings.	
-150		Shovel		Wet		19			SAND: 10YR 7/6, yellow, very fine grained, quartz grains, loose, rounded to subrounded, estimated 20% returns	
-155		Shovel		Wet		158			SAND: 10YR 7/4, very pale brown, quartz grains, loose, unconsolidated, slightly sucrosic dolomitic, estimated 20% returns.	
-160		Shovel		Wet		—			No returns.	
-165		Shovel		Wet		—			No returns. Note: samples washed to remove soap before P.I.D. readings.	
-170		Shovel		Wet		19			DOLOMITE: 10Yr 6/3, pale brown, very fine grained to fine crystalline, siliceous, sandy, vuggy porosity (looks like reef).	
-175		Shovel		Wet		6.8			DOLOMITE: as above, abundant vugs and pinpoint porosity.	
-180									DOLOMITE: as above, 20% returns with foam.	

WELL LOG

WELL NO.
MW-113

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 7-7/8" TOTAL DEPTH: 200.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -26.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -26.0'
	Open Hole	Surface to -200.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-185		Shovel		Wet		—			DOLOMITE: as above.	
-190		Shovel		Wet		—			DOLOMITE: 2.5Y 7/3, pale yellow, very fine to fine grained to medium crystalline, abundant vuggy porosity and pinpoint porosity, some sandy.	
-195		Shovel		Wet		5.5			SANDSTONE: 10R 4/4, weak red, very fine grained, firm, subrounded.	
-200		Shovel		Wet		9.9				

WELL LOG

WELL NO.
MW-114

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

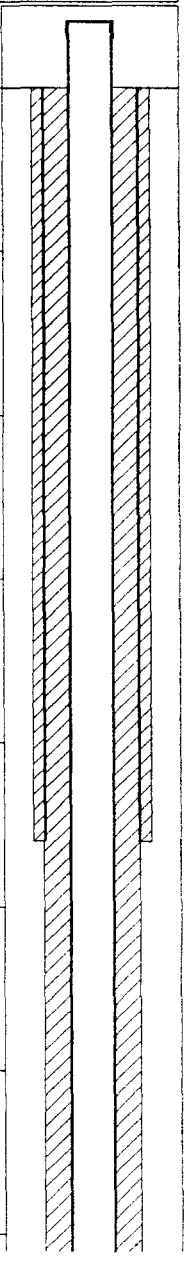
PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 17-1/2"; 12-1/4", 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -111.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	
CASING TYPE:	14" Diameter Steel	Surface to -23.0'
	8-5/8" Diameter Steel	2.0' to -111.0'
	Open Hole	Surface to -220.0'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0		Shovel		Mud		—			siliceousT: 5YR 5/4, reddish brown, very large to small LIMESTONE cobbles (overburden), boulders, 90 minutes to drill 10 feet.
-5		Shovel		Mud		—			siliceousT: as above.
-10		Shovel		Mud		—			siliceousT: as above.
-15		Shovel		Mud		—			DOLOMITE: 7.5YR 6/3, light brown, very fine crystalline, dense, smooth, clean.
-20		Shovel		Damp		0.0			DOLOMITE: as above, set 14" casing from surface to 23 feet.
-25		Shovel		Moist		2.3			DOLOMITE: as above, strong odor at 30 feet.
-30		Shovel		Moist		2.3			SAND: 10YR 4/1, dark gray, very fine grained, consolidated, firm, moderate to strong odor.
-35									

WELL INSTALLATION



WELL LOG

WELL NO. MW-114

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 17-1/2"; 12-1/4", 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -111.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	
CASING TYPE:	14" Diameter Steel	Surface to -23.0'
	8-5/8" Diameter Steel	2.0' to -111.0'
	Open Hole	Surface to -220.0'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
		Shovel		Damp		0.9			DOLOMITE: 10YR 7/3, very pale brown, very fine crystalline, dense, trace LIMESTONE.	
-40		Shovel		Dry		2.0			DOLOMITE: 10YR 4/8–7/3, very fine crystalline, siliceous, dense, trace LIMESTONE, trace SAND (10YR 8/2).	
-45		Shovel		Dry		3.1			DOLOMITE: as above.	
-50		Shovel		Wet		12.8			DOLOMITE: 10YR 4/8–7/3, very fine crystalline, dense, hard, smooth drilling. Note: samples wet (mist with foam for sample recovery).	
-55		Shovel		Wet		14			SAND: 10YR 5/1, gray, very fine grained, consolidated, well graded, firm, subrounded to subangular, slightly siliceousty, rough drilling at 56'.	
-60		Shovel		Wet		10			SAND: as above.	
-65		Shovel		Wet		4.5			DOLOMITE: 10YR 5/2, gray brown, very fine crystalline, brown-black stain, dolomitic, some mottling, trace pinpoint porosity, trace pale green SANDSTONE, very fine grained, consolidated, firm, well sorted.	
-70		Shovel		Wet		4.5			DOLOMITE: as above.	

WELL LOG

WELL NO. MW-114

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 17-1/2"; 12-1/4", 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -111.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	
CASING TYPE:	14" Diameter Steel	Surface to -23.0'
	8-5/8" Diameter Steel	2.0' to -111.0'
	Open Hole	Surface to -220.0'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
-75		Shovel		Wet		19			DOLOMITE: 2.5YR 6/2, light brown/gray, dense, very fine crystalline, clean.
-80		Shovel		Wet		18			SAND: 10YR 5/1, gray, very fine grained, consolidated, firm, subrounded, well sorted.
-85		Shovel		Wet		21			SAND: 2.5Y 6/2, light brown/gray, very fine crystalline, dense, trace SANDSTONE.
-90		Shovel		Wet		24			SAND: 10YR 5/1 gray, very fine grained, consolidated, firm, subrounded, well sorted.
-95		Shovel		Wet		13			DOLOMITE AND SAND: 10YR 5/1, gray, as above; 2.5Y 6/2, light gray, dense.
-100		Shovel		Wet		13			DOLOMITE AND SAND: as above, trace glauconite.
-105		Shovel		Wet		10			DOLOMITE: as above.
-110									DOLOMITE: as above, set casing at 111 feet.

WELL INSTALLATION

WELL LOG

WELL NO. MW-114

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 17-1/2"; 12-1/4", 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -111.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	
CASING TYPE:	14" Diameter Steel	Surface to -23.0'
	8-5/8" Diameter Steel	2.0' to -111.0'
	Open Hole	Surface to -220.0'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
		Shovel		Dry		1.1				
-115									DOLOMITE: 10YR 7/3, very pale brown, very fine crystalline, clean, trace 10YR 8/6 yellow.	
		Shovel		Dry		0.3				
-120									DOLOMITE: 2.5Y 7/2, light gray, very fine crystalline, clean, trace brown-black stain	
		Shovel		Dry		0.3				
-125									DOLOMITE: as above.	
		Shovel		Dry		0.1				
-130									DOLOMITE: 10YR 7/2, light gray, very fine crystalline, dense, trace conchoidal fractures, very clean, very powdery.	
		Shovel		Dry		0.2				
-135									DOLOMITE: 10YR 7/2, light gray, very fine crystalline, very clean.	
		Shovel		Dry		0.0				
-140									DOLOMITE: 10YR 6/2, light brownish gray, very fine crystalline, clean, trace sandy, trace pale green.	
		Shovel		Dry		0.0				
-145									DOLOMITE: as above.	
		Shovel		Dry		0.0				

WELL LOG

WELL NO. MW-114

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 17-1/2"; 12-1/4", 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -111.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	
CASING TYPE:	14" Diameter Steel	Surface to -23.0'
	8-5/8" Diameter Steel	2.0' to -111.0'
	Open Hole	Surface to -220.0'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-150		Shovel		Dry		0.3			DOLOMITE: 10YR 4/1, dark gray, very fine to fine crystalline, some sandy, some 10YR 6/2.	
-155		Shovel		Dry		0.0			SAND: 10YR 6/2, light brownish gray, very fine crystalline, clean, at 156' 4" thick layer 10YR 8/8 yellow.	
-160		Shovel		Dry		0.0			SAND: as above.	
-165		Shovel		Dry		0.0			SAND: as above.	
-170		Shovel		Dry		0.1			SAND: 10YR 5/1, gray, very fine to fine grained, subangular, consolidated, poorly sorted, some 10YR 7/3 SAND, trace quartz grains.	
-175		Shovel		Dry		0.0			SAND: as above, color change at 173'.	
-180		Shovel		Moist		0.0			SAND: 10YR 7/4, very pale brown, very fine to fine grained, consolidated, slightly friable, poorly cemented, poor to fairly sorted.	
-185		Shovel		Wet		3.3			DOLOMITE: 10YR 7/6, yellow, very sandy, moist (making water), mist with foam.	

WELL LOG

WELL NO.
MW-114

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: — DATE COMPLETED: —
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 17-1/2"; 12-1/4", 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -111.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	
CASING TYPE:	14" Diameter Steel	Surface to -23.0'
	8-5/8" Diameter Steel	2.0' to -111.0'
	Open Hole	Surface to -220.0'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Wet		1.8			LIMESTONE: 10YR 7/2, light gray, very fine to fine to medium crystalline, very larg vugs, very vuggy, large oolites?, some fractured porosity.	
-195		Shovel		Wet		1.4			LIMESTONE: as above.	
-200		Shovel		Wet		1.9			LIMESTONE: 10YR 7/2, light gray, fine to medium crystalline, some fractured porosity, very vuggy.	
-205		Shovel		Wet		1.7			LIMESTONE: as above, becoming more siliceousiceous.	
-210		Shovel		Wet		0.8			LIMESTONE: 10YR 7/2, light gray, very fine to fine to trace medium crystalline, becoming more siliceousiceous, large vugs, some inter-crystalline porosity.	
-215		Shovel		Wet		1.0			LIMESTONE: as above.	
-220										

WELL LOG

WELL NO.
MW-115

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/20/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 224.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -224.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILTY SAND: 10R 5/6, reddish brown, overburden, trace organics, 30% cobbles, slightly rounded, moderately well sorted.	
-5										
-10									LIMESTONE: GLEY 1 7/N, gray, angular, moderately hard, no visible bedding or crystalline structures.	
-15									DOLOMITE AND LIMESTONE: GLEY 2 8/5 BG, gray, mixed cobbles; GLEY 1 6/N, some voids with crystalline structures within, possibly calcite or aragonite, void space ~1 mm diameter, cobbles from .2 to 1.3 cm diameter, ~30% DOLOMITE, 70% LIMESTONE, trace black CHERT, conchoidal fracture, slight hydrocarbon odor.	
-20										
-25									INTERBEDDED SANDSTONE AND LIMESTONE: SR 4/6, red lense, moderately well cemented, some voids visible; GLEY 1 8/10GY, gray green interbedded with GLEY 1 8/10Y, gray white LIMESTONE, some void space.	
-30									SANDSTONE: 5R 4/6, reddish, hard, well cemented, likely dolomitic cement.	
-35										

WELL LOG

WELL NO. MW-115

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/20/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 224.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -224.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-40									DOLOMITE: GLEY 2 7/5 PB, light gray, hard, crystalline, conchoidal fractures, no void space or structure.	
-45									SANDSTONE: 7.5R 4/3, weak red, fine grained, well sorted, poorly cemented, damp, faint hydrocarbon odor, laminar bedding, mix of light gray color in grains in bedding planes. GLEY 2 7/10B, becoming moderately cemented from 52' on.	
-50										
-55									DOLOMITE: GLEY 2 7/5 PB, light gray, very hard, crystalline, conchoidal fractures, no void space or fracture.	
-60										
-65									DOLOMITE: as above, hydrocarbon staining on DOLOMITE pieces.	
									DOLOMITE: GLEY 2 7/5 PB, light gray, very hard, crystalline, conchoidal fractures, no void space or fracture.	
-70									SILTY SANDSTONE: 5YR 5/2, reddish brown, poorly cemented, well sorted, strong hydrocarbon odor but no visible product, slightly damp, fine grained.	
									DOLOMITE: GLEY 2 7/5 PB, light gray, very hard, crystalline, conchoidal fractures, no void space or fracture.	

WELL LOG

WELL NO.
MW-115

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/20/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 224.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -224.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-75									SANDSTONE: 5YR 5/2, reddish brown, poorly cemented, well sorted, strong hydrocarbon odor but no visible product, slightly damp, fine grained.	
-80									DOLOMITE: GLEY 2 7/5 PB, light gray, very hard, crystalline, conchoidal fractures, no void space or fracture.	
-85									SANDSTONE: 10YR 7/1, light gray, soft, fine grained, well sorted, poorly cemented, damp, faint hydrocarbon odor, no visible structure.	
-90									INTERBEDDED SANDSTONE AND DOLOMITE: ~60% SANDSTONE, 10YR 7/1, light gray, soft, fine grained, well sorted, poorly cemented, damp, faint hydrocarbon odor, no visible structure; ~40% DOLOMITE, GLEY 2 7/5 PB, light gray, very hard, crystalline, conchoidal fractures, no void space or fracture, no odor.	
-95										
-100										
-105									SILTY SANDSTONE: 10YR 7/1, light gray, moderately sorted, poorly cemented, soft, trace black chert, microscopic bedding, laminar.	
-110									INTERBEDDED SANDSTONE AND DOLOMITE: ~60% SANDSTONE, 10YR 7/1, light gray, soft, fine grained, well sorted, poorly cemented, damp, faint hydrocarbon odor, no visible structure; ~40% DOLOMITE, GLEY 2 7/5 PB, light gray, very hard, crystalline, conchoidal fractures, no void space or fracture, no odor.	

WELL LOG

WELL NO. MW-115

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/20/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 224.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -224.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-115									DOLOMITE: GLEY 2 7/5 PB, light gray, very hard, most of stone ground into powde trace green DOLOMITE	
-120										
-125										
-130									DOLOMITE: as above, but harder, lighter color (7.5YR 7/4).	
-135										
-140										
-145									SANDSTONE LENSE: soft lense. DOLOMITE: as above, but harder, lighter color (7.5YR 7/4).	

WELL LOG

WELL NO. MW-115

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/20/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 224.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -224.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-150									SANDSTONE LENSE: slightly softer, larger DOLOMITE pieces.	
-155									DOLOMITE: as above, but harder, lighter color (7.5YR 7/4).	
-160										
-165									DOLOMITE: softer, as above.	
-170									SANDSTONE: 7.5YR 6/4, poorly sorted, poorly cemented, no structure apparent, trace of DOLOMITE and CHERT flakes, increase in DOLOMITE flakes at 175', medium grained, possibly some soft DOLOMITE.	
-175										
-180									DOLOMITE: GLEY 2 6/5 BG, greenish gray, medium soft, with orangish staining in predominately 7.5YR 6/2, gray DOLOMITE with interbedded CHERT flakes and orangish staining, poorly sorted, no visible structure.	
-185									SANDSTONE: 7.5YR 6/4, poorly sorted, poorly cemented, no structure apparent, trace of DOLOMITE and CHERT flakes, increase in DOLOMITE flakes at 175', medium grained, possibly some soft DOLOMITE.	

ARCADIS

WELL LOG

WELL NO.
MW-115

1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/20/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 224.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -35.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -35.0'
	Open Hole	Surface to -224.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190										
-195									SANDSTONE: as above, but softer, same composition, at 200'-strong hyrdrocarbon odor, then less noticable.	
-200										
-205									SANDSTONE: as above, but finer grained, moderate to well sorted, trace black CHERT flakes, trace CALCITE flakes. Started to produce more water.	
-210										
-215									DOLOMITE: GLEY 2 6/5 BG, greenish gray, medium soft, with orangish staining in predominately 7.5YR 6/2, gray DOLOMITE, medium hard.	
-220									DOLOMITE: as above, but larger DOLOMITE pieces, softer, more water in this unit.	
									DOLOMITE: as above, ~30% orange CHERT flakes, a lot of water produced, no visible product, but strong odor.	

WELL LOG

WELL NO. MW-116

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/15/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -34.6'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -34.6'
	Open Hole	Surface to -220.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILTY SAND: 2.5YR 6/6, overburden, 30% cobbles mixed angular and partly rounded, .5 to 2 cm diameter, poorly sorted, trace organics, cobbles mix of LIMESTONE and DOLOMITE, GM, poorly sorted.	
-5									DOLOMITE AND LIMESTONE: 70% LIMESTONE, 2.5Y 8/1, hard, no voids evident, crystalline structure; 30% DOLOMITE, 7.5YR 5/1, dark brown, hard, crystalline appearance.	
-10									SILTY SAND: very silty, 10YR 8/4, pale brown, softer lense, small cobbles, SANDSTONE fragments.	
-15									DOLOMITE: GLEY 1 4/N, hard, crystalline, uniform, no apparent voids.	
-20									SANDSTONE LENSE: 5R 4/1, damp, lense, soft, can be broken with hands, visibly damp, well sorted, no visible bedding structures, poorly cemented.	
									DOLOMITE: as above.	
									SANDSTONE LENSE: as above.	
-25									DOLOMITE: as above.	
									SANDSTONE LENSE: as above.	
-30									DOLOMITE: GLEY 1 4/N, very hard, crystalline, conchoidal fractures.	
									SANDSTONE LENSE: as above.	
									DOLOMITE: as above.	
-35									INTERBEDDED SANDSTONE AND DOLOMITE: as above.	

WELL LOG

WELL NO. MW-116

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/15/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -34.6'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -34.6'
	Open Hole	Surface to -220.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-40									INTERBEDDED SANDSTONE AND DOLOMITE: as above, checked P.I.D.–not above background.	
-45									INTERBEDDED SANDSTONE AND DOLOMITE: as above.	
-50									INTERBEDDED SANDSTONE AND DOLOMITE: as above, less sandstone.	
-55									DOLOMITE AND LIMESTONE: 2.5Y 6/1, gray, hard, crystalline, conchoidal fracture, no visible structure or void space; some (10%) LIMESTONE, 5Y 8/1, white, hard, angular, small moderately porous voids, no structures; at 55' DOLOMITE, 10YR 7/2, light gray, thin lense.	
-60									DOLOMITE: 2.5Y 6/1, gray, hard, crystalline, conchoidal fracture, no visible structur or voids.	
-65									DOLOMITE: as above.	
-70									DOLOMITE: as above, trace LIMESTONE, 5Y 8/1, white, hard, angular, small moderately porous voids, no structures.	

WELL LOG

WELL NO. MW-116

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/15/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -34.6'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -34.6'
	Open Hole	Surface to -220.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-75									DOLOMITE: as above.	
-80									INTERBEDDED SANDSTONE AND DOLOMITE: DOLOMITE–2.5Y 6/1, gray, hard, crystalline, conchoidal fracture, no visible structure or voids; SANDSTONE–5R 4/1, damp, poorly cemented, calcareous cement, slight bedding, structure linear, breaks easily with hands, well graded; LIMESTONE–2.5Y 6/1, gray, hard, crystalline, conchoidal fracture, no visible structure or voids, trace amount.	
-85									SANDSTONE: 5R 4/4, damp, poorly to moderately cemented, white mottles ~ 5%, fine grained, moderately well sorted, white grains possibly LIMESTONE pebbles, minute laminar bedding planes; trace DOLOMITE, as described above.	
-90									SANDSTONE: as above, poorly cemented, soft, some clay.	
-95									SANDSTONE: as above.	
-100									SANDSTONE: as above, slightly more clay to 107'.	
-105									No sample.	
-110									DOLOMITE, CHERT AND CLAY: mix of DOLOMITE, CHERT and CLAY; DOLOMITE–2.5Y 6/1, gray, hard, crystalline, conchoidal fracture, no visible structure or voids; 20% DOLOMITE–GLEY 2 7/10 BG, green, slightly crystalline.	
									DOLOMITE, CHERT AND CLAY: same as above, but 50% green DOLOMITE, moderate size cuttings.	

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PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/15/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -34.6'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -34.6'
	Open Hole	Surface to -220.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-115									DOLOMITE, CHERT AND CLAY: as above, but 10% green DOLOMITE, small cuttings possibly 20% to 10% SAND grains, poorly sorted, medium grained.	
-120									DOLOMITE: same DOLOMITE as above, but very crystalline, very hard, bit ground cuttings to powder so fragments are indistinct, possibly some LIMESTONE.	
-125									DOLOMITE: as above, trace black chert flakes.	
-130									DOLOMITE: as above.	
-135									DOLOMITE: as above.	
-140									DOLOMITE: as above.	
-145									DOLOMITE: as above.	

WELL LOG

WELL NO. MW-116

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/15/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -34.6'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -34.6'
	Open Hole	Surface to -220.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-150									DOLOMITE: as above, some slightly larger DOLOMITE chunks, drilling easier, slightly softer, some SANDSTONE, very poorly cemented.	
-155									DOLOMITE: as above, more SANDSTONE.	
-160									SANDSTONE: 10YR 6/6, brownish yellow, medium grained, poorly to moderately sorted, trace DOLOMITE and green DOLOMITE and black CHERT.	
-165									SANDSTONE: as above, trace mica, possibly dark black, sheen, thin flakes.	
-170									SANDSTONE: as above, including mica flakes.	
-175									SANDSTONE: as above.	
-180									SANDSTONE: as above, in water at 180'.	
-185									SANDSTONE: as above.	

WELL LOG

WELL NO.
MW-116

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PROJECT NUMBER: NP000443.0002
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: —
—
DRILLING CO: WEST TEXAS WATER WELL
DRILLING METHOD: MUD/AIR ROTARY
SAMPLING METHOD: SHOVEL
DATE BEGUN: 7/15/99 DATE COMPLETED: 7/15/99
DRILLER: R. KEITH ELEVATION (SURF.): —
LOGGER: L. AUSTRINS ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4"; 7-7/8" TOTAL DEPTH: 220.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	0.0' to -34.6'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" Diameter Steel	2.0' to -34.6'
	Open Hole	Surface to -220.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190									SANDSTONE: as above.	
-195									SANDSTONE: as above.	
-200									SANDSTONE: as above, increase in percent of DOLOMITE flakes (~40%), small, angular.	
-205									LIMESTONE: 10YR 7/1, light gray, very porous, some reddish material in void space, trace black CHERT, easy to drill through.	
-210									LIMESTONE: as above, slightly harder, slightly more crystalline, some DOLOMITE, same as above, easy to drill through.	
-215									LIMESTONE: as above, a lot of water production.	
-220										

WELL LOG

WELL NO. MW-117

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: AIR HAMMER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 9-14-99 DATE COMPLETED: 9-15-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES: HOLE COLLAPSED AFTER COMPLETION

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-7/8", 5-1/2" TOTAL DEPTH: 240' PLUG-BACK DEPTH 240'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Steel	+2.5' to -20.0'
	Open Hole	Surface to -240.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0				Dry					SAND: 5YR 4/3, red brown sand, very fine to fine grained, loose, very silty, some cobbles.	
-5				Dry		10.3			DOLOMITE: light gray, very fine crystalline, dense.	
-10				Dry		13.1			DOLOMITE: light tan, very fine, crystalline, chalky, some silty SAND, slight odor.	
-15				Dry		9.6			DOLOMITE: light gray, very fine, crystalline, some dense, some chalky (9/15/99 drilled out).	
-20				Dry					DOLOMITE: as above, strong odor, trace light gray SAND, very fine grained, trace fracture and pin point porosity at 20'.	
-25				Dry		4.6			DOLOMITE: 7.5YR 8/2, pink white, very fine, crystalline, dense, clean.	
-30				Dry		8.0			SAND: 7.5YR 7/1, light gray, very fine grained.	
-35				Wet		10.5			SAND: 7.5YR 7/1, light gray, very fine grained, (air hammer pulverizes sample), some DOLOMITE cobbles. Well making some water, but dried up as drilling continued.	
-40				Moist		5.7				
-45				Damp		1.9			DOLOMITE: 5YR 5/2, red gray, very fine crystalline, dense.	
-50				Dry		2.0				
-55				Damp		6.0			SAND: 2.5YR 6/1, gray, very fine grained, consolidated, rounded to subrounded.	
-60				Damp		6.8			SAND: 2.5YR 6/1, gray, very fine grained, consolidated, rounded to subrounded, sample quality very poor, slight to moderate odor, sample pulverized by air hammer.	

WELL LOG

WELL NO. MW-117

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: AIR HAMMER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 9-14-99 DATE COMPLETED: 9-15-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES: HOLE COLLAPSED AFTER COMPLETION

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-7/8", 5-1/2" TOTAL DEPTH: 240' PLUG-BACK DEPTH 240'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Steel	+2.5' to -20.0'
	Open Hole	Surface to -240.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65				Dry		130			SAND: gray, trace DOLOMITE cobbles.	
-70				Damp		31			DOLOMITE AND SAND: DOLOMITE 80%, SAND 20%.	
-75				Damp		19			DOLOMITE: 7.5 YR 5/2, brown, very fine crystalline, some mottled black staining.	
-80				Damp		8.5				
-85				Damp		9.6			DOLOMITE AND SAND: 10YR 7/2	
-90				Damp					SAND: 10YR 6/1, gray, very fine grained.	
-95				Damp		3.0			DOLOMITE: 10YR 5/1, gray, very fine crystalline, dense, trace PYRITE.	
-100				Damp		2.6			SAND: 10 YR 7/2, light gray, very fine grained, firm to dense.	
-105				Damp		3.1			SAND: 10 YR 7/2, light gray, very fine grained, firm to dense; 10% DOLOMITE cobbles.	
-110				Damp		2.5			DOLOMITE: 10YR 7/3, very pale brown, very fine crystalline, dense, some sandy. Note: hole making water on connections.	
-115						3.0				
-120						2.5			DOLOMITE: 10YR 7/2, light gray, very fine cystalline, dense, some sandy.	
-125						2.0				
-130										

WELL LOG

WELL NO. MW-117

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: AIR HAMMER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 9-14-99 DATE COMPLETED: 9-15-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES: HOLE COLLAPSED AFTER COMPLETION

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-7/8", 5-1/2" TOTAL DEPTH: 240' PLUG-BACK DEPTH 240'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Steel	+2.5' to -20.0'
	Open Hole	Surface to -240.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-135						2.2				
									DOLOMITE: 10YR 7/2, light gray, trace SAND.	
-140						2.0				
						3.1				
-145									DOLOMITE: 7.5YR 8/2, pink white, very fine crystalline, trace oolilitic.	
-150						2.6				
						2.7				
-155									DOLOMITE: 10YR 7/3, very pale brown, very fine to fine cystalline, trace vuggy porosity.	
-160						3.6				
						3.9				
-165										
						3.7				
-170										
						3.5				
-175										
						2.9				
-180										
						2.1				
-185									SAND: 10YR 8/4, very fine grained, pulverized.	
						3.8				
-190										
						2.1				
-195									DOLOMITE: 10YR, 8/4, very fine crystalline, some vuggy porosity.	

WELL LOG

WELL NO. MW-117

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PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: AIR HAMMER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 9-14-99 DATE COMPLETED: 9-15-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES: HOLE COLLAPSED AFTER COMPLETION

STATIC WATER LEVEL: — MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-7/8", 5-1/2" TOTAL DEPTH: 240' PLUG-BACK DEPTH 240'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Steel	+2.5' to -20.0'
	Open Hole	Surface to -240.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-200				Wet		2.1			DOLOMITE: 10YR 8/3, very pale brown, very fine crystalline, some vuggy porosity, some sandy.	
-205				Wet						
-210				Moist						
-215									DOLOMITE: 10YR 7/2, light gray, very fine crystalline, trace vuggy porosity.	
-220										
-225				Wet					DOLOMITE: 10YR 7/2, light gray, very fine crystalline, becoming more vugular. Well making water.	
-230				Wet						
-235				Wet						
-240										

WELL LOG

WELL NO. MW-117A

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

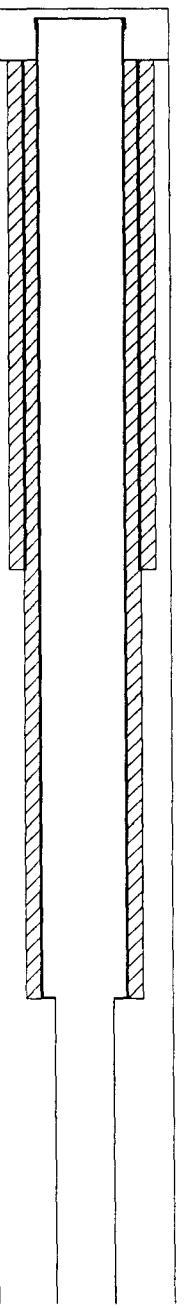
PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-3-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 182.80' MEAS. PT.: GROUND LEVEL DATE: —
HOLE SIZE(S): 17-1/2", 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -46'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	14" DIAMETER STEEL CASING	SURFACE TO -25'
	8-5/8" DIAMETER STEEL CASING	SURFACE TO -46'
	OPEN HOLE	SURFACE TO -225'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0									SAND: 5YR, red brown, very fine grained, loose, some limestone cobbles.
-5		Shovel		Damp					DOLOMITE: light gray to tan
-10		Shovel		Damp					GRAVEL
-15		Shovel		Dry					
-20		Shovel		Dry					SAND: 10YR 6/3, pale brown, very fine grained, loose, rounded, quartz grains, strong odor, slightly damp.
-25		Shovel		Damp					
-30		Shovel		Dry					DOLOMITE: 7.5YR 8/2, pink white, very fine, crystalline, dense, clean.
-35		Shovel		Dry					SAND: 7.5YR 7/1, light gray, very fine grained, consolidated, moderate odor.
-40		Shovel		Wet		8.0			drilled with auger from 40' to 46', no sample, very hard drilling from 42' to 46' - cuttings on auger were dry.
-45		Shovel		Wet					
-50		Shovel		Dry		0.7			DOLOMITE: 5YR 6/1, gray, crystalline, some concoidal fracture.
-55		Shovel		Dry		1.2			
-60		Shovel		Dry		5.1			

WELL INSTALLATION



WELL LOG

WELL NO. MW-117A

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-3-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 182.80' MEAS. PT.: GROUND LEVEL DATE: —
HOLE SIZE(S): 17-1/2", 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -46'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	14" DIAMETER STEEL CASING	SURFACE TO -25'
	8-5/8" DIAMETER STEEL CASING	SURFACE TO -46'
	OPEN HOLE	SURFACE TO -225'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Dry		4.8			SILTY SANDSTONE: 7.5YR 5/1, gray, very fine grained, well sorted, no visible bedding structures, began to change at 62' from DOLOMITE to SILTY SANDSTONE.	
-70		Shovel		Damp		63.8			DOLOMITE: 7.5YR 5/1, crystalline, concoidal fracture, trace silty SAND.	
-75		Shovel		Dry		5.8				
-80		Shovel		Dry		3.7			DOLOMITE: 5 YR 6/1, gray, crystalline, trace concoidal fracture, trace microscopic inclusions, possible quartz.	
-85		Shovel		Dry		1.5			SILTY SANDSTONE: 7.5yr 5/1, very fine grained, well sorted, no visible bedding or structures.	
-90		Shovel		Sl. Damp		2.6			SILTY SANDSTONE: 5YR 7/1, light gray, fine grained, poorly cohesive, no visible bedding structures, well sorted.	
-95		Shovel		Dry		3.0			DOLOMITE: 5YR 6/1, very crystalline, some concoidal fracture, very hard.	
-100		Shovel		Dry		0.6			SILTY SANDSTONE: 7.5YR 5/1, moderately cohesive, fine grained, well sorted, no visible bedding structures.	
-105		Shovel		Sl. Damp		0.0			SILTY SANDSTONE: 7.5YR 5/2, brown, moderately cohesive, fine grained, well sorted, no visible bedding structures.	
-110		Shovel		Sl. Damp		0.0			DOLOMITE: 7.5YR 6/2, pinkish gray, trace concoidal fracture.	
-115		Shovel		Dry		0.3			DOLOMITE: as above and 5YR 6/1, gray, trace concoidal fracture.	
-120		Shovel		Dry		1.7			DOLOMITE: 5YR 6/1, trace concoidal fracture, very hard.	

WELL LOG

WELL NO. MW-117A

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-3-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 182.80' MEAS. PT.: GROUND LEVEL DATE: —
HOLE SIZE(S): 17-1/2", 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -46'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	14" DIAMETER STEEL CASING	SURFACE TO -25'
	8-5/8" DIAMETER STEEL CASING	SURFACE TO -46'
	OPEN HOLE	SURFACE TO -225'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Dry		0.0			DOLOMITE: predominantly pinkish gray, 7.5YR 6/2 with trace gray, 5YR 6/1, trace concoidal fracture.	
-130		Shovel		Dry		0.3			DOLOMITE: 7.5YR 6/2, pinkish gray, trace concoidal fracture.	
-135		Shovel		Dry		0.0				
-140		Shovel		Dry		0.4			DOLOMITE: 5YR 5/2, reddish gray, grained, moist, very soft, traces of SILTY CLAY, approximately 30% silts.	
-145		Shovel		Dry		0.0			SILTY SANDSTONE: 7.5YR 7/2, pinkish gray, fine grained, well sorted, no visible bedding structures.	
-150		Shovel		Damp		0.0			SILTY SANDSTONE: 7.5YR 7/2, pinkish gray, very fine grained, well sorted, very poorly cohesive, no visible bedding structures.	
-155		Shovel		Damp		0.0				
-160		Shovel		Damp		0.0				
-165		Shovel		Damp		0.0				
-170		Shovel								
-175		Shovel								
-180		Shovel								
-185		Shovel								

WELL LOG

WELL NO. MW-117A

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-3-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 182.80' MEAS. PT.: GROUND LEVEL DATE: —
HOLE SIZE(S): 17-1/2", 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -46'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	14" DIAMETER STEEL CASING	SURFACE TO -25'
	8-5/8" DIAMETER STEEL CASING	SURFACE TO -46'
	OPEN HOLE	SURFACE TO -225'
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel								
-195		Shovel								
-200		Shovel								
-205		Shovel								
-210		Shovel								
-215		Shovel								
-220		Shovel		Wet						
-225		Shovel								

WELL LOG

WELL NO. MW-118

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: SHOVEL
SAMPLING METHOD: —
DATE BEGUN: 9-16-99 DATE COMPLETED: 9-17-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 138.25' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-3/4", 5-1/2" TOTAL DEPTH: 202.6' PLUG-BACK DEPTH 202.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Casing	+2.5' to -36.5'
	Open Hole	Surface to -202.0
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0				Dry		0.2			GRAVEL: 5YR 6/2, dolomitic, fines react well with hydrochloric acid, pinkish gray, hard, some SAND.	
-5				Dry		0.0			GRAVEL: 5YR 6/2, dolomitic, pinkish gray, hard microcrystalline fine react with hydrochloric acid.	
-10				Dry		1.0			GRAVEL: multicolored, (80% DOLOMITE, 20% CHERT), hard, subrounded to angular, few fines.	
-15				Dry		0.0			GRAVEL: dolomitic, as above with very thin SAND stringers.	
-20				Dry		1.4			DOLOMITE: 10YR 5/1, microcrystalline, hard with sandstone stringers, very fine grained, pale red.	
-25				Dry		14.4			DOLOMITE: 10YR 7/1, light gray, microcrystalline, poor reaction with hydrochloric acid.	
-30				Dry		16.4			DOLOMITE: 2.5YR 6/4, weak red, multicolored bands, microcyystalline, dense, 1% calcareous CLAY.	
-35				Dry		0.1			DOLOMITE: 7.5YR 7/6, reddish yellow, semi-hard, very sandy, fine grained SAND, trace CLAY.	
-40				Dry		0.0			DOLOMITE: as above.	
-45				Dry					SANDSTONE: 10YR 7/4, very pale brown, fine grained, well rounded, air hammer powders.	
-50				Dry		0.0			DOLOMITE: 10YR 6/6, brownish yellow, very hard, black bands running through, microcrystalline, thinly bedded layers of SANDSTONE; 10YR 7/4 as above.	
-55				Dry		2.6			DOLOMITE: 5YR 7/1, light gray, very hard, coarse grain, no banding, poor reaction to hydrochloric acid.	
-60				Dry		6.7			DOLOMITE: as above, 50'-55' multicolored.	
-65				Dry		7.4			DOLOMITE: 7.5YR 6/1, dray, very hard, microcrystalline, air hammer powders.	
									DOLOMITE: as above, light brown, sandstone layers, interbedded, sandstone layers less the 2" thick.	

WELL LOG

WELL NO. MW-118

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: SHOVEL
SAMPLING METHOD: —
DATE BEGUN: 9-16-99 DATE COMPLETED: 9-17-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 138.25' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-3/4", 5-1/2" TOTAL DEPTH: 202.6' PLUG-BACK DEPTH 202.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Casing	+2.5' to -36.5'
	Open Hole	Surface to -202.0
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-70				Dry		9.3			DOLOMITE: multicolored, microcrystalline, conchoidal fracturing, very hard, trace CLAY, brown.	
-75				Dry		9.4			DOLOMITE: multicolored, very hard, microcrystalline, some conchoidal fracturing, trace CLAY, brown.	
-80				Dry		1.7				
-85				Dry		0.0			SANDSTONE: air hammer pulverized sand into dust, no sample, some circulation loss.	
-90				Dry		0.9			SAND: 10YR 7/2, light gray, very fine grained, unable to determine cementing, well rounded to well sorted.	
-95				Dry					SAND: 7.5YR 6/3, light brown, very fine grained, very well sorted, well rounded, very little recovery.	
-100				Dry		0.0			DOLOMITE AND SAND: 7.5YR 6/3, interbedded layers of SAND; 10YR 5/2, DOLOMITE, grayish brown, soft SAND layers, hard DOLOMITE.	
-105				Dry		0.4			DOLOMITE: 10YR 5/1, grayish brown, dense, 10-15% SAND, poor reactivity to hydrochloric acid, regained good circulation.	
-110				Dry		0.0			DOLOMITE: 10YR 5/1, grayish brown, 10% dark gray, dense, microcrystalline, some conchoidal fracturing.	
-115				Dry		0.0			DOLOMITE: as above, 10% SAND.	
-120				Dry		0.1			DOLOMITE: 10YR 7/3, pale brown, hard, microcrystalline, tract conchoidal fractuing, 5% SAND.	
-125				Dry		0.0			DOLOMITE: 5YR 7/2, pinkish gray, dense, microcrystalline, no conchoidal fracturing.	
-130				Dry		0.0				
-135				Dry		0.0				
				Dry		0.9			DOLOMITE: as above, 25% SANDSTONE, 10YR 7/6, yellow, fine grained, well rounded, well sorted, friable.	

WELL LOG

WELL NO. MW-118

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0004
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: RHINO DRILLING
DRILLING METHOD: SHOVEL
SAMPLING METHOD: —
DATE BEGUN: 9-16-99 DATE COMPLETED: 9-17-99
DRILLER: — ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 138.25' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 7-3/4", 5-1/2" TOTAL DEPTH: 202.6' PLUG-BACK DEPTH 202.0'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	—	—
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	6-5/8" Diameter Casing	+2.5' to -36.5'
	Open Hole	Surface to -202.0
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-140				Dry		0.3			SANDSTONE: 10YR 7/6, yellow, very fine grained, well rounded, well sorted, soft, loss of circulation.	
-145				Dry		0.9				
-150										
-155										
-160									no sample, drilling like still SANDSTONE. Lost circulation. TD @ 200'	
-165										
-170										
-175										
-180										
-185										
-190										
-195										
-200										

WELL LOG

WELL NO. MW-119

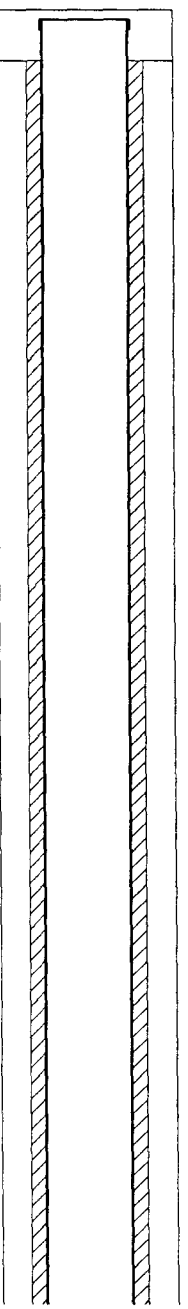
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 201.21' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -78'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -78'
	OPEN HOLE	SURFACE TO -245
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SAND: 10YR 8/4, pale brown, very fine grained, loose, unconsolidated.	
-5		Shovel		Dry		0				
-10		Shovel		Dry		0			DOLOMITE: 10YR 7/2, light gray, dense, interbedded, pale yellow SAND.	
-15		Shovel		Dry		0			DOLOMITE: 10YR 7/2, light gray, dense, slightly chalky.	
-20		Shovel		Dry		0			SAND: gray.	
-25		Shovel		Dry		0			SAND: 10YR 6/4, light yellow brown, very fine grained, firm, consolidated, subrounded.	
-30		Shovel		Dry		0			SAND: 7.5YR 5/6, strong brown, loose, unconsolidated, rounded.	
-35		Shovel		Dry		0			SAND: 7.5YR 5/6, strong brown to 10YR 6/3, pale brown, loose, unconsolidated, rounded, non plastic.	
-40		Shovel		Dry		0				
-45		Shovel		Dry		0				
-50		Shovel		Dry		0				
-55		Shovel		Moist		0				
-60						0				



WELL LOG

WELL NO. MW-119

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 201.21' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -78'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -78'
	OPEN HOLE	SURFACE TO -245
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Sl. Moist		0				
-70		Shovel		Dry		0				
-75		Shovel		Dry		0				
-80						0			DOLOMITE: 7.5YR 8/3, pink, very fine crystalline, chalky.	
-85		Shovel		Dry		0				
-90		Shovel		Dry		0				
-95		Shovel		Dry		0				
-100		Shovel		Dry		0				
-105		Shovel		Dry		0			DOLOMITE: 7.5YR 7/3, pink, very fine crystalline, chalky.	
-110		Shovel		Dry		0				
-115		Shovel		Dry		0				
-120		Shovel		Dry		0				
									SAND: 10YR 6/3, pale brown, very fine grained, rounded to subrounded, loose unconsolidated, some quartz grain, damp, non plastic.	

WELL LOG

WELL NO. MW-119

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 201.21' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -78'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -78'
	OPEN HOLE	SURFACE TO -245
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Dry		0				
-130		Shovel		Dry		0			DOLOMITE: 7.5YR 7/3, pink, very fine crystalline, chalky.	
-135		Shovel		Dry		0				
-140		Shovel		Dry		0				
-145		Shovel		Dry		0			DOLOMITE: 10YR 7/2, light gray, very fine crystalline, dense, chalky, some concoidal fracture. Note: Air hammer pulverizing the rocks.	
-150		Shovel		Dry		0				
-155		Shovel		Dry		0				
-160		Shovel		Dry		0				
-165		Shovel		Dry		0				
-170		Shovel		Dry		0			DOLOMITE: 10YR 7/2, light gray, very fine crystalline.	
-175		Shovel		Dry		0				
-180		Shovel		Dry		0			SAND: 10YR 8/6, yellow, loose, very fine grained, dry.	
-185		Shovel		Dry		0			DOLOMITE	

WELL LOG

WELL NO. MW-119

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT, CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 201.21' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -78'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -78'
	OPEN HOLE	SURFACE TO -245
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Dry		0			SAND: 10YR 8/6, red, yellow, very fine grained.	
-195		Shovel		Dry		0				
-200		Shovel		Wet		0			Lost circulation. No return. TD @ 245'	
-205				Wet						
-210				Wet						
-215				Wet						
-220				Wet						
-225				Wet						
-230				Wet						
-235				Wet						
-240										
-245										

WELL LOG

WELL NO. MW-120

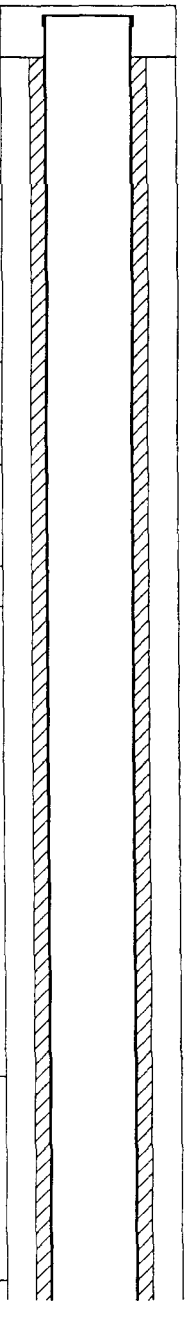
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 240'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -75'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -75'
	OPEN HOLE	SURFACE TO -240'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									DOLOMITE AND SAND: 7.5YR 8/2, pink, white, dense, some sand unconsolidated.	
-5		Shovel		Dry		0				
-10		Shovel		Dry		0			DOLOMITE: 7.5YR 6/1, gray, very fine crystalline, dense, trace concoidal fracture, interbedded, pale yellow SAND.	
-15		Shovel		Dry		0			SAND: 10YR 7/4, very pale brown, very fine grained, consolidated, firm well cemented, subrounded.	
-20		Shovel		Dry		0			SAND: 10YR 6/4, light yellow, brown, very fine grained.	
-25		Shovel		Dry		0			DOLOMITE: 7.5YR 6/1, gray, very fine crystalline, dense, trace concoidal fracture.	
-30		Shovel		Dry		0			SAND: 10YR 6/4, light yellow, brown, very fine grained, consolidated, rounded, firm, well cemented, slightly plastic. SAND at 35' loosee, unconsolidated, very fine grained.	
-35		Shovel		Dry		0				
-40		Shovel		Dry		0				
-45		Shovel		Dry		0				
-50		Shovel		Dry		0			SAND: 7/5YR 6/1, gray, very fine grained, loose, unconsolidated, dry, silty, some chalky.	
-55		Shovel		Dry		0				
-60		Shovel		Damp		0				



WELL LOG

WELL NO. MW-120

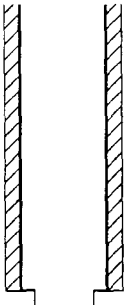
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 240'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -75'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -75'
	OPEN HOLE	SURFACE TO -240'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Dry		0			SILTY SAND: 7.5 YR 6/2, gray, very fine grained, loose, slightly damp.	
-70		Shovel		Dry		0			SAND: 7.5YR 6/1, gray, very fine grained, loose, becoming firm.	
-75		Shovel		Dry		0			DOLOMITE: 7.5YR 8/2, pinkish white, very fine crystalline, chalky, dense.	
-80		Shovel		Dry		0				
-85		Shovel		Dry		0			SAND: red brown, very fine grained, loose, silty.	
-90		Shovel		Dry					DOLOMITE: 2.5YR 5/1, gray, very fine to fine crystalline, firm to hard, some chalky.	
-95		Shovel		Dry		28				
-100		Shovel		Dry		1.2				
-105		Shovel		Dry		0			DOLOMITE: 7.5YR 7/3, pink, very fine crystalline, hard, clean, concoidal fractures.	
-110		Shovel		Damp		0			SAND: 7.5YR 6/6, red yellow, very fine grained.	
-115		Shovel		Damp		5.1			DOLOMITE	
-120		Shovel		Damp		138			SAND: 10YR 8/3, very pale brown, very fine grained, powdery, damp.	
									DOLOMITE	
									SAND: 10YR 8/3, very pale brown, very fine grained, powdery, damp, mild to moderate odor.	
									DOLOMITE: 10YR 7/2, light gray, very fine crystalline, dense.	



WELL LOG

WELL NO.
MW-120

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 240'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -75'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -75'
	OPEN HOLE	SURFACE TO -240'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Dry		13				
-130		Shovel		Dry		3.8				
-135		Shovel		Dry		0				
-140						1.2				
-145		Shovel		Dry		34				
-150		Shovel		Damp		28			SAND: 10YR 8/6, yellow, very fine grained, loose, silty, subrounded, unconsolidated.	
-155		Shovel		Dry		2			DOLOMITE: 10YR 7/2, light gray, very fine crystalline, dense, chalky.	
-160		Shovel		Dry		0				
-165		Shovel		Dry		0				
-170		Shovel		Dry		1.2				
-175		Shovel		Dry		2.1				
-180		Shovel		Dry		0				
-185						0			SAND: 10YR 8/6, yellow.	
									DOLOMITE: 10YR 7/2, light gray, very fine crystalline, dense, chalky.	

WELL LOG

WELL NO. MW-120

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: 12-27-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 240'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -75'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -75'
	OPEN HOLE	SURFACE TO -240'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Dry		0				
-195		Shovel		Wet		0			SAND: loose.	
-200						0			Lost circulation; no returns. Hole making water.	
-205				Wet						
-210		Shovel		Wet					DOLOMITE: 10YR, 5/1, gray, some pale green SAND, consolidated, firm, wet.	
-215		Shovel		Wet						
-220		Shovel		Wet						
-225		Shovel		Wet						
-230		Shovel		Wet						
-235		Shovel		Wet						
-240										

WELL LOG

WELL NO. MW-121

Page 1 of 4

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILTY SAND: 5YR 7/3, pink, very fine grained, unconsolidated, some slightly plastic.	
-5		Shovel		Dry		0.0				
-10		Shovel		Dry		0.0			DOLOMITE: 5YR 8/3, pink, sandy, very fine crystalline.	
-15		Shovel		Dry		0.0			SAND: pale yellow.	
									DOLOMITE: 10YR 6/2, light brownish gray, very fine crystalline, dense, some brittle, some chalky, pale yellow stringer @ 18'.	
-20		Shovel		Dry		0.0			SAND: 7.5YR 7/8, red yellow, very fine to fine grained, some quartz grains, consolidated, well cemented, rounded, slightly calcacerous.	
-25		Shovel		Dry		0.0				
									DOLOMITE	
-30		Shovel		Dry		0.0			DOLOMITE AND SAND: 5YR 8/3, pink, very fine grained, loose, rounded, 25YR 7/1 and light red gray DOLOMITE, very fine crystalline, dense, some chalky.	
-35		Shovel		Dry		0.0				
-40		Shovel				0.0			SAND: interbedded, pale yellow, well cemented, firm to hard.	
-45		Shovel							SILTY SANDSTONE: 10YR 4/1, dark gray, moderately cemented, breaks with some difficulty.	
-50		Shovel		Damp		1.4			SANDSTONE: as above interbedded with DOLOMITE, hard crystalline, 10YR 6/1, gray.	
-55		Shovel		Dry		2.3				
-60		Shovel		Dry to		8.6				

WELL LOG

WELL NO.
MW-121

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
				Damp					SANDSTONE: as above but higher % of DOLOMITE.	
-65		Shovel		Dry		2.6			DOLOMITE: 10YR 6/1, gray, crystalline, hard, trace concoidal fractures interbedded with trace of SANDSTONE as above.	
-70		Shovel		Sl. Damp		1.6				
-75		Shovel		Dry		27.1			DOLOMITE: 5YR 6/2, pinkish gray, hard, crystalline, concoidal fractures.	
-80		Shovel		Dry		0.0			SILTY SANDSTONE: 10YR 4/1, dark gray, moderately well cemented, no visible bedding structures, slight odor.	
-85		Shovel		Damp		2.1			SILTY SANDSTONE: as above, wet, insufficient sample volume for PID reading.	
-90		Shovel		Wet					SILTY SAND: 10YR 4/1, fine grained, well sorted, poorly consolidated.	
-95		Shovel		Damp		1.2				
-100		Shovel		Damp		0.0			DOLOMITE: 7/5YR 7/2, pinkish gray, crystalline, trace concoidal fracture, hard.	
-105		Shovel		Dry		2.6				
-110		Shovel		Dry		0.5			SILTY SAND: 10YR 7/2, light gray, fine grained, well sorted, poorly consolidated, strong hydrocarbon odor.	
-115		Shovel		Damp		13.3			SILTY SAND: as above with some CLAY, approximately 10% soft, moist, 10YR 4/1, brown, hydrocarbon odor.	
-120		Shovel		Damp to Wet		47.5			SILTY SAND: 10YR 7/2, light gray, fine grained, well sorted, poorly consolidated, slight hydrocarbon odor.	

WELL LOG

WELL NO. MW-121

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Damp		7.5			Water in hole, no sample return, material too fine to bring up without water.	
-130		Shovel		Wet					No sample.	
-135				Wet						
-140				Wet						
-145				Wet						
-150				Wet						
-155				Wet						
-160				Wet						
-165				Wet						
-170				Wet						
-175				Wet						
-180				Wet						
-185				Wet						

WELL LOG

WELL NO.
MW-121

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 195.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190				Wet						
-195				Wet						
-200				Wet						
-205				Wet						
-210				Wet						
-215				Wet						
-220				Wet						
-225				Wet						

WELL LOG

WELL NO. MW-122

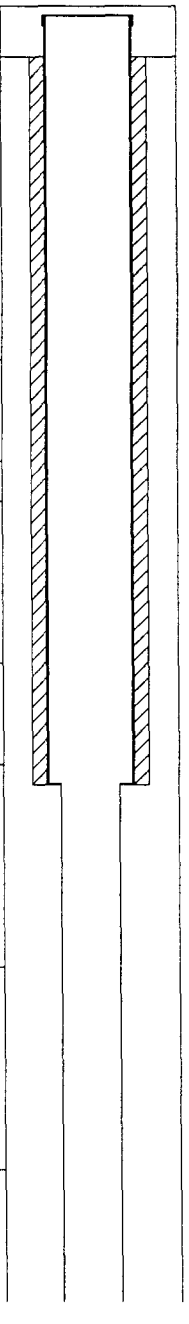
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 197.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SAND: loose.	
-5		Shovel		Dry		0.0			DOLOMITE: 5YR 7/3, pink very fine crystalline, sandy, firm some interbedded SANDSTONE.	
-10		Shovel		Dry		0.0				
-15		Shovel		Dry		0.0			DOLOMITE: 10YR 6/2, light brown, gray, very fine grained, some iron stain.	
-20		Shovel		Dry		0.0			SAND: pale yellow.	
-25		Shovel		Dry		0.0			DOLOMITE: 10YR 6/2, light brown, gray, very fine grained, some iron stain, pale yellow SAND @ 25' and 28'.	
-30		Shovel		Dry		0.0			SAND: light gray, very fine to fine grained, well cemented, firm, slightly calcareous, sand at 34; loose, unconsolidated.	
-35		Shovel		Dry		0.5			Unconsolidated material from 35' to 65', no sample return.	
-40										
-45									SILTY SAND: 7.5YR 4/3, brown, fine grained, well sorted, moist, unconsolidated, with some CLAY.	
-50		Shovel		Damp		2.6				
-55		Shovel		Sl. Damp		53.6			SILTY SANDSTONE: 7.5 YR 4/3, flecks of clear quartz grains, moderately to poorly consolidated, no visible bedding.	
-60		Shovel		Sl. Damp		0.3				



WELL LOG

WELL NO. MW-122

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 197.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Dry		0.7				
-70		Shovel		Dry		60.0				
-75		Shovel		Dry		0.0			DOLOMITE: 5YR 6/2, pinkish gray, crystalline, trace concoidal fracture.	
-80		Shovel		Damp		0.7			SILTY SAND: 7.5YR 4/3, brown, fine grained. well sorted, unconsolidated, moist to damp, trace CLAY.	
-85		Shovel		Damp		9.4				
-90		Shovel		Dry		8.3			DOLOMITE: light greenish gray, GLEY2 8/10BG, crystalline, trace concoidal fracture.	
-95		Shovel		Dry		0.0				
-100		Shovel		Dry		1.2			DOLOMITE: 5YR 7/2, pinkish gray, trace concoidal fracture, traces fo green feldspar on edges.	
-105		Shovel		Dry		10.5			DOLOMITE: 5YR 7/2, crystalline and mix of greenish gray, GLEY2 8/10BG, pinkish gray, 5YR 7/2, crystalline, trace concoidal fracture.	
-110		Shovel		Dry		7.3				
-115		Shovel		Dry		14.9			DOLOMITE: GLEY2 8/10BG, greenish gray, trace concoidal fracture, traces fo green feldspar on edges. .	
-120		Shovel		Dry		2.6				
-125		Shovel		Dry		0.0				

WELL LOG

WELL NO. MW-122

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 197.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-130		Shovel		Dry		2.6				
-135		Shovel		Dry		0.0				
-140		Shovel		Dry		0.3				
-145		Shovel		Dry		0.4				
-150		Shovel		Dry		9.5			DOLOMITE: 5YR 6/2, mixed with SILTY SANDSTONE, poorly cohesive, clear quartz flecks.	
-155		Shovel		Dry		0.6			DOLOMITE: GLEY2 8/10BG, gray, crystalline, concoidal fracture.	
-160		Shovel		Sl. Damp		11.2			DOLOMITE: GLEY2 8/10BG, gray, crystalline, concoidal fracture, mixed with SANDSTONE.	
-165		Shovel		Dry		7.6			DOLOMITE: GLEY2 8/10BG, gray, crystalline, concoidal fracture.	
-170		Shovel		Dry		32.6				
-175		Shovel		Dry		0.0				
-180		Shovel		Dry		0.0			DOLOMITE: mixed with SANDSTONE, same as 150-155' depth interval.	
-185		Shovel		Damp		0.0			SILTY SANDSTONE: 7.5YR 8/3, pink, very fine grained, no visible bedding structures, well sorted, moderately cohesive.	

WELL LOG

WELL NO. MW-122

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-7-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 197.61' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -36'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -36'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Damp		0.6				
-195		Shovel		Damp		0.0			SILTY SANDSTONE: 10YR 8/3, very pale brown, well sorted, very pooly cohesive to unconsolidated.	
-200		Shovel								
-205		Shovel								
-210		Shovel							Begin to add water to lift fines - no sample return at 210'.	
-215		Shovel								
-220		Shovel								
-225		Shovel								

WELL LOG

WELL NO. MW-123

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 142.88' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -35'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -35'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									surface overburden, large boulders to small gravel to silt.	
-5		Shovel		Dry		0.0			DOLOMITE: 10YR 5/1, gray, very fine crystalline, dense, some silty SAND.	
-10		Shovel		Dry		0.0				
-15		Shovel		Dry		0.0				
-20		Shovel		Dry		0.0				
-25		Shovel		Dry		0.0			SILTY CLAY: 7.5YR 7/6, reddish yellow, very fine to fine grained, yellow limestone 6" at 27'.	
-30		Shovel		Dry		0.0			DOLOMITE	
-35		Shovel		Dry		0.0				
-40		Shovel							No sample.	
-45		Shovel		Damp		0.1			DOLOMITIZED SANDSTONE: interbedded, 7.5YR 7/6, SANDSTONE, reddish yellow, crystalline, 7.5YR 7/1, DOLOMITE, light gray, slightly damp.	
-50		Shovel		Dry		0.1				
-55		Shovel		Damp		0.1			SANDSTONE: 10YR 7/2, light gray, moderaterly cohesive.	
-60		Shovel		Dry		0.3			DOLOMITE: 7.5YR 7/1, light gray, crystalline, very hard, some concoidal fracturing.	

WELL LOG

WELL NO. MW-123

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 142.88' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -35'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -35'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Sl. Damp		0.6			DOLOMITIZED SANDSTONE: interbedded, same as 50-55' interval.	
-70		Shovel		Dry		2.0			DOLOMITE: 7.5YR 7/1, light gray, very hard crystalline, drilling is slower.	
-75		Shovel		Dry		22.8			DOLOMITE: 7.5YR 7/1, light gray, very hard crystalline, drilling is slower, some SANDSTONE, 7.5YR 7/2, light gray.	
-80		Shovel		Dry		12.9			DOLOMITE: 7.5YR 7/1, light gray, very hard crystalline, drilling is slower, some SANDSTONE, slight odor, trace oil staining on DOLOMITE.	
-85		Shovel		Dry		41.2			DOLOMITE: 7.5YR 7/1, light gray, very fine crystalline.	
-90		Shovel		Dry		1.7				
-95		Shovel		Dry		0.7				
-100		Shovel		Dry		0.2				
-105		Shovel		Dry		2.1				
-110		Shovel		Damp		1.4			SANDSTONE: 10YR 7/4, very pale brown, very fine grained, no visible bedding, slightly damp.	
-115		Shovel		Damp		0.9				
-120		Shovel		Damp		1.5				
-125		Shovel		Damp		3.7				

WELL LOG

WELL NO. MW-123

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 142.88' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -35'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -35'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-130		Shovel		Damp		1.1				
-135		Shovel		Damp		20.3			SANDSTONE: 10YR 7/4, very pale brown, very fine grained, no visible bedding, slightly damp, less cohesive, slight odor.	
-140		Shovel		Damp		23.7				
-145		Shovel		Damp		26.2			SILTY SAND: 10YR 7/4, very pale brown, very fine grained, well sorted, well graded, slight odor.	
-150		Shovel							Lost pressure at 150', added water, no sample return.	
-155										
-160										
-165										
-170										
-175										
-180										
-185										

WELL LOG

WELL NO.
MW-123

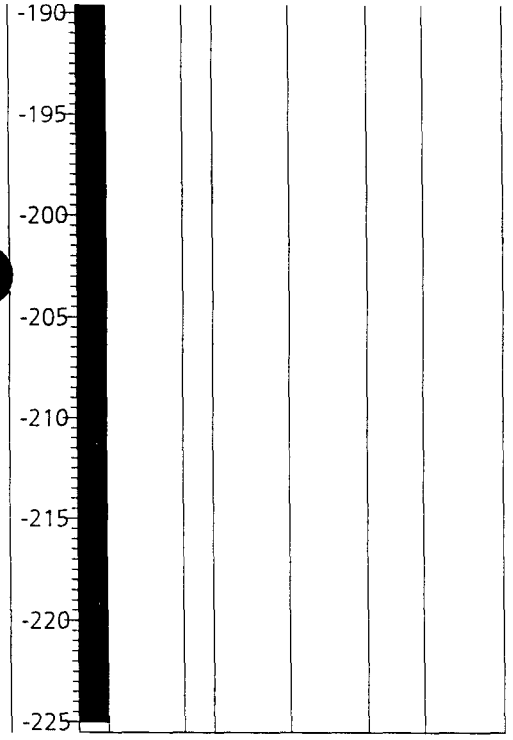
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 142.88' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -35'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -35'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION



WELL LOG

WELL NO.
MW-124

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-1-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 151.95' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -17'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -17'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									LIMESTONE CONGLOMERATE: loose, some DOLOMITE.	
									SILTY SAND: dry, some CHERT.	
-5		Shovel		Dry		0.0			DOLOMITE: 5YR 6/6, reddish yellow.	
-10		Shovel		Dry		0.0			DOLOMITE: 10YR 7/6, yellow, very fine cyrstalline, dense, trace concoidal fractures, some light tan, trace black stain, no odor.	
-15		Shovel		Dry						
-20									No sample.	
-25										
-30										
-35		Shovel							DOLOMITE: 10YR 7/6, yellow, hard crystalline, some silty clay, 2.5YR 5/6, orange brown.	
-40		Shovel		Dry		0.6			DOLOMITE: 10YR 6/6, yellowish brown, crystalline, GLEY2 8/10B, light bluish gray.	
-45		Shovel		Damp		9.1			SANDSTONE: 10YR 7/4, pale brown with orange veins, slightly damp, slightly cohesive, can break with hands.	
-50		Shovel		Damp		1.4				
-55		Shovel		Damp		0.8				
-60		Shovel		Damp		1.3				
-65		Shovel		Damp		3.3			DOLOMITE: 5YR 7/4, hard crystalline, concoidal fractures.	

WELL LOG

WELL NO. MW-124

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-1-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 151.95' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -17'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -17'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-70		Shovel		Dry		0.6			DOLOMITE: 5YR 7/4 and 5YR 6/1, light reddish brown, crystalline.	
-75		Shovel		Dry		1.4			DOLOMITE: 5YR 7/4, crystalline as above.	
-80		Shovel		Dry		1.0			DOLOMITE: as above with traces of moderately cohesive SANDSTONE, 10YR 7/4, pale brown.	
-85		Shovel		Sl. Damp		4.6				
-90		Shovel		Dry		0.0				
-95		Shovel		Dry		1.0			SANDSTONE: 10YR 7/4, pale brown, moderately to highly cohesive.	
-100		Shovel		Sl. Damp		1.6				
-105		Shovel		Sl. Damp		0.7			DOLOMITE: 5YR 7/4, crystalline, concoidal fracture.	
-110		Shovel		Dry		1.5			SANDSTONE: 10YR 7/4, pale brown, moderaterly cohesive, interbedded with crystalline DOLOMITE, 5YR 7/4.	
-115		Shovel		Sl. Damp		1.3			SANDSTONE: 10YR 7/4 with orange veins, moderately cohesive, no bedding structures.	
-120		Shovel		Damp		0.2				
-125		Shovel		Damp		1.0				
-130		Shovel		Damp		0.6			SANDSTONE: as above, slightly lighter color, 10YR 8/2, very pale brown, trace orange color grains.	
-135		Shovel		Damp		0.6			SANDSTONE: as above, slightly less cohesive.	

WELL LOG

WELL NO. MW-124

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-1-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 151.95' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -17'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -17'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-140		Shovel		Damp		1.5			SANDSTONE: as above but even less cohesive, breaks apart very easily.	
-145		Shovel		Damp		1.2			SILTY SAND: 10YR 8/2, fine grained, well sorted, hydrocarbon odor.	
-150		Shovel		Damp		5.5			SILTY SAND: as above with some SANDSTONE COBBLES, still slight odor.	
-155		Shovel		Damp		33.0				
-160		Shovel		Damp		0.3			SILTY SAND: as above with CLAY, wet, will hold together moderately well.	
-165		Shovel		Wet		1.0			Lost pressure in hole - had to pump water. No sample return.	
-170										
-175										
-180										
-185										
-190										
-195										
-200										
-205										
-210										

WELL LOG

WELL NO.
MW-124

ARCADIS
1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-1-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 151.95' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -17'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -17'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-215										
-220										
-225										

WELL LOG

WELL NO. MW-125

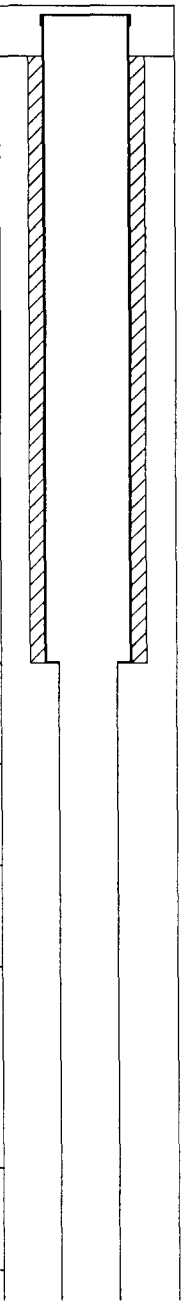
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: 12-9-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 166.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -30'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -30'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILT: 5YR 5/4, red brown, with interbedded GRAVEL.	
-5		Shovel		Dry		0.0			SILTY SAND: 5YR 5/4, red brown, very fine grained, some plastic, loose, some interbedded GRAVEL, trace quartz grain, unconsolidated, subrounded to rounded, silty GRAVEL, loose.	
-10		Shovel		Dry		0.0				
-15		Shovel		Dry		0.0				
-20		Shovel		Dry		0.0			DOLOMITE: 5YR 5/1, gray, very fine grained, dense, trace concoidal fracture, 6" gray green SAND at 25'.	
-25		Shovel		Dry		0.0				
-30		Shovel		Dry					No sample.	
-35		Shovel		Dry		27.8			DOLOMITE: 5YR 5/1, reddish gray, crystalline.	
-40		Shovel		Dry		2.2			DOLOMITE: 5YR 5/1 (80%) and interbedded SANDSTONE 2.5YR 5/2, grayish brown.	
-45		Shovel		Dry		6.5			DOLOMITE: 5 YR 5/1, hard crystalline, trace concoidal fracture.	
-50		Shovel		Dry		2.1				
-55		Shovel		Sl. Damp		4.5			SILTY SANDSTONE: 2.5YR 5/1, gray, very fine grained, well sorted, poorly cohesive, breaks apart easily, no visible bedding, well sorted.	
-60		Shovel		Dry		3.1			DOLOMITE: same as 45-55' interval, interbedded with SILTY SANDSTONE as	



WELL LOG

WELL NO. MW-125

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: 12-9-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 166.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -30'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -30'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
									above.	
-65		Shovel		Sl. Damp					SANDSTONE: 2.5Y 5/1, gray, very fine grained, well sorted, poorly cohesive, breaks apart easily, no visible bedding, well sorted, interbedded SANDSTONE and DOLOMITE, same as 60-65' interval, 20% SANDSTONE.	
-70		Shovel		Dry		22.0			DOLOMITE: same as 60-65' interval, interbedded with SANDSTONE.	
-75		Shovel		Damp		0.6			SANDSTONE: 2.5Y 5/1 with orange flecks and very poorly cohesive SILTSTONE, very fine grained, 2.5 Y 7/1, light gray.	
-80		Shovel		Dry					DOLOMITE: 5YR 5/1, crystalline, trace concoidal fracture.	
-85		Shovel		Dry		10.3			DOLOMITE: 5YR 5/1, crystalline, apparent concoidal fracture.	
-90		Shovel		Dry		17.3			DOLOMITE: as above with interbedded SANDSTONE 20%, 2.5Y 5/1.	
-95		Shovel		Dry					DOLOMITE: 5 YR 5/1, crystalline, concoidal fractures, very hard.	
-100		Shovel		Dry		100			DOLOMITE: 5YR 5/1, crystalline, concoidal fractures, traces of SANDSTONE, 10YR 6/6, brownish yellow.	
-105		Shovel		Dry		3.6				
-110		Shovel		Dry		5.3			DOLOMITE: 5 YR 5/1, gray, very hard, crystalline.	
-115		Shovel		Dry		3.1				
-120		Shovel		Dry		1.3				
-125		Shovel		Dry		2.6				

WELL LOG

WELL NO. MW-125

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: 12-9-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 166.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -30'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -30'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-130		Shovel		Dry		5.9			DOLOMITE: 10YR 6/6, with some SANDSTONE, well consolidated.	
-135		Shovel		Damp		1.0			SANDSTONE: 7.5 YR 8/3, poorly consolidated, breaks apart very easily.	
-140		Shovel		Damp		2.0			SILTY SANDSTONE: 10YR 7/4, very pale brown, very soft, very fine grained, uniform grain size, no visible bedding.	
-145		Shovel		Damp		2.0				
-150		Shovel		Damp		0.5			SILTY SANDSTONE: 10YR 7/4, very pale brown, very soft, very fine grained, uniform grain size, no visible bedding, slightly more consolided.	
-155		Shovel		Damp		2.0				
-160		Shovel		Damp		2.2				
-165		Shovel		Damp		3.1				
-170		Shovel		Damp		2.9				
-175		Shovel		Damp		3.5				
-180		Shovel							No sample.	
-185										

WELL LOG

WELL NO. MW-125

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: 12-9-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 166.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 9-7/8", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -30'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -30'
	OPEN HOLE	SURFACE TO -225'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190										
-195										
-200										
-205										
-210										
-215										
-220									SANDSTONE: 10YR 5/6, reddish, very well consolidated, some vuggs.	
-225										

WELL LOG

WELL NO.
MW-126

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 53.08' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 70'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -30.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -30.0'
	OPEN HOLE	SURFACE TO 70.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILTY SAND	
-5		Shovel		Dry		0.0			DOLOMITE: 5YR 7/2, pink, gray, very fine crystalline, dense, trace concoidal fracture.	
-10		Shovel		Dry		0.0				
-15		Shovel		Damp		22.0			DOLOMITE: 5YR 7/2, pink, gray, some loose GRAVEL, damp, moderate odor, gray stain. Note - strong water flow @ 17' into well.	
-20		Shovel		Damp		11.0				
-25		Shovel		Dry		5.0			SAND: 5YR 4/1, dark gray, very fine grained, loose, unconsolidated, quartz grains, moderate odor, moist, silty.	
				Damp						
-30		Shovel		Moist		5.0			Very wet - concrete did not set inside casing, need water to lift cuttings until 50', but still heavy from concrete above so no sample until 60'.	
-35										
-40										
-45										
-50										
-55										
-60										

WELL LOG

WELL NO. MW-126

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 53.08' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 70'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -30.0'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-5/8" DIAMETER STEEL CASING	SURFACE TO -30.0'
	OPEN HOLE	SURFACE TO 70.0'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65									DOLOMITE: 5YR 7/2, pinkish gray, crystalline, some concoidal fracture (at 60-65'). Water at 65' strong hydrocarbon odor approximately 6" thickness then crystalline DOLOMITE for approximately 9', terminated drilling @ 70'.	
-70										

WELL LOG

WELL NO.
MW-127
Page 1 of 4

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 202.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -70'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -70'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SAND: 10YR 7/4, pale brown, very fine grained, firm, consolidated, slightly calcareous.	
-5		Shovel		Dry		0.0				
-10		Shovel		Dry		0.0			SAND: pale yellow brown at 8', very fine grained, loose, rounded, quartz grains, unconsolidated, dry.	
									DOLOMITE: light gray, dense.	
-15		Shovel		Dry		0.0			SAND: 10YR 7/4, pale brown, very fine grained, very powdery, loose, (fast drilling).	
-20		Shovel		Dry		0.0				
-25		Shovel		Dry		0.0			SAND: 10YR 6/6, brownish yellow, loose.	
-30		Shovel		Dry		0.0			SAND: 10YR 6/3, pale brown, becoming firm, slightly consolidated, very fine grained.	
-35		Shovel		Dry		0.0			DOLOMITE: sandy, dense.	
									SAND: 10YR 5/3, brown, very fine grained.	
-40		Shovel		Dry		0.0				
-45		Shovel		Dry						
-50		Shovel		Dry						
-55		Shovel		Moist					SAND: olive gray, very fine grained, loose, silty, non plastic, moist.	
-60		Shovel		Damp						

WELL LOG

WELL NO. MW-127

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 202.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -70'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -70'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel								
-70		Shovel							DOLOMITE	
-75		Shovel							SAND	
-80		Shovel							DOLOMITE	
									SAND	
-85		Shovel		Dry					DOLOMITE	
-90		Shovel		Dry						
-95		Shovel		Dry					DOLOMITE: 10YR 8/1, white, very fine crystalline, chalky. Air hammer pulverizing samples, quality poor.	
-100		Shovel		Dry						
-105		Shovel		Dry					DOLOMITE: 10YR 6/2, light brown, gray, very fine crystalline, dense, some concoidal fracture, some chalky.	
-110		Shovel		Damp					SAND: 10YR 6/1, gray, very fine grained, slight odor, damp.	
-115		Shovel		Damp					SAND: 10YR 4/2, dark gray, brown, very fine grained, loose, non plastic, slightly damp, poorly graded.	
-120		Shovel		Damp					SAND: as above, 10YR 4/1, dark gray, damp.	

WELL LOG

WELL NO. MW-127

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 202.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -70'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -70'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Damp					DOLOMITE: 10YR 7/2, light gray, very fine crystalline, chalky, some dense.	
-130		Shovel		Dry						
-135		Shovel		Dry						
-140		Shovel		Dry						
-145		Shovel		Dry						
-150		Shovel		Dry					DOLOMITE: 10YR 7/1 gray, very fine crystalline, dense, some concoidal fracture.	
-155		Shovel		Dry						
-160		Shovel		Dry						
-165		Shovel		Dry						
-170		Shovel		Dry					DOLOMITE: 10YR 8/1, white.	
-175		Shovel		Dry						
-180		Shovel		Dry						
-185		Shovel		Dry					DOLOMITE: 10YR 8/1, white to 7/1 gray, very fine crystalline, dense. Hole making water @ 195'.	

WELL LOG

WELL NO. MW-127

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-6-99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 202.12' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -70'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -70'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Dry						
-195		Shovel		Wet						
-200		Shovel		Wet						
-205		Shovel		Wet		0.0			DOLOMITE: 10YR 7/2, gray, some red CLAY and SAND.	
-210		Shovel		Wet		0.0			Lost circulation. No sample.	
-215				Wet						
-220				Wet						
-225				Wet						
-230				Wet						
-235				Wet						
-240				Wet						
-245				Wet						

WELL LOG

WELL NO. MW-128

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

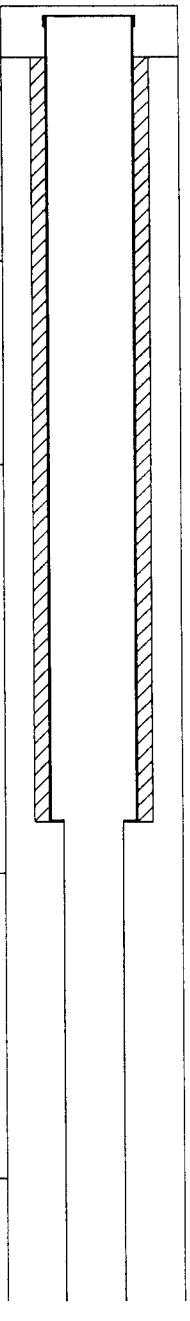
PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLAN
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-20-99 DATE COMPLETED: 12-29-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 160.91' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" " TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0									CLAY AND SAND: 7.5YR 8/4, pink, silty, very fine grained, moderately plastic, some gravels.
-5		Shovel		Dry		0.0			
-10		Shovel		Dry		0.0			DOLOMITIZED SANDSTONE: 10YR 6/2, light brown, gray, firm, consolidated, well sorted.
-15		Shovel		Dry		0.0			
-20		Shovel		Dry		0.0			DOLOMITE: 10YR 7/2, light gray, very fine crystalline,dense.
-25		Shovel		Dry		0.0			
-30		Shovel		Dry		0.0			
-35		Shovel		Dry		0.0			
-40		Shovel		Dry		0.0			DOLOMITE: 10YR 7/2, light gray, dense, hard drilling.
-45		Shovel		Dry		0.0			
-50		Shovel		Dry		0.0			
-55		Shovel		Dry		0.0			DOLOMITE: 10YR 7/2, light gray, some chalky..
-60		Shovel		Dry		0.0			

WELL INSTALLATION



WELL LOG

WELL NO. MW-128

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLAN CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-20-99 DATE COMPLETED: 12-29-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 160.91' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" " TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Dry		0.0				
-70		Shovel		Dry		0.0				
-75		Shovel		Dry		0.0				
-80		Shovel		Dry		0.0			SAND: 10YR 7/1, gray, very fine grained, loose, dry, rounded to subrounded.	
-85		Shovel		Dry		0.0				
-90		Shovel		Dry		0.0				
-95		Shovel		Dry		0.0				
-100		Shovel		Dry		0.0			DOLOMITE: 10YR 5/1, gray, very fine crystalline, dense, some trace SAND.	
-105		Shovel		Dry		0.0				
-110		Shovel		Dry		0.0				
-115		Shovel		Moist		3.6			DOLOMITE: 10YR 5/1, gray, very fine crystalline, dense, some trace SAND, moist from sitting overnight	
-120		Shovel		Dry		2.8				

WELL LOG

WELL NO. MW-128

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLAN
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-20-99 DATE COMPLETED: 12-29-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 160.91' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" "
TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Dry		2.9				
-130		Shovel		Dry					DOLOMITE: 10YR 8/1, white, chalky, firm.	
-135		Shovel		Dry		3.5				
-140		Shovel		Dry					SAND: 10YR 8/4, very pale brown-yellow, very fine grained, loose, rounded to subrounded, fast drilling.	
-145		Shovel		Dry		1.2				
-150		Shovel		Dry						
-155		Shovel		Dry		2.0			DOLOMITE: 10YR 8/4, pale brown, firm, sandy.	
-160		Shovel		Dry						
-165		Shovel		Dry		2.7			SAND: 10YR 8/4, pale brown to yellow, 8/6, very fine grained, loose, slightly damp.	
-170		Shovel		Dry						
-175		Shovel		Damp		1.5				
-180		Shovel		Damp						
-185		Shovel		Moist		0.0				

WELL LOG

WELL NO. MW-128

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLAN
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-20-99 DATE COMPLETED: 12-29-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 160.91' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" "
TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	7-7/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Wet						
-195		Shovel		Wet		0.0			DOLOMITE: 10YR 7/1, gray.	
-200		Shovel		Wet						
-205		Shovel		Wet						
-210		Shovel		Wet					SAND: 10YR 8/4, light brown, very fine grained, unconsolidated, loose, samples washed, no OVM reading.	
-215		Shovel		Wet						
-220		Shovel		Wet						
-225										

WELL LOG

WELL NO. MW-129

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILT: orange/brown, loose, very fine.	
-5		Shovel							DOLOMITE: gravels/cobbles, light gray, very hard, dense.	
-10		Shovel							DOLOMITE: gravels/cobbles, medium gray, very hard, dense.	
-15		Shovel							DOLOMITE: gravels/cobbles, light gray, very hard, dense.	
-20		Shovel							DOLOMITE: gravels/cobbles, light gray, very hard, dense.	
-25		Shovel							DOLOMITE: gravels/cobbles, medium gray, very hard, dense.	
-30		Shovel							DOLOMITE: gravels/cobbles, light gray, very hard, dense.	
-35		Shovel							DOLOMITE: fine gravels, light gray, very hard, dense.	
-40		Shovel							DOLOMITE: 10YR 7/1, gray, very fine crystalline, chalky, dense.	
-45		Shovel		Dry						
-50		Shovel		Dry						
-55		Shovel		Dry		6.0				
-60		Shovel								

WELL LOG

WELL NO. MW-129

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Dry		9.8			DOLOMITE: 10YR 7/1, gray, very fine crystalline, dense, chalky.	
-70		Shovel		Dry						
-75		Shovel		Dry		10.2			SAND: 10YR 8/1, white, very fine grained, chalky.	
-80		Shovel		Dry					DOLOMITE: 10YR 7/1, gray, very fine crystalline, dense.	
-85		Shovel		Dry		0.6				
-90		Shovel		Dry						
-95		Shovel		Dry		0.8				
-100		Shovel		Dry		0.5				
-105		Shovel		Dry		11.2				
-110		Shovel		Dry		0.4				
-115		Shovel		Dry		0.4				
-120		Shovel		Dry						

WELL LOG

WELL NO. MW-129

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Dry		2.0				
-130		Shovel		Dry						
-135		Shovel		Dry						
-140		Shovel		Dry						
-145		Shovel		Dry					DOLOMITE: 10YR 7/1, gray, very fine crystalline, dense, chalky.	
-150		Shovel		Dry						
-155		Shovel		Dry						
-160		Shovel		Dry						
-165		Shovel		Dry						
-170		Shovel		Dry						
-175		Shovel		Dry					SAND: 10YR 8/3, very pale brown, very fine to micro crystalline, sucrosive sugar-sand.	
-180		Shovel		Wet						
-185		Shovel		Wet					SAND: 10YR 4/1, dark gray, very fine crystalline, consolidated, some quartz, well sorted. Note black particles floating or water, no odor.	

WELL LOG

WELL NO. MW-129

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -37.5'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -37.5'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Wet						
-195		Shovel		Wet						
-200		Shovel		Wet					DOLOMITE: 10YR 7/1 to 8/4, very fine to fine crystalline, some oolitic, vuggy, porosity.	
-205		Shovel		Wet						
-210		Shovel		Wet		0.0				
-215		Shovel				0.0				
-220		Shovel		Wet		0.0			DOLOMITE: 10YR 7/1 to 8/4, very fine to fine crystalline.	
-225		Shovel		Wet		0.0				
-230		Shovel		Wet		0.0			SAND: 10 YR 7/1, very fine grained, some quartz grains, consolidated, silty, non plastic, pin point porosity to intergranular porosity	
-235		Shovel		Wet		0.0				
-240		Shovel		Wet		0.0				
-245		Shovel		Wet		0.0				

WELL LOG

WELL NO. MW-130

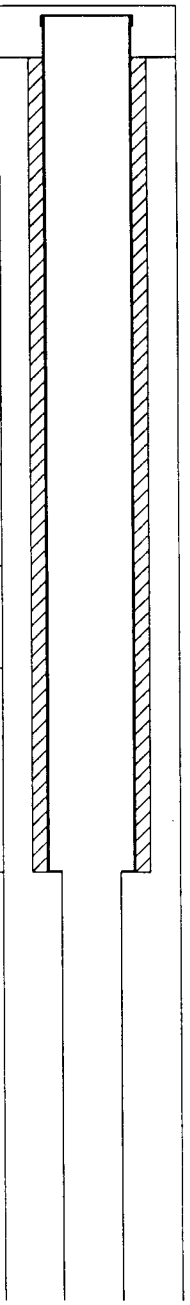
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -40'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -40'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									DOLOMITE: cream/tan, very hard, dense, crypo-crystalline.	
-5		Shovel							DOLOMITE: dull yellow/gray, very hard, dense, crypto-crystalline.	
-10		Shovel							DOLOMITE: dull yellow/brown, very hard, dense, crypto-crystalline.	
-15		Shovel							DOLOMITE: cream/tan, very hard, dense, crypto-crystalline.	
-20		Shovel							DOLOMITE: cream/pale pink, very hard, dense crypto-crystalline.	
-25		Shovel							DOLOMITE: gray/tan, very hard, dense, crypto-crystalline.	
-30		Shovel							DOLOMITE: gray, very hard, dense, crypto-crystalline.	
-35		Shovel								
-40		Shovel							DOLOMITE: 10YR 6/1, gray, dense, very fine crystalline.	
-45		Shovel		Dry		0.0				
-50		Shovel		Dry		0.0				
-55		Shovel		Dry		0.0				
-60		Shovel		Dry		0.0				



WELL LOG

WELL NO. MW-130

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -40'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -40'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel		Dry		0.0			DOLOMITE: 10YR 6/1, gray, dense, very fine crystalline, trace SAND.	
-70		Shovel		Dry		0.0				
-75		Shovel		Dry		0.0			DOLOMITE: 10YR 7/2, light gray, very fine crystalline, dense, chalky.	
-80		Shovel		Dry		0.0				
-85		Shovel		Dry		0.0				
-90		Shovel		Dry		0.0			DOLOMITE: becoming gray.	
-95		Shovel		Dry		0.0				
-100		Shovel		Dry		0.0			DOLOMITE: trace, light green.	
-105		Shovel		Dry		0.0				
-110		Shovel		Dry		0.0			DOLOMITE: 10YR 6/2, gray, dense, very fine crystalline, some chalky, trace light yellow SAND.	
-115		Shovel		Dry		0.0				
-120		Shovel		Dry		0.0				

WELL LOG

WELL NO. MW-130

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -40'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -40'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel		Dry		0.0				
-130		Shovel		Dry		0.0				
-135		Shovel		Dry		0.0				
-140		Shovel		Dry		0.0			SAND: 10YR 8/4, very fine grained, slightly silty, dry.	
-145		Shovel		Dry		0.0				
-150		Shovel		Dry		0.0				
-155		Shovel		Dry		0.0				
-160		Shovel		Dry		0.0				
-165		Shovel		Dry		0.0			DOLOMITE: 10YR 8/4, very fine crystalline, dense.	
-170		Shovel		Dry		0.0			SAND: 10YR 8/4, yellow to brown.	
-175		Shovel		Wet		0.0				
-180		Shovel		Wet		0.0			DOLOMITE: 10YR 7/2, light gray, very fine crystalline.	
-185		Shovel		Wet		0.0				

WELL LOG

WELL NO. MW-130

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12-17-99 DATE COMPLETED: 12-30-99
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 174.64' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 225'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -40'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -40'
	OPEN HOLE	SURFACE TO -225
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel		Wet		0.0			SAND: 10YR 8/2, very pale brown.	
-195		Shovel		Wet		0.0				
-200		Shovel		Wet		0.0				
-205		Shovel		Wet					Hole making water, no sample return.	
-210				Wet						
-215										
-220				Wet						
-225				Wet						

WELL LOG

WELL NO. MW-131

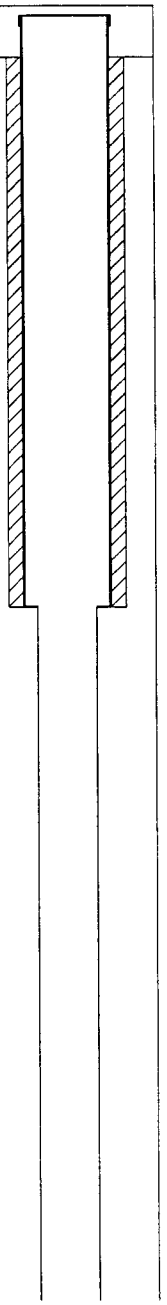
ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12/20/99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 158.32' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -27'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -27'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SILTY SAND: red, brown.	
-5		Shovel		Dry		0.0			CLAY AND GRAVEL: slightly plastic, with SILTY SANDS.	
-10		Shovel		Dry		0.0				
-15		Shovel		Dry		0.0			CLAY AND GRAVEL: slightly plastic, with SILTY SANDS, loose.	
-20		Shovel		Dry		0.0			DOLOMITE: 5YR 6/2, pink, gray, very fine crystalline, dense, some concoidal fractures.	
-25		Shovel		Dry		0.0				
-30		Shovel		Dry		0.0				
-35		Shovel		Dry		0.0			DOLOMITE: 5YR 6/2, very fine crystalline, dense.	
-40		Shovel		Dry		0.0				
-45		Shovel		Dry		0.0				
-50		Shovel		Dry		0.0			DOLOMITE: 10YR 7/1, light gray, very fine crystalline, some chalky, dense.	
-55		Shovel		Dry		0.0				
-60		Shovel		Dry		0.0				



WELL LOG

WELL NO. MW-131

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12/20/99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 158.32' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -27'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -27'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-65		Shovel				0.0			DOLOMITE: adding water to clean out hole sample, quality poor.	
-70		Shovel				0.5			DOLOMITE: 10YR 5/1, gray, very fine crystalline, dense.	
-75		Shovel				0.0				
-80		Shovel				0.0				
-85		Shovel				0.0				
-90		Shovel				0.0			DOLOMITE: 10YR 7/4, very pale brown, very fine crystalline, dense. Adding water to hole, losing 2-3 feet every connection.	
-95		Shovel				0.0				
-100		Shovel				0.0				
-105		Shovel				0.0				
-110		Shovel				0.0			DOLOMITE: 10YR 7/2, light gray, very fine crystalline.	
-115		Shovel				0.0				
-120		Shovel				0.0				

WELL LOG

WELL NO. MW-131

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12/20/99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 158.32' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -27'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -27'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-125		Shovel				0.0				
-130		Shovel				0.0				
-135		Shovel				0.0			SAND: 10YR 8/3, pale yellow, very fine grained, firm.	
-140		Shovel				0.0				
-145		Shovel				0.0				
-150		Shovel				0.0				
-155		Shovel				0.0				
-160		Shovel				0.0			DOLOMITE: 10YR 7/3, very pale brown, very fine crystalline, dense.	
-165		Shovel				0.0				
-170		Shovel				0.0			DOLOMITE: samples washed, sample quality poor.	
-175		Shovel								
-180		Shovel								
-185		Shovel								

WELL LOG

WELL NO. MW-131

ARCADIS 1030 Andrews Highway Suite 120, Midland, TX 79701-3872 Tel: 915/699-1381 Fax: 915/699-1978

PROJECT NUMBER: NP000443.0005
CLIENT NAME: MARATHON OIL COMPANY
PROJECT NAME: INDIAN BASIN
SITE LOCATION: INDIAN BASIN GAS PLANT
CARLSBAD, NEW MEXICO
DRILLING CO: LARIAT DRILLING
DRILLING METHOD: AIR ROTARY/AIR HAMMER/AUGER
SAMPLING METHOD: SHOVEL
DATE BEGUN: 12/20/99 DATE COMPLETED: —
DRILLER: R.B. DAVIS ELEVATION (SURF.): —
LOGGER: D. McNEESE ELEVATION (T.O.C.): —
NOTES:

STATIC WATER LEVEL: 158.32' MEAS. PT.: T.O.C. DATE: —
HOLE SIZE(S): 12-1/4", 6-3/4" TOTAL DEPTH: 245'
SURFACE COMPLETION: —

	TYPES	DEPTHS
GROUT TYPE:	PORTLAND CEMENT	SURFACE TO -27'
SEAL TYPE:	—	—
SCREEN PACK:	—	—
CASING TYPE:	8-5/8" DIAMETER STEEL CASING	SURFACE TO -27'
	OPEN HOLE	SURFACE TO -245'
	—	—
WELL SCREEN:	—	—
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-190		Shovel							DOLOMITE: 10YR 7/4, very pale brown, very fine crystalline, dense, moderate, odor.	
-195		Shovel							very fast drilling, partial circulation loss, making water, no sample.	
-200		Shovel							DOLOMITE: 10YR 8/4, pale brown, very fine crystalline, fast drilling.	
-205		Shovel								
-210		Shovel								
-215		Shovel								
-220		Shovel								
-225		Shovel							SANDY CLAY: red.	
-230		Shovel								
-235		Shovel							well making excessive water, no sample.	
-240										
-245										

Appendix F

Historical Fluid Level Data

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
Shallow Zone Wells					
MW-1	12/01/91	3792.50	9.68	0	3782.82
MW-1	04/01/96	3792.50	D	--	--
MW-1	01/27/98	3792.50	14.90	0	3777.60
MW-1	06/16/98	3792.50	D	--	--
MW-2	01/28/98	3788.72	D	--	--
MW-2	06/16/98	3788.72	D	--	--
MW-2	01/16/96	3788.72	D	--	--
MW-3	04/19/96	3787.50	D	--	--
MW-3	07/16/96	3787.50	D	--	--
MW-3	10/13/96	3787.50	D	--	--
MW-3	01/28/98	3787.50	D	--	--
MW-3	06/16/98	3787.50	D	--	--
MW-4	04/15/92	3785.88	18.58	0	3767.30
MW-4	07/01/92	3785.88	17.74	0	3768.14
MW-4	10/01/92	3785.88	18.54	0	3767.34
MW-4	01/01/93	3785.88	18.57	0	3767.31
MW-4	04/01/93	3785.88	18.57	0	3767.31
MW-4	01/28/98	3785.88	D	--	--
MW-4	06/16/98	3785.88	D	--	--
MW-4	01/05/00	3785.88	18.78	0	3767.10
MW-5	01/16/96	3801.69	D	--	--
MW-5	04/19/96	3801.69	D	--	--
MW-5	07/15/96	3801.69	D	--	--
MW-5	10/13/96	3801.69	D	--	--
MW-5	01/27/98	3801.69	D	--	--
MW-5	06/16/98	3801.69	D	--	--
MW-6	01/16/96	3785.17	D	--	--
MW-6	01/27/98	3785.17	D	--	--
MW-6	06/15/98	3785.17	D	--	--
MW-7	01/16/96	3784.46	D	--	--
MW-7	04/17/96	3784.46	D	--	--
MW-7	07/15/96	3784.46	D	--	--
MW-7	10/13/96	3784.46	D	--	--
MW-7	01/27/98	3784.46	D	--	--
MW-7	06/15/98	3784.46	D	--	--
MW-8	01/16/96	3795.04	D	--	--
MW-8	04/17/96	3795.04	D	--	--
MW-8	10/13/96	3795.04	D	--	--
MW-8	01/27/98	3795.04	D	--	--
MW-8	06/15/98	3795.04	D	--	--

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-9	01/16/96	3807.85	D	--	--
MW-9	04/17/96	3807.85	D	--	--
MW-9	07/15/96	3807.85	D	--	--
MW-9	10/13/96	3807.85	D	--	--
MW-9	01/27/98	3807.85	D	--	--
MW-9	06/15/98	3807.85	D	--	--
MW-10	12/01/91	3790.78	16.68	0	3774.10
MW-10	04/15/92	3790.78	16.70	0	3774.08
MW-10	07/01/92	3790.78	16.02	0	3774.76
MW-10	10/01/92	3790.78	16.97	0	3773.81
MW-10	01/01/93	3790.78	17.74	0	3773.04
MW-10	04/01/93	3790.78	18.31	0	3772.47
MW-10	01/01/94	3790.78	18.21	0	3772.57
MW-10	01/16/96	3790.78	D	--	--
MW-10	04/17/96	3790.78	D	--	--
MW-10	07/16/96	3790.78	D	--	--
MW-10	10/13/96	3790.78	17.00	0	3773.78
MW-10	02/04/97	3790.78	17.99	0	3772.79
MW-10	03/18/97	3790.78	17.88	0	3772.90
MW-10	04/29/97	3790.78	18.21	0	3772.57
MW-10	07/15/97	3790.78	18.20	0	3772.58
MW-10	10/14/97	3790.78	18.45	0	3772.33
MW-10	01/28/98	3790.78	18.20	0	3772.58
MW-10	04/27/98	3790.78	18.19	0	3772.59
MW-10	06/16/98	3790.78	D	--	--
MW-10	10/10/98	3790.78	18.96	0	3771.82
MW-10	01/27/99	3790.78	18.21	0	3772.57
MW-10	04/19/99	3790.78	18.20	0	3772.58
MW-10	01/05/00	3790.78	18.24	0	3772.54
MW-11	12/01/91	3806.96	22.08	0	3784.88
MW-11	04/15/92	3806.96	22.73	0	3784.23
MW-11	07/01/92	3806.96	18.00	0	3788.96
MW-11	10/01/92	3806.96	22.47	0	3784.49
MW-11	01/01/93	3806.96	24.03	0	3782.93
MW-11	04/01/93	3806.96	24.38	0	3782.58
MW-11	10/01/93	3806.96	24.43	0	3782.53
MW-11	01/01/94	3806.96	24.30	0	3782.66
MW-11	04/01/94	3806.96	24.38	0	3782.58
MW-11	07/01/94	3806.96	24.34	0	3782.62
MW-11	10/01/94	3806.96	22.23	0	3784.73
MW-11	04/01/95	3806.96	24.23	0	3782.73
MW-11	07/01/95	3806.96	23.80	0	3783.16
MW-11	10/01/95	3806.96	22.01	0	3784.95
MW-11	01/16/96	3806.96	23.91	0	3783.05
MW-11	04/19/96	3806.96	23.97	0	3782.99
MW-11	07/15/96	3806.96	20.05	0	3786.91
MW-11	10/13/96	3806.96	20.46	0	3786.50

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-11	02/04/97	3806.96	23.22	0	3783.74
MW-11	04/28/97	3806.96	23.40	0	3783.56
MW-11	06/17/98	3806.96	24.20	0	3782.76
MW-11	04/19/99	3806.96	D	--	--
MW-11	01/05/00	3806.96	24.30	0	3782.66
MW-12	01/27/98	3809.96	D	--	--
MW-12	06/16/98	3809.96	D	--	--
MW-13	12/01/91	3801.58	18.14	0	3783.44
MW-13	04/15/92	3801.58	18.92	0	3782.66
MW-13	01/01/95	3801.58	19.76	0	3781.82
MW-13	04/01/95	3801.58	20.34	0	3781.24
MW-13	07/01/95	3801.58	20.36	0	3781.22
MW-13	10/01/95	3801.58	18.41	0	3783.17
MW-13	01/16/96	3801.58	19.83	0.08	3781.80
MW-13	04/19/96	3801.58	19.89	0.09	3781.75
MW-13	07/15/96	3801.58	17.15	0.08	3784.48
MW-13	10/13/96	3801.58	17.39	0	3784.19
MW-13	02/04/97	3801.58	19.15	0	3782.43
MW-13	03/18/97	3801.58	19.31	0	3782.27
MW-13	04/28/97	3801.58	19.34	0	3782.24
MW-13	06/17/98	3801.58	20.74	0	3780.84
MW-13	04/19/99	3801.58	21.52	0.27	3780.26
MW-13	01/05/00	3801.58	20.07	0	3781.51
MW-14	12/01/91	3803.61	9.68	0	3793.93
MW-14	10/01/93	3803.61	22.55	0	3781.06
MW-14	01/01/94	3803.61	22.78	0	3780.83
MW-14	01/27/98	3803.61	22.36	0	3781.25
MW-14	06/16/98	3803.61	22.88	0	3780.73
MW-14	04/19/99	3803.61	23.74	0.24	3780.05
MW-14	01/05/00	3803.61	22.22	0	3781.39
MW-15	12/01/91	3803.59	9.68	0	3793.91
MW-15	01/27/98	3803.59	19.28	0	3784.31
MW-15	06/16/98	3803.59	D	--	--
MW-15	01/05/00	3803.59	19.37	0	3784.22
MW-16	12/01/91	3801.04	9.68	0	3791.36
MW-16	04/01/93	3801.04	22.32	0	3778.72
MW-16	07/01/93	3801.04	22.25	0	3778.79
MW-16	01/27/98	3801.04	22.37	0	3778.67
MW-16	06/16/98	3801.04	D	--	--
MW-16	01/05/00	3801.04	22.38	0	3778.66
MW-17	12/01/91	3799.55	9.68	0	3789.87
MW-17	04/01/93	3799.55	18.68	0	3780.87
MW-17	07/01/93	3799.55	19.13	0	3780.42

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-17	10/01/93	3799.55	19.11	0	3780.44
MW-17	01/01/94	3799.55	19.27	0	3780.28
MW-17	01/27/98	3799.55	19.20	0	3780.35
MW-17	06/17/98	3799.55	D	--	--
MW-17	01/05/00	3799.55	19.10	0	3780.45
MW-18	12/01/91	3795.82	9.68	0	3786.14
MW-18	04/15/92	3795.82	15.25	0	3780.57
MW-18	07/01/92	3795.82	11.08	0	3784.74
MW-18	10/01/92	3795.82	15.89	0	3779.93
MW-18	01/01/93	3795.82	17.05	0	3778.77
MW-18	04/01/93	3795.82	17.13	0	3778.69
MW-18	01/27/98	3795.82	17.30	0	3778.52
MW-18	06/16/98	3795.82	D	--	--
MW-18	01/05/00	3795.82	D	--	--
MW-19	04/15/92	3797.21	16.50	0	3780.71
MW-19	07/01/92	3797.21	12.15	0	3785.06
MW-19	10/01/92	3797.21	17.16	0	3780.05
MW-19	01/01/93	3797.21	18.85	0	3778.36
MW-19	04/01/93	3797.21	18.93	0	3778.28
MW-19	01/16/96	3797.21	19.04	0	3778.17
MW-19	04/19/96	3797.21	19.06	0	3778.15
MW-19	07/16/96	3797.21	19.04	0	3778.17
MW-19	10/13/96	3797.21	16.09	0	3781.12
MW-19	02/04/97	3797.21	18.34	0	3778.87
MW-19	03/18/97	3797.21	18.50	0	3778.71
MW-19	04/28/97	3797.21	18.84	0	3778.37
MW-19	06/17/98	3797.21	18.88	0	3778.33
MW-19	04/19/99	3797.21	18.80	0	3778.41
MW-19	01/05/00	3797.21	18.75	0	3778.46
MW-20	12/01/91	3797.59	9.68	0	3787.91
MW-20	01/27/98	3797.59	D	--	--
MW-20	06/17/98	3797.59	D	--	--
MW-20	01/05/00	3797.59	16.08	0	3781.51
MW-21	12/01/91	3798.21	9.68	0	3788.53
MW-21	04/01/93	3798.21	22.63	0	3775.58
MW-21	07/01/93	3798.21	22.88	0	3775.33
MW-21	10/01/93	3798.21	23.13	0	3775.08
MW-21	01/27/98	3798.21	23.03	0	3775.18
MW-21	06/16/98	3798.21	D	--	--
MW-21	01/05/00	3798.21	22.89	0	3775.32
MW-22	12/01/91	3799.20	9.68	0	3789.52
MW-22	04/15/92	3799.20	17.16	0	3782.04
MW-22	07/01/92	3799.20	17.07	0	3782.13
MW-22	10/01/92	3799.20	17.29	0	3781.91

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F
Historic Fluid Level Data, May 1991 - January 2000
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-22	01/01/93	3799.20	17.29	0	3781.91
MW-22	04/01/93	3799.20	17.29	0	3781.91
MW-22	01/27/98	3799.20	17.20	0	3782.00
MW-22	06/16/98	3799.20	D	--	--
MW-22	01/05/00	3799.20	17.19	0	3782.01
MW-23	01/28/98	3794.48	D	--	--
MW-23	06/16/98	3794.48	D	--	--
MW-24	12/01/91	3794.09	9.68	0	3784.41
MW-24	04/15/92	3794.09	12.90	0	3781.19
MW-24	07/01/92	3794.09	14.09	0	3780.00
MW-24	10/01/92	3794.09	12.92	0	3781.17
MW-24	01/16/96	3794.09	D	--	--
MW-24	04/19/96	3794.09	D	--	--
MW-24	07/16/96	3794.09	D	--	--
MW-24	10/13/96	3794.09	D	--	--
MW-24	01/27/98	3794.09	12.92	0	3781.17
MW-24	06/16/98	3794.09	D	--	--
MW-25	01/28/98	3786.97	D	--	--
MW-25	06/16/98	3786.97	D	--	--
MW-26	12/01/91	3793.01	9.68	0	3783.33
MW-26	07/01/92	3793.01	16.37	0	3776.64
MW-26	10/01/92	3793.01	19.66	0	3773.35
MW-26	01/01/93	3793.01	20.41	0	3772.60
MW-26	04/01/93	3793.01	20.72	0	3772.29
MW-26	07/01/93	3793.01	20.77	0	3772.24
MW-26	10/01/93	3793.01	20.78	0	3772.23
MW-26	01/01/94	3793.01	20.77	0	3772.24
MW-26	06/17/98	3793.01	D	--	--
MW-26	01/05/00	3793.01	20.77	0	3772.24
MW-27	01/28/98	3790.93	D	--	--
MW-27	06/16/98	3790.93	D	--	--
MW-28	12/01/91	3797.03	19.23	0	3777.80
MW-28	01/27/98	3797.03	18.48	0	3778.55
MW-28	06/16/98	3797.03	D	--	--
MW-28	01/05/00	3797.03	19.11	0	3777.92
MW-29	01/16/96	3794.06	D	--	--
MW-29	04/19/96	3794.06	D	--	--
MW-29	07/16/96	3794.06	D	--	--
MW-29	10/13/96	3794.06	D	--	--
MW-29	01/28/98	3794.06	D	--	--
MW-29	06/16/98	3794.06	D	--	--

Notes:
Water level elevations corrected for condensate using a specific gravity of 0.73
feet amsl Feet above mean sea level
feet bmp Feet below measuring point
D Well was dry at time of gauging
-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-30	12/01/91	3788.30	14.75	0	3773.55
MW-30	01/28/98	3788.30	D	--	--
MW-30	06/16/98	3788.30	D	--	--
MW-31	12/01/91	3791.15	18.85	0	3772.30
MW-31	04/15/92	3791.15	19.00	0	3772.15
MW-31	07/01/92	3791.15	18.50	0	3772.65
MW-31	10/01/92	3791.15	19.00	0	3772.15
MW-31	01/01/93	3791.15	19.44	0	3771.71
MW-31	04/01/93	3791.15	19.64	0	3771.51
MW-31	01/28/98	3791.15	19.03	0	3772.12
MW-31	06/16/98	3791.15	D	--	--
MW-31	01/05/00	3791.15	19.06	0	3772.09
MW-32	07/01/92	3797.47	15.35	0	3782.12
MW-32	01/16/96	3797.47	D	--	--
MW-32	04/19/96	3797.47	D	--	--
MW-32	07/15/96	3797.47	D	--	--
MW-32	10/13/96	3797.47	D	--	--
MW-32	01/27/98	3797.47	15.70	0	3781.77
MW-32	06/16/98	3797.47	D	--	--
MW-33	12/01/91	3802.48	19.02	0	3783.46
MW-33	01/01/93	3802.48	19.91	0	3782.57
MW-33	07/01/93	3802.48	19.91	0	3782.57
MW-33	01/27/98	3802.48	19.91	0	3782.57
MW-33	06/16/98	3802.48	19.97	0	3782.51
MW-33	01/05/00	3802.48	19.94	0	3782.54
MW-34	12/01/91	3806.00	19.72	0	3786.28
MW-34	01/27/98	3806.00	D	--	--
MW-34	06/16/98	3806.00	D	--	--
MW-34	01/05/00	3806.00	19.81	0	3786.19
MW-35	12/01/91	3800.81	18.24	0	3782.57
MW-35	07/01/93	3800.81	19.77	0	3781.04
MW-35	10/01/93	3800.81	19.81	0	3781.00
MW-35	01/01/94	3800.81	20.09	0	3780.72
MW-35	01/27/98	3800.81	20.10	0	3780.71
MW-35	06/16/98	3800.81	20.57	0	3780.24
MW-35	01/05/00	3800.81	19.78	0	3781.03
MW-36	01/27/98	3792.94	D	--	--
MW-36	06/16/98	3792.94	D	--	--
MW-36	01/05/00	3792.94	D	--	--
MW-37	12/01/91	3795.03	11.72	0	3783.31
MW-37	04/01/93	3795.03	19.96	0	3775.07
MW-37	07/01/93	3795.03	20.11	0	3774.92

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-37	10/01/93	3795.03	20.19	0	3774.84
MW-37	01/01/94	3795.03	20.21	0	3774.82
MW-37	01/27/98	3795.03	19.37	0	3775.66
MW-37	06/16/98	3795.03	19.82	0	3775.21
MW-37	01/05/00	3795.03	17.58	0	3777.45
MW-38	12/01/91	3797.32	13.48	0	3783.84
MW-38	04/15/92	3797.32	16.54	0	3780.78
MW-38	07/01/92	3797.32	12.42	0	3784.90
MW-38	10/01/92	3797.32	17.66	0	3779.66
MW-38	01/01/93	3797.32	20.24	0	3777.08
MW-38	04/01/93	3797.32	20.42	0	3776.90
MW-38	07/01/93	3797.32	20.23	0	3777.09
MW-38	10/01/93	3797.32	20.30	0	3777.02
MW-38	01/16/96	3797.32	D	--	--
MW-38	04/19/96	3797.32	D	--	--
MW-38	07/15/96	3797.32	D	--	--
MW-38	10/13/96	3797.32	16.54	0	3780.78
MW-38	02/03/97	3797.32	19.96	0	3777.36
MW-38	04/28/97	3797.32	20.30	0	3777.02
MW-38	07/15/97	3797.32	20.38	0	3776.94
MW-38	10/13/97	3797.32	20.22	0	3777.10
MW-38	01/27/98	3797.32	20.18	0	3777.14
MW-38	04/27/98	3797.32	20.32	0	3777.00
MW-38	06/16/98	3797.32	D	--	--
MW-38	10/09/98	3797.32	20.41	0	3776.91
MW-38	01/27/99	3797.32	19.78	0	3777.54
MW-38	04/19/99	3797.32	20.01	0	3777.31
MW-38	01/05/00	3797.32	19.41	0	3777.91
MW-39	12/01/91	3796.20	13.05	0	3783.15
MW-39	01/01/93	3796.20	17.15	0	3779.05
MW-39	04/01/93	3796.20	22.32	0	3773.88
MW-39	07/01/93	3796.20	17.78	0	3778.42
MW-39	10/01/93	3796.20	18.10	0	3778.10
MW-39	01/01/94	3796.20	18.72	0	3777.48
MW-39	04/01/94	3796.20	19.07	0	3777.13
MW-39	07/01/94	3796.20	19.29	0	3776.91
MW-39	10/01/94	3796.20	19.23	0	3776.97
MW-39	01/01/95	3796.20	19.57	0	3776.63
MW-39	04/01/95	3796.20	19.84	0	3776.36
MW-39	07/01/95	3796.20	19.84	0	3776.36
MW-39	10/01/95	3796.20	20.03	0	3776.17
MW-39	01/16/96	3796.20	20.29	0.	3775.91
MW-39	04/19/96	3796.20	20.32	0	3775.88
MW-39	07/15/96	3796.20	20.30	0	3775.90
MW-39	10/13/96	3796.20	15.70	0	3780.50
MW-39	02/03/97	3796.20	17.11	0	3779.09
MW-39	04/28/97	3796.20	17.44	0	3778.76

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-39	07/14/97	3796.20	17.41	0	3778.79
MW-39	10/13/97	3796.20	18.60	0	3777.60
MW-39	01/27/98	3796.20	19.20	0	3777.00
MW-39	04/27/98	3796.20	19.25	0	3776.95
MW-39	06/16/98	3796.20	19.41	0	3776.79
MW-39	10/09/98	3796.20	20.04	0	3776.16
MW-39	01/27/99	3796.20	20.04	0	3776.16
MW-39	04/19/99	3796.20	20.03	0	3776.17
MW-39	01/05/00	3796.20	D	--	--
MW-40	04/01/93	3803.12	18.68	0	3784.44
MW-40	01/27/98	3803.12	D	--	--
MW-40	06/16/98	3803.12	D	--	--
MW-41	12/01/91	3799.04	14.61	0	3784.43
MW-41	01/01/93	3799.04	19.18	0	3779.86
MW-41	07/01/93	3799.04	19.28	0	3779.76
MW-41	10/01/93	3799.04	19.74	0	3779.30
MW-41	01/01/94	3799.04	19.82	0	3779.22
MW-41	04/01/94	3799.04	21.19	0	3777.85
MW-41	07/01/94	3799.04	20.52	0	3778.52
MW-41	10/01/94	3799.04	19.60	0	3779.44
MW-41	01/01/95	3799.04	19.87	0	3779.17
MW-41	04/01/95	3799.04	19.82	0	3779.22
MW-41	07/01/95	3799.04	19.82	0	3779.22
MW-41	10/01/95	3799.04	20.58	0	3778.46
MW-41	01/16/96	3799.04	20.06	0	3778.98
MW-41	04/19/96	3799.04	20.10	0	3778.94
MW-41	07/15/96	3799.04	20.06	0	3778.98
MW-41	10/13/96	3799.04	19.02	0	3780.02
MW-41	02/03/97	3799.04	18.98	0	3780.06
MW-41	03/18/97	3799.04	19.09	0	3779.95
MW-41	04/28/97	3799.04	18.98	0	3780.06
MW-41	07/14/97	3799.04	18.85	0	3780.19
MW-41	04/27/98	3799.04	19.26	0	3779.78
MW-41	06/17/98	3799.04	19.37	0	3779.67
MW-41	10/09/98	3799.04	19.18	0	3779.86
MW-41	01/27/99	3799.04	18.72	0	3780.32
MW-41	04/19/99	3799.04	18.81	0	3780.23
MW-41	01/05/00	3799.04	18.61	0	3780.43
MW-42	12/01/91	3804.73	19.98	0	3784.75
MW-42	07/01/93	3804.73	22.63	0	3782.10
MW-42	10/01/93	3804.73	22.89	0	3781.84
MW-42	01/01/94	3804.73	23.13	0	3781.60
MW-42	01/27/98	3804.73	21.94	0	3782.79
MW-42	06/16/98	3804.73	D	--	--
MW-42	01/05/00	3804.73	23.50	0	3781.23

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-43	12/01/91	3802.05	17.38	0	3784.67
MW-43	07/01/93	3802.05	21.33	0	3780.72
MW-43	10/01/93	3802.05	21.18	0	3780.87
MW-43	01/01/94	3802.05	21.27	0	3780.78
MW-43	04/01/94	3802.05	22.38	0	3779.67
MW-43	07/01/94	3802.05	21.41	0	3780.64
MW-43	10/01/94	3802.05	21.41	0	3780.64
MW-43	01/01/95	3802.05	21.44	0	3780.61
MW-43	04/01/95	3802.05	21.53	0	3780.52
MW-43	07/01/95	3802.05	21.53	0	3780.52
MW-43	10/01/95	3802.05	21.80	0	3780.25
MW-43	01/16/96	3802.05	21.75	0	3780.30
MW-43	04/19/96	3802.05	21.70	0	3780.35
MW-43	07/15/96	3802.05	21.44	0	3780.61
MW-43	10/13/96	3802.05	20.13	0	3781.92
MW-43	02/03/97	3802.05	20.71	0	3781.34
MW-43	04/28/97	3802.05	20.49	0	3781.56
MW-43	07/14/97	3802.05	20.39	0	3781.66
MW-43	10/13/97	3802.05	20.78	0	3781.27
MW-43	01/27/98	3802.05	20.55	0	3781.50
MW-43	04/27/98	3802.05	20.72	0	3781.33
MW-43	06/16/98	3802.05	20.89	0	3781.16
MW-43	10/09/98	3802.05	21.16	0	3780.89
MW-43	01/27/99	3802.05	20.40	0	3781.65
MW-43	04/19/99	3802.05	20.55	0	3781.50
MW-43	01/05/00	3802.05	20.58	0	3781.47
MW-44	12/01/91	3804.14	17.85	0	3786.29
MW-44	04/15/92	3804.14	19.40	0	3784.74
MW-44	07/01/92	3804.14	17.27	0	3786.87
MW-44	10/01/92	3804.14	20.28	0	3783.86
MW-44	01/01/93	3804.14	21.20	0	3782.94
MW-44	04/01/93	3804.14	21.48	0	3782.66
MW-44	07/01/93	3804.14	21.63	0	3782.51
MW-44	10/01/93	3804.14	21.58	0	3782.56
MW-44	01/01/94	3804.14	21.68	0	3782.46
MW-44	04/01/94	3804.14	22.02	0	3782.12
MW-44	07/01/94	3804.14	22.13	0	3782.01
MW-44	10/01/94	3804.14	21.58	0	3782.56
MW-44	01/01/95	3804.14	21.88	0	3782.26
MW-44	04/01/95	3804.14	22.26	0	3781.88
MW-44	07/01/95	3804.14	22.26	0	3781.88
MW-44	10/01/95	3804.14	21.84	0	3782.30
MW-44	01/16/96	3804.14	21.86	0	3782.28
MW-44	04/19/96	3804.14	21.88	0	3782.26
MW-44	07/15/96	3804.14	21.75	0	3782.39
MW-44	10/13/96	3804.14	19.32	0	3784.82
MW-44	02/03/97	3804.14	20.79	0	3783.35
MW-44	04/28/97	3804.14	20.43	0	3783.71

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-44	07/14/97	3804.14	20.31	0	3783.83
MW-44	10/13/97	3804.14	20.73	0	3783.41
MW-44	01/27/98	3804.14	20.66	0	3783.48
MW-44	04/27/98	3804.14	20.84	0	3783.30
MW-44	06/16/98	3804.14	21.04	0	3783.10
MW-44	10/09/98	3804.14	20.71	0	3783.43
MW-44	01/27/99	3804.14	20.01	0	3784.13
MW-44	04/19/99	3804.14	20.41	0	3783.73
MW-44	01/05/00	3804.14	19.96	0	3784.18
MW-45	12/01/91	3808.68	13.91	0	3794.77
MW-45	07/01/93	3808.68	21.49	0	3787.19
MW-45	10/01/93	3808.68	21.47	0	3787.21
MW-45	01/01/94	3808.68	21.54	0	3787.14
MW-45	04/01/94	3808.68	22.64	0	3786.04
MW-45	07/01/94	3808.68	21.85	0	3786.83
MW-45	10/01/94	3808.68	21.52	0	3787.16
MW-45	01/01/95	3808.68	21.78	0	3786.90
MW-45	04/01/95	3808.68	22.13	0	3786.55
MW-45	07/01/95	3808.68	22.13	0	3786.55
MW-45	01/05/00	3808.68	18.88	0	3789.80
MW-46	10/01/93	3805.54	19.87	0	3785.67
MW-46	01/01/94	3805.54	19.42	0	3786.12
MW-46	04/01/94	3805.54	19.59	0	3785.95
MW-46	10/01/94	3805.54	19.20	0	3786.34
MW-46	04/01/95	3805.54	19.55	0	3785.99
MW-46	07/01/95	3805.54	19.55	0	3785.99
MW-46	01/16/96	3805.54	19.48	0	3786.06
MW-46	04/19/96	3805.54	19.52	0	3786.02
MW-46	07/15/96	3805.54	19.41	0	3786.13
MW-46	10/13/96	3805.54	15.73	0	3789.81
MW-46	02/04/97	3805.54	18.22	0	3787.32
MW-46	04/28/97	3805.54	16.93	0	3788.61
MW-46	07/14/97	3805.54	17.15	0	3788.39
MW-46	10/13/97	3805.54	18.01	0	3787.53
MW-46	01/27/98	3805.54	17.54	0	3788.00
MW-46	04/27/98	3805.54	18.34	0	3787.20
MW-46	06/16/98	3805.54	18.69	0	3786.85
MW-46	10/10/98	3805.54	17.82	0	3787.72
MW-46	01/27/99	3805.54	16.91	0	3788.63
MW-46	04/19/99	3805.54	17.44	0	3788.10
MW-46	01/05/00	3805.54	16.76	0	3788.78
MW-47	12/01/91	3805.09	18.49	0	3786.60
MW-47	07/01/93	3805.09	21.37	0	3783.72
MW-47	01/16/96	3805.09	D	--	--
MW-47	04/19/96	3805.09	D	--	--
MW-47	07/15/96	3805.09	D	--	--

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-47	10/13/96	3805.09	19.66	0	3785.43
MW-47	02/04/97	3805.09	21.51	0	3783.58
MW-47	04/28/97	3805.09	21.46	0	3783.63
MW-47	07/14/97	3805.09	21.54	0	3783.55
MW-47	10/13/97	3805.09	21.48	0	3783.61
MW-47	01/27/98	3805.09	21.80	0	3783.29
MW-47	04/27/98	3805.09	21.50	0	3783.59
MW-47	06/16/98	3805.09	21.62	0	3783.47
MW-47	10/10/98	3805.09	21.54	0	3783.55
MW-47	01/27/99	3805.09	21.52	0	3783.57
MW-47	04/19/99	3805.09	21.49	0	3783.60
MW-47	01/05/00	3805.09	21.62	0	3783.47
MW-48	12/01/91	3806.18	18.05	0	3788.13
MW-48	04/15/92	3806.18	19.44	0	3786.74
MW-48	07/01/92	3806.18	17.25	0	3788.93
MW-48	10/01/92	3806.18	18.87	0	3787.31
MW-48	01/01/93	3806.18	19.58	0	3786.60
MW-48	01/16/96	3806.18	D	--	--
MW-48	04/19/96	3806.18	D	--	--
MW-48	07/15/96	3806.18	D	--	--
MW-48	10/13/96	3806.18	17.88	0	3788.30
MW-48	02/04/97	3806.18	19.60	0	3786.58
MW-48	04/28/97	3806.18	19.66	0	3786.52
MW-48	07/14/97	3806.18	19.66	0	3786.52
MW-48	10/13/97	3806.18	19.68	0	3786.50
MW-48	01/27/98	3806.18	19.71	0	3786.47
MW-48	04/27/98	3806.18	19.72	0	3786.46
MW-48	06/16/98	3806.18	19.75	0	3786.43
MW-48	10/09/98	3806.18	19.71	0	3786.47
MW-48	01/27/99	3806.18	19.74	0	3786.44
MW-48	04/19/99	3806.18	19.71	0	3786.47
MW-48	01/05/00	3806.18	19.77	0	3786.41
MW-49	12/01/91	3805.61	16.60	0	3789.01
MW-49	07/01/93	3805.61	21.98	0	3783.63
MW-49	10/01/93	3805.61	21.93	0	3783.68
MW-49	01/01/94	3805.61	22.27	0	3783.34
MW-49	04/01/94	3805.61	22.64	0	3782.97
MW-49	07/01/94	3805.61	22.73	0	3782.88
MW-49	10/01/94	3805.61	22.30	0	3783.31
MW-49	01/01/95	3805.61	22.56	0	3783.05
MW-49	04/01/95	3805.61	22.94	0	3782.67
MW-49	07/01/95	3805.61	22.94	0	3782.67
MW-49	10/01/95	3805.61	22.68	0	3782.93
MW-49	01/16/96	3805.61	22.55	0	3783.06
MW-49	04/19/96	3805.61	22.59	0	3783.02
MW-49	07/15/96	3805.61	22.76	0	3782.85
MW-49	10/13/96	3805.61	19.54	0	3786.07

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-49	02/03/97	3805.61	20.66	0	3784.95
MW-49	03/18/97	3805.61	20.99	0	3784.62
MW-49	04/28/97	3805.61	20.70	0	3784.91
MW-49	07/14/97	3805.61	20.31	0	3785.30
MW-49	10/13/97	3805.61	21.01	0	3784.60
MW-49	01/27/98	3805.61	21.08	0	3784.53
MW-49	04/27/98	3805.61	21.34	0	3784.27
MW-49	06/16/98	3805.61	21.35	0	3784.26
MW-49	10/09/98	3805.61	22.52	0	3783.09
MW-49	01/27/99	3805.61	20.50	0	3785.11
MW-49	04/19/99	3805.61	20.81	0	3784.80
MW-49	01/05/00	3805.61	20.07	0	3785.54
MW-50	12/01/91	3813.35	20.74	0	3792.61
MW-50	04/15/92	3813.35	22.83	0	3790.52
MW-50	07/01/92	3813.35	15.91	0	3797.44
MW-50	10/01/92	3813.35	23.77	0	3789.58
MW-50	01/01/93	3813.35	25.52	0	3787.83
MW-50	04/01/93	3813.35	26.16	0	3787.19
MW-50	07/01/93	3813.35	26.43	0	3786.92
MW-50	10/01/93	3813.35	26.43	0	3786.92
MW-50	01/01/94	3813.35	26.83	0	3786.52
MW-50	04/01/94	3813.35	27.04	0	3786.31
MW-50	07/01/94	3813.35	27.16	0	3786.19
MW-50	10/01/94	3813.35	26.87	0	3786.48
MW-50	01/01/95	3813.35	27.03	0	3786.32
MW-50	04/01/95	3813.35	27.37	0	3785.98
MW-50	07/01/95	3813.35	27.37	0	3785.98
MW-50	10/01/95	3813.35	26.85	0	3786.50
MW-50	01/16/96	3813.35	27.20	0	3786.15
MW-50	04/19/96	3813.35	27.22	0	3786.13
MW-50	07/15/96	3813.35	27.04	0	3786.31
MW-50	10/13/96	3813.35	25.89	0	3787.46
MW-50	02/03/97	3813.35	25.15	0	3788.20
MW-50	03/18/97	3813.35	25.18	0	3788.17
MW-50	04/28/97	3813.35	24.81	0	3788.54
MW-50	07/14/97	3813.35	24.56	0	3788.79
MW-50	10/13/97	3813.35	25.45	0	3787.90
MW-50	01/27/98	3813.35	25.39	0	3787.96
MW-50	04/27/98	3813.35	25.84	0	3787.51
MW-50	06/16/98	3813.35	26.05	0	3787.30
MW-50	10/09/98	3813.35	25.80	0	3787.55
MW-50	01/27/99	3813.35	24.78	0	3788.57
MW-50	04/19/99	3813.35	25.21	0	3788.14
MW-50	01/05/00	3813.35	24.39	0	3788.96
MW-51	12/01/91	3810.86	17.77	0	3793.09
MW-52	07/01/92	3817.49	19.00	0	3798.49

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F
Historic Fluid Level Data, May 1991 - January 2000
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-52	01/16/96	3817.49	D	--	--
MW-52	04/19/96	3817.49	D	--	--
MW-52	07/15/96	3817.49	D	--	--
MW-52	10/13/96	3817.49	20.97	0	3796.52
MW-52	02/04/97	3817.49	21.31	0	3796.18
MW-52	04/28/97	3817.49	D	--	--
MW-52	07/14/97	3817.49	D	--	--
MW-52	10/13/97	3817.49	D	--	--
MW-52	01/27/98	3817.49	D	--	--
MW-52	04/27/98	3817.49	D	--	--
MW-52	06/16/98	3817.49	D	--	--
MW-52	10/09/98	3817.49	21.37	0	3796.12
MW-52	01/27/99	3817.49	D	--	--
MW-52	04/19/99	3817.49	D	--	--
MW-53	01/16/96	3809.92	D	--	--
MW-53	04/19/96	3809.92	D	--	--
MW-53	07/15/96	3809.92	D	--	--
MW-53	10/13/96	3809.92	D	--	--
MW-53	01/27/98	3809.92	D	--	--
MW-53	06/16/98	3809.92	D	--	--
MW-54	12/01/91	3823.86	43.80	0	3780.06
MW-54	04/15/92	3823.86	44.77	0	3779.09
MW-54	07/01/92	3823.86	44.16	0	3779.70
MW-54	10/01/92	3823.86	44.66	0	3779.20
MW-54	01/01/93	3823.86	45.54	0	3778.32
MW-54	04/01/93	3823.86	46.11	0	3777.75
MW-54	07/01/93	3823.86	46.61	0	3777.25
MW-54	10/01/93	3823.86	46.73	0	3777.13
MW-54	01/01/94	3823.86	46.34	0	3777.52
MW-54	04/01/94	3823.86	47.45	0	3776.41
MW-54	07/01/94	3823.86	47.12	0	3776.74
MW-54	10/01/94	3823.86	46.65	0	3777.21
MW-54	01/01/95	3823.86	46.59	0	3777.27
MW-54	04/01/95	3823.86	46.96	0	3776.90
MW-54	07/01/95	3823.86	46.96	0	3776.90
MW-54	10/01/95	3823.86	47.40	0	3776.46
MW-54	01/16/96	3823.86	46.79	0	3777.07
MW-54	04/17/96	3823.86	48.97	0	3774.89
MW-54	07/15/96	3823.86	48.74	0	3775.12
MW-54	10/13/96	3823.86	46.14	0	3777.72
MW-54	02/04/97	3823.86	46.06	0	3777.80
MW-54	04/28/97	3823.86	46.27	0	3777.59
MW-54	07/14/97	3823.86	46.42	0	3777.44
MW-54	10/14/97	3823.86	47.16	0	3776.70
MW-54	01/27/98	3823.86	47.27	0	3776.59
MW-54	04/27/98	3823.86	46.86	0	3777.00
MW-54	06/16/98	3823.86	47.31	0	3776.55

Notes:
Water level elevations corrected for condensate using a specific gravity of 0.73
feet amsl Feet above mean sea level
feet bmp Feet below measuring point
D Well was dry at time of gauging
-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-54	10/10/98	3823.86	46.79	0	3777.07
MW-54	01/27/99	3823.86	46.19	0	3777.67
MW-54	04/19/99	3823.86	46.32	0	3777.54
MW-54	01/05/00	3823.86	45.55	0	3778.31
MW-55	12/01/91	3794.40	24.43	0	3769.97
MW-55	04/15/92	3794.40	24.77	0	3769.63
MW-55	07/01/92	3794.40	21.89	0	3772.51
MW-55	10/01/92	3794.40	24.47	0	3769.93
MW-55	01/01/93	3794.40	26.57	0	3767.83
MW-55	04/01/93	3794.40	28.70	0	3765.70
MW-55	07/01/93	3794.40	30.02	0	3764.38
MW-55	10/01/93	3794.40	30.76	0	3763.64
MW-55	01/01/94	3794.40	31.15	0	3763.25
MW-55	04/01/94	3794.40	32.30	0	3762.10
MW-55	07/01/94	3794.40	31.90	0	3762.50
MW-55	10/01/94	3794.40	28.61	0	3765.79
MW-55	01/01/95	3794.40	29.50	0	3764.90
MW-55	04/01/95	3794.40	30.65	0	3763.75
MW-55	07/01/95	3794.40	30.65	0	3763.75
MW-55	10/01/95	3794.40	32.20	0	3762.20
MW-55	01/16/96	3794.40	30.74	0	3763.66
MW-55	04/17/96	3794.40	33.03	0	3761.37
MW-55	07/16/96	3794.40	28.85	0	3765.55
MW-55	10/13/96	3794.40	28.02	0	3766.38
MW-55	02/04/97	3794.40	26.43	0	3767.97
MW-55	04/29/97	3794.40	26.91	0	3767.49
MW-55	07/15/97	3794.40	26.81	0	3767.59
MW-55	10/14/97	3794.40	27.21	0	3767.19
MW-55	01/28/98	3794.40	27.38	0	3767.02
MW-55	04/27/98	3794.40	27.57	0	3766.83
MW-55	06/16/98	3794.40	28.00	0	3766.40
MW-55	10/10/98	3794.40	28.36	0	3766.04
MW-55	01/27/99	3794.40	27.68	0	3766.72
MW-55	04/19/99	3794.40	27.89	0	3766.51
MW-55	01/05/00	3794.40	27.92	0	3766.48
MW-56	12/01/91	3782.45	32.58	0	3749.87
MW-56	04/15/92	3782.45	9.26	0	3773.19
MW-56	07/01/92	3782.45	31.37	0	3751.08
MW-56	10/01/92	3782.45	34.68	0	3747.77
MW-56	01/01/93	3782.45	40.40	0	3742.05
MW-56	01/16/96	3782.45	D	--	--
MW-56	04/19/96	3782.45	D	--	--
MW-56	07/16/96	3782.45	D	--	--
MW-56	10/14/96	3782.45	34.34	0	3748.11
MW-56	02/04/97	3782.45	37.47	0	3744.98
MW-56	03/18/97	3782.45	40.26	0	3742.19
MW-56	04/29/97	3782.45	42.34	0	3740.11

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-56	07/15/97	3782.45	43.73	0	3738.72
MW-56	10/14/97	3782.45	D	--	--
MW-56	01/28/98	3782.45	D	--	--
MW-56	04/27/98	3782.45	D	--	--
MW-56	06/16/98	3782.45	D	--	--
MW-56	10/10/98	3782.45	D	--	--
MW-56	01/27/99	3782.45	D	--	--
MW-56	04/19/99	3782.45	43.56	0	3738.89
MW-56	01/05/00	3782.45	41.79	0	3740.66
MW-61	01/27/99	3816.20	36.06	0	3780.14
MW-61	04/19/99	3816.20	36.88	0	3779.32
MW-61	01/05/00	3816.20	36.55	0	3779.65
MW-65	12/01/91	3763.31	55.90	0	3707.41
MW-65	07/01/93	3763.31	56.34	0	3706.97
MW-65	10/01/93	3763.31	56.81	0	3706.50
MW-65	01/01/94	3763.31	56.67	0	3706.64
MW-65	07/01/94	3763.31	56.70	0	3706.61
MW-65	10/01/94	3763.31	56.20	0	3707.11
MW-65	01/01/95	3763.31	56.58	0	3706.73
MW-65	04/01/95	3763.31	57.14	0	3706.17
MW-65	07/01/95	3763.31	57.14	0	3706.17
MW-65	10/01/95	3763.31	57.07	0	3706.24
MW-65	01/16/96	3763.31	57.25	0	3706.06
MW-65	04/17/96	3763.31	57.35	0	3705.96
MW-65	07/16/96	3763.31	56.01	0	3707.30
MW-65	10/14/96	3763.31	56.92	0	3706.39
MW-65	02/04/97	3763.31	56.12	0	3707.19
MW-65	04/28/97	3763.31	56.18	0	3707.13
MW-65	07/15/97	3763.31	56.44	0	3706.87
MW-65	10/14/97	3763.31	56.22	0	3707.09
MW-65	01/28/98	3763.31	56.29	0	3707.02
MW-65	04/27/98	3763.31	56.39	0	3706.92
MW-65	06/15/98	3763.31	57.22	0	3706.09
MW-65	01/27/99	3763.31	35.01	0	3728.30
MW-65	04/19/99	3763.31	56.69	0	3706.62
MW-65	01/05/99	3763.31	56.71	0	3706.60
MW-69	12/01/91	3805.11	29.38	0	3775.73
MW-69	04/15/92	3805.11	31.63	0	3773.48
MW-69	07/01/92	3805.11	24.71	0	3780.40
MW-69	10/01/92	3805.11	31.37	0	3773.74
MW-69	01/01/93	3805.11	33.61	0	3771.50
MW-69	04/01/93	3805.11	39.58	0	3765.53
MW-69	07/01/93	3805.11	41.96	0	3763.15
MW-69	10/01/93	3805.11	41.26	0	3763.85
MW-69	10/01/95	3805.11	32.51	0	3772.60
MW-69	01/20/96	3805.11	37.54	4.19	3770.62

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F
Historic Fluid Level Data, May 1991 - January 2000
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-69	04/17/96	3805.11	36.60	0.26	3768.69
MW-69	07/15/96	3805.11	31.26	0.36	3774.11
MW-69	02/03/97	3805.11	34.33	3.24	3773.14
MW-69	04/28/97	3805.11	32.74	0.02	3772.38
MW-69	07/14/97	3805.11	34.34	0.02	3770.78
MW-69	10/13/97	3805.11	35.55	0	3769.56
MW-69	01/27/98	3805.11	39.44	2.45	3767.45
MW-69	04/27/98	3805.11	39.08	0	3766.03
MW-69	06/15/98	3805.11	40.77	0.79	3764.91
MW-69	01/05/00	3805.11	35.75	0.02	3769.37
MW-77	01/01/95	3775.48	80.03	0	3695.45
MW-77	04/01/95	3775.48	80.04	0	3695.44
MW-77	07/01/95	3775.48	80.04	0	3695.44
MW-77	10/01/95	3775.48	79.70	0	3695.78
MW-77	01/16/96	3775.48	79.84	0	3695.64
MW-77	04/17/96	3775.48	78.95	0	3696.53
MW-77	07/16/96	3775.48	79.42	0	3696.06
MW-77	10/14/96	3775.48	80.02	0	3695.46
MW-77	02/04/97	3775.48	D	--	--
MW-77	04/29/97	3775.48	80.35	0	3695.13
MW-77	07/15/97	3775.48	80.31	0	3695.17
MW-77	10/14/97	3775.48	78.92	0	3696.56
MW-77	01/28/98	3775.48	77.00	0	3698.48
MW-77	04/27/98	3775.48	78.48	0	3697.00
MW-77	06/16/98	3775.48	75.30	0	3700.18
MW-77	10/10/98	3775.48	79.84	0	3695.64
MW-77	01/27/99	3775.48	76.41	0	3699.07
MW-77	04/19/99	3775.48	77.50	0	3697.98
MW-77	01/05/00	3775.48	79.36	0	3696.12
MW-78	01/01/95	3785.82	86.51	0	3699.31
MW-78	04/01/95	3785.82	86.32	0	3699.50
MW-78	07/01/95	3785.82	86.32	0	3699.50
MW-78	10/01/95	3785.82	86.19	0	3699.63
MW-78	01/16/96	3785.82	86.22	0	3699.60
MW-78	04/17/96	3785.82	86.29	0	3699.53
MW-78	07/16/96	3785.82	86.41	0	3699.41
MW-78	10/14/96	3785.82	59.39	0	3726.43
MW-78	02/04/97	3785.82	75.78	0	3710.04
MW-78	04/29/97	3785.82	74.53	0	3711.29
MW-78	07/15/97	3785.82	74.47	0	3711.35
MW-78	10/14/97	3785.82	82.08	0	3703.74
MW-78	01/28/98	3785.82	81.61	0	3704.21
MW-78	04/27/98	3785.82	82.33	0	3703.49
MW-78	06/16/98	3785.82	82.27	0	3703.55
MW-78	10/10/98	3785.82	82.85	0	3702.97
MW-78	01/27/99	3785.82	83.30	0.01	3702.53
MW-78	04/19/99	3785.82	83.42	0	3702.40

Notes:
Water level elevations corrected for condensate using a specific gravity of 0.73
feet amsl Feet above mean sea level
feet bmp Feet below measuring point
D Well was dry at time of gauging
-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-78	01/05/00	3785.82	82.49	0	3703.33
MW-79	01/01/95	3788.39	76.29	0	3712.10
MW-79	04/01/95	3788.39	77.32	0	3711.07
MW-79	07/01/95	3788.39	77.32	0	3711.07
MW-79	10/01/95	3788.39	79.57	0	3708.82
MW-79	01/16/96	3788.39	78.31	0	3710.08
MW-79	04/17/96	3788.39	78.36	0	3710.03
MW-79	07/15/96	3788.39	81.09	0	3707.30
MW-79	10/13/96	3788.39	80.08	0	3708.31
MW-79	02/03/97	3788.39	80.44	0	3707.95
MW-79	04/28/97	3788.39	75.65	0	3712.74
MW-79	07/14/97	3788.39	75.46	0	3712.93
MW-79	10/13/97	3788.39	78.70	0	3709.69
MW-79	01/27/98	3788.39	80.52	0	3707.87
MW-79	04/27/98	3788.39	81.14	0	3707.25
MW-79	06/15/98	3788.39	80.84	0	3707.55
MW-79	10/09/98	3788.39	81.13	0	3707.26
MW-79	01/27/99	3788.39	79.95	0	3708.44
MW-79	04/19/99	3788.39	73.09	0	3715.30
MW-79	01/05/00	3788.39	76.99	0	3711.40
MW-80	01/16/96	3821.64	D	--	--
MW-80	04/19/96	3821.64	D	--	--
MW-80	07/15/96	3821.64	D	--	--
MW-80	10/13/96	3821.64	D	--	--
MW-80	02/03/97	3821.64	D	--	--
MW-80	04/28/97	3821.64	D	--	--
MW-80	07/14/97	3821.64	D	--	--
MW-80	10/13/97	3821.64	D	--	--
MW-80	01/27/98	3821.64	D	--	--
MW-80	04/27/98	3821.64	D	--	--
MW-80	06/15/98	3821.64	D	--	--
MW-80	10/09/98	3821.64	D	--	--
MW-80	01/27/99	3821.64	D	--	--
MW-80	04/19/99	3821.64	D	--	--
MW-90	02/04/97	3781.73	43.24	0	3738.49
MW-90	04/28/97	3781.73	43.54	0	3738.19
MW-90	07/14/97	3781.73	43.42	0	3738.31
MW-90	10/13/97	3781.73	44.78	0	3736.95
MW-90	01/27/98	3781.73	43.26	0	3738.47
MW-90	04/27/98	3781.73	43.68	0	3738.05
MW-90	06/15/98	3781.73	44.26	0	3737.47
MW-90	10/09/98	3781.73	96.68	0	3685.05
MW-90	01/27/99	3781.73	46.40	0.01	3735.34
MW-90	04/19/99	3781.73	40.11	0	3741.62
MW-90	01/05/00	3781.73	44.81	0	3736.92

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-91	02/04/97	3783.07	64.90	0	3718.17
MW-91	04/29/97	3783.07	64.96	0.01	3718.11
MW-91	07/15/97	3783.07	64.96	0.02	3718.12
MW-91	10/14/97	3783.07	68.75	0	3714.32
MW-91	01/28/98	3783.07	70.57	0	3712.50
MW-91	04/27/98	3783.07	69.38	0	3713.69
MW-91	06/16/98	3783.07	72.26	0	3710.81
MW-91	10/10/98	3783.07	72.41	0	3710.66
MW-91	01/27/99	3783.07	72.66	0	3710.41
MW-91	04/19/99	3783.07	65.39	0	3717.68
MW-91	01/05/00	3783.07	70.73	0	3712.34
MW-92	02/04/97	3785.29	D	--	--
MW-92	04/29/97	3785.29	D	--	--
MW-92	07/15/97	3785.29	D	--	--
MW-92	10/14/97	3785.29	D	--	--
MW-92	01/28/98	3785.29	D	--	--
MW-92	04/27/98	3785.29	72.52	0	3712.77
MW-92	06/16/98	3785.29	72.45	0	3712.84
MW-92	10/10/98	3785.29	72.51	0	3712.78
MW-92	01/27/99	3785.29	72.43	0	3712.86
MW-92	04/19/99	3785.29	72.41	0	3712.88
MW-93	02/03/97	3817.50	D	--	--
MW-93	04/29/97	3817.50	D	--	--
MW-93	07/14/97	3817.50	D	--	--
MW-93	10/13/97	3817.50	D	--	--
MW-93	01/27/98	3817.50	D	--	--
MW-93	04/27/98	3817.50	D	--	--
MW-93	06/15/98	3817.50	D	--	--
MW-93	10/09/98	3817.50	D	--	--
MW-93	01/27/99	3817.50	D	--	--
MW-93	04/19/99	3817.50	D	--	--
MW-99	02/04/97	3770.05	D	--	--
MW-99	04/29/97	3770.05	D	--	--
MW-99	07/15/97	3770.05	D	--	--
MW-99	10/14/97	3770.05	D	--	--
MW-99	01/28/98	3770.05	D	--	--
MW-99	04/27/98	3770.05	D	--	--
MW-99	06/16/98	3770.05	D	--	--
MW-99	10/10/98	3770.05	D	--	--
MW-99	01/27/99	3770.05	D	--	--
MW-99	04/19/99	3770.05	D	--	--
MW-100	04/29/97	3773.31	D	--	--
MW-100	07/15/97	3773.31	D	--	--
MW-100	10/14/97	3773.31	D	--	--
MW-100	01/28/98	3773.31	D	--	--

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-100	04/27/98	3773.31	D	--	--
MW-100	06/16/98	3773.31	D	--	--
MW-100	10/10/98	3773.31	D	--	--
MW-100	01/27/99	3773.31	D	--	--
MW-100	04/19/99	3773.31	D	--	--
MW-101	02/04/97	3762.71	D	--	--
MW-101	04/29/97	3762.71	D	--	--
MW-101	07/15/97	3762.71	D	--	--
MW-101	10/14/97	3762.71	D	--	--
MW-101	01/28/98	3762.71	D	--	--
MW-101	04/27/98	3762.71	D	--	--
MW-101	06/16/98	3762.71	D	--	--
MW-101	10/10/98	3762.71	D	--	--
MW-101	01/27/99	3762.71	D	--	--
MW-101	04/19/99	3762.71	D	--	--
MW-102	02/04/97	3753.69	D	--	--
MW-102	04/28/97	3753.69	D	--	--
MW-102	07/15/97	3753.69	D	--	--
MW-102	10/13/97	3753.69	D	--	--
MW-102	01/28/98	3753.69	82.60	0	3671.09
MW-102	04/27/98	3753.69	82.60	0	3671.09
MW-102	06/15/98	3753.69	D	--	--
MW-102	10/10/98	3753.69	D	--	--
MW-102	01/27/99	3753.69	82.62	0	3671.07
MW-102	04/19/99	3753.69	82.57	0	3671.12
MW-103	02/04/97	3743.14	D	--	--
MW-103	04/29/97	3743.14	D	--	--
MW-103	07/15/97	3743.14	D	--	--
MW-103	10/14/97	3743.14	72.30	0	3670.84
MW-103	01/28/98	3743.14	72.70	0	3670.44
MW-103	04/27/98	3743.14	72.78	0	3670.36
MW-103	06/16/98	3743.14	D	--	--
MW-103	10/10/98	3743.14	D	--	--
MW-103	01/27/99	3743.14	73.15	0	3669.99
MW-103	04/19/99	3743.14	73.16	0	3669.98
MW-105	02/04/97	3736.93	D	--	--
MW-105	04/28/97	3736.93	D	--	--
MW-105	07/15/97	3736.93	D	--	--
MW-105	10/13/97	3736.93	D	--	--
MW-105	01/28/98	3736.93	82.93	0	3654.00
MW-105	04/27/98	3736.93	D	--	--
MW-105	06/15/98	3736.93	82.84	0	3654.09
MW-105	10/10/98	3736.93	82.33	0	3654.60
MW-105	01/27/99	3736.93	82.62	0	3654.31
MW-105	04/19/99	3736.93	82.00	0	3654.93

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-105	01/05/00	3736.93	82.42	0	3654.51
MW-106	02/04/97	3721.97	87.97	0	3634.00
MW-106	04/28/97	3721.97	87.59	0	3634.38
MW-106	07/15/97	3721.97	87.63	0	3634.34
MW-106	10/13/97	3721.97	88.75	0	3633.22
MW-106	01/28/98	3721.97	88.97	0	3633.00
MW-106	04/27/98	3721.97	89.36	0	3632.61
MW-106	06/15/98	3721.97	89.63	0	3632.34
MW-106	10/10/98	3721.97	89.61	0	3632.36
MW-106	01/27/99	3721.97	86.55	0	3635.42
MW-106	04/19/99	3721.97	89.58	0	3632.39
MW-106	01/05/00	3721.97	89.05	0	3632.92
MW-107	02/04/97	3726.27	D	--	--
MW-107	04/29/97	3726.27	D	--	--
MW-107	07/15/97	3726.27	D	--	--
MW-107	10/13/97	3726.27	D	--	--
MW-107	01/28/98	3726.27	D	--	--
MW-107	04/27/98	3726.27	D	--	--
MW-107	06/15/98	3726.27	D	--	--
MW-107	10/10/98	3726.27	D	--	--
MW-107	01/27/99	3726.27	D	--	--
MW-107	04/19/99	3726.27	D	--	--
MW-109	06/17/98	3809.53	D	--	--
MW-109	10/10/98	3809.53	17.79	0	3791.74
MW-109	01/05/00	3809.53	17.42	0	3792.11
MW-126	01/05/00	3795.58	53.08	0	3742.50
STOCK WELL	01/01/94	3779.76	19.61	0	3760.15
SUMP-16A	12/01/91	3785.14	11.65	0	3773.49
SUMP-16A	04/15/92	3785.14	12.02	0	3773.12
SUMP-16A	07/01/92	3785.14	4.87	0	3780.27
SUMP-16A	10/01/92	3785.14	12.00	0	3773.14
SUMP-16A	01/01/93	3785.14	13.00	0	3772.14
SUMP-16A	04/01/93	3785.14	14.15	0	3770.99
SUMP-16A	10/01/94	3785.14	11.25	0	3773.89
SUMP-16A	01/01/95	3785.14	16.34	0	3768.80
SUMP-16A	04/01/95	3785.14	17.32	0	3767.82
SUMP-16A	07/01/95	3785.14	17.32	0	3767.82
SUMP-16A	10/01/95	3785.14	14.60	0	3770.54
SUMP-16A	01/16/96	3785.14	16.30	0	3768.84
SUMP-16A	04/19/96	3785.14	17.45	0	3767.69
SUMP-16A	07/15/96	3785.14	16.85	0	3768.29
SUMP-16A	10/13/96	3785.14	15.99	0	3769.15

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
SUMP-A10	01/16/96	3800.99	D	--	--
SUMP-A10	04/19/96	3800.99	D	--	--
SUMP-A10	07/15/96	3800.99	D	--	--
SUMP-A10	10/13/96	3800.99	11.62	0	3789.37
Lower Queen Wells					
MW-57	05/28/91	3787.70	160.25	0	3627.45
MW-57	06/01/91	3787.70	160.25	0	3627.45
MW-57	07/16/91	3787.70	160.29	0	3627.41
MW-57	08/21/91	3787.70	155.50	0	3632.20
MW-57	09/18/91	3787.70	154.29	0	3633.41
MW-57	10/22/91	3787.70	157.11	0	3630.59
MW-57	11/15/91	3787.70	157.50	0	3630.20
MW-57	03/01/92	3787.70	157.92	0	3629.78
MW-57	04/01/92	3787.70	157.59	0	3630.11
MW-57	05/01/92	3787.70	148.00	0	3639.70
MW-57	06/01/92	3787.70	151.21	0	3636.49
MW-57	07/01/92	3787.70	154.07	0	3633.63
MW-57	08/01/92	3787.70	155.24	0	3632.46
MW-57	09/01/92	3787.70	155.67	0	3632.03
MW-57	10/01/92	3787.70	156.01	0	3631.69
MW-57	11/01/92	3787.70	156.31	0	3631.39
MW-57	12/01/92	3787.70	156.55	0	3631.15
MW-57	01/01/93	3787.70	156.68	0	3631.02
MW-57	02/01/93	3787.70	156.79	0	3630.91
MW-57	03/01/93	3787.70	157.00	0	3630.70
MW-57	04/01/93	3787.70	156.95	0	3630.75
MW-57	05/01/93	3787.70	157.23	0	3630.47
MW-57	06/01/93	3787.70	157.13	0	3630.57
MW-57	07/01/93	3787.70	157.42	0	3630.28
MW-57	08/01/93	3787.70	157.28	0	3630.42
MW-57	09/01/93	3787.70	157.57	0	3630.13
MW-57	10/01/93	3787.70	157.65	0	3630.05
MW-57	11/01/93	3787.70	157.89	0	3629.81
MW-57	12/01/93	3787.70	157.96	0	3629.74
MW-57	01/01/94	3787.70	157.91	0	3629.79
MW-57	02/01/94	3787.70	158.78	0	3628.92
MW-57	03/01/94	3787.70	158.92	0	3628.78
MW-57	04/01/94	3787.70	158.96	0	3628.74
MW-57	05/01/94	3787.70	158.74	0	3628.96
MW-57	07/01/94	3787.70	158.49	0	3629.21
MW-57	08/01/94	3787.70	158.16	0	3629.54
MW-57	09/01/94	3787.70	158.14	0	3629.56
MW-57	10/01/94	3787.70	158.31	0	3629.39
MW-57	12/01/94	3787.70	159.51	0	3628.19
MW-57	01/01/95	3787.70	158.77	0	3628.93
MW-57	04/01/95	3787.70	158.96	0	3628.74
MW-57	07/01/95	3787.70	158.06	0	3629.64

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-57	10/01/95	3787.70	159.23	0	3628.47
MW-57	01/16/96	3787.70	159.67	0	3628.03
MW-57	04/17/96	3787.70	161.95	0	3625.75
MW-57	07/16/96	3787.70	162.02	0	3625.68
MW-57	10/14/96	3787.70	158.83	0	3628.87
MW-57	02/04/97	3787.70	159.89	0	3627.81
MW-57	04/29/97	3787.70	160.23	0	3627.47
MW-57	07/15/97	3787.70	160.29	0	3627.41
MW-57	09/30/97	3787.70	161.30	0	3626.40
MW-57	10/09/97	3787.70	161.33	0	3626.37
MW-57	10/14/97	3787.70	161.13	0	3626.57
MW-57	10/29/97	3787.70	161.04	0.01	3626.66
MW-57	11/04/97	3787.70	161.23	0.01	3626.47
MW-57	11/12/97	3787.70	161.26	0.01	3626.44
MW-57	11/19/97	3787.70	161.34	0.01	3626.36
MW-57	11/24/97	3787.70	161.33	0	3626.37
MW-57	12/10/97	3787.70	161.30	0	3626.40
MW-57	01/28/98	3787.70	161.11	0	3626.59
MW-57	02/25/98	3787.70	161.44	0	3626.26
MW-57	04/27/98	3787.70	161.29	0	3626.41
MW-57	05/28/98	3787.70	161.67	0	3626.03
MW-57	06/16/98	3787.70	161.62	0	3626.08
MW-57	10/10/98	3787.70	162.11	0	3625.59
MW-57	01/27/99	3787.70	162.16	0	3625.54
MW-57	04/19/99	3787.70	162.33	0	3625.37
MW-57	01/05/00	3787.70	162.62	0	3625.08
MW-58	07/16/91	3824.07	197.91	0	3626.16
MW-58	08/21/91	3824.07	193.76	0	3630.31
MW-58	09/18/91	3824.07	193.26	0	3630.81
MW-58	10/22/91	3824.07	194.45	0	3629.62
MW-58	11/15/91	3824.07	194.77	0	3629.30
MW-58	01/16/96	3824.07	D	--	--
MW-58	07/16/96	3824.07	D	--	--
MW-58	10/14/96	3824.07	196.01	0.01	3628.06
MW-58	02/04/97	3824.07	203.00	0	3621.07
MW-58	04/28/97	3824.07	204.14	0	3619.93
MW-58	07/15/97	3824.07	197.66	0	3626.41
MW-58	10/01/97	3824.07	199.20	0.3	3625.08
MW-58	10/09/97	3824.07	199.52	0.67	3625.03
MW-58	10/14/97	3824.07	196.10	0	3627.97
MW-58	01/28/98	3824.07	198.55	0	3625.52
MW-58	05/28/98	3824.07	205.14	0	3618.93
MW-58	10/11/98	3824.07	200.48	0	3623.59
MW-58	01/27/99	3824.07	D	--	--
MW-58	04/19/99	3824.07	217.17	0	3606.90
MW-58	01/05/00	3824.07	210.57	0	3613.50
MW-59	07/16/91	3819.59	193.98	0	3625.61

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-59	08/21/91	3819.59	189.84	0	3629.75
MW-59	09/18/91	3819.59	189.38	0	3630.21
MW-59	10/22/91	3819.59	190.65	0	3628.94
MW-59	11/15/91	3819.59	190.00	0	3629.59
MW-59	01/16/96	3819.59	192.56	0.07	3627.08
MW-59	04/17/96	3819.59	193.37	1.37	3627.22
MW-59	07/16/96	3819.59	193.40	1.42	3627.22
MW-59	10/14/96	3819.59	192.43	1.22	3628.05
MW-59	02/04/97	3819.59	193.70	1.28	3626.82
MW-59	04/29/97	3819.59	194.09	1.14	3626.33
MW-59	07/15/97	3819.59	194.11	1.17	3626.33
MW-59	09/30/97	3819.59	195.30	1.2	3625.16
MW-59	10/09/97	3819.59	194.05	0	3625.54
MW-59	10/14/97	3819.59	195.81	1.99	3625.23
MW-59	01/28/98	3819.59	193.94	0	3625.65
MW-59	04/27/98	3819.59	194.15	0	3625.44
MW-59	05/28/98	3819.59	195.72	1.16	3624.71
MW-59	06/16/98	3819.59	195.59	1.19	3624.86
MW-59	10/10/98	3819.59	194.84	1.09	3625.54
MW-59	01/27/99	3819.59	195.95	0.89	3624.29
MW-59	04/19/99	3819.59	195.95	0.78	3624.21
MW-59	01/05/00	3819.59	195.39	0	3624.20
MW-60	07/16/91	3815.28	188.22	0	3627.06
MW-60	08/21/91	3815.28	184.81	0	3630.47
MW-60	09/18/91	3815.28	184.32	0	3630.96
MW-60	10/22/91	3815.28	185.50	0	3629.78
MW-60	11/15/91	3815.28	185.43	0	3629.85
MW-60	03/01/92	3815.28	186.00	0	3629.28
MW-60	04/01/92	3815.28	185.79	0	3629.49
MW-60	05/01/92	3815.28	180.10	0	3635.18
MW-60	06/01/92	3815.28	181.67	0	3633.61
MW-60	07/01/92	3815.28	183.21	0	3632.07
MW-60	08/01/92	3815.28	183.61	0	3631.67
MW-60	09/01/92	3815.28	183.94	0	3631.34
MW-60	10/01/92	3815.28	184.18	0	3631.10
MW-60	11/01/92	3815.28	184.44	0	3630.84
MW-60	12/01/92	3815.28	184.67	0	3630.61
MW-60	01/01/93	3815.28	184.75	0	3630.53
MW-60	02/01/93	3815.28	184.86	0	3630.42
MW-60	03/01/93	3815.28	185.08	0	3630.20
MW-60	04/01/93	3815.28	185.02	0	3630.26
MW-60	05/01/93	3815.28	185.29	0	3629.99
MW-60	06/01/93	3815.28	185.23	0	3630.05
MW-60	07/01/93	3815.28	185.47	0	3629.81
MW-60	08/01/93	3815.28	185.41	0	3629.87
MW-60	09/01/93	3815.28	185.66	0	3629.62
MW-60	10/01/93	3815.28	185.70	0	3629.58
MW-60	11/01/93	3815.28	185.96	0	3629.32

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl *Feet above mean sea level*

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-60	12/01/93	3815.28	185.98	0	3629.30
MW-60	01/01/94	3815.28	185.93	0	3629.35
MW-60	02/01/94	3815.28	186.79	0	3628.49
MW-60	03/01/94	3815.28	184.91	0	3630.37
MW-60	04/01/94	3815.28	186.91	0	3628.37
MW-60	05/01/94	3815.28	186.71	0	3628.57
MW-60	07/01/94	3815.28	186.54	0	3628.74
MW-60	08/01/94	3815.28	185.34	0	3629.94
MW-60	09/01/94	3815.28	186.24	0	3629.04
MW-60	10/01/94	3815.28	186.44	0	3628.84
MW-60	12/01/94	3815.28	187.54	0	3627.74
MW-60	01/01/95	3815.28	186.81	0	3628.47
MW-60	04/01/95	3815.28	187.01	0	3628.27
MW-60	07/01/95	3815.28	187.09	0	3628.19
MW-60	10/01/95	3815.28	187.29	0	3627.99
MW-60	01/19/96	3815.28	187.76	0	3627.52
MW-60	04/17/96	3815.28	187.83	0	3627.45
MW-60	07/16/96	3815.28	188.04	0	3627.24
MW-60	10/13/96	3815.28	187.89	0	3627.39
MW-60	02/04/97	3815.28	188.19	0	3627.09
MW-60	03/18/97	3815.28	188.40	0	3626.88
MW-60	04/28/97	3815.28	188.48	0	3626.80
MW-60	07/14/97	3815.28	188.74	0	3626.54
MW-60	10/01/97	3815.28	189.70	0	3625.58
MW-60	10/09/97	3815.28	189.65	0	3625.63
MW-60	10/13/97	3815.28	189.97	0	3625.31
MW-60	01/27/98	3815.28	189.37	0	3625.91
MW-60	04/27/98	3815.28	189.65	0	3625.63
MW-60	05/28/98	3815.28	190.32	0	3624.96
MW-60	06/15/98	3815.28	189.90	0	3625.38
MW-60	10/10/98	3815.28	190.04	0	3625.24
MW-60	01/27/99	3815.28	190.99	0	3624.29
MW-60	04/19/99	3815.28	190.92	0	3624.36
MW-60	01/05/00	3815.28	190.71	0	3624.57
MW-61A	07/16/91	3815.97	189.06	0	3626.91
MW-61A	08/21/91	3815.97	186.85	0	3629.12
MW-61A	09/18/91	3815.97	186.92	0	3629.05
MW-61A	10/22/91	3815.97	187.99	0	3627.98
MW-61A	11/15/91	3815.97	187.00	0	3628.97
MW-61A	10/01/94	3815.97	187.26	0	3628.71
MW-61A	12/01/94	3815.97	188.24	0	3627.73
MW-61A	01/01/95	3815.97	187.57	0	3628.40
MW-61A	02/04/97	3815.97	187.98	0	3627.99
MW-61A	04/28/97	3815.97	188.14	0	3627.83
MW-61A	07/14/97	3815.97	191.60	0	3624.37
MW-61A	09/30/97	3815.97	191.10	0	3624.87
MW-61A	10/09/97	3815.97	192.16	0.01	3623.81
MW-61A	10/13/97	3815.97	190.78	0	3625.19

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-61A	01/27/98	3815.97	192.27	0	3623.70
MW-61A	04/27/98	3815.97	192.64	0	3623.33
MW-61A	05/28/98	3815.97	192.00	0	3623.97
MW-61A	06/15/98	3815.97	193.73	0	3622.24
MW-61A	10/10/98	3815.97	193.22	0	3622.75
MW-61A	01/27/99	3815.97	193.37	0	3622.60
MW-61A	04/19/99	3815.97	202.48	0	3613.49
MW-61A	01/05/00	3815.97	193.51	0	3622.46
MW-62	08/21/91	3819.90	189.51	0	3630.39
MW-62	09/18/91	3819.90	189.11	0	3630.79
MW-62	10/22/91	3819.90	190.80	0	3629.10
MW-62	11/15/91	3819.90	189.60	0	3630.30
MW-62	01/16/96	3819.90	192.04	0.01	3627.86
MW-62	04/17/96	3819.90	192.39	0.01	3627.51
MW-62	07/16/96	3819.90	192.34	0	3627.56
MW-62	10/14/96	3819.90	191.45	0.01	3628.45
MW-62	02/04/97	3819.90	192.57	0	3627.33
MW-62	04/28/97	3819.90	192.89	0	3627.01
MW-62	07/15/97	3819.90	193.26	0	3626.64
MW-62	09/30/97	3819.90	194.20	0	3625.70
MW-62	10/09/97	3819.90	194.20	0	3625.70
MW-62	10/14/97	3819.90	193.80	0	3626.10
MW-62	10/29/97	3819.90	194.22	0.01	3625.68
MW-62	11/04/97	3819.90	194.18	0	3625.72
MW-62	11/12/97	3819.90	194.14	0.02	3625.77
MW-62	11/19/97	3819.90	194.30	0.01	3625.60
MW-62	11/24/97	3819.90	194.24	0.01	3625.66
MW-62	12/10/97	3819.90	194.33	0	3625.57
MW-62	01/28/98	3819.90	193.81	0	3626.09
MW-62	02/25/98	3819.90	194.32	0	3625.58
MW-62	04/27/98	3819.90	194.22	0	3625.68
MW-62	05/28/98	3819.90	194.76	0	3625.14
MW-62	06/16/98	3819.90	194.34	0	3625.56
MW-62	10/10/98	3819.90	194.77	0	3625.13
MW-62	01/27/99	3819.90	194.92	0	3624.98
MW-62	04/19/99	3819.90	195.03	0	3624.87
MW-62	01/05/00	3819.90	195.19	0	3624.71
MW-63	08/21/91	3826.16	193.73	0	3632.43
MW-63	09/18/91	3826.16	190.65	0	3635.51
MW-63	10/22/91	3826.16	194.29	0	3631.87
MW-63	11/15/91	3826.16	195.34	0	3630.82
MW-63	03/01/92	3826.16	196.82	0	3629.34
MW-63	04/01/92	3826.16	197.02	0	3629.14
MW-63	05/01/92	3826.16	183.25	0	3642.91
MW-63	06/01/92	3826.16	187.21	0	3638.95
MW-63	07/01/92	3826.16	189.00	0	3637.16
MW-63	08/01/92	3826.16	192.73	0	3633.43

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-63	09/01/92	3826.16	193.65	0	3632.51
MW-63	10/01/92	3826.16	194.24	0	3631.92
MW-63	11/01/92	3826.16	194.90	0	3631.26
MW-63	12/01/92	3826.16	195.32	0	3630.84
MW-63	01/01/93	3826.16	195.55	0	3630.61
MW-63	02/01/93	3826.16	195.84	0	3630.32
MW-63	03/01/93	3826.16	196.14	0	3630.02
MW-63	04/01/93	3826.16	195.99	0	3630.17
MW-63	05/01/93	3826.16	196.34	0	3629.82
MW-63	06/01/93	3826.16	196.43	0	3629.73
MW-63	07/01/93	3826.16	196.62	0	3629.54
MW-63	08/01/93	3826.16	196.69	0	3629.47
MW-63	09/01/93	3826.16	196.93	0	3629.23
MW-63	10/01/93	3826.16	196.89	0	3629.27
MW-63	11/01/93	3826.16	197.32	0	3628.84
MW-63	12/01/93	3826.16	197.43	0	3628.73
MW-63	01/01/94	3826.16	197.33	0	3628.83
MW-63	02/01/94	3826.16	198.42	0	3627.74
MW-63	03/01/94	3826.16	198.37	0	3627.79
MW-63	04/01/94	3826.16	197.47	0	3628.69
MW-63	05/01/94	3826.16	198.28	0	3627.88
MW-63	07/01/94	3826.16	197.98	0	3628.18
MW-63	08/01/94	3826.16	197.12	0	3629.04
MW-63	09/01/94	3826.16	197.33	0	3628.83
MW-63	10/01/94	3826.16	197.74	0	3628.42
MW-63	12/01/94	3826.16	199.00	0	3627.16
MW-63	01/01/95	3826.16	198.20	0	3627.96
MW-63	04/01/95	3826.16	198.46	0	3627.70
MW-63	07/01/95	3826.16	198.49	0	3627.67
MW-63	10/01/95	3826.16	198.57	0	3627.59
MW-63	01/16/96	3826.16	198.90	0	3627.26
MW-63	04/17/96	3826.16	199.23	0	3626.93
MW-63	07/16/96	3826.16	198.91	0	3627.25
MW-63	10/13/96	3826.16	194.89	0	3631.27
MW-63	02/04/97	3826.16	199.01	0	3627.15
MW-63	04/28/97	3826.16	199.46	0	3626.70
MW-63	07/14/97	3826.16	200.01	0	3626.15
MW-63	10/01/97	3826.16	200.80	0	3625.36
MW-63	10/09/97	3826.16	209.05	0	3617.11
MW-63	10/13/97	3826.16	200.88	0	3625.28
MW-63	01/27/98	3826.16	200.96	0	3625.20
MW-63	04/27/98	3826.16	201.28	0	3624.88
MW-63	05/28/98	3826.16	200.72	0	3625.44
MW-63	06/16/98	3826.16	201.56	0	3624.60
MW-63	10/09/98	3826.16	202.01	0	3624.15
MW-63	01/27/99	3826.16	202.44	0	3623.72
MW-63	04/19/99	3826.16	202.39	0	3623.77
MW-63	01/05/00	3826.16	202.45	0	3623.71

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-64	08/21/91	3798.57	167.43	0	3631.14
MW-64	09/18/91	3798.57	167.21	0	3631.36
MW-64	10/22/91	3798.57	168.66	0	3629.91
MW-64	11/15/91	3798.57	168.90	0	3629.67
MW-64	03/01/92	3798.57	169.20	0	3629.37
MW-64	04/01/92	3798.57	169.00	0	3629.57
MW-64	05/01/92	3798.57	161.58	0	3636.99
MW-64	06/01/92	3798.57	164.25	0	3634.32
MW-64	07/01/92	3798.57	166.36	0	3632.21
MW-64	08/01/92	3798.57	166.82	0	3631.75
MW-64	09/01/92	3798.57	167.17	0	3631.40
MW-64	10/01/92	3798.57	167.45	0	3631.12
MW-64	11/01/92	3798.57	167.63	0	3630.94
MW-64	12/01/92	3798.57	167.85	0	3630.72
MW-64	01/01/93	3798.57	167.99	0	3630.58
MW-64	02/01/93	3798.57	168.08	0	3630.49
MW-64	03/01/93	3798.57	168.26	0	3630.31
MW-64	04/01/93	3798.57	168.22	0	3630.35
MW-64	05/01/93	3798.57	168.52	0	3630.05
MW-64	06/01/93	3798.57	168.46	0	3630.11
MW-64	07/01/93	3798.57	168.70	0	3629.87
MW-64	08/01/93	3798.57	168.59	0	3629.98
MW-64	09/01/93	3798.57	168.83	0	3629.74
MW-64	10/01/93	3798.57	168.88	0	3629.69
MW-64	11/01/93	3798.57	169.09	0	3629.48
MW-64	12/01/93	3798.57	169.13	0	3629.44
MW-64	01/01/94	3798.57	169.12	0	3629.45
MW-64	02/01/94	3798.57	169.92	0	3628.65
MW-64	03/01/94	3798.57	170.05	0	3628.52
MW-64	04/01/94	3798.57	170.03	0	3628.54
MW-64	05/01/94	3798.57	169.89	0	3628.68
MW-64	07/01/94	3798.57	169.65	0	3628.92
MW-64	08/01/94	3798.57	168.39	0	3630.18
MW-64	09/01/94	3798.57	169.32	0	3629.25
MW-64	10/01/94	3798.57	169.56	0	3629.01
MW-64	12/01/94	3798.57	170.71	0	3627.86
MW-64	01/01/95	3798.57	169.94	0	3628.63
MW-64	04/01/95	3798.57	170.13	0	3628.44
MW-64	07/01/95	3798.57	170.24	0	3628.33
MW-64	10/01/95	3798.57	170.33	0	3628.24
MW-64	01/19/96	3798.57	170.87	0	3627.70
MW-64	04/17/96	3798.57	170.98	0	3627.59
MW-64	07/16/96	3798.57	171.27	0.33	3627.54
MW-64	10/13/96	3798.57	170.69	0.29	3628.09
MW-64	02/04/97	3798.57	171.53	0.38	3627.31
MW-64	03/18/97	3798.57	171.95	0.55	3627.02
MW-64	04/28/97	3798.57	171.93	0.55	3627.04
MW-64	07/15/97	3798.57	171.41	0.53	3627.54
MW-64	10/01/97	3798.57	173.70	1.4	3625.89

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-64	10/09/97	3798.57	173.58	1.28	3625.92
MW-64	10/13/97	3798.57	173.33	1.29	3626.18
MW-64	10/21/97	3798.57	173.34	1.17	3626.08
MW-64	11/12/97	3798.57	176.15	0	3622.42
MW-64	11/19/97	3798.57	173.02	0	3625.55
MW-64	11/24/97	3798.57	174.56	0	3624.01
MW-64	12/10/97	3798.57	174.50	0	3624.07
MW-64	01/06/98	3798.57	174.50	0	3624.07
MW-64	01/15/98	3798.57	174.40	0	3624.17
MW-64	01/20/98	3798.57	174.56	0	3624.01
MW-64	01/28/98	3798.57	174.56	0	3624.01
MW-64	02/03/98	3798.57	173.16	0	3625.41
MW-64	02/25/98	3798.57	172.77	0	3625.80
MW-64	04/27/98	3798.57	172.74	0	3625.83
MW-64	05/28/98	3798.57	173.84	0	3624.73
MW-64	06/15/98	3798.57	173.03	0	3625.54
MW-64	10/10/98	3798.57	173.41	0	3625.16
MW-64	01/27/99	3798.57	173.54	0	3625.03
MW-64	04/19/99	3798.57	173.62	0	3624.95
MW-64	01/05/00	3798.57	173.82	0	3624.75
MW-65A	08/21/91	3763.26	131.36	0	3631.90
MW-65A	09/18/91	3763.26	130.91	0	3632.35
MW-65A	10/22/91	3763.26	133.09	0	3630.17
MW-65A	11/15/91	3763.26	133.70	0	3629.56
MW-65A	01/16/96	3763.26	136.11	1.3	3628.09
MW-65A	06/15/98	3763.26	137.96	0.93	3625.97
MW-65A	01/05/00	3763.26	139.58	0.97	3624.39
MW-66	08/21/91	3828.98	196.77	0	3632.21
MW-66	09/18/91	3828.98	198.73	0	3630.25
MW-66	10/22/91	3828.98	199.70	0	3629.28
MW-66	11/15/91	3828.98	199.88	0	3629.10
MW-66	03/01/92	3828.98	200.37	0	3628.61
MW-66	04/01/92	3828.98	200.25	0	3628.73
MW-66	05/01/92	3828.98	195.25	0	3633.73
MW-66	06/01/92	3828.98	196.08	0	3632.90
MW-66	07/01/92	3828.98	197.35	0	3631.63
MW-66	08/01/92	3828.98	197.77	0	3631.21
MW-66	09/01/92	3828.98	198.17	0	3630.81
MW-66	10/01/92	3828.98	198.40	0	3630.58
MW-66	11/01/92	3828.98	198.76	0	3630.22
MW-66	12/01/92	3828.98	198.98	0	3630.00
MW-66	01/01/93	3828.98	199.10	0	3629.88
MW-66	02/01/93	3828.98	199.23	0	3629.75
MW-66	03/01/93	3828.98	199.49	0	3629.49
MW-66	04/01/93	3828.98	199.38	0	3629.60
MW-66	05/01/93	3828.98	199.63	0	3629.35
MW-66	06/01/93	3828.98	199.59	0	3629.39

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-66	07/01/93	3828.98	199.82	0	3629.16
MW-66	08/01/93	3828.98	199.78	0	3629.20
MW-66	09/01/93	3828.98	200.01	0	3628.97
MW-66	10/01/93	3828.98	200.09	0	3628.89
MW-66	11/01/93	3828.98	200.35	0	3628.63
MW-66	12/01/93	3828.98	200.42	0	3628.56
MW-66	01/01/94	3828.98	200.33	0	3628.65
MW-66	02/01/94	3828.98	201.39	0	3627.59
MW-66	03/01/94	3828.98	201.44	0	3627.54
MW-66	04/01/94	3828.98	201.36	0	3627.62
MW-66	05/01/94	3828.98	201.26	0	3627.72
MW-66	07/01/94	3828.98	200.91	0	3628.07
MW-66	08/01/94	3828.98	199.86	0	3629.12
MW-66	09/01/94	3828.98	200.66	0	3628.32
MW-66	10/01/94	3828.98	200.83	0	3628.15
MW-66	12/01/94	3828.98	201.96	0	3627.02
MW-66	01/01/95	3828.98	201.04	0	3627.94
MW-66	04/01/95	3828.98	202.26	0	3626.72
MW-66	07/01/95	3828.98	201.59	0	3627.39
MW-66	10/01/95	3828.98	201.62	0	3627.36
MW-66	01/16/96	3828.98	200.89	0	3628.09
MW-66	04/17/96	3828.98	202.29	0	3626.69
MW-66	07/16/96	3828.98	202.45	0	3626.53
MW-66	10/13/96	3828.98	200.80	0	3628.18
MW-66	02/04/97	3828.98	202.60	0	3626.38
MW-66	04/28/97	3828.98	202.84	0	3626.14
MW-66	07/14/97	3828.98	202.72	0	3626.26
MW-66	09/30/97	3828.98	204.00	0	3624.98
MW-66	10/09/97	3828.98	204.20	0	3624.78
MW-66	10/13/97	3828.98	203.77	0	3625.21
MW-66	01/27/98	3828.98	203.79	0	3625.19
MW-66	04/27/98	3828.98	204.09	0	3624.89
MW-66	05/28/98	3828.98	204.18	0	3624.80
MW-66	06/15/98	3828.98	204.37	0	3624.61
MW-66	10/10/98	3828.98	204.86	0	3624.12
MW-66	01/27/99	3828.98	205.05	0	3623.93
MW-66	04/19/99	3828.98	205.10	0	3623.88
MW-66	01/05/99	3828.98	205.13	0	3623.85
MW-67	09/18/91	3765.87	133.99	0	3631.88
MW-67	10/22/91	3765.87	135.74	0	3630.13
MW-67	11/15/91	3765.87	136.00	0	3629.87
MW-67	03/01/92	3765.87	136.35	0	3629.52
MW-67	04/01/92	3765.87	136.25	0	3629.62
MW-67	05/01/92	3765.87	127.66	0	3638.21
MW-67	06/01/92	3765.87	131.08	0	3634.79
MW-67	07/01/92	3765.87	133.24	0	3632.63
MW-67	08/01/92	3765.87	133.89	0	3631.98
MW-67	09/01/92	3765.87	134.24	0	3631.63

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-67	10/01/92	3765.87	134.33	0	3631.54
MW-67	11/01/92	3765.87	134.76	0	3631.11
MW-67	12/01/92	3765.87	135.00	0	3630.87
MW-67	01/01/93	3765.87	135.10	0	3630.77
MW-67	02/01/93	3765.87	135.19	0	3630.68
MW-67	03/01/93	3765.87	135.39	0	3630.48
MW-67	04/01/93	3765.87	135.37	0	3630.50
MW-67	05/01/93	3765.87	135.63	0	3630.24
MW-67	06/01/93	3765.87	135.58	0	3630.29
MW-67	07/01/93	3765.87	135.81	0	3630.06
MW-67	08/01/93	3765.87	135.69	0	3630.18
MW-67	09/01/93	3765.87	135.99	0	3629.88
MW-67	10/01/93	3765.87	136.04	0	3629.83
MW-67	11/01/93	3765.87	136.26	0	3629.61
MW-67	12/01/93	3765.87	136.31	0	3629.56
MW-67	01/01/94	3765.87	136.25	0	3629.62
MW-67	02/01/94	3765.87	137.16	0	3628.71
MW-67	03/01/94	3765.87	137.22	0	3628.65
MW-67	04/01/94	3765.87	137.31	0	3628.56
MW-67	05/01/94	3765.87	137.14	0	3628.73
MW-67	07/01/94	3765.87	136.82	0	3629.05
MW-67	08/01/94	3765.87	135.55	0	3630.32
MW-67	09/01/94	3765.87	136.58	0	3629.29
MW-67	10/01/94	3765.87	136.71	0	3629.16
MW-67	12/01/94	3765.87	137.89	0	3627.98
MW-67	01/01/95	3765.87	137.09	0	3628.78
MW-67	04/01/95	3765.87	137.29	0	3628.58
MW-67	07/01/95	3765.87	137.40	0	3628.47
MW-67	10/01/95	3765.87	137.54	0	3628.33
MW-67	01/19/96	3765.87	138.02	0	3627.85
MW-67	04/17/96	3765.87	138.13	0	3627.74
MW-67	07/16/96	3765.87	138.14	0	3627.73
MW-67	10/14/96	3765.87	137.53	0	3628.34
MW-67	02/04/97	3765.87	138.37	0	3627.50
MW-67	04/28/97	3765.87	138.64	0	3627.23
MW-67	07/15/97	3765.87	138.95	0	3626.92
MW-67	10/01/97	3765.87	140.50	0.8	3625.95
MW-67	10/09/97	3765.87	144.05	4.35	3624.99
MW-67	10/13/97	3765.87	139.98	0.67	3626.37
MW-67	10/21/97	3765.87	140.55	0.75	3625.86
MW-67	10/29/97	3765.87	140.54	0.83	3625.93
MW-67	11/04/97	3765.87	140.43	0.75	3625.98
MW-67	11/12/97	3765.87	140.52	0.87	3625.98
MW-67	11/19/97	3765.87	140.55	0.77	3625.88
MW-67	11/24/97	3765.87	140.70	0.95	3625.86
MW-67	12/10/97	3765.87	140.57	0.85	3625.92
MW-67	01/06/98	3765.87	139.76	0	3626.11
MW-67	01/15/98	3765.87	139.75	0	3626.12
MW-67	01/20/98	3765.87	141.43	0.9	3625.09

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-67	01/28/98	3765.87	140.14	0.77	3626.29
MW-67	02/03/98	3765.87	141.33	0.73	3625.07
MW-67	02/10/98	3765.87	141.32	0	3624.55
MW-67	02/17/98	3765.87	141.81	0.44	3624.38
MW-67	02/25/98	3765.87	141.12	0	3624.75
MW-67	04/27/98	3765.87	141.13	0.65	3625.21
MW-67	05/28/98	3765.87	141.43	0	3624.44
MW-67	06/15/98	3765.87	141.49	0	3624.38
MW-67	10/10/98	3765.87	140.50	0.05	3625.40
MW-67	04/19/99	3765.87	140.72	0	3625.15
MW-67	01/05/00	3765.87	140.77	0.47	3625.44
MW-68	09/18/91	3797.83	166.68	0	3631.15
MW-68	10/22/91	3797.83	169.37	0	3628.46
MW-68	11/15/91	3797.83	167.30	0	3630.53
MW-68	10/14/97	3797.83	171.76	0	3626.07
MW-68	01/27/98	3797.83	173.22	1.99	3626.06
MW-68	06/17/98	3797.83	172.90	0.85	3625.55
MW-68	01/05/00	3797.83	173.17	0	3624.66
MW-70	09/18/91	3822.57	191.59	0	3630.98
MW-70	10/22/91	3822.57	191.68	0	3630.89
MW-70	11/15/91	3822.57	192.20	0	3630.37
MW-70	03/01/92	3822.57	192.74	0	3629.83
MW-70	04/01/92	3822.57	192.62	0	3629.95
MW-70	05/01/92	3822.57	189.97	0	3632.60
MW-70	06/01/92	3822.57	188.42	0	3634.15
MW-70	07/01/92	3822.57	188.87	0	3633.70
MW-70	08/01/92	3822.57	189.54	0	3633.03
MW-70	09/01/92	3822.57	190.02	0	3632.55
MW-70	10/01/92	3822.57	190.48	0	3632.09
MW-70	11/01/92	3822.57	190.86	0	3631.71
MW-70	12/01/92	3822.57	191.17	0	3631.40
MW-70	01/01/93	3822.57	191.39	0	3631.18
MW-70	02/01/93	3822.57	191.54	0	3631.03
MW-70	03/01/93	3822.57	191.77	0	3630.80
MW-70	04/01/93	3822.57	191.80	0	3630.77
MW-70	05/01/93	3822.57	192.09	0	3630.48
MW-70	06/01/93	3822.57	192.18	0	3630.39
MW-70	07/01/93	3822.57	192.32	0	3630.25
MW-70	08/01/93	3822.57	192.30	0	3630.27
MW-70	09/01/93	3822.57	192.53	0	3630.04
MW-70	10/01/93	3822.57	192.65	0	3629.92
MW-70	11/01/93	3822.57	192.91	0	3629.66
MW-70	12/01/93	3822.57	192.96	0	3629.61
MW-70	01/01/94	3822.57	192.99	0	3629.58
MW-70	02/01/94	3822.57	194.02	0	3628.55
MW-70	03/01/94	3822.57	194.00	0	3628.57
MW-70	04/01/94	3822.57	193.19	0	3629.38

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-70	05/01/94	3822.57	193.86	0	3628.71
MW-70	07/01/94	3822.57	193.59	0	3628.98
MW-70	08/01/94	3822.57	193.09	0	3629.48
MW-70	09/01/94	3822.57	193.17	0	3629.40
MW-70	10/01/94	3822.57	193.38	0	3629.19
MW-70	12/01/94	3822.57	194.58	0	3627.99
MW-70	01/01/95	3822.57	192.83	0	3629.74
MW-70	04/01/95	3822.57	194.11	0	3628.46
MW-70	07/01/95	3822.57	194.19	0	3628.38
MW-70	10/01/95	3822.57	194.19	0	3628.38
MW-70	01/16/96	3822.57	194.68	0	3627.89
MW-70	04/17/96	3822.57	194.94	0	3627.63
MW-70	07/15/96	3822.57	194.70	0	3627.87
MW-70	10/13/96	3822.57	193.98	0	3628.59
MW-70	02/03/97	3822.57	194.47	0	3628.10
MW-70	04/28/97	3822.57	195.01	0	3627.56
MW-70	07/14/97	3822.57	195.44	0	3627.13
MW-70	10/01/97	3822.57	196.20	0	3626.37
MW-70	10/13/97	3822.57	196.05	0	3626.52
MW-70	10/29/97	3822.57	196.24	0.01	3626.33
MW-70	11/04/97	3822.57	196.35	0	3626.22
MW-70	11/12/97	3822.57	196.34	0	3626.23
MW-70	11/19/97	3822.57	196.36	0.01	3626.21
MW-70	11/24/97	3822.57	196.36	0	3626.21
MW-70	12/10/97	3822.57	196.47	0	3626.10
MW-70	01/27/98	3822.57	196.22	0	3626.35
MW-70	02/25/98	3822.57	196.45	0	3626.12
MW-70	04/27/98	3822.57	196.48	0	3626.09
MW-70	05/28/98	3822.57	196.91	0	3625.66
MW-70	06/15/98	3822.57	196.74	0	3625.83
MW-70	10/09/98	3822.57	197.27	0	3625.30
MW-70	01/27/99	3822.57	199.24	0	3623.33
MW-70	04/19/99	3822.57	197.40	0	3625.17
MW-70	01/05/00	3822.57	197.73	0	3624.84
MW-71	10/01/93	3778.05	149.68	0	3628.37
MW-71	11/01/93	3778.05	149.90	0	3628.15
MW-71	12/01/93	3778.05	149.93	0	3628.12
MW-71	01/01/94	3778.05	149.92	0	3628.13
MW-71	02/01/94	3778.05	150.94	0	3627.11
MW-71	03/01/94	3778.05	150.90	0	3627.15
MW-71	04/01/94	3778.05	149.98	0	3628.07
MW-71	05/01/94	3778.05	150.64	0	3627.41
MW-71	07/01/94	3778.05	150.37	0	3627.68
MW-71	08/01/94	3778.05	149.35	0	3628.70
MW-71	09/01/94	3778.05	150.19	0	3627.86
MW-71	10/01/94	3778.05	150.41	0	3627.64
MW-71	12/01/94	3778.05	151.41	0	3626.64
MW-71	01/01/95	3778.05	150.65	0	3627.40

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-71	04/01/95	3778.05	150.88	0	3627.17
MW-71	07/01/95	3778.05	150.84	0	3627.21
MW-71	10/01/95	3778.05	151.15	0	3626.90
MW-71	01/16/96	3778.05	151.36	0	3626.69
MW-71	04/17/96	3778.05	151.74	0	3626.31
MW-71	07/16/96	3778.05	151.69	0	3626.36
MW-71	10/13/96	3778.05	149.72	0	3628.33
MW-71	02/04/97	3778.05	152.39	0	3625.66
MW-71	04/28/97	3778.05	152.52	0	3625.53
MW-71	07/14/97	3778.05	152.86	0	3625.19
MW-71	10/01/97	3778.05	153.40	0	3624.65
MW-71	10/09/97	3778.05	153.41	0.01	3624.64
MW-71	10/13/97	3778.05	153.39	0	3624.66
MW-71	01/28/98	3778.05	153.47	0	3624.58
MW-71	04/27/98	3778.05	153.91	0	3624.14
MW-71	05/28/98	3778.05	153.86	0	3624.19
MW-71	06/15/98	3778.05	153.88	0	3624.17
MW-71	10/10/98	3778.05	154.34	0	3623.71
MW-71	01/27/99	3778.05	154.50	0	3623.55
MW-71	04/19/99	3778.05	154.56	0	3623.49
MW-71	01/05/00	3778.05	154.66	0	3623.39
MW-72	10/01/93	3819.32	190.55	0.5	3629.14
MW-72	11/01/93	3819.32	189.91	0	3629.41
MW-72	12/01/93	3819.32	196.73	3.72	3625.30
MW-72	01/16/96	3819.32	216.76	16.5	3614.60
MW-72	04/17/96	3819.32	214.60	16.35	3616.65
MW-72	07/16/96	3819.32	201.95	11.85	3626.02
MW-72	10/14/96	3819.32	211.05	5.84	3612.53
MW-72	02/04/97	3819.32	213.65	1.22	3606.56
MW-72	04/29/97	3819.32	197.65	2.72	3623.65
MW-72	07/15/97	3819.32	212.06	6.71	3612.15
MW-72	10/09/97	3819.32	228.35	0	3590.97
MW-72	10/14/97	3819.32	229.54	0	3589.78
MW-72	10/29/97	3819.32	229.55	0	3589.77
MW-72	11/04/97	3819.32	227.75	0	3591.57
MW-72	11/12/97	3819.32	227.83	0	3591.49
MW-72	11/19/97	3819.32	206.30	0.26	3613.20
MW-72	11/24/97	3819.32	227.73	0	3591.59
MW-72	12/10/97	3819.32	228.74	0	3590.58
MW-72	01/06/98	3819.32	228.54	0.02	3590.79
MW-72	01/15/98	3819.32	228.50	0	3590.82
MW-72	01/20/98	3819.32	228.92	0	3590.40
MW-72	02/03/98	3819.32	220.23	0	3599.09
MW-72	02/10/98	3819.32	224.93	0	3594.39
MW-72	02/17/98	3819.32	224.27	0	3595.05
MW-72	02/25/98	3819.32	224.67	0	3594.65
MW-72	04/27/98	3819.32	216.73	0	3602.59
MW-72	05/28/98	3819.32	229.14	0	3590.18

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-72	06/16/98	3819.32	222.68	0	3596.64
MW-72	10/11/98	3819.32	196.22	0	3623.10
MW-72	01/27/99	3819.32	229.90	0.01	3589.43
MW-72	04/19/99	3820.05	229.80	0	3590.25
MW-72	01/05/00	3820.05	209.27	0	3610.78
MW-73	12/01/94	3820.09	202.90	6.12	3621.65
MW-73	01/01/95	3820.09	195.75	1.68	3625.57
MW-73	04/01/95	3820.09	207.07	8.52	3619.23
MW-73	07/01/95	3820.09	204.48	6.72	3620.51
MW-73	10/01/95	3820.09	192.35	0	3627.74
MW-73	01/16/96	3820.09	192.66	0	3627.43
MW-73	04/17/96	3820.09	204.10	1.86	3617.34
MW-73	07/16/96	3820.09	193.91	1.61	3627.35
MW-73	10/14/96	3820.09	191.42	0.01	3628.67
MW-73	02/04/97	3820.09	193.00	0	3627.09
MW-73	04/29/97	3820.09	194.09	0.68	3626.49
MW-73	07/15/97	3820.09	193.70	0	3626.39
MW-73	09/30/97	3820.09	195.00	0.9	3625.74
MW-73	10/09/97	3820.09	194.92	0.72	3625.69
MW-73	10/14/97	3820.09	195.15	0	3624.94
MW-73	01/28/98	3820.09	194.50	0	3625.59
MW-73	04/27/98	3820.09	194.40	0	3625.69
MW-73	05/28/98	3820.09	194.66	0	3625.43
MW-73	06/16/98	3820.09	194.67	0	3625.42
MW-73	10/10/98	3820.09	194.47	0	3625.62
MW-73	01/27/99	3820.09	195.14	0	3624.95
MW-73	04/19/99	3820.09	195.80	0	3624.29
MW-73	01/05/00	3820.09	195.89	0	3624.20
MW-74	12/01/94	3820.82	192.31	0	3628.51
MW-74	01/01/95	3820.82	193.88	1.44	3627.99
MW-74	04/01/95	3820.82	189.31	0.48	3631.86
MW-74	07/01/95	3820.82	188.07	0	3632.75
MW-74	01/16/96	3820.82	188.65	0	3632.17
MW-74	04/17/96	3820.82	187.30	0	3633.52
MW-74	07/16/96	3820.82	186.52	0	3634.30
MW-74	10/14/96	3820.82	178.77	0	3642.05
MW-74	02/04/97	3820.82	182.50	0	3638.32
MW-74	04/29/97	3820.82	183.92	0	3636.90
MW-74	07/15/97	3820.82	183.74	0	3637.08
MW-74	09/30/97	3820.82	185.30	0	3635.52
MW-74	10/09/97	3820.82	185.25	0	3635.57
MW-74	10/14/97	3820.82	185.77	0	3635.05
MW-74	01/28/98	3820.82	184.15	0	3636.67
MW-74	04/27/98	3820.82	184.44	0	3636.38
MW-74	05/28/98	3820.82	134.12	0	3686.70
MW-74	06/16/98	3820.82	187.47	0	3633.35
MW-74	10/10/98	3820.82	189.19	0	3631.63

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-74	01/27/99	3820.82	186.50	0	3634.32
MW-74	04/19/99	3820.82	133.90	0	3686.92
MW-74	01/05/00	3820.82	189.39	0	3631.43
MW-75	12/01/94	3816.12	228.96	23.04	3603.98
MW-75	01/01/95	3816.12	209.93	12.72	3615.47
MW-75	04/01/95	3816.12	251.13	35.4	3590.83
MW-75	07/01/95	3816.12	295.32	59.52	3564.24
MW-75	01/18/96	3816.12	197.10	3.1	3621.28
MW-75	04/17/96	3816.12	189.17	0.04	3626.97
MW-75	07/16/96	3816.12	190.40	1.76	3627.00
MW-75	10/14/96	3816.12	190.01	1.79	3627.41
MW-75	02/04/97	3816.12	193.45	0	3622.67
MW-75	04/29/97	3816.12	200.64	3.34	3617.91
MW-75	07/15/97	3816.12	200.95	6.17	3619.67
MW-75	10/09/97	3816.12	200.87	4.59	3618.60
MW-75	10/14/97	3816.12	200.86	2.76	3617.27
MW-75	10/29/97	3816.12	200.62	0.54	3615.89
MW-75	11/04/97	3816.12	200.76	3.52	3617.92
MW-75	11/12/97	3816.12	196.10	0	3620.02
MW-75	11/19/97	3816.12	199.10	2.75	3619.02
MW-75	11/24/97	3816.12	200.42	5.57	3619.76
MW-75	12/10/97	3816.12	195.43	0	3620.69
MW-75	01/06/98	3816.12	214.82	0	3601.30
MW-75	01/15/98	3816.12	214.80	0	3601.32
MW-75	01/20/98	3816.12	200.95	0	3615.17
MW-75	02/03/98	3816.12	201.20	1.9	3616.30
MW-75	02/10/98	3816.12	205.10	4.5	3614.30
MW-75	02/17/98	3816.12	200.77	0.95	3616.04
MW-75	02/25/98	3816.12	203.15	2.15	3614.53
MW-75	04/27/98	3816.12	200.72	8.77	3621.80
MW-75	05/28/98	3816.12	201.72	2.7	3616.37
MW-75	06/16/98	3816.12	205.82	0	3610.30
MW-75	10/11/98	3816.12	192.53	3.8	3626.36
MW-75	01/27/99	3816.14	201.89	0.26	3614.44
MW-75	04/19/99	3816.14	207.70	0	3608.44
MW-75	01/05/00	3816.14	200.59	4.47	3618.81
MW-76	12/01/94	3796.01	167.36	0	3628.65
MW-76	01/01/95	3796.01	169.05	2.04	3628.45
MW-76	07/01/95	3796.01	180.14	6.84	3620.86
MW-76	10/01/95	3796.01	168.22	0.41	3628.09
MW-76	01/16/96	3796.01	168.85	0.95	3627.85
MW-76	04/17/96	3796.01	169.59	0.99	3627.14
MW-76	07/16/96	3796.01	167.04	0	3628.97
MW-76	10/14/96	3796.01	171.86	0	3624.15
MW-76	02/04/97	3796.01	169.32	0	3626.69
MW-76	04/29/97	3796.01	174.30	0	3621.71
MW-76	07/15/97	3796.01	175.10	0	3620.91

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- *No data obtained*

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-76	09/30/97	3796.01	176.20	0	3619.81
MW-76	10/14/97	3796.01	173.57	0	3622.44
MW-76	01/28/98	3796.01	173.10	0	3622.91
MW-76	04/27/98	3796.01	175.25	0	3620.76
MW-76	05/28/98	3796.01	173.68	0	3622.33
MW-76	06/16/98	3796.01	175.25	0	3620.76
MW-76	01/27/99	3796.01	177.03	1	3619.71
MW-81	10/01/95	3817.03	195.77	2.74	3623.26
MW-81	01/16/96	3817.03	199.04	4.29	3621.12
MW-81	04/17/96	3817.03	204.35	9.95	3619.94
MW-81	07/16/96	3817.03	204.26	9.37	3619.61
MW-81	10/13/96	3817.03	202.11	8.49	3621.11
MW-81	02/04/97	3817.03	197.25	2.11	3621.32
MW-81	04/28/97	3817.03	204.40	9.15	3619.30
MW-81	07/14/97	3817.03	196.19	1.45	3621.89
MW-81	10/09/97	3817.03	200.02	0.02	3617.02
MW-81	10/14/97	3817.03	200.96	0.06	3616.11
MW-81	10/29/97	3817.03	202.44	1.44	3615.64
MW-81	11/04/97	3817.03	200.92	0	3616.11
MW-81	11/12/97	3817.03	200.95	0.25	3616.26
MW-81	11/19/97	3817.03	200.94	0.01	3616.09
MW-81	11/24/97	3817.03	200.81	0	3616.22
MW-81	12/10/97	3817.03	200.85	0	3616.18
MW-81	01/06/98	3817.03	199.35	0	3617.68
MW-81	01/15/98	3817.03	199.30	0	3617.73
MW-81	01/20/98	3817.03	200.89	0.79	3616.71
MW-81	01/27/98	3817.03	200.14	0.89	3617.53
MW-81	02/03/98	3817.03	200.88	0.58	3616.57
MW-81	02/10/98	3817.03	206.74	1.64	3611.48
MW-81	02/17/98	3817.03	218.70	12.08	3607.14
MW-81	02/25/98	3817.03	217.41	11.41	3607.94
MW-81	04/27/98	3817.03	197.05	0	3619.98
MW-81	05/28/98	3817.03	192.28	0	3624.75
MW-81	06/15/98	3817.03	197.58	0	3619.45
MW-81	10/11/98	3817.03	193.23	0	3623.80
MW-81	01/27/99	3817.03	200.12	0	3616.91
MW-81	04/19/99	3817.03	200.84	0	3616.19
MW-81	01/05/00	3817.03	199.38	0	3617.65
MW-82	10/01/95	3825.07	196.65	0	3628.42
MW-82	01/18/96	3825.07	209.62	0	3615.45
MW-82	04/17/96	3825.07	209.12	0	3615.95
MW-82	07/16/96	3825.07	222.80	0	3602.27
MW-82	10/14/96	3825.07	196.33	0.02	3628.75
MW-82	02/04/97	3825.07	223.66	0	3601.41
MW-82	04/28/97	3825.07	249.21	0	3575.86
MW-82	07/15/97	3825.07	248.90	0	3576.17
MW-82	09/30/97	3825.07	249.20	0	3575.87

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-82	10/09/97	3825.07	197.07	0	3628.00
MW-82	10/14/97	3825.07	229.01	0	3596.06
MW-82	10/29/97	3825.07	200.15	0	3624.92
MW-82	11/04/97	3825.07	209.26	0	3615.81
MW-82	11/12/97	3825.07	211.36	2.62	3615.62
MW-82	11/19/97	3825.07	213.86	5.28	3615.06
MW-82	11/24/97	3825.07	213.96	0	3611.11
MW-82	12/10/97	3825.07	212.95	0	3612.12
MW-82	02/25/98	3825.07	245.20	0	3579.87
MW-82	04/27/98	3825.07	235.62	0	3589.45
MW-82	05/28/98	3825.07	210.13	0	3614.94
MW-82	06/16/98	3825.07	249.20	0	3575.87
MW-82	10/11/98	3825.07	199.81	0	3625.26
MW-82	01/27/99	3825.07	250.24	0	3574.83
MW-82	04/19/99	3825.07	199.99	0	3625.08
MW-82	01/05/00	3825.07	199.67	0	3625.40
MW-83	10/01/95	3794.12	169.47	1.67	3625.87
MW-83	01/18/96	3794.12	189.30	16.8	3617.08
MW-83	04/17/96	3794.12	179.40	0.2	3614.86
MW-83	07/16/96	3794.12	176.36	0.56	3618.16
MW-83	10/14/96	3794.12	176.25	0.18	3618.00
MW-83	02/04/97	3794.12	178.77	0	3615.35
MW-83	04/28/97	3794.12	179.41	0	3614.71
MW-83	07/15/97	3794.12	168.18	1.62	3627.12
MW-83	09/30/97	3794.12	202.70	0	3591.42
MW-83	10/09/97	3794.12	202.70	0	3591.42
MW-83	10/14/97	3794.12	200.25	0	3593.87
MW-83	10/21/97	3794.12	202.55	0	3591.57
MW-83	10/29/97	3794.12	200.20	0	3593.92
MW-83	11/04/97	3794.12	200.17	0	3593.95
MW-83	11/12/97	3794.12	200.20	0	3593.92
MW-83	11/19/97	3794.12	194.44	0.58	3600.10
MW-83	11/24/97	3794.12	193.52	0	3600.60
MW-83	12/10/97	3794.12	187.51	0	3606.61
MW-83	01/28/98	3794.12	170.53	0	3623.59
MW-83	02/25/98	3794.12	182.22	4.87	3615.45
MW-83	04/27/98	3794.12	188.78	0	3605.34
MW-83	05/28/98	3794.12	170.14	0	3623.98
MW-83	06/16/98	3794.12	184.32	9.51	3616.74
MW-83	10/11/98	3794.12	169.96	0	3624.16
MW-83	01/27/99	3794.12	189.10	0	3605.02
MW-83	04/19/99	3794.12	124.09	0	3670.03
MW-83	01/05/00	3794.12	191.08	0	3603.04
MW-84	07/16/96	3759.60	131.50	0.39	3628.38
MW-84	10/14/96	3759.60	131.79	1.05	3628.57
MW-84	02/04/97	3759.60	132.84	1.29	3627.70
MW-84	04/29/97	3759.60	133.64	1.79	3627.26

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-84	07/15/97	3759.60	133.89	1.9	3627.09
MW-84	09/30/97	3759.60	134.90	2.3	3626.37
MW-84	10/14/97	3759.60	136.64	3.94	3625.83
MW-84	10/21/97	3759.60	137.06	4.32	3625.69
MW-84	10/29/97	3759.60	133.35	0.72	3626.77
MW-84	11/04/97	3759.60	133.72	0	3625.88
MW-84	11/12/97	3759.60	132.70	0.05	3626.93
MW-84	11/19/97	3759.60	136.38	3.66	3625.89
MW-84	11/24/97	3759.60	136.00	3.23	3625.95
MW-84	12/10/97	3759.60	134.60	1.65	3626.20
MW-84	01/06/98	3759.60	133.48	0.08	3626.17
MW-84	01/15/98	3759.60	133.30	0	3626.30
MW-84	01/20/98	3759.60	147.14	6.91	3617.50
MW-84	01/28/98	3759.60	133.96	0.46	3625.97
MW-84	02/03/98	3759.60	133.89	0.13	3625.80
MW-84	02/10/98	3759.60	133.70	0.01	3625.90
MW-84	02/17/98	3759.60	139.13	2.86	3622.55
MW-84	02/25/98	3759.60	134.69	0.23	3625.07
MW-84	04/27/98	3759.60	135.34	0.89	3624.90
MW-84	05/28/98	3759.60	134.40	0	3625.20
MW-84	06/16/98	3759.60	134.94	0.4	3624.95
MW-84	10/11/98	3759.60	134.10	0	3625.50
MW-84	01/27/99	3759.60	135.21	0	3624.39
MW-84	04/19/99	3759.60	136.05	0.15	3623.66
MW-84	01/05/00	3759.60	137.31	0	3622.29
MW-85	07/16/96	3824.93	200.62	3.64	3626.96
MW-85	10/13/96	3824.93	201.10	4.86	3627.37
MW-85	02/04/97	3824.93	200.85	3.34	3626.51
MW-85	04/29/97	3824.93	199.89	1.19	3625.90
MW-85	07/14/97	3824.93	199.39	0	3625.54
MW-85	10/09/97	3824.93	200.15	0.15	3624.88
MW-85	10/14/97	3824.93	200.35	0	3624.58
MW-85	10/29/97	3824.93	199.31	0	3625.62
MW-85	11/04/97	3824.93	200.16	0.1	3624.84
MW-85	11/12/97	3824.93	200.00	0	3624.93
MW-85	11/19/97	3824.93	199.28	0.01	3625.65
MW-85	11/24/97	3824.93	200.07	0	3624.86
MW-85	12/10/97	3824.93	200.12	0	3624.81
MW-85	01/06/98	3824.93	201.37	0.6	3623.99
MW-85	01/15/98	3824.93	201.30	0.55	3624.03
MW-85	01/20/98	3824.93	207.80	4.23	3620.21
MW-85	01/27/98	3824.93	201.62	1.82	3624.63
MW-85	02/03/98	3824.93	201.68	0.79	3623.82
MW-85	02/10/98	3824.93	201.36	0.42	3623.87
MW-85	02/17/98	3824.93	201.78	0.73	3623.68
MW-85	02/25/98	3824.93	200.95	0.2	3624.12
MW-85	04/27/98	3824.93	200.91	0.57	3624.43
MW-85	05/28/98	3824.93	203.78	1.02	3621.89

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-85	06/16/98	3824.93	201.29	0.55	3624.04
MW-85	10/11/98	3824.93	201.32	1.27	3624.53
MW-85	01/27/99	3824.93	203.01	0.49	3622.28
MW-85	04/19/99	3824.93	202.58	0	3622.35
MW-85	01/05/00	3824.93	200.79	0	3624.14
MW-86	10/14/96	3823.99	193.32	0	3630.67
MW-86	02/04/97	3823.99	190.99	0	3633.00
MW-86	04/28/97	3823.99	197.37	0	3626.62
MW-86	07/14/97	3823.99	199.78	0	3624.21
MW-86	09/30/97	3823.99	188.10	0	3635.89
MW-86	10/09/97	3823.99	198.76	0	3625.23
MW-86	10/14/97	3823.99	196.27	0	3627.72
MW-86	01/27/98	3823.99	205.50	0	3618.49
MW-86	04/27/98	3823.99	203.08	0	3620.91
MW-86	05/28/98	3823.99	199.71	0	3624.28
MW-86	06/16/98	3823.99	203.43	0	3620.56
MW-86	10/11/98	3823.99	198.11	0	3625.88
MW-86	01/27/99	3823.99	222.50	0	3601.49
MW-86	04/19/99	3823.99	201.13	0	3622.86
MW-86	01/05/00	3823.99	211.12	0	3612.87
MW-87	08/01/96	3740.50	113.11	0	3627.39
MW-87	10/14/96	3740.50	112.19	0	3628.31
MW-87	02/04/97	3740.50	112.94	0	3627.56
MW-87	04/28/97	3740.50	113.21	0	3627.29
MW-87	07/14/97	3740.50	113.83	0	3626.67
MW-87	10/09/97	3740.50	114.20	0	3626.30
MW-87	10/13/97	3740.50	114.43	0	3626.07
MW-87	10/29/97	3740.50	113.95	0	3626.55
MW-87	11/04/97	3740.50	114.30	0	3626.20
MW-87	11/12/97	3740.50	114.22	0	3626.28
MW-87	11/19/97	3740.50	114.35	0	3626.15
MW-87	11/24/97	3740.50	114.25	0	3626.25
MW-87	12/10/97	3740.50	114.32	0	3626.18
MW-87	01/28/98	3740.50	114.07	0	3626.43
MW-87	02/25/98	3740.50	114.35	0	3626.15
MW-87	04/27/98	3740.50	114.52	0	3625.98
MW-87	05/28/98	3740.50	105.30	0	3635.20
MW-87	06/15/98	3740.50	114.52	0	3625.98
MW-87	10/10/98	3740.50	114.96	0	3625.54
MW-87	01/27/99	3740.50	115.08	0	3625.42
MW-87	04/19/99	3740.50	115.15	0	3625.35
MW-87	01/05/00	3740.50	115.32	0	3625.18
MW-87A	08/01/96	3739.53	124.91	0	3614.62
MW-87A	10/14/96	3739.53	104.75	0	3634.78
MW-87A	02/04/97	3739.53	103.69	0	3635.84
MW-87A	04/28/97	3739.53	104.43	0	3635.10

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-87A	07/14/97	3739.53	104.92	0	3634.61
MW-87A	10/13/97	3739.53	104.44	0	3635.09
MW-87A	01/28/98	3739.53	104.79	0	3634.74
MW-87A	04/27/98	3739.53	105.21	0	3634.32
MW-87A	05/28/98	3739.53	114.02	0	3625.51
MW-87A	06/15/98	3739.53	105.47	0	3634.06
MW-87A	10/10/98	3739.53	105.99	0	3633.54
MW-87A	01/27/99	3739.53	105.98	0	3633.55
MW-87A	04/19/99	3739.53	107.30	0	3632.23
MW-87A	01/05/00	3739.53	106.05	0	3633.48
MW-88	08/01/96	3789.70	163.59	0	3626.11
MW-88	10/13/96	3789.70	162.22	0	3627.48
MW-88	02/04/97	3789.70	163.38	0	3626.32
MW-88	04/28/97	3789.70	163.54	0	3626.16
MW-88	07/14/97	3789.70	163.84	0	3625.86
MW-88	10/01/97	3789.70	164.40	0	3625.30
MW-88	10/09/97	3789.70	164.38	0	3625.32
MW-88	10/13/97	3789.70	164.34	0	3625.36
MW-88	01/27/98	3789.70	164.41	0	3625.29
MW-88	04/27/98	3789.70	164.84	0	3624.86
MW-88	05/28/98	3789.70	164.00	0	3625.70
MW-88	06/15/98	3789.70	164.87	0	3624.83
MW-88	10/10/98	3789.70	165.38	0	3624.32
MW-88	01/27/99	3789.70	165.49	0	3624.21
MW-88	04/19/99	3789.70	165.54	0	3624.16
MW-88	01/05/00	3789.70	165.62	0	3624.08
MW-89	08/01/96	3827.68	201.41	0	3626.27
MW-89	10/14/96	3827.68	199.95	0	3627.73
MW-89	02/04/97	3827.68	201.39	0	3626.29
MW-89	04/28/97	3827.68	201.67	0	3626.01
MW-89	07/14/97	3827.68	201.94	0	3625.74
MW-89	10/01/97	3827.68	202.80	0	3624.88
MW-89	10/09/97	3827.68	202.70	0	3624.98
MW-89	10/13/97	3827.68	202.70	0	3624.98
MW-89	01/27/98	3827.68	202.82	0	3624.86
MW-89	04/27/98	3827.68	203.04	0	3624.64
MW-89	05/28/98	3827.68	203.19	0	3624.49
MW-89	06/15/98	3827.68	203.27	0	3624.41
MW-89	10/10/98	3827.68	203.83	0	3623.85
MW-89	01/27/99	3827.68	204.12	0	3623.56
MW-89	04/19/99	3827.68	204.12	0	3623.56
MW-89	01/05/00	3827.68	204.47	0	3623.21
MW-94	07/15/96	3821.48	194.15	0	3627.33
MW-94	10/13/96	3821.48	196.21	0	3625.27
MW-94	02/04/97	3821.48	197.60	0	3623.88
MW-94	07/14/97	3821.48	198.65	0	3622.83

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-94	09/30/97	3821.48	199.70	0	3621.78
MW-94	10/09/97	3821.48	196.04	0	3625.44
MW-94	10/14/97	3821.48	195.95	0	3625.53
MW-94	01/27/98	3821.48	195.89	0	3625.59
MW-94	04/27/98	3821.48	196.20	0	3625.28
MW-94	05/28/98	3821.48	196.35	0	3625.13
MW-94	06/16/98	3821.48	196.42	0	3625.06
MW-94	10/10/98	3821.48	196.91	0	3624.57
MW-94	01/27/99	3821.48	197.28	0	3624.20
MW-94	04/19/99	3821.48	197.18	0	3624.30
MW-94	01/05/00	3821.48	197.37	0	3624.11
MW-95	04/29/97	3746.26	118.48	0	3627.78
MW-95	07/15/97	3746.26	118.59	0	3627.67
MW-95	10/14/97	3746.26	119.30	0	3626.96
MW-95	10/29/97	3746.26	119.31	0	3626.95
MW-95	11/04/97	3746.26	119.35	0	3626.91
MW-95	11/12/97	3746.26	119.30	0	3626.96
MW-95	11/19/97	3746.26	119.41	0	3626.85
MW-95	11/24/97	3746.26	119.45	0	3626.81
MW-95	12/10/97	3746.26	119.42	0	3626.84
MW-95	01/28/98	3746.26	119.49	0	3626.77
MW-95	02/25/98	3746.26	119.62	0	3626.64
MW-95	04/27/98	3746.26	119.78	0	3626.48
MW-95	05/28/98	3746.26	119.90	0	3626.36
MW-95	06/16/98	3746.26	119.97	0	3626.29
MW-95	10/10/98	3746.26	120.46	0	3625.80
MW-95	01/27/99	3746.26	120.59	0	3625.67
MW-95	04/19/99	3746.26	120.72	0	3625.54
MW-95	01/05/00	3746.26	120.81	0	3625.45
MW-96	04/29/97	3739.80	112.60	0	3627.20
MW-96	07/15/97	3739.80	112.57	0	3627.23
MW-96	10/01/97	3739.80	113.40	0	3626.40
MW-96	10/09/97	3739.80	113.34	0	3626.46
MW-96	10/13/97	3739.80	113.38	0	3626.42
MW-96	10/29/97	3739.80	113.38	0	3626.42
MW-96	*11/04/97*	*3739.80*	*113.35*	*0*	*3626.45*
MW-96	11/12/97	3739.80	113.31	0	3626.49
MW-96	11/19/97	3739.80	113.45	0	3626.35
MW-96	11/24/97	3739.80	113.58	0	3626.22
MW-96	12/10/97	3739.80	113.47	0	3626.33
MW-96	01/28/98	3739.80	113.46	0	3626.34
MW-96	02/25/98	3739.80	113.48	0	3626.32
MW-96	04/27/98	3739.80	113.74	0	3626.06
MW-96	05/28/98	3739.80	113.88	0	3625.92
MW-96	06/15/98	3739.80	113.92	0	3625.88
MW-96	10/10/98	3739.80	114.37	0	3625.43
MW-96	01/27/99	3739.80	114.48	0	3625.32

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-96	04/19/99	3739.80	114.56	0	3625.24
MW-96	01/05/00	3739.80	114.74	0	3625.06
MW-97	04/29/97	3750.16	122.82	0	3627.34
MW-97	07/15/97	3750.16	122.91	0	3627.25
MW-97	10/01/97	3750.16	123.80	0	3626.36
MW-97	10/09/97	3750.16	123.75	0	3626.41
MW-97	10/13/97	3750.16	123.61	0	3626.55
MW-97	10/29/97	3750.16	123.62	0	3626.54
MW-97	11/04/97	3750.16	123.74	0	3626.42
MW-97	11/12/97	3750.16	123.70	0	3626.46
MW-97	11/19/97	3750.16	123.85	0	3626.31
MW-97	11/24/97	3750.16	123.80	0	3626.36
MW-97	12/10/97	3750.16	123.90	0	3626.26
MW-97	01/28/98	3750.16	123.71	0	3626.45
MW-97	02/25/98	3750.16	123.89	0	3626.27
MW-97	04/27/98	3750.16	123.99	0	3626.17
MW-97	05/28/98	3750.16	124.12	0	3626.04
MW-97	06/15/98	3750.16	124.17	0	3625.99
MW-97	10/10/98	3750.16	124.63	0	3625.53
MW-97	01/27/99	3750.16	124.73	0	3625.43
MW-97	04/19/99	3750.16	124.83	0	3625.33
MW-97	01/05/00	3750.16	125.01	0	3625.15
MW-98	04/29/97	3770.15	142.42	0	3627.73
MW-98	07/15/97	3770.15	142.51	0	3627.64
MW-98	10/14/97	3770.15	143.55	0.29	3626.81
MW-98	10/29/97	3770.15	143.43	0.23	3626.88
MW-98	11/04/97	3770.15	143.50	0.25	3626.83
MW-98	11/12/97	3770.15	143.35	0.17	3626.92
MW-98	11/19/97	3770.15	143.48	0.22	3626.83
MW-98	11/24/97	3770.15	143.54	0.26	3626.79
MW-98	12/10/97	3770.15	143.52	0.12	3626.71
MW-98	01/28/98	3770.15	143.53	0.22	3626.78
MW-98	02/25/98	3770.15	143.77	0.19	3626.51
MW-98	04/27/98	3770.15	143.73	0.15	3626.52
MW-98	05/28/98	3770.15	143.80	0	3626.35
MW-98	06/16/98	3770.15	143.87	0.05	3626.31
MW-98	10/10/98	3770.15	144.32	0.08	3625.88
MW-98	01/27/99	3770.15	144.39	0	3625.76
MW-98	04/19/99	3770.15	148.78	0	3621.37
MW-98	01/05/00	3770.15	143.88	0	3626.27
MW-104	07/15/97	3793.64	168.72	0	3624.92
MW-104	10/13/97	3793.64	167.22	0	3626.42
MW-104	10/29/97	3793.64	167.25	0	3626.39
MW-104	11/04/97	3793.64	167.30	0	3626.34
MW-104	11/12/97	3793.64	167.20	0	3626.44
MW-104	11/19/97	3793.64	167.30	0	3626.34

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-104	11/24/97	3793.64	167.30	0	3626.34
MW-104	12/10/97	3793.64	167.28	0	3626.36
MW-104	01/28/98	3793.64	167.33	0	3626.31
MW-104	02/25/98	3793.64	167.34	0	3626.30
MW-104	04/27/98	3793.64	167.59	0	3626.05
MW-104	05/28/98	3793.64	167.75	0	3625.89
MW-104	06/15/98	3793.64	167.81	0	3625.83
MW-104	10/10/98	3793.64	168.27	0	3625.37
MW-104	01/27/99	3793.64	168.69	0.29	3625.16
MW-104	04/19/99	3793.64	173.11	0.39	3620.81
MW-104	01/05/00	3793.64	168.57	0.15	3625.18
MW-108	07/15/97	3747.13	119.97	0	3627.16
MW-108	10/13/97	3747.13	120.47	0	3626.66
MW-108	10/29/97	3747.13	120.45	0	3626.68
MW-108	11/04/97	3747.13	120.42	0	3626.71
MW-108	11/12/97	3747.13	124.40	0	3622.73
MW-108	11/19/97	3747.13	120.55	0	3626.58
MW-108	11/24/97	3747.13	120.54	0	3626.59
MW-108	12/10/97	3747.13	120.55	0	3626.58
MW-108	01/28/98	3747.13	120.58	0	3626.55
MW-108	02/25/98	3747.13	120.57	0	3626.56
MW-108	04/27/98	3747.13	120.85	0	3626.28
MW-108	05/28/98	3747.13	120.72	0	3626.41
MW-108	06/15/98	3747.13	121.03	0	3626.10
MW-108	10/10/98	3747.13	121.50	0	3625.63
MW-108	01/27/99	3747.13	120.59	0	3626.54
MW-108	04/19/99	3747.13	121.72	0	3625.41
MW-108	01/05/00	3747.13	121.89	0	3625.24
MW-110	06/17/98	3812.61	187.42	1.3	3626.13
MW-110	10/09/98	3812.61	188.34	0	3624.27
MW-110	01/27/99	3812.61	192.59	0.02	3620.03
MW-110	04/19/99	3812.61	189.31	0	3623.30
MW-110	01/05/00	3812.61	191.89	0	3620.72
MW-111	06/19/98	3824.44	200.24	0	3624.20
MW-111	10/10/98	3824.44	200.89	0	3623.55
MW-111	01/27/99	3824.44	201.24	0	3623.20
MW-111	04/19/99	3824.44	201.26	0	3623.18
MW-111	01/05/00	3824.44	201.21	0	3623.23
MW-112	01/05/00	3780.11	154.98	0	3625.13
MW-113	01/05/00	3772.67	147.43	0	3625.24
MW-114	01/05/00	3805.32	181.31	0	3624.01
MW-115	01/05/00	3804.69	181.19	0	3623.50

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F
Historic Fluid Level Data, May 1991 - January 2000
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
MW-117A	01/05/00	3808.24	182.80	0	3625.44
MW-118	01/05/00	3762.88	138.21	0	3624.67
MW-119	01/05/00	3824.74	201.21	0	3623.53
MW-120	01/05/00	3820.65	195.61	1.17	3625.89
MW-121	01/05/00	3820.88	195.12	0	3625.76
MW-122	01/05/00	3822.79	197.61	0	3625.18
MW-123	01/05/00	3768.77	142.88	0.61	3626.34
MW-124	01/05/00	3777.83	151.95	0	3625.88
MW-125	01/05/00	3790.61	166.64	1.27	3624.90
MW-127	01/05/00	3825.17	202.12	0	3623.05
MW-128	01/05/00	3786.08	160.91	0	3625.17
MW-129	01/05/00	3800.82	175.48	0.84	3625.95
MW-130	01/05/00	3775.54	149.65	0.60	3626.33
MW-131	01/05/00	3784.23	158.32	0	3625.91
IW-1	07/16/96	3808.55	185.32	2.91	3625.36
IW-1	10/13/96	3808.55	181.83	2.81	3628.77
IW-1	02/03/97	3808.55	185.60	5.38	3626.87
IW-1	04/28/97	3808.55	183.12	1.53	3626.54
IW-1	07/14/97	3808.55	182.27	0.38	3626.55
IW-1	10/13/97	3808.55	181.80	0.16	3626.86
IW-1	11/04/97	3808.55	52.65	0	3755.90
IW-1	11/12/97	3808.55	55.85	0	3752.70
IW-1	11/19/97	3808.55	41.80	0	3766.75
IW-1	11/24/97	3808.55	70.90	0	3737.65
IW-1	12/10/97	3808.55	4.00	0	3804.55
IW-1	04/27/98	3808.55	82.27	0	3726.28
IW-1	05/28/98	3808.55	11.26	0	3797.29
IW-1	06/15/98	3808.55	181.05	0	3627.50
IW-1	10/09/98	3808.55	61.46	0	3747.09
IW-1	01/05/00	3808.55	18.15	0	3790.40
IW-2	08/01/96	3835.86	207.22	0	3628.64
IW-2	10/13/96	3835.86	205.52	0	3630.34
IW-2	02/03/97	3835.86	52.92	0	3782.94

Notes:
Water level elevations corrected for condensate using a specific gravity of 0.73
feet amsl Feet above mean sea level
feet bmp Feet below measuring point
D Well was dry at time of gauging
-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
IW-2	04/28/97	3835.86	28.89	0	3806.97
IW-2	07/14/97	3835.86	133.89	0	3701.97
IW-2	10/13/97	3835.86	29.61	0	3806.25
IW-2	11/04/97	3835.86	208.50	0	3627.36
IW-2	11/12/97	3835.86	208.70	0	3627.16
IW-2	11/19/97	3835.86	208.78	0	3627.08
IW-2	11/24/97	3835.86	208.95	0	3626.91
IW-2	12/10/97	3835.86	175.58	0	3660.28
IW-2	01/27/98	3835.86	121.00	0	3714.86
IW-2	02/25/98	3835.86	24.64	0	3811.22
SW-01	02/04/97	3808.19	D	--	--
SW-01	05/28/98	3808.19	198.00	0	3610.19
SW-01	06/17/98	3808.19	198.05	0	3610.14
SW-02	08/21/91	3808.79	180.53	0	3628.26
SW-02	09/18/91	3808.79	180.53	0	3628.26
SW-02	10/22/91	3808.79	179.74	0	3629.05
SW-02	11/15/91	3808.79	179.44	0	3629.35
SW-02	03/01/92	3808.79	180.12	0	3628.67
SW-02	04/01/92	3808.79	180.00	0	3628.79
SW-02	05/01/92	3808.79	176.52	0	3632.27
SW-02	06/01/92	3808.79	176.06	0	3632.73
SW-02	07/01/92	3808.79	176.06	0	3632.73
SW-02	08/01/92	3808.79	176.99	0	3631.80
SW-02	09/01/92	3808.79	177.57	0	3631.22
SW-02	10/01/92	3808.79	178.02	0	3630.77
SW-02	11/01/92	3808.79	178.31	0	3630.48
SW-02	12/01/92	3808.79	179.06	0	3629.73
SW-02	01/01/93	3808.79	178.88	0	3629.91
SW-02	02/01/93	3808.79	179.08	0	3629.71
SW-02	03/01/93	3808.79	179.31	0	3629.48
SW-02	04/01/93	3808.79	179.04	0	3629.75
SW-02	05/01/93	3808.79	179.22	0	3629.57
SW-02	06/01/93	3808.79	179.39	0	3629.40
SW-02	07/01/93	3808.79	179.76	0	3629.03
SW-02	08/01/93	3808.79	179.76	0	3629.03
SW-02	09/01/93	3808.79	179.86	0	3628.93
SW-02	10/01/93	3808.79	179.63	0	3629.16
SW-02	11/01/93	3808.79	180.39	0	3628.40
SW-02	12/01/93	3808.79	179.62	0	3629.17
SW-02	01/01/94	3808.79	180.41	0	3628.38
SW-02	02/01/94	3808.79	181.55	0	3627.24
SW-02	03/01/94	3808.79	180.10	0	3628.69
SW-02	04/01/94	3808.79	180.58	0	3628.21
SW-02	05/01/94	3808.79	181.13	0	3627.66
SW-02	07/01/94	3808.79	181.00	0	3627.79
SW-02	08/01/94	3808.79	180.61	0	3628.18
SW-02	09/01/94	3808.79	180.52	0	3628.27

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
SW-02	10/01/94	3808.79	181.56	0	3627.23
SW-02	12/01/94	3808.79	184.89	0	3623.90
SW-02	01/01/95	3808.79	181.26	0	3627.53
SW-02	04/01/95	3808.79	181.50	0	3627.29
SW-02	07/01/95	3808.79	181.62	0	3627.17
SW-02	10/01/95	3808.79	181.70	0	3627.09
SW-02	01/16/96	3808.79	182.21	0	3626.58
SW-02	04/17/96	3808.79	182.25	0	3626.54
SW-02	07/15/96	3808.79	182.24	0	3626.55
SW-02	10/01/96	3808.79	180.89	0	3627.90
SW-02	01/01/97	3808.79	182.21	0	3626.58
SW-02	02/04/97	3808.79	182.31	0	3626.48
SW-02	04/28/97	3808.79	182.80	0	3625.99
SW-02	07/15/97	3808.79	183.04	0	3625.75
SW-02	10/14/97	3808.79	183.89	0	3624.90
SW-02	01/27/98	3808.79	183.74	0	3625.05
SW-02	04/27/98	3808.79	185.05	0	3623.74
SW-02	05/28/98	3808.79	185.13	0	3623.66
SW-02	06/17/98	3808.79	185.15	0	3623.64
SW-02	10/09/98	3808.79	185.65	0	3623.14
SW-02	01/27/99	3808.79	185.94	0	3622.85
SW-02	04/19/99	3808.79	185.62	0	3623.17
SW-03	07/15/96	3842.29	215.52	0	3626.77
SW-03	10/01/96	3842.29	213.51	0	3628.78
SW-03	02/03/97	3842.29	215.63	0	3626.66
SW-03	04/28/97	3842.29	216.14	0	3626.15
SW-03	07/14/97	3842.29	216.74	0	3625.55
SW-03	10/14/97	3842.29	217.51	0	3624.78
SW-03	01/27/98	3842.29	217.54	0	3624.75
SW-03	04/27/98	3842.29	217.80	0	3624.49
SW-03	05/28/98	3842.29	217.98	0	3624.31
SW-03	06/15/98	3842.29	218.50	0	3623.79
SW-03	10/09/98	3842.29	218.58	0	3623.71
SW-03	01/27/99	3842.29	D	--	--
SW-03	04/19/99	3842.29	219.03	0	3623.26
SW-03	01/05/00	3842.29	218.96	0	3623.33
VE-01	06/15/98	--	204.78	0	--
VE-01	01/05/00	--	205.54	0	--
VE-02	06/15/98	--	200.67	0	--
VE-02	01/05/00	--	201.48	0	--
VE-03	06/15/98	--	191.32	0	--
VE-03	01/05/00	--	192.13	0	--
VE-04	06/15/98	--	179.89	0	--
VE-04	01/05/00	--	D	--	--

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix F

Historic Fluid Level Data, May 1991 - January 2000

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Date	Measuring Point Elevation (feet amsl)	Depth to Water (feet bmp)	Condensate Thickness (feet)	Corrected Water-Level Elevation (feet amsl)
VE-05	06/15/98	--	164.48	0	--
VE-16	10/29/97	3750.96	124.27	0	3626.69
VE-16	11/04/97	3750.96	124.35	0	3626.61
VE-16	11/12/97	3750.96	124.22	0	3626.74
VE-16	11/19/97	3750.96	124.33	0	3626.63
VE-16	11/24/97	3750.96	124.33	0	3626.63
VE-16	12/10/97	3750.96	124.30	0	3626.66
VE-16	02/25/98	3750.96	124.38	0	3626.58
VE-16	06/15/98	3750.96	124.81	0	3626.15
VE-16	01/05/00	3750.96	125.69	0	3625.27
VE-17	10/29/97	3756.73	118.48	0	3638.25
VE-17	11/04/97	3756.73	117.00	0	3639.73
VE-17	11/12/97	3756.73	117.93	0	3638.80
VE-17	11/19/97	3756.73	118.13	0	3638.60
VE-17	11/24/97	3756.73	118.32	0	3638.41
VE-17	12/10/97	3756.73	118.24	0	3638.49
VE-17	02/25/98	3756.73	119.27	0	3637.46
VE-17	06/15/98	3756.73	117.27	0	3639.46
VE-17	01/05/00	3756.73	120.11	0	3636.62
VE-18	06/15/98	3756.82	131.71	0	3625.11
VE-18	01/05/00	3756.82	131.56	0	3625.26
VE-19	10/29/97	3761.18	136.05	2.05	3626.62
VE-19	11/04/97	3761.18	136.41	2.45	3626.55
VE-19	11/19/97	3761.18	140.88	2.88	3622.40
VE-19	11/24/97	3761.18	140.33	1.39	3621.86
VE-19	12/10/97	3761.18	138.56	0	3622.62
VE-19	01/06/98	3761.18	139.67	2.56	3623.37
VE-19	01/15/98	3761.18	140.90	3.4	3622.76
VE-19	01/20/98	3761.18	140.16	0.48	3621.37
VE-19	02/03/98	3761.18	136.63	0.01	3624.55
VE-19	02/10/98	3761.18	138.66	1.11	3623.33
VE-19	02/17/98	3761.18	139.83	1.89	3622.72
VE-19	02/25/98	3761.18	139.80	1.95	3622.80
VE-19	05/28/98	3761.18	133.78	0	3627.40
VE-19	06/16/98	3761.18	136.97	0	3624.21
VE-19	01/05/00	3761.18	136.37	0.46	3625.15
VE-20	06/16/98	3768.41	142.26	0	3626.15
VE-20	01/05/00	3768.41	143.31	0	3625.10

Notes:

Water level elevations corrected for condensate using a specific gravity of 0.73

feet amsl Feet above mean sea level

feet bmp Feet below measuring point

D Well was dry at time of gauging

-- No data obtained

Appendix G

Historical Analytical Data

Historical BTEX Analytical Data

Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
BIEBBLE	05/28/91	--	--	--	<10
BIEBBLE	07/01/91	<5	--	--	--
BIEBBLE	07/19/91	--	<5	<5	--
BIEBBLE	04/01/92	<1	<1	<1	<1
BIEBBLE	07/01/92	<1	<1	<1	<1
BIEBBLE	10/01/92	<1	<1	<1	<1
BIEBBLE	01/01/93	<1	<1	<1	<1
BIEBBLE	04/15/93	<1	<1	<1	<1
BIEBBLE	07/15/93	<0.5	<0.5	<0.5	<0.5
BIEBBLE	10/14/93	<0.5	<0.5	<0.5	<0.5
BIEBBLE	01/13/94	<0.5	<0.5	<0.5	<0.5
BIEBBLE	04/05/94	<0.5	<0.5	<0.5	<0.5
BIEBBLE	07/21/94	<0.5	<0.5	<0.5	<0.5
BIEBBLE	10/06/94	<0.5	<0.5	<0.5	<0.5
BIEBBLE	01/11/95	<0.5	<0.5	<0.5	<0.5
BIEBBLE	04/07/95	<0.5	<0.5	<0.5	<0.5
BIEBBLE	07/21/95	<0.5	<0.5	<0.5	<0.5
BIEBBLE	10/12/95	<0.5	<0.5	<0.5	<0.5
BIEBBLE	01/19/96	<0.5	<0.5	<0.5	<0.5
BIEBBLE	04/17/96	<0.5	<0.5	<0.5	<0.5
BIEBBLE	07/01/96	<0.5	<0.5	<0.5	<0.5
BIEBBLE	10/01/96	<0.5	<0.5	<0.5	0.5
BIEBBLE	02/10/97	<0.5	<0.5	<0.5	<0.5
IW-2	08/01/96	<0.5	<0.5	<0.5	<0.5
LYMAN	05/28/91	--	--	--	<10
LYMAN	07/01/91	<5	--	--	--
LYMAN	07/19/91	--	<5	<5	--
LYMAN	04/01/92	<1	<1	<1	<1
LYMAN	07/01/92	<1	<1	<1	<1
LYMAN	10/01/92	<1	<1	<1	<1
LYMAN	01/01/93	<1	<1	<1	<1
LYMAN	04/15/93	<1	<1	<1	<1
LYMAN	05/12/93	<1	<1	<1	<1
LYMAN	06/28/93	<0.5	<0.5	<0.5	<0.5
LYMAN	07/15/93	<0.5	<0.5	<0.5	<0.5
LYMAN	08/03/93	<0.5	<0.5	<0.5	<0.5
LYMAN	09/21/93	<0.5	<0.5	<0.5	<0.5
LYMAN	10/14/93	<0.5	<0.5	<0.5	<0.5
LYMAN	11/10/93	<0.5	<0.5	<0.5	<0.5
LYMAN	12/06/93	<0.5	<0.5	<0.5	<0.5
LYMAN	01/12/94	<0.5	<0.5	<0.5	<0.5
LYMAN	02/09/94	<0.5	<0.5	<0.5	<0.5
LYMAN	03/16/94	<0.5	<0.5	<0.5	<0.5
LYMAN	04/05/94	<0.5	<0.5	<0.5	<0.5
LYMAN	05/19/94	<0.5	<0.5	<0.5	<0.5
LYMAN	06/23/94	<0.5	<0.5	<0.5	<0.5
LYMAN	07/21/94	<0.5	<0.5	<0.5	<0.5
LYMAN	08/24/94	<0.5	<0.5	<0.5	<0.5
LYMAN	09/20/94	<0.5	<0.5	<0.5	0.8

Notes:
Concentrations listed in micrograms per liter (ug/L)
<5 Constituent not detected above noted laboratory detection limit
-- Indicates parameter was not analyzed

Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
LYMAN	10/06/94	<0.5	<0.5	<0.5	<0.5
LYMAN	11/30/94	<0.5	<0.5	<0.5	<0.5
LYMAN	12/16/94	<0.5	<0.5	<0.5	<0.5
LYMAN	01/11/95	<0.5	<0.5	<0.5	<0.5
LYMAN	03/09/95	<0.5	<0.5	<0.5	<0.5
LYMAN	04/07/95	<0.5	<0.5	<0.5	<0.5
LYMAN	05/18/95	<0.5	<0.5	<0.5	<0.5
LYMAN	07/21/95	<0.5	<0.5	<0.5	<0.5
LYMAN	10/12/95	<0.5	<0.5	<0.5	1.6
LYMAN	12/27/95	<0.5	<0.5	<0.5	<0.5
LYMAN	01/19/96	<0.5	<0.5	<0.5	<0.5
LYMAN	03/18/96	<0.5	<0.5	<0.5	<0.5
LYMAN	04/18/96	<0.5	<0.5	<0.5	<0.5
LYMAN	07/01/96	<0.5	<0.5	<0.5	<0.5
LYMAN	10/01/96	<0.5	<0.5	<0.5	<0.5
LYMAN	02/10/97	<0.5	<0.5	<0.5	<0.5
LYMAN	01/14/98	<0.5	<0.5	<0.5	<0.5
LYMAN	04/30/98	<0.5	<0.5	<0.5	<0.5
LYMAN	06/29/98	<1	<1	<1	<1
MW-1	05/01/91	500	--	--	--
MW-1	05/28/91	--	<500	1000	<500
MW-1	09/01/91	250	--	--	--
MW-1	12/01/91	200	200	300	100
MW-10	05/01/91	5500	--	--	--
MW-10	05/28/91	--	7000	500	4500
MW-10	09/01/91	2300	--	--	--
MW-10	12/01/91	2300	<100	200	2500
MW-10	04/01/92	1840	106	<3	2415
MW-10	07/01/92	1842	101	482	2183
MW-10	10/01/92	2100	144	436	759
MW-10	01/01/94	ND	--	ND	ND
MW-10	02/11/97	<0.5	<0.5	<0.5	<0.5
MW-11	09/01/91	3000	--	--	--
MW-11	12/01/91	3800	5800	500	5200
MW-11	04/01/92	3573	2979	484	6714
MW-11	07/01/92	2199	2440	463	3693
MW-11	10/01/92	2755	1896	<3	5196
MW-11	01/01/93	2746	1821	475	4280
MW-11	10/05/94	1800	<50	450	3500
MW-11	07/21/95	95	<0.5	4.4	250
MW-11	01/20/96	1000	32	190	2800
MW-11	04/19/96	650	38	84	2800
MW-11	07/01/96	500	46	370	2300
MW-11	10/01/96	270	15	230	1600
MW-11	02/07/97	270	20	81	1400
MW-12	09/01/91	3800	--	--	--
MW-13	09/01/91	3100	--	--	--
MW-13	12/01/91	3000	750	500	3300
MW-13	04/01/92	3501	142	<3	7137

Notes:
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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-13	07/01/92	2708	136	597	2247
MW-13	10/01/96	1100	520	1200	2800
MW-13	02/07/97	1300	130	690	1000
MW-13	07/01/98	800	<10	640	170
MW-14	09/01/91	5100	--	--	--
MW-14	06/22/98	820	<10	840	<10
MW-15	09/01/91	5100	--	--	--
MW-16	09/01/91	1700	--	--	--
MW-16	04/15/93	514	53	39	2134
MW-17	09/01/91	2000	--	--	--
MW-17	04/15/93	1500	58	230	2900
MW-18	09/01/91	4300	--	--	--
MW-18	04/01/92	2900	82	750	1200
MW-18	07/01/92	2700	22	600	55
MW-18	10/01/92	3300	115	870	187
MW-19	07/01/91	4900	--	--	--
MW-19	07/19/91	--	1000	1300	--
MW-19	07/30/91	--	--	--	2500
MW-19	09/01/91	4700	--	--	--
MW-19	04/01/92	3240	347	807	326
MW-19	07/01/92	3000	40	800	41
MW-19	10/01/92	2756	73	758	166
MW-19	04/15/93	3926	130	16	82
MW-19	10/01/96	140	5.9	5.2	17
MW-19	02/07/97	360	980	1100	5600
MW-20	09/01/91	110	--	--	--
MW-21	05/01/91	9	--	--	--
MW-21	05/28/91	--	9	<1	3
MW-21	09/01/91	1000	--	--	--
MW-21	12/01/91	1100	<50	<50	1000
MW-21	04/15/93	114	19	38	38
MW-22	09/01/91	4	--	--	--
MW-24	09/01/91	3400	--	--	--
MW-24	07/01/92	4353	27	55	708
MW-26	09/01/91	3100	--	--	--
MW-26	12/01/91	3000	<100	400	3700
MW-26	07/01/92	2000	48	390	1400
MW-26	10/01/92	1860	59	567	1774
MW-26	01/01/93	1708	82	399	1083
MW-26	04/15/93	861	62	600	2014
MW-28	09/01/91	2200	--	--	--
MW-31	09/01/91	<1	--	--	--
MW-31	07/01/92	332	36	11	54
MW-31	10/01/92	9	32	10	18
MW-32	09/01/91	200	--	--	--
MW-33	09/01/91	6300	--	--	--
MW-34	09/01/91	2500	--	--	--
MW-35	09/01/91	5700	--	--	--
MW-37	06/01/91	<25	--	--	--

Notes:
Concentrations listed in micrograms per liter (ug/L)
<5 Constituent not detected above noted laboratory detection limit
-- Indicates parameter was not analyzed

Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-37	06/22/91	--	<25	<25	<25
MW-37	09/01/91	150	--	--	--
MW-37	07/14/93	27	7	<3	<3
MW-38	05/01/91	500	--	--	--
MW-38	05/28/91	--	<250	250	<250
MW-38	06/01/91	<10	--	--	--
MW-38	06/22/91	--	<10	<10	<10
MW-38	09/01/91	15	--	--	--
MW-38	12/01/91	15	<1	15	<1
MW-38	04/01/92	67	17	55	7
MW-38	07/01/92	37	34	25	56
MW-38	10/01/92	166	18	242	24
MW-38	10/01/96	0.6	<0.5	<0.5	0.7
MW-38	02/07/97	0.7	<0.5	<0.5	0.7
MW-39	05/01/91	<1	--	--	--
MW-39	05/28/91	--	<1	11	38
MW-39	06/01/91	<1	--	--	--
MW-39	06/22/91	--	<1	<1	<1
MW-39	09/01/91	880	--	--	--
MW-39	01/01/93	14	6	<5	<5
MW-39	04/15/93	28	15	4	11
MW-39	07/15/93	24	3	<3	3
MW-39	10/14/93	19	23	<3	10
MW-39	01/13/94	<2.5	<2.5	8.4	70
MW-39	04/07/94	<0.5	<0.5	4	38
MW-39	07/20/94	<0.5	<0.5	5.9	78
MW-39	01/10/95	<5	7.1	250	80
MW-39	10/01/96	20	<0.5	<0.5	<0.5
MW-39	02/07/97	<0.5	<0.5	<0.5	<0.5
MW-39	07/18/97	<0.5	<0.5	<0.5	<0.5
MW-39	04/30/98	<0.5	<0.5	<0.5	<0.5
MW-39	07/01/98	<1	<1	<1	<1
MW-41	07/01/91	300	--	--	--
MW-41	07/19/91	--	<50	350	--
MW-41	07/30/91	--	--	--	<50
MW-41	09/01/91	200	--	--	--
MW-41	12/01/91	170	30	400	<10
MW-41	07/15/93	12	<5	22	<5
MW-41	10/14/93	8.9	<0.5	17	<0.5
MW-41	01/13/94	5.3	<5	27	140
MW-41	04/06/94	0.6	<0.5	3.8	7.4
MW-41	07/20/94	1.4	31	4.9	<0.5
MW-41	10/06/94	3.2	44	0.7	90
MW-41	01/11/95	13	<5	42	23
MW-41	04/06/95	4.8	<0.5	19	33
MW-41	07/21/95	<0.5	<0.5	1.1	6.3
MW-41	10/12/95	1.8	8	2.6	18
MW-41	01/20/96	<5	10	<5	14
MW-41	04/19/96	1.7	9.8	5.5	6.7

Notes:
Concentrations listed in micrograms per liter (ug/L)
<5 Constituent not detected above noted laboratory detection limit
-- Indicates parameter was not analyzed

Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-41	07/01/96	<0.5	6.1	3.6	1.7
MW-41	10/01/96	8.1	2.4	5.8	5.5
MW-41	02/07/97	82	6.2	7.2	9.1
MW-41	07/18/97	280	6.9	6.9	23
MW-41	04/30/98	<0.5	7.1	4.5	21
MW-41	06/28/98	41	<1	<1	<1
MW-41	04/20/99	150	<5	<5	<10
MW-42	09/01/91	<1	--	--	--
MW-42	12/01/91	<1	<1	<1	<1
MW-43	06/01/91	<10	--	--	--
MW-43	06/22/91	--	<10	15	10
MW-43	09/01/91	320	--	--	--
MW-43	07/15/93	25	17	<3	3
MW-43	10/14/93	10	11	<3	<3
MW-43	01/13/94	<0.5	<0.5	<0.5	<0.5
MW-43	04/06/94	<0.5	<0.5	1.2	14
MW-43	07/20/94	<0.5	<0.5	1.5	7.1
MW-43	10/06/94	0.8	<0.5	2.3	17
MW-43	01/11/95	3	<0.5	5.5	15
MW-43	04/06/95	0.6	<0.5	2.8	14
MW-43	07/21/95	3	4	5.8	5.9
MW-43	10/12/95	1.2	2.4	3.8	5.5
MW-43	01/20/96	1.4	3.1	6.6	5.3
MW-43	04/19/96	4.4	4.3	1.3	5.3
MW-43	07/01/96	8.2	5.7	4.4	7
MW-43	10/01/96	230	2.1	4.3	3.6
MW-43	02/07/97	64	8.1	18	28
MW-43	07/18/97	110	<1	4.1	<1
MW-43	04/30/98	29	5.8	2.8	26
MW-43	06/22/98	7.3	<1	<1	<1
MW-43	04/20/99	12	<5	<5	<10
MW-43	12/08/99	<5	11	6.2	46
MW-44	06/01/91	75	--	--	--
MW-44	06/22/91	--	<25	220	<25
MW-44	09/01/91	59	--	--	--
MW-44	04/01/92	6	22	24	2
MW-44	07/01/92	97	25	102	96
MW-44	10/01/92	12	34	96	24
MW-44	01/01/93	14	18	65	<1
MW-44	04/15/93	7	15	18	14
MW-44	07/15/93	6	16	<3	18
MW-44	10/14/93	3.6	<0.5	19	5.6
MW-44	01/13/94	12	<5	7.2	14
MW-44	04/06/94	22	<2.5	3.3	11
MW-44	07/20/94	36	<5	12	14
MW-44	10/05/94	130	<25	120	77
MW-44	01/11/95	63	<5	140	26
MW-44	04/06/95	19	2	71	16
MW-44	07/21/95	5.8	<0.5	16	5.6

Notes:

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-44	10/12/95	120	<50	240	260
MW-44	01/20/96	51	14	130	15
MW-44	04/19/96	26	11	74	6.3
MW-44	07/01/96	83	99	280	310
MW-44	10/01/96	33	2.7	20	2.6
MW-44	02/07/97	270	26	53	48
MW-44	07/18/97	750	<10	45	<10
MW-44	04/30/98	520	22	17	44
MW-44	06/22/98	440	<5	9.2	<5
MW-44	04/20/99	91	<5	16	<10
MW-45	06/01/91	<1	--	--	--
MW-45	06/22/91	--	<1	<1	<1
MW-45	09/01/91	<1	--	--	--
MW-45	12/01/91	<1	<1	<1	<1
MW-45	07/15/93	<3	6	7	4
MW-45	10/14/93	<3	3	<3	3
MW-45	01/13/94	<0.5	<0.5	<0.5	<0.5
MW-45	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-45	07/20/94	<0.5	<0.5	<0.5	<0.5
MW-46	06/01/91	3200	--	--	--
MW-46	06/22/91	--	<50	900	<50
MW-46	07/01/91	300	--	--	--
MW-46	07/19/91	--	<50	250	--
MW-46	07/30/91	--	--	--	250
MW-46	09/01/91	140	--	--	--
MW-46	10/01/96	900	33	440	59
MW-46	02/11/97	3300	550	1000	1400
MW-46	05/29/97	5000	1200	230	<100
MW-46	07/18/97	6100	1900	270	130
MW-46	04/30/98	1600	41	140	290
MW-46	07/01/98	1700	<5	97	120
MW-46	04/20/99	210	<5	11	20
MW-46	12/08/99	50	43	34	129
MW-47	06/01/91	600	--	--	--
MW-47	06/22/91	--	<100	2000	2700
MW-47	09/01/91	2600	--	--	--
MW-47	12/01/91	2200	<50	<50	<50
MW-47	10/01/96	1500	59	200	250
MW-48	09/01/91	<1	--	--	--
MW-48	12/01/91	<1	5	10	<1
MW-48	07/01/92	47	18	6	18
MW-48	10/01/96	<0.5	<0.5	<0.5	1
MW-49	06/01/91	60	--	--	--
MW-49	06/22/91	--	<10	60	40
MW-49	09/01/91	35	--	--	--
MW-49	07/15/93	210	27	42	30
MW-49	10/14/93	68	26	9	20
MW-49	01/13/94	13	<5	15	110
MW-49	04/06/94	82	<0.5	11	10

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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-49	07/20/94	150	<5	32	27
MW-49	10/05/94	78	49	40	300
MW-49	01/11/95	220	<5	46	97
MW-49	04/06/95	120	<0.5	24	26
MW-49	07/21/95	17	<0.5	3.5	3.4
MW-49	10/12/95	240	<50	59	130
MW-49	01/20/96	160	130	120	570
MW-49	04/19/96	87	23	18	32
MW-49	07/01/96	370	220	190	630
MW-49	10/01/96	95	16	36	12
MW-49	02/07/97	79	66	45	160
MW-49	07/18/97	130	<1	35	9.8
MW-49	04/30/98	130	39	41	69
MW-49	07/01/98	78	<1	15	<1
MW-49	04/20/99	81	<5	32	<10
MW-49	12/08/99	32	68	58	380
MW-50	06/01/91	<1	--	--	--
MW-50	06/22/91	--	<1	<1	<1
MW-50	09/01/91	<1	--	--	--
MW-50	12/01/91	<1	<1	<1	<1
MW-50	04/01/92	7	18	<3	17
MW-50	07/01/92	4	167	7	11
MW-50	10/01/92	8	10	3	2
MW-50	01/01/93	8	5	<3	5
MW-50	04/15/93	<1	<1	<1	<1
MW-50	07/15/93	<3	12	10	4
MW-50	10/14/93	9	16	<3	<3
MW-50	01/13/94	<0.5	<0.5	<0.5	<0.5
MW-50	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-50	07/20/94	<0.5	<0.5	<0.5	<0.5
MW-50	10/05/94	<0.5	<0.5	<0.5	<0.5
MW-50	01/11/95	<0.5	<0.5	<0.5	<0.5
MW-50	04/06/95	<0.5	<0.5	<0.5	<0.5
MW-50	07/21/95	<0.5	<0.5	<0.5	<0.5
MW-50	10/12/95	<0.5	<0.5	<0.5	<0.5
MW-50	01/20/96	<0.5	<0.5	<0.5	<0.5
MW-50	04/19/96	<0.5	<0.5	<0.5	<0.5
MW-50	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-50	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-50	02/07/97	<0.5	<0.5	<0.5	<0.5
MW-50	07/18/97	<1	<1	<1	<1
MW-50	04/30/98	<0.5	<0.5	<0.5	<0.5
MW-50	06/28/98	<1	<1	<1	<1
MW-50	04/20/99	<5	<5	<5	<10
MW-50	12/08/99	<5	<5	<5	<10
MW-51	09/01/91	800	--	--	--
MW-51	12/01/91	<1	<1	<1	<1
MW-52	09/01/91	<1	--	--	--
MW-52	07/01/92	5	31	4	5

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Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-53	09/01/91	<1	--	--	--
MW-54	09/01/91	<1	--	--	--
MW-54	12/01/91	<1	<1	<1	<1
MW-54	04/01/92	10	10	<3	14
MW-54	07/01/92	8	44	23	195
MW-54	10/01/92	62	7	195	630
MW-54	01/01/93	14	4	15	113
MW-54	04/14/93	10	<3	<3	8
MW-54	07/14/93	<3	<3	<3	3
MW-54	10/14/93	17	35	16	24
MW-54	01/12/94	8.6	<0.5	7.4	<0.5
MW-54	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-54	07/20/94	15	1.2	8.5	8.7
MW-54	10/05/94	19	0.6	29	6.3
MW-54	01/10/95	<0.5	<0.5	<0.5	<0.5
MW-54	04/06/95	<0.5	<0.5	<0.5	<0.5
MW-54	07/21/95	<0.5	<0.5	<0.5	<0.5
MW-54	10/11/95	0.7	<0.5	1.7	3
MW-54	01/20/96	<0.5	<0.5	<0.5	<0.5
MW-54	04/18/96	<0.5	<0.5	<0.5	<0.5
MW-54	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-54	10/01/96	0.9	<0.5	0.6	<0.5
MW-54	02/10/97	<0.5	<0.5	<0.5	<0.5
MW-54	07/16/97	0.9	3.2	2.1	17
MW-54	04/29/98	<0.5	<0.5	<0.5	<0.5
MW-54	06/25/98	<1	<1	<1	<1
MW-54	04/22/99	<5	<5	<5	<10
MW-54	01/06/00	<5	<5	<5	<10
MW-55	06/01/91	<50	--	--	--
MW-55	06/22/91	--	<50	<50	100
MW-55	09/01/91	940	--	--	--
MW-55	12/01/91	400	25	<25	25
MW-55	04/01/92	297	24	15	34
MW-55	07/01/92	483	36	64	66
MW-55	10/01/92	215	56	92	26
MW-55	01/01/93	390	68	90	32
MW-55	04/14/93	412	20	89	18
MW-55	07/14/93	625	21	8	50
MW-55	10/14/93	581	27	102	18
MW-55	01/12/94	290	<2.5	89	<2.5
MW-55	04/08/94	370	<2.5	33	<2.5
MW-55	07/20/94	360	5.5	16	120
MW-55	10/05/94	910	<5	480	<5
MW-55	01/11/95	650	<5	400	41
MW-55	04/11/95	420	<2.5	260	21
MW-55	07/20/95	350	<5	270	22
MW-55	10/11/95	100	6.1	70	15
MW-55	01/19/96	650	15	430	29
MW-55	04/18/96	370	13	310	22

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Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-55	07/01/96	800	35	520	99
MW-55	10/01/96	520	32	460	84
MW-55	02/10/97	410	20	230	64
MW-55	07/16/97	140	11	110	9.2
MW-55	04/29/98	110	12	31	7.7
MW-55	06/25/98	180	<1	31	<1
MW-55	04/22/99	100	<5	13	<10
MW-55	12/09/99	90	19	15	<10
MW-56	06/01/91	2100	--	--	--
MW-56	06/22/91	--	<50	2900	<50
MW-56	07/01/91	2000	--	--	--
MW-56	07/19/91	--	500	1000	--
MW-56	07/30/91	--	--	--	1000
MW-56	09/01/91	2200	--	--	--
MW-56	12/01/91	1000	2000	3000	6000
MW-56	07/01/92	1114	64	962	49
MW-56	10/01/92	1026	47	<3	839
MW-56	01/01/93	1128	40	10	804
MW-56	10/01/96	1000	23	94	92
MW-56	02/11/97	370	12	51	51
MW-57	05/28/91	--	--	--	<0.2
MW-57	06/01/91	<1	--	--	--
MW-57	06/22/91	--	1	<1	<1
MW-57	07/01/91	<1	--	--	--
MW-57	07/19/91	--	0.2	0.4	--
MW-57	09/01/91	1600	--	--	--
MW-57	12/01/91	350	<10	<10	<10
MW-57	04/01/92	127	29	<3	16
MW-57	07/01/92	948	422	112	876
MW-57	10/01/92	15	33	<3	78
MW-57	01/01/93	21	40	165	19
MW-57	04/14/93	8	21	15	16
MW-57	07/14/93	6	8	<3	<3
MW-57	10/13/93	<0.5	1.6	<0.5	1.2
MW-57	01/12/94	<0.5	<0.5	<0.5	<0.5
MW-57	04/07/94	<0.5	<0.5	<0.5	<0.5
MW-57	07/19/94	0.7	<0.5	<0.5	1.8
MW-57	10/05/94	1.1	<0.5	<0.5	4
MW-57	01/11/95	4.3	<0.5	<0.5	1.3
MW-57	04/08/95	<0.5	<0.5	<0.5	<0.5
MW-57	07/20/95	<0.5	0.8	<0.5	<0.5
MW-57	10/11/95	64	1.7	0.7	5
MW-57	01/19/96	16	1.5	1	4.2
MW-57	04/18/96	<0.5	0.9	<0.5	<0.5
MW-57	07/01/96	2.8	1	<0.5	1.4
MW-57	10/01/96	54	2.8	3.4	13
MW-57	02/10/97	<0.5	0.9	<0.5	<0.5
MW-57	07/15/97	<0.5	<0.5	<0.5	<0.5
MW-57	04/29/98	<0.5	<0.5	<0.5	0.9

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Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-57	06/24/98	<1	<1	<1	<1
MW-57	04/20/99	<5	<5	<5	<10
MW-58	09/01/91	40	--	--	--
MW-58	12/01/91	90	40	20	80
MW-58	04/01/92	203	32	56	68
MW-58	07/01/92	178	58	32	44
MW-58	10/01/92	190	49	26	57
MW-58	01/01/93	192	30	23	39
MW-58	04/13/93	55	16	31	9
MW-58	07/13/93	25	42	14	13
MW-58	10/13/93	50	21	212	555
MW-58	04/05/94	<2.5	<2.5	7.4	27
MW-58	07/19/94	2	29	4.5	27
MW-58	10/06/94	6.7	<5	15	39
MW-58	04/08/95	2.2	<0.5	2.1	6.8
MW-58	10/01/96	110	320	940	10000
MW-58	01/30/98	350	23	42	96
MW-58	06/22/98	22	<1	28	35
MW-59	09/01/91	540	--	--	--
MW-59	12/01/91	420	40	240	420
MW-59	04/01/92	42	12	20	20
MW-59	07/01/92	268	45	110	232
MW-59	10/01/92	99	37	44	46
MW-59	01/01/93	26	<3	55	10
MW-59	04/13/93	10	14	12	5
MW-59	10/13/93	10	13	89	433
MW-59	04/05/94	<2.5	<2.5	3.3	25
MW-59	07/19/94	13	69	0.5	73
MW-59	10/06/94	4.1	3.7	23	37
MW-59	06/24/98	<5	<5	79	42
MW-60	05/28/91	--	--	--	<0.2
MW-60	07/01/91	<0.2	--	--	--
MW-60	07/19/91	--	<0.2	0.4	--
MW-60	09/01/91	33	--	--	--
MW-60	12/01/91	<1	<1	<1	<1
MW-60	04/01/92	5	9	<3	4
MW-60	07/01/92	17	1	<1	1
MW-60	10/01/92	32	109	36	57
MW-60	01/01/93	138	4	260	6
MW-60	04/14/93	17	16	<3	12
MW-60	07/14/93	<0.5	<0.5	<0.5	<0.5
MW-60	10/13/93	<0.5	1	0.5	1
MW-60	01/12/94	<0.5	<0.5	<0.5	<0.5
MW-60	04/07/94	<0.5	<0.5	<0.5	<0.5
MW-60	07/19/94	<0.5	1.3	<0.5	3.5
MW-60	10/05/94	<0.5	0.6	0.6	4.9
MW-60	01/10/95	<0.5	<0.5	<0.5	0.6
MW-60	04/07/95	<0.5	<0.5	<0.5	<0.5
MW-60	07/19/95	<0.5	4.9	<0.5	<0.5

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Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-60	10/11/95	<0.5	<0.5	<0.5	<0.5
MW-60	01/19/96	<0.5	<0.5	<0.5	<0.5
MW-60	04/18/96	<0.5	<0.5	<0.5	<0.5
MW-60	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-60	10/01/96	2.5	0.9	<0.5	<0.5
MW-60	02/09/97	<0.5	<0.5	0.5	0.8
MW-60	05/06/97	<0.5	<0.5	<0.5	<0.5
MW-60	07/15/97	<0.5	<0.5	<0.5	<0.5
MW-60	10/16/97	<0.5	<0.5	<0.5	<0.5
MW-60	01/30/98	<0.5	<0.5	<0.5	<0.5
MW-60	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-60	07/01/98	<1	<1	<1	<1
MW-60	10/12/98	<0.5	<0.5	<0.5	<0.5
MW-60	02/01/99	<0.5	<0.5	<0.5	<0.5
MW-60	04/20/99	<5	<5	<5	<10
MW-60	12/13/99	<5	<5	<5	<10
MW-61	09/01/91	<1	--	--	--
MW-61	12/01/91	--	<1	<1	<1
MW-61	01/13/94	1.4	1	1.7	1.1
MW-61	04/07/94	<0.5	<0.5	0.5	<0.5
MW-61	07/20/94	3.2	<0.5	<0.5	0.8
MW-61	10/04/94	<5	23	14	160
MW-61	01/11/95	<0.5	0.7	2.5	0.8
MW-61	04/11/95	7	<0.5	7.8	35
MW-61	07/21/95	<0.5	<0.5	<0.5	<0.5
MW-61	10/10/95	<0.5	<0.5	<0.5	<0.5
MW-61	01/20/96	<0.5	<0.5	<0.5	<0.5
MW-61	04/18/96	<0.5	<0.5	<0.5	<0.5
MW-61	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-61	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-61	02/10/97	<0.5	<0.5	<0.5	<0.5
MW-61	07/17/97	<0.5	<0.5	<0.5	<0.5
MW-61	04/29/98	<0.5	<0.5	<0.5	<0.5
MW-61	06/28/98	<1	<1	<1	<1
MW-61	04/20/99	100	<5	13	<10
MW-61	04/20/99	100	<5	13	<10
MW-61A	05/28/91	--	--	--	0.5
MW-61A	07/01/91	2	--	--	--
MW-61A	07/19/91	--	1.5	0.4	--
MW-61A	09/01/91	190	--	--	--
MW-61A	12/01/91	10	10	5	75
MW-61A	04/01/92	6	7	<3	13
MW-61A	07/01/92	60	<10	3	8
MW-61A	10/01/92	470	17	<3	2351
MW-61A	01/01/93	585	82	397	2368
MW-61A	04/13/93	2821	173	817	3993
MW-61A	04/05/94	<0.5	<0.5	0.5	3.8
MW-61A	07/19/94	<0.5	<0.5	<0.5	2.5
MW-61A	10/04/94	4.8	4.5	3.7	37

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Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-61A	01/10/95	16	<5	30	220
MW-61A	01/20/96	<0.5	<0.5	<0.5	0.8
MW-61A	04/19/96	<0.5	<0.5	<0.5	<0.5
MW-61A	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-61A	10/01/96	1.7	1.7	1.3	9.4
MW-61A	02/06/97	42	3.4	8.4	46
MW-61A	05/07/97	330	59	<25	850
MW-61A	06/27/97	22	11	-5.4	26
MW-61A	07/15/97	16	<10	10	93
MW-61A	10/15/97	35	13	22	95
MW-61A	01/29/98	15	16	26	130
MW-61A	04/29/98	7.1	9.5	24	93
MW-61A	06/28/98	1.5	<1	7.9	20
MW-61A	10/11/98	4.5	22	15	61
MW-61A	02/01/99	<0.5	<0.5	12	54
MW-61A	04/20/99	<5	<5	15	40
MW-61A	12/16/99	<5	6.3	<5	26.7
MW-62	09/01/91	2200	--	--	--
MW-62	12/01/91	1400	<200	400	2400
MW-62	04/01/92	263	48	170	298
MW-62	07/01/92	357	13	184	301
MW-62	10/01/92	212	19	416	1692
MW-62	01/01/93	78	18	--	207
MW-62	04/13/93	33	15	16	24
MW-62	07/14/93	98	12	70	204
MW-62	10/13/93	19	20	20	32
MW-62	01/11/94	4.1	<2.5	13	44
MW-62	04/05/94	<2.5	<2.5	4.4	26
MW-62	07/19/94	4.3	32	7.5	26
MW-62	10/06/94	13	13	11	39
MW-62	04/08/95	7.5	30	12	30
MW-62	07/18/97	20	19	58	210
MW-62	06/26/98	<10	<10	41	56
MW-62	04/21/99	<5	<5	18	20
MW-63	09/01/91	<1	--	--	--
MW-63	12/01/91	<1	<1	<1	<1
MW-63	04/01/92	5	6	<3	8
MW-63	07/01/92	12	28	3	20
MW-63	10/01/92	4	7	17	33
MW-63	01/01/93	12	4	<3	13
MW-63	04/13/93	<1	<1	<1	<1
MW-63	07/13/93	4	<3	<3	<3
MW-63	10/12/93	14	48	11	39
MW-63	01/11/94	<0.5	0.7	<0.5	0.7
MW-63	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-63	07/18/94	1	9.6	1.4	13
MW-63	10/04/94	<0.5	2.6	1	8
MW-63	01/09/95	<0.5	<0.5	<0.5	<0.5
MW-63	04/07/95	<0.5	<0.5	<0.5	<0.5

Notes:
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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-63	07/18/95	<0.5	1	<0.5	<0.5
MW-63	10/10/95	<0.5	<0.5	<0.5	<0.5
MW-63	01/18/96	<0.5	<0.5	<0.5	<0.5
MW-63	04/17/96	<0.5	<0.5	<0.5	<0.5
MW-63	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-63	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-63	02/05/97	<0.5	<0.5	<0.5	<0.5
MW-63	07/15/97	<0.5	<0.5	<0.5	<0.5
MW-63	10/15/97	<0.5	<0.5	<0.5	<0.5
MW-63	06/25/98	<1	<1	<1	<1
MW-63	10/11/98	<0.5	<0.5	<0.5	<0.5
MW-63	04/22/99	<5	<5	<5	<10
MW-64	09/01/91	150	--	--	--
MW-64	12/01/91	130	<10	40	160
MW-64	04/01/92	245	32	82	331
MW-64	07/01/92	115	19	10	40
MW-64	10/01/92	37	61	<3	96
MW-64	01/01/93	6	2	1	4
MW-64	04/13/93	5	11	5	9
MW-64	07/13/93	2	<0.5	<0.5	<0.5
MW-64	10/13/93	18	12	3	71
MW-64	11/10/93	<4	<4	<4	<4
MW-64	01/12/94	1.7	<0.5	<0.5	0.9
MW-64	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-64	07/19/94	<0.5	0.5	<0.5	3.6
MW-64	10/05/94	<0.5	0.5	0.6	5.6
MW-64	01/10/95	12	<0.5	5.1	13
MW-64	04/07/95	18	<0.5	18	41
MW-64	07/19/95	17	1.1	9.8	23
MW-64	10/11/95	25	1.7	13	32
MW-64	01/19/96	14	2.2	9.3	23
MW-64	04/18/96	10	2	4.3	7.9
MW-64	07/16/97	84	<25	130	310
MW-64	06/23/98	<1	<1	<1	<1
MW-64	04/21/99	<5	<5	<5	<10
MW-64	12/13/99	<5	<5	<5	<10
MW-65	09/01/91	<1	--	--	--
MW-65	12/01/91	--	<1	<1	<1
MW-65	07/15/93	<3	6	<3	3
MW-65	10/05/94	<0.5	<0.5	<0.5	<0.5
MW-65	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-65	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-65	02/11/97	<0.5	<0.5	<0.5	<0.5
MW-65	05/07/97	<0.5	<0.5	<0.5	<0.5
MW-65	04/30/98	<0.5	<0.5	<0.5	<0.5
MW-65	12/09/99	<5	<5	<5	<10
MW-65A	09/01/91	680	--	--	--
MW-65A	12/01/91	150	15	<1	15
MW-65A	04/01/92	26	15	<3	12

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Appendix G

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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-65A	07/01/92	413	235	93	551
MW-65A	10/01/92	11	<3	<3	67
MW-65A	01/01/93	3	<3	<3	11
MW-65A	04/13/93	4	9	3	8
MW-65A	07/13/93	<3	3	<3	<3
MW-65A	10/13/93	7	3	<3	<3
MW-65A	01/11/94	<0.5	<0.5	<0.5	<0.5
MW-65A	04/05/94	<0.5	<0.5	<0.5	<0.5
MW-65A	07/19/94	<0.5	<0.5	<0.5	<0.5
MW-65A	10/06/94	1.7	<0.5	<0.5	<0.5
MW-65A	01/11/95	<0.5	<0.5	<0.5	0.7
MW-65A	04/08/95	<0.5	<0.5	<0.5	0.5
MW-65A	01/20/96	<0.5	<0.5	<0.5	<0.5
MW-65A	04/18/96	<0.5	<0.5	<0.5	2
MW-65A	06/25/98	<1	<1	16	415
MW-66	09/01/91	<1	--	--	--
MW-66	12/01/91	<1	<1	<1	<1
MW-66	04/01/92	4	7	<3	4
MW-66	07/01/92	8	25	7	11
MW-66	10/01/92	12	36	<3	34
MW-66	01/01/93	3	6	3	20
MW-66	04/13/93	<3	5	5	<3
MW-66	07/13/93	8	4	<3	<3
MW-66	10/12/93	13	60	4	29
MW-66	11/10/93	<4	<4	<4	<4
MW-66	01/11/94	<0.5	<0.5	<0.5	0.6
MW-66	04/07/94	<0.5	<0.5	<0.5	<0.5
MW-66	07/19/94	<0.5	0.6	<0.5	0.8
MW-66	10/04/94	<0.5	3	1.5	17
MW-66	01/09/95	<0.5	<0.5	<0.5	<0.5
MW-66	04/11/95	<0.5	<0.5	<0.5	<0.5
MW-66	07/19/95	<0.5	0.9	<0.5	<0.5
MW-66	10/10/95	<0.5	<0.5	<0.5	3.5
MW-66	01/19/96	<0.5	<0.5	<0.5	<0.5
MW-66	04/17/96	<0.5	0.8	<0.5	1
MW-66	07/01/96	<0.5	<0.5	<0.5	0.5
MW-66	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-66	02/05/97	<0.5	<0.5	<0.5	<0.5
MW-66	05/06/97	<0.5	<0.5	<0.5	<0.5
MW-66	07/16/97	<0.5	<0.5	<0.5	<0.5
MW-66	10/15/97	<0.5	<0.5	<0.5	<0.5
MW-66	01/29/98	<0.5	<0.5	<0.5	<0.5
MW-66	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-66	06/17/98	<1	1.6	<1	<1
MW-66	10/11/98	<0.5	<0.5	<0.5	<0.5
MW-66	02/01/99	<0.5	<0.5	<0.5	<0.5
MW-66	04/21/99	<5	<5	<5	<10
MW-66	12/10/99	<5	<5	<5	<10
MW-67	09/01/91	280	--	--	--

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-67	12/01/91	320	<10	<10	<10
MW-67	04/01/92	5	8	<3	12
MW-67	07/01/92	69	10	20	116
MW-67	10/01/92	3	9	<3	73
MW-67	01/01/93	8	3	<3	12
MW-67	04/13/93	7	18	7	19
MW-67	07/13/93	7	<3	<3	<3
MW-67	10/13/93	<0.5	0.9	<0.5	1.1
MW-67	01/12/94	<0.5	<0.5	<0.5	<0.5
MW-67	04/07/94	<0.5	<0.5	<0.5	<0.5
MW-67	07/19/94	<0.5	0.6	<0.5	3
MW-67	10/05/94	<0.5	<0.5	<0.5	4.3
MW-67	01/11/95	1	<0.5	<0.5	1.1
MW-67	04/07/95	1.8	<0.5	<0.5	1.3
MW-67	07/21/95	<0.5	<0.5	<0.5	0.6
MW-67	10/11/95	6.1	1.8	0.5	4.2
MW-67	01/19/96	4.8	3.6	0.6	4.7
MW-67	04/18/96	3.4	0.9	<0.5	2.5
MW-67	07/01/96	95	110	28	280
MW-67	02/10/97	15	4.8	1.9	41
MW-67	07/16/97	160	330	110	1200
MW-67	06/24/98	1.3	2.7	3.5	45.3
MW-67	04/22/99	<5	<5	<5	<10
MW-68	09/01/91	240	--	--	--
MW-68	12/01/91	1900	4500	500	4000
MW-68	04/01/92	2470	3370	550	3866
MW-68	07/01/92	160	267	49	746
MW-68	10/01/92	2205	3327	<3	4721
MW-68	01/01/93	376	944	246	2376
MW-68	04/13/93	650	1900	330	4000
MW-68	07/13/93	150	230	110	1100
MW-68	10/13/93	374	628	286	2398
MW-68	01/11/94	3000	820	1000	7700
MW-68	04/05/94	120	61	170	1300
MW-68	07/19/94	260	170	220	2000
MW-68	10/17/97	740	100	490	3800
MW-68	06/26/98	390	26	140	990
MW-69	09/01/91	2400	--	--	--
MW-69	12/01/91	2100	1100	150	4200
MW-69	07/01/92	568	56	1785	1966
MW-69	10/01/92	1598	71	<3	2879
MW-69	01/01/93	1284	49	309	1931
MW-69	07/18/97	930	23	410	1100
MW-69	04/30/98	970	22	500	530
MW-69	06/29/98	1200	<10	520	510
MW-70	09/01/91	<1	--	--	--
MW-70	12/01/91	<1	<1	<1	<1
MW-70	04/01/92	3	17	<3	8
MW-70	07/01/92	<1	3	1	13

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-70	10/01/92	11	40	63	60
MW-70	01/01/93	<3	<3	8	5
MW-70	04/14/93	9	20	<3	4
MW-70	07/13/93	<1	11	3	<3
MW-70	10/12/93	25	19	19	18
MW-70	11/10/93	<4	<4	<4	40
MW-70	01/11/94	<0.5	0.6	<0.5	<0.5
MW-70	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-70	07/18/94	<0.5	<0.5	<0.5	<0.5
MW-70	10/04/94	1.2	4.3	1.3	12
MW-70	01/09/95	<0.5	2.3	<0.5	2.4
MW-70	04/05/95	<0.5	<0.5	<0.5	1.1
MW-70	07/18/95	<0.5	0.8	<0.5	<0.5
MW-70	10/10/95	<0.5	<0.5	<0.5	<0.5
MW-70	01/18/96	<0.5	<0.5	<0.5	<0.5
MW-70	04/17/96	<0.5	<0.5	<0.5	<0.5
MW-70	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-70	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-70	02/05/97	<0.5	<0.5	<0.5	<0.5
MW-70	10/15/97	<0.5	<0.5	<0.5	<0.5
MW-70	06/16/98	<1	<1	<1	<1
MW-70	04/22/99	<5	<5	<5	<10
MW-71	09/01/93	<4	<4	<4	<4
MW-71	10/12/93	8	5	4	16
MW-71	11/10/93	<4	<4	<4	<4
MW-71	01/11/94	<0.5	1.3	<0.5	0.5
MW-71	04/06/94	<0.5	<0.5	<0.5	<0.5
MW-71	07/18/94	<0.5	3	0.7	6.2
MW-71	10/04/94	1.1	6.8	2.7	31
MW-71	01/10/95	<0.5	<0.5	<0.5	<0.5
MW-71	06/23/95	<0.5	66	<0.5	<0.5
MW-71	07/18/95	<0.5	1.2	<0.5	1.9
MW-71	10/10/95	<0.5	<0.5	<0.5	7.3
MW-71	01/18/96	<0.5	<0.5	<0.5	<0.5
MW-71	04/17/96	<0.5	<0.5	<0.5	<0.5
MW-71	07/01/96	<0.5	<0.5	<0.5	<0.5
MW-71	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-71	02/09/97	5.2	1.3	0.8	1.3
MW-71	05/06/97	<0.5	<0.5	<0.5	<0.5
MW-71	07/17/97	<0.5	<0.5	<0.5	<0.5
MW-71	10/16/97	<0.5	<0.5	<0.5	<0.5
MW-71	01/29/98	<0.5	<0.5	<0.5	<0.5
MW-71	04/29/98	<0.5	<0.5	<0.5	<0.5
MW-71	06/28/98	<1	<1	<1	<1
MW-71	10/11/98	<0.5	<0.5	<0.5	<0.5
MW-71	02/01/99	<0.5	<0.5	<0.5	<0.5
MW-71	04/21/99	<5	<5	<5	<10
MW-71	12/10/99	<5	<5	<5	<10
MW-72	04/05/94	<2.5	<2.5	4.7	15

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Appendix G

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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-72	07/19/94	18	<0.5	5.1	2.8
MW-72	06/30/98	56	<10	100	<10
MW-73	06/30/98	1.1	<1	<1	<1
MW-73	12/14/99	5.7	<5	<5	8.9
MW-74	07/18/97	180	320	180	1900
MW-74	06/24/98	220	<10	10	<10
MW-74	12/14/99	100	3900	990	6700
MW-75	06/30/98	200	<10	89	270
MW-76	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-76	06/29/98	<1	<1	<1	<1
MW-77	07/21/95	<0.5	<0.5	1.9	2.8
MW-77	01/20/96	<0.5	3.1	<0.5	7.1
MW-77	04/19/96	<0.5	3.8	0.8	2.5
MW-77	07/01/96	8	14	19	35
MW-77	10/01/96	160	320	150	1000
MW-77	05/07/97	8.4	70	8.3	52
MW-77	07/18/97	14	30	11	71
MW-77	12/09/99	<5	<5	<5	<10
MW-78	10/01/96	32	15	9.1	35
MW-78	02/10/97	41	7.9	7.4	12
MW-78	05/07/97	20	42	12	23
MW-78	07/17/97	8.2	10	6.6	16
MW-78	04/30/98	1.4	4.9	2	7.7
MW-78	06/28/98	<1	<1	<1	<1
MW-78	04/22/99	<5	<5	<5	<10
MW-78	12/09/99	<5	44	55	420
MW-79	01/11/95	110	<5	8.5	61
MW-79	04/06/95	14	<0.5	10	53
MW-79	07/21/95	<5	74	7.7	62
MW-79	10/10/95	16	4	<2.5	3.7
MW-79	01/18/96	10	6.7	1.4	4.9
MW-79	04/19/96	2.4	7.3	1	2.7
MW-79	07/01/96	3.2	6.3	0.9	6.3
MW-79	10/01/96	1.7	5.8	1	4.2
MW-79	02/10/97	<0.5	<0.5	<0.5	<0.5
MW-79	05/07/97	<0.5	<0.5	<0.5	<0.5
MW-79	07/17/97	<0.5	<0.5	<0.5	<0.5
MW-79	04/29/98	<0.5	1.5	<0.5	1.1
MW-79	06/28/98	<1	<1	<1	<1
MW-79	04/22/99	<5	<5	<5	<10
MW-79	12/09/99	<5	<5	<5	<10
MW-81	06/29/98	<1	<1	<1	1.5
MW-82	10/11/95	280	<50	450	910
MW-82	06/25/98	70	<5	75	510
MW-83	06/25/98	<10	<10	16	31
MW-84	06/23/98	93	13	55	458
MW-85	06/23/98	280	<5	120	6.3
MW-86	10/17/97	510	360	580	1400
MW-86	06/26/98	91	10	28	360

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Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-87	08/01/96	<0.5	20	<0.5	0.5
MW-87	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-87	02/09/97	<0.5	<0.5	<0.5	<0.5
MW-87	05/06/97	<0.5	<0.5	<0.5	<0.5
MW-87	10/16/97	<0.5	<0.5	<0.5	<0.5
MW-87	01/29/98	<0.5	<0.5	<0.5	<0.5
MW-87	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-87	06/27/98	<1	<1	<1	<1
MW-87	10/12/98	<0.5	<0.5	<0.5	<0.5
MW-87	02/02/99	<0.5	<0.5	<0.5	<0.5
MW-87	04/20/99	<5	<5	<5	<10
MW-87	12/13/99	<5	<5	<5	<10
MW-87A	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-87A	02/09/97	0.9	<0.5	0.7	1.5
MW-87A	05/07/97	<0.5	<0.5	<0.5	<0.5
MW-87A	10/16/97	<0.5	<0.5	<0.5	<0.5
MW-87A	01/29/98	<0.5	<0.5	<0.5	<0.5
MW-87A	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-87A	06/27/98	<1	<1	<1	<1
MW-87A	02/02/99	<0.5	<0.5	<0.5	<0.5
MW-87A	04/20/99	<5	<5	<5	<10
MW-87A	12/13/99	<5	<5	<5	<10
MW-88	08/01/96	<0.5	1.1	0.5	1
MW-88	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-88	02/05/97	<0.5	<0.5	<0.5	<0.5
MW-88	04/30/97	<0.5	<0.5	<0.5	<0.5
MW-88	10/15/97	<0.5	<0.5	<0.5	<0.5
MW-88	01/29/98	<0.5	<0.5	<0.5	<0.5
MW-88	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-88	06/27/98	<1	<1	<1	<1
MW-88	10/11/98	<0.5	<0.5	<0.5	<0.5
MW-88	02/01/99	1.6	1.8	1.6	4.8
MW-88	04/21/99	<5	<5	<5	<10
MW-88	12/10/99	<5	<5	<5	<10
MW-89	08/01/96	<0.5	1.1	<0.5	<0.5
MW-89	10/01/96	<0.5	<0.5	<0.5	<0.5
MW-89	02/05/97	<0.5	<0.5	<0.5	<0.5
MW-89	04/30/97	<0.5	<0.5	<0.5	<0.5
MW-89	10/15/97	<0.5	<0.5	<0.5	<0.5
MW-89	01/29/98	<0.5	<0.5	<0.5	<0.5
MW-89	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-89	06/17/98	<1	<1	<1	<1
MW-89	02/01/99	11	1.3	<0.5	<0.5
MW-89	04/21/99	<5	<5	<5	<10
MW-89	12/10/99	<5	<5	<5	<10
MW-90	02/10/97	17	0.5	15	1.4
MW-90	05/07/97	1.1	0.5	0.5	<0.5
MW-90	07/17/97	<0.5	<0.5	<0.5	<0.5
MW-90	04/29/98	<0.5	<0.5	<0.5	<0.5

Notes:
Concentrations listed in micrograms per liter (ug/L)
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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-90	06/17/98	<1	<1	<1	<1
MW-90	04/23/99	<5	<5	<5	<10
MW-90	12/09/99	<5	<5	<5	<10
MW-91	02/11/97	340	14	50	55
MW-91	04/30/98	17	32	19	200
MW-91	04/23/99	19	<5	8	<10
MW-91	12/09/99	140	15	5.2	19
MW-94	10/17/97	<0.5	<0.5	<0.5	<0.5
MW-94	06/26/98	<1	<1	<1	<1
MW-94	04/22/99	<5	<5	<5	<10
MW-95	04/30/97	<0.5	<0.5	<0.5	<0.5
MW-95	01/30/98	<0.5	<0.5	<0.5	<0.5
MW-95	06/22/98	<1	<1	<1	<1
MW-95	04/22/99	<5	<5	<5	<10
MW-95	12/14/99	<5	<5	<5	<10
MW-96	04/30/97	<0.5	<0.5	<0.5	<0.5
MW-96	10/16/97	<0.5	<0.5	<0.5	<0.5
MW-96	01/30/98	<0.5	<0.5	<0.5	<0.5
MW-96	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-96	07/01/98	<1	<1	<1	<1
MW-96	10/12/98	<0.5	<0.5	<0.5	<0.5
MW-96	02/02/99	<0.5	<0.5	<0.5	<0.5
MW-96	04/22/99	<5	<5	<5	<10
MW-96	12/14/99	<5	<5	<5	<10
MW-97	04/30/97	<0.5	<0.5	<0.5	<0.5
MW-97	10/17/97	<0.5	<0.5	<0.5	<0.5
MW-97	01/30/98	<0.5	<0.5	<0.5	<0.5
MW-97	04/28/98	<0.5	<0.5	<0.5	<0.5
MW-97	07/01/98	<1	<1	<1	<1
MW-97	10/12/98	<2.5	<2.5	<2.5	<2.5
MW-97	02/02/99	<0.5	<0.5	<0.5	<0.5
MW-97	04/22/99	<5	<5	<5	<10
MW-97	12/14/99	<5	<5	<5	<10
MW-98	04/30/97	5.8	3.5	1.5	26
MW-98	06/29/98	<1	7.1	20	1010
MW-98	12/15/99	<5	13.2	<5	63.1
MW-104	07/17/97	<0.5	0.5	<0.5	0.7
MW-104	07/01/98	<1	<1	<1	<1
MW-105	06/28/98	<1	<1	<1	<1
MW-105	12/09/99	<5	<5	<5	<10
MW-106	02/11/97	<0.5	<0.5	<0.5	<0.5
MW-106	05/07/97	<0.5	<0.5	<0.5	<0.5
MW-106	07/18/97	<0.5	<0.5	<0.5	<0.5
MW-106	04/30/98	<0.5	<0.5	<0.5	<0.5
MW-106	06/28/98	<1	<1	<1	<1
MW-106	04/29/99	<5	<5	<5	<10
MW-106	12/08/99	<5	<5	<5	<10
MW-108	07/17/97	<0.5	<0.5	0.5	<0.5
MW-108	06/22/98	<1	<1	<1	<1

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-108	04/22/99	<5	<5	<5	<10
MW-108	12/14/99	<5	<5	<5	<10
MW-110	06/30/98	170	<10	150	160
MW-111	06/29/98	<1	<1	<1	<1
MW-111	10/11/98	<0.5	<0.5	<0.5	<0.5
MW-111	02/01/99	<0.5	0.8	<0.5	<0.5
MW-111	04/21/99	<5	<5	<5	<10
MW-111	12/13/99	<5	<5	<5	<10
MW-113	08/11/99	140	<5	59	390
MW-114	07/26/99	<5	<5	<5	<10
MW-115	07/26/99	<5	<5	<5	10
MW-116	07/26/99	<5	<5	<5	<10
MW-117A	12/16/99	<5	<5	<5	<10
MW-118	12/15/99	<5	<5	<5	<10
MW-119	12/28/99	16	<5	<5	<10
MW-121	12/16/99	500	10	370	20
MW-122	12/16/99	11	29	<5	22
MW-124	12/14/99	79	<50	210	1500
MW-127	12/28/99	190	7.1	38	16
MW-128	12/28/99	11	<5	<5	<10
SUMP-16A	07/01/91	560	--	--	--
SUMP-16A	07/19/91	--	850	100	--
SUMP-16A	07/30/91	--	--	--	660
SUMP-16A	09/01/91	240	--	--	--
SUMP-16A	12/01/91	2000	1000	<500	3500
SUMP-16A	04/01/92	1332	203	<3	3679
SUMP-16A	07/01/92	1495	2028	280	3442
SUMP-16A	10/01/92	632	87	<3	1821
SUMP-16A	01/01/93	741	40	96	1355
SUMP-16A	04/14/93	707	881	298	4226
SUMP-16A	10/05/94	170	<2.5	120	680
SUMP-16A	01/11/95	2	5.1	2.4	32
SUMP-16A	10/12/95	130	<13	98	780
SUMP-16A	04/19/96	0.8	1.5	3.8	27
SUMP-16A	07/01/96	5.1	0.9	1.2	7.7
SUMP-A10	10/12/95	<0.5	2.9	<0.5	<0.5
SW-01	05/28/91	--	--	--	<10
SW-01	07/01/91	<5	--	--	--
SW-01	07/19/91	--	<5	<5	--
SW-01	09/01/91	<1	--	--	--
SW-01	12/01/91	<1	--	--	--
SW-01	04/01/92	5	6	<3	14
SW-01	07/01/92	17.5	69	<3	67
SW-01	10/01/92	16	15	<3	10
SW-01	01/01/93	6	<3	<3	<3
SW-01	04/15/93	<1	<1	<1	<1
SW-01	05/12/93	<1	<1	<1	<1
SW-01	06/28/93	<0.5	<0.5	<0.5	<0.5
SW-01	07/15/93	<0.5	<0.5	<0.5	<0.5

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
SW-01	08/03/93	<0.5	<0.5	<0.5	<0.5
SW-01	09/21/93	<0.5	<0.5	1	0.6
SW-01	10/14/93	<0.5	<0.5	<0.5	<0.5
SW-01	11/10/93	<0.5	<0.5	<0.5	<0.5
SW-01	12/06/93	<0.5	<0.5	<0.5	<0.5
SW-01	01/12/94	<0.5	<0.5	<0.5	<0.5
SW-01	02/09/94	<0.5	<0.5	<0.5	<0.5
SW-01	03/16/94	<0.5	<0.5	<0.5	<0.5
SW-01	04/05/94	<0.5	<0.5	<0.5	<0.5
SW-01	05/19/94	<0.5	<0.5	<0.5	<0.5
SW-01	06/23/94	<0.5	<0.5	<0.5	<0.5
SW-01	07/21/94	<0.5	<0.5	<0.5	<0.5
SW-01	08/24/94	<0.5	<0.5	<0.5	<0.5
SW-01	09/20/94	<0.5	<0.5	0.8	2.2
SW-01	10/06/94	<0.5	<0.5	<0.5	0.6
SW-01	11/30/94	<0.5	<0.5	<0.5	<0.5
SW-01	12/16/94	<0.5	<0.5	0.7	4.8
SW-01	01/11/95	<0.5	<0.5	<0.5	<0.5
SW-01	03/09/95	<0.5	<0.5	<0.5	<0.5
SW-01	04/07/95	<0.5	<0.5	<0.5	<0.5
SW-01	05/18/95	<0.5	<0.5	<0.5	<0.5
SW-01	07/21/95	<0.5	<0.5	<0.5	<0.5
SW-01	10/12/95	<0.5	<0.5	0.6	1.2
SW-01	12/27/95	<0.5	<0.5	<0.5	<0.5
SW-01	01/19/96	0.8	4.5	1.5	8.7
SW-01	03/18/96	<0.5	<0.5	<0.5	<0.5
SW-01	04/24/96	<0.5	<0.5	<0.5	<0.5
SW-01	07/01/96	<0.5	<0.5	<0.5	<0.5
SW-01	10/01/96	<0.5	<0.5	<0.5	<0.5
SW-01	02/10/97	<0.5	<0.5	<0.5	<0.5
SW-01	12/10/97	<0.1	<0.1	<0.1	<0.1
SW-01	06/30/98	<1	<1	<1	<1
SW-01	04/23/99	<5	<5	<5	<10
SW-02	09/01/91	<1	--	--	--
SW-02	12/01/91	<1	--	--	--
SW-02	04/01/92	11	12	<3	5
SW-02	07/01/92	7	38	<1	24
SW-02	10/01/92	69	37	25	61
SW-02	01/01/93	47	6	7	9
SW-02	04/15/93	4	<1	<1	<1
SW-02	05/12/93	3	<1	<1	<1
SW-02	01/11/95	<0.5	<0.5	<0.5	<0.5
SW-02	06/24/98	<1	<1	<1	<1
SW-02	04/23/99	<5	<5	<5	<10
SW-03	07/01/96	<0.5	<0.5	<0.5	<0.5
SW-03	10/01/96	<0.5	<0.5	<0.5	<0.5
SW-03	06/24/98	<1	<1	<1	<1
SW-03	04/23/99	<5	<5	<5	<10
TH-21A	07/01/91	1700	--	--	--

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
TH-21A	07/19/91	--	3400	1200	--
TH-21A	07/30/91	--	--	--	2200
TH-A11	07/01/91	1100	--	--	--
TH-A11	07/19/91	--	1600	1100	--
TH-A11	07/30/91	--	--	--	800
TH-A11	09/01/91	1400	--	--	--
TH-A11	12/01/91	2900	3500	300	4000
TH-A11	04/01/92	3465	3303	306	4158
TH-A11	07/01/92	1258	1710	423	3416
TH-A11	10/01/92	2742	2235	<3	3408
UIHS_ARROYO	05/28/91	--	--	--	<10
UIHS_ARROYO	07/01/91	<5	--	--	--
UIHS_ARROYO	07/19/91	--	<5	<5	--
UIHS_ARROYO	09/01/91	<1	--	--	--
UIHS_ARROYO	12/01/91	<1	--	--	--
UIHS_ARROYO	04/01/92	<1	<1	<1	<1
UIHS_ARROYO	07/01/92	<1	<1	<1	<1
UIHS_ARROYO	10/01/92	<1	<1	<1	<1
UIHS_ARROYO	01/01/93	<1	<1	<1	<1
UIHS_ARROYO	04/15/93	<1	<1	--	<1
UIHS_ARROYO	05/12/93	<1	<1	<1	<1
UIHS_ARROYO	06/28/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	07/15/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	08/03/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	09/21/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	10/14/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	11/10/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	12/06/93	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	01/13/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	02/09/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	03/16/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	04/05/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	05/19/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	06/23/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	07/21/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	08/24/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	09/20/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	10/06/94	<0.5	<0.5	<0.5	0.6
UIHS_ARROYO	11/30/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	12/16/94	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	01/11/95	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	03/09/95	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	04/07/95	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	05/18/95	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	07/21/95	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	10/12/95	<0.5	<0.5	<0.5	1.2
UIHS_ARROYO	12/27/95	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	01/19/96	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	03/18/96	<0.5	<0.5	<0.5	<0.5

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Appendix G

Historical BTEX Analytical Data, May 1991 - December 1999

Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	Sample Date	Analytical Results			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
UIHS_ARROYO	04/24/96	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	07/01/96	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	10/01/96	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	02/10/97	<0.5	<0.5	<0.5	<0.5
UIHS_ARROYO	06/26/98	<1	<1	<1	<1

Notes:

Concentrations listed in micrograms per liter (ug/L)

<5 Constituent not detected above noted laboratory detection limit

-- Indicates parameter was not analyzed

ARCADIS GERAGHTY & MILLER

Historical General Chemistry
Analytical Data

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	BIEBBLE 7/1/91	BIEBBLE 4/1/92	BIEBBLE 7/1/92	BIEBBLE 10/1/92	BIEBBLE 1/1/93	BIEBBLE 4/15/93	BIEBBLE 7/15/93	BIEBBLE 10/14/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	14	13.5	7.8	10.1	10.6	11.4	13.3	10.4
Cyanide	--	--	--	--	--	--	--	--
Fluoride	1.4	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	250	--	--	--	--	--	--	--
Total dissolved solids (TDS)	1000	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	BIEBBLE 1/13/94	BIEBBLE 4/5/94	BIEBBLE 7/21/94	BIEBBLE 10/6/94	BIEBBLE 1/11/95	BIEBBLE 4/7/95	BIEBBLE 7/21/95	BIEBBLE 10/12/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	11	10.5	15	13	8	10.8	10	13
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	BIEBBLE 1/19/96	BIEBBLE 4/17/96	BIEBBLE 7/1/96	BIEBBLE 10/1/96	BIEBBLE 2/10/97	IW-02 8/1/96	IW-02 8/22/96	LOWER-QUEEN-MAX 4/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	9	10.5	11	11	10	--	7	218
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	370	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled	LOWER-QUEEN-MAX 7/1/92	LOWER-QUEEN-MAX 10/1/92	LOWER-QUEEN-MAX 1/1/93	LOWER-QUEEN-MAX 4/1/93	LOWER-QUEEN-MAX 7/1/93	LOWER-QUEEN-MAX 10/1/93
Bicarbonate Alkalinity		--	--	--	--	--	--
Ammonia (as N)		--	--	--	--	--	--
Bromide		--	--	--	--	--	--
Carbonate Alkalinity		--	--	--	--	--	--
Chloride		236	285	344	363	459	181
Cyanide		--	--	--	--	--	--
Fluoride		--	--	--	--	--	--
Hydroxide		--	--	--	--	--	--
Carbon Dioxide		--	--	--	--	--	--
Nitrate		--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)		--	--	--	--	--	--
Orthophosphate		--	--	--	--	--	--
pH*		--	--	--	--	--	--
Phenols, total		--	--	--	--	--	--
Specific conductivity**		--	--	--	--	--	--
Sulfate		--	--	--	--	--	--
Total dissolved solids (TDS)		--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID	LOWER-QUEEN-MAX	LOWER-QUEEN-MAX	LOWER-QUEEN-MAX	LOWER-QUEEN-MAX	LOWER-QUEEN-MAX	LOWER-QUEEN-MAX
Date Sampled	1/1/94	4/1/94	7/1/94	10/1/94	1/1/95	4/1/95
Parameter						
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	160	139	129	130	152	152
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	LYMAN 7/1/91	LYMAN 4/1/92	LYMAN 7/1/92	LYMAN 10/1/92	LYMAN 1/1/93	LYMAN 4/15/93	LYMAN 5/12/93	LYMAN 6/28/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	20	12.6	14.6	15.5	13.2	13	13	12.5
Cyanide	--	--	--	--	--	--	--	--
Fluoride	1.3	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	450	--	--	--	--	--	--	--
Total dissolved solids (TDS)	980	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	LYMAN 7/15/93	LYMAN 8/3/93	LYMAN 9/21/93	LYMAN 10/14/93	LYMAN 11/10/93	LYMAN 12/6/93	LYMAN 1/12/94	LYMAN 2/9/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	15	13.1	12.4	14.6	482	14	13	12.6
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled	LYMAN 3/16/94	LYMAN 4/5/94	LYMAN 5/19/94	LYMAN 6/23/94	LYMAN 7/21/94	LYMAN 8/24/94	LYMAN 9/20/94	LYMAN 10/6/94
Bicarbonate Alkalinity		--	--	--	--	--	--	--	--
Ammonia (as N)		--	--	--	--	--	--	--	--
Bromide		--	--	--	--	--	--	--	--
Carbonate Alkalinity		--	--	--	--	--	--	--	--
Chloride		13	12.5	12.1	12	12	11.5	11	14
Cyanide		--	--	--	--	--	--	--	--
Fluoride		--	--	--	--	--	--	--	--
Hydroxide		--	--	--	--	--	--	--	--
Carbon Dioxide		--	--	--	--	--	--	--	--
Nitrate		--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)		--	--	--	--	--	--	--	--
Orthophosphate		--	--	--	--	--	--	--	--
pH*		--	--	--	--	--	--	--	--
Phenols, total		--	--	--	--	--	--	--	--
Specific conductivity**		--	--	--	--	--	--	--	--
Sulfate		--	--	--	--	--	--	--	--
Total dissolved solids (TDS)		--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	LYMAN 11/30/94	LYMAN 12/16/94	LYMAN 1/11/95	LYMAN 3/9/95	LYMAN 4/7/95	LYMAN 5/18/95	LYMAN 7/21/95	LYMAN 10/12/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	12.1	11.8	11	12	13	10	11	12
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	LYMAN 1/19/96	LYMAN 4/18/96	LYMAN 7/1/96	LYMAN 10/1/96	LYMAN 2/10/97	LYMAN 4/30/98	LYMAN 6/29/98	MW-001 4/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	9	11.1	9	10	11	15	13	2000
Cyanide	--	--	--	--	--	--	< 0.005	--
Fluoride	--	--	--	--	--	--	0.6	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	7.4	--
Phenols, total	--	--	--	--	--	--	< 0.005	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	670	--
Total dissolved solids (TDS)	--	--	--	--	--	--	1000	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-001 5/1/91	MW-001 12/1/91	MW-010 5/1/91	MW-010 9/1/91	MW-010 12/1/91	MW-010 4/1/92	MW-010 7/1/92	MW-010 10/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	310	152	60	--	323	319	240	312
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	< 10	--	--	--	--
Total dissolved solids (TDS)	820	--	1600	1440	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-001 12/1/91	MW-010 5/1/91	MW-010 9/1/91	MW-010 12/1/91	MW-010 4/1/92	MW-010 7/1/92	MW-010 10/1/92	MW-010 1/1/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	152	60	--	323	319	240	312	0
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	< 10	--	--	--	--	--
Total dissolved solids (TDS)	--	1600	1440	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled	MW-010 2/11/97	MW-011 12/1/91	MW-011 4/1/92	MW-011 7/1/92	MW-011 10/1/92	MW-011 1/1/93	MW-011 10/5/94	MW-011 7/21/95
Bicarbonate Alkalinity		--	--	--	--	--	--	--	--
Ammonia (as N)		--	--	--	--	--	--	--	--
Bromide		--	--	--	--	--	--	--	--
Carbonate Alkalinity		--	--	--	--	--	--	--	--
Chloride		120	790	653	270	239	544	130	260
Cyanide		--	--	--	--	--	--	--	--
Fluoride		--	--	--	--	--	--	--	--
Hydroxide		--	--	--	--	--	--	--	--
Carbon Dioxide		--	--	--	--	--	--	--	--
Nitrate		--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)		--	--	--	--	--	--	--	--
Orthophosphate		--	--	--	--	--	--	--	--
pH*		--	--	--	--	--	--	--	--
Phenols, total		--	--	--	--	--	--	--	--
Specific conductivity**		--	--	--	--	--	--	--	--
Sulfate		--	--	--	--	--	--	--	--
Total dissolved solids (TDS)		--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-011 1/20/96	MW-011 4/19/96	MW-011 7/1/96	MW-011 10/1/96	MW-011 2/7/97	MW-013 9/1/91	MW-013 12/1/91	MW-013 4/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	120	120	37	16	46	--	780	1240
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	< 10	--	--
Total dissolved solids (TDS)	--	--	--	--	--	2790	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-013 7/1/92	MW-013 10/1/96	MW-013 2/7/97	MW-013 3/21/97	MW-013 6/21/98	MW-014 6/22/98
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	269	45	70	--	230	330
Cyanide	--	--	--	--	< 0.005	< 0.005
Fluoride	--	--	--	0.4	0.3	0.4
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	7	7
Phenols, total	--	--	--	--	0.023	0.008
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	< 10	< 5	< 5
Total dissolved solids (TDS)	--	--	--	770	1000	1400

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID Date Sampled Parameter	MW-016 4/15/93	MW-017 4/15/93	MW-018 5/1/91	MW-018 4/1/92	MW-018 7/1/92	MW-018 10/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	246	306	310	464	109	408
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	1580	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-019 5/1/91	MW-019 5/22/91	MW-019 7/1/91	MW-019 9/1/91	MW-019 4/1/92	MW-019 7/1/92	MW-019 10/1/92	MW-019 10/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	320	--	466	--	463	90	420	96
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	< 0.1	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	16	--	--	< 10	--	--	--	--
Total dissolved solids (TDS)	1540	--	--	1460	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-019 2/7/97	MW-021 5/1/91	MW-021 12/1/91	MW-021 4/15/93	MW-024 7/1/92	MW-026 5/1/91	MW-026 12/1/91	MW-026 7/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	240	230	343	283	455	440	356	164
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	1220	--	--	--	1650	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-026 10/1/92	MW-026 1/1/93	MW-031 7/1/92	MW-031 10/1/92	MW-037 6/1/91	MW-037 6/25/91	MW-037 7/14/93	MW-038 5/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	222	177	337	296	52	--	173	60
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	< 0.1	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	< 10
Total dissolved solids (TDS)	--	--	--	--	--	--	--	790

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-038 5/22/91	MW-038 6/1/91	MW-038 6/25/91	MW-038 12/1/91	MW-038 4/1/92	MW-038 7/1/92	MW-038 10/1/92	MW-038 10/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	--	38	--	111	127	147	128	280
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	< 0.1	--	< 0.1	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-038 2/7/97	MW-039 5/1/91	MW-039 6/1/91	MW-039 6/25/91	MW-039 1/1/93	MW-039 4/15/93	MW-039 7/15/93	MW-039 10/14/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	310	9.6	244	--	231	83	296	277
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	< 0.1	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-039 1/13/94	MW-039 4/7/94	MW-039 7/20/94	MW-039 1/10/95	MW-039 10/1/96	MW-039 2/7/97	MW-039 7/18/97	MW-041 6/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	260	220	198	194	140	160	160	29
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	41
Total dissolved solids (TDS)	--	--	--	--	--	--	--	758

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-041 6/25/91	MW-041 7/1/91	MW-041 12/1/91	MW-041 7/15/93	MW-041 10/14/93	MW-041 1/13/94	MW-041 4/6/94	MW-041 7/20/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	--	38	108	242	264	370	290	259
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	0.1	0.1	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-041 10/6/94	MW-041 1/11/95	MW-041 4/6/95	MW-041 7/21/95	MW-041 10/12/95	MW-041 1/20/96	MW-041 4/19/96	MW-041 7/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	300	326	300	270	240	270	260	250
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-041 10/1/96	MW-041 2/7/97	MW-041 3/20/97	MW-041 7/18/97	MW-041 6/19/98	MW-041 4/20/99	MW-042 12/1/91	MW-043 6/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	250	180	--	140	120	56	571	138
Cyanide	--	--	--	--	< 0.005	--	--	--
Fluoride	--	--	1.5	--	1.5	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	7.5	--	--	--
Phenols, total	--	--	--	--	0.024	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	98	--	190	--	--	47
Total dissolved solids (TDS)	--	--	1500	--	1200	810	--	1300

Notes:
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* Measured in standard units (su)
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-043 6/25/91	MW-043 9/1/91	MW-043 7/15/93	MW-043 10/14/93	MW-043 1/13/94	MW-043 4/6/94
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	--	--	232	230	260	250
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	< 0.1	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	370	--	--	--	--
Total dissolved solids (TDS)	--	1600	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< *Constituent not detected above noted laboratory detection limit.*

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-043 7/20/94	MW-043 10/6/94	MW-043 1/11/95	MW-043 4/6/95	MW-043 7/21/95	MW-043 10/12/95
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	266	270	280	280	270	220
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-043 1/20/96	MW-043 4/19/96	MW-043 7/1/96	MW-043 10/1/96	MW-043 2/7/97	MW-043 7/18/97	MW-043 6/22/98	MW-043 4/20/99
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	280	280	270	380	330	230	210	130
Cyanide	--	--	--	--	--	--	< 0.005	--
Fluoride	--	--	--	--	--	--	0.8	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	7.3	--
Phenols, total	--	--	--	--	--	--	0.007	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	53	--
Total dissolved solids (TDS)	--	--	--	--	--	--	1500	1100

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-044 6/1/91	MW-044 6/25/91	MW-044 4/1/92	MW-044 7/1/92	MW-044 10/1/92	MW-044 1/1/93	MW-044 4/15/93	MW-044 7/15/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	33	--	660	263	356	300	365	445
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	< 0.1	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	33	--	--	--	--	--	--	--
Total dissolved solids (TDS)	641	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-044 10/14/93	MW-044 1/13/94	MW-044 4/6/94	MW-044 7/20/94	MW-044 10/5/94	MW-044 1/11/95	MW-044 4/6/95	MW-044 7/21/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	543	490	440	430	360	360	410	400
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-044 10/12/95	MW-044 1/20/96	MW-044 4/19/96	MW-044 7/1/96	MW-044 10/1/96	MW-044 2/7/97	MW-044 7/18/97	MW-044 6/22/98
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	520	580	530	480	32	180	310	260
Cyanide	--	--	--	--	--	--	--	< 0.005
Fluoride	--	--	--	--	--	--	--	0.8
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	7.2
Phenols, total	--	--	--	--	--	--	--	0.04
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	66
Total dissolved solids (TDS)	--	--	--	--	--	--	--	1000

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-044 4/20/99	MW-045 6/1/91	MW-045 6/25/91	MW-045 9/1/91	MW-045 12/1/91	MW-045 7/15/93	MW-045 10/14/93	MW-045 1/13/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	94	507	--	--	354	434	408	440
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	3.9	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	2940	--	2090	--	--	--	--
Total dissolved solids (TDS)	910	5440	--	3920	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-045 4/6/94	MW-045 7/20/94	MW-046 6/1/91	MW-046 6/25/91	MW-046 7/1/91	MW-046 10/1/96	MW-046 2/11/97	MW-046 5/29/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	990
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	3
Chloride	430	429	152	--	45	170	220	132
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	1.3
Hydroxide	--	--	--	--	--	--	--	< 1
Carbon Dioxide	--	--	--	--	--	--	--	62
Nitrate	--	--	--	0.1	0.1	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	7.5
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	1200
Sulfate	--	--	20	--	--	--	--	106
Total dissolved solids (TDS)	--	--	1220	NA/R	--	--	--	1300

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-046 7/18/97	MW-046 12/10/97	MW-046 6/21/98	MW-046 4/20/99	MW-047 6/1/91	MW-047 6/25/91	MW-047 12/1/91	MW-047 10/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	180	--	140	31	51	--	433	700
Cyanide	--	--	< 0.005	--	--	--	--	--
Fluoride	1.3	1.3	1.1	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	< 0.1	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	7.2	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	22	--	23	--	--	--
Total dissolved solids (TDS)	--	--	940	580	652	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-048 12/1/91	MW-048 7/1/92	MW-048 10/1/96	MW-049 6/1/91	MW-049 6/25/91	MW-049 7/15/93	MW-049 10/14/93	MW-049 1/13/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	400	431	200	365	--	399	397	400
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	< 0.1	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	1800	--	--	--	--
Total dissolved solids (TDS)	--	--	--	3910	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-049 4/6/94	MW-049 7/20/94	MW-049 10/5/94	MW-049 1/11/95	MW-049 4/6/95	MW-049 7/21/95	MW-049 10/12/95	MW-049 1/20/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	380	368	380	389	390	380	350	410
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-049 4/19/96	MW-049 7/1/96	MW-049 10/1/96	MW-049 2/7/97	MW-049 3/20/97	MW-049 7/18/97
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	400	360	36	410	--	350
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	1.4	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	1000	--
Total dissolved solids (TDS)	--	--	--	--	3100	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-049 6/21/98	MW-049 4/20/99	MW-050 6/1/91	MW-050 6/25/91	MW-050 12/1/91	MW-050 4/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	630	410	388	--	380	397
Cyanide	0.05	--	--	--	--	--
Fluoride	1.3	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	1.5	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	7	--	--	--	--	--
Phenols, total	0.012	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	780	--	3420	--	--	--
Total dissolved solids (TDS)	2800	3000	6070	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Parameter / Well ID / Date Sampled	MW-050 7/1/92	MW-050 10/1/92	MW-050 1/1/93	MW-050 4/15/93	MW-050 7/15/93	MW-050 10/14/93	MW-050 1/13/94	MW-050 4/6/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	379	370	337	955	347	292	320	290
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-050 7/20/94	MW-050 10/5/94	MW-050 1/11/95	MW-050 4/6/95	MW-050 7/21/95	MW-050 10/12/95	MW-050 1/20/96	MW-050 4/19/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	290	290	314	320	310	240	290	330
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
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May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-050 7/1/96	MW-050 10/1/96	MW-050 2/7/97	MW-050 3/20/97	MW-050 7/18/97	MW-050 6/19/98	MW-050 4/20/99	MW-051 12/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	310	360	360	--	330	340	360	38
Cyanide	--	--	--	--	--	< 0.005	--	--
Fluoride	--	--	--	1.2	--	1.2	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	8.2	--	--
Phenols, total	--	--	--	--	--	< 0.005	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	3600	--	3800	--	--
Total dissolved solids (TDS)	--	--	--	5900	--	5900	6200	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-052 7/1/92	MW-054 12/1/91	MW-054 4/1/92	MW-054 7/1/92	MW-054 10/1/92	MW-054 1/1/93	MW-054 4/14/93	MW-054 7/14/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	3	87	151	80	55	134	145	146
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-054 10/14/93	MW-054 1/12/94	MW-054 4/6/94	MW-054 7/20/94	MW-054 10/5/94	MW-054 1/10/95	MW-054 4/6/95	MW-054 7/21/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	122	140	102	135	130	32	102	95
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-054 10/11/95	MW-054 1/20/96	MW-054 4/18/96	MW-054 7/1/96	MW-054 10/1/96	MW-054 2/10/97	MW-054 7/16/97	MW-054 6/25/98
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	110	120	140	110	110	180	160	110
Cyanide	--	--	--	--	--	--	--	< 0.005
Fluoride	--	--	--	--	--	--	--	1.8
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	7.1
Phenols, total	--	--	--	--	--	--	--	< 0.005
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	1300
Total dissolved solids (TDS)	--	--	--	--	--	--	--	2200

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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled							
	MW-054 4/22/99	MW-055 6/1/91	MW-055 12/1/91	MW-055 4/1/92	MW-055 7/1/92	MW-055 10/1/92	MW-055 1/1/93	MW-055 4/14/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	180	200	501	385	273	292	300	301
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	3400	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-055 7/14/93	MW-055 10/14/93	MW-055 1/12/94	MW-055 4/8/94	MW-055 7/20/94	MW-055 10/5/94	MW-055 1/11/95	MW-055 4/11/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	312	287	320	310	299	390	321	320
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-055 7/20/95	MW-055 10/11/95	MW-055 1/19/96	MW-055 4/18/96	MW-055 7/1/96	MW-055 10/1/96	MW-055 2/10/97	MW-055 7/16/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	300	250	370	310	350	210	270	300
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-055 6/25/98	MW-055 7/16/97	MW-056 6/1/91	MW-056 7/1/91	MW-056 9/1/91	MW-056 12/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	300	160	100	102	--	197
Cyanide	< 0.005	--	--	--	--	--
Fluoride	1.5	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	7	--	--	--	--	--
Phenols, total	0.016	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	55	--	--	--	< 10	--
Total dissolved solids (TDS)	1500	1000	--	--	1220	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-056 7/1/92	MW-056 10/1/92	MW-056 1/1/93	MW-056 10/1/96	MW-056 2/11/97	MW-056 3/20/97
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	248	183	269	270	170	--
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	1.5
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	< 10
Total dissolved solids (TDS)	--	--	--	--	--	1200

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-057 6/1/91	MW-057 7/1/91	MW-057 12/1/91	MW-057 4/1/92	MW-057 7/1/92	MW-057 10/1/92	MW-057 1/1/93	MW-057 4/14/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	15.2	21	32	117	63	67	131	80
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	< 1	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	2.7	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	60	--	--	--	--	--	--
Total dissolved solids (TDS)	--	460	--	--	--	--	--	--

Notes:
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** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-057 7/14/93	MW-057 10/13/93	MW-057 1/12/94	MW-057 4/7/94	MW-057 7/19/94	MW-057 10/5/94	MW-057 1/11/95	MW-057 4/8/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	72	73.6	64	58	48	60	35	31
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-057 7/20/95	MW-057 10/11/95	MW-057 1/19/96	MW-057 4/18/96	MW-057 7/1/96	MW-057 10/1/96	MW-057 2/10/97	MW-057 7/15/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	37	47	44	44	30	30	32	36
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-057 6/25/98	MW-057 4/20/99	MW-058 12/1/91	MW-058 4/1/92	MW-058 7/1/92	MW-058 10/1/92	MW-058 1/1/93	MW-058 4/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	50	44	124	156	149	155	175	133
Cyanide	< 0.005	--	--	--	--	--	--	--
Fluoride	0.5	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	7.3	--	--	--	--	--	--	--
Phenols, total	0.006	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	110	--	--	--	--	--	--	--
Total dissolved solids (TDS)	490	500	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-058 7/13/93	MW-058 10/13/93	MW-058 4/5/94	MW-058 7/19/94	MW-058 10/6/94	MW-058 1/11/95	MW-058 4/8/95	MW-058 4/18/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	133	59	48	38	36	26	39	29
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-058 10/1/96	MW-058 6/22/98	MW-059 12/1/91	MW-059 4/1/92	MW-059 7/1/92	MW-059 10/1/92	MW-059 1/1/93	MW-059 4/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	38	42	149	52	55	69	46	29
Cyanide	--	< 0.005	--	--	--	--	--	--
Fluoride	--	0.9	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	7.4	--	--	--	--	--	--
Phenols, total	--	< 0.005	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	< 5	--	--	--	--	--	--
Total dissolved solids (TDS)	--	760	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-059 10/13/93	MW-059 4/5/94	MW-059 7/19/94	MW-059 10/6/94	MW-059 1/11/95	MW-059 2/9/97	MW-059 6/24/98	MW-060 7/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	56	30	< 5	25	12	29	560	13
Cyanide	--	--	--	--	--	--	< 0.005	--
Fluoride	--	--	--	--	--	--	0.6	2
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	0.4
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	7.5	--
Phenols, total	--	--	--	--	--	--	0.022	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	2300	383
Total dissolved solids (TDS)	--	--	--	--	--	--	4100	860

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-060 12/1/91	MW-060 4/1/92	MW-060 7/1/92	MW-060 10/1/92	MW-060 1/1/93	MW-060 4/14/93	MW-060 7/14/93	MW-060 10/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	10	10	10	14	6	9	10.7	13.5
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Parameter / Well ID / Date Sampled	MW-060 1/12/94	MW-060 4/7/94	MW-060 7/19/94	MW-060 10/5/94	MW-060 1/10/95	MW-060 4/7/95	MW-060 7/19/95	MW-060 10/11/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	9.5	9	< 5	9.1	20	8.8	9	9
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-060 1/19/96	MW-060 4/18/96	MW-060 7/1/96	MW-060 10/1/96	MW-060 10/19/96	MW-060 2/9/97
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	16	12.7	12	12	16	9
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* *Measured in standard units (su)*

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-060 3/19/97	MW-060 5/6/97	MW-060 7/15/97	MW-060 10/16/97	MW-060 6/21/98	MW-060 4/20/99
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	0.07	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	--	10	11	--	12	--
Cyanide	--	--	--	--	< 0.005	--
Fluoride	0.8	--	--	--	1.4	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	0.28	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	< 0.2	--	--
Orthophosphate	--	--	--	0.06	--	--
pH*	--	--	--	--	7.3	--
Phenols, total	--	--	--	--	< 0.005	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	280	--	--	--	390	--
Total dissolved solids (TDS)	760	--	--	--	720	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-061 12/1/91	MW-061 1/13/94	MW-061 4/7/94	MW-061 7/20/94	MW-061 10/4/94	MW-061 1/11/95	MW-061 4/11/95	MW-061 7/21/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	413	420	450	387	400	439	420	400
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-061 10/10/95	MW-061 1/20/96	MW-061 4/18/96	MW-061 7/1/96	MW-061 10/1/96	MW-061 2/10/97	MW-061 7/17/97	MW-061 6/18/98
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	300	420	450	370	420	410	390	480
Cyanide	--	--	--	--	--	--	--	< 0.005
Fluoride	--	--	--	--	--	--	--	2.2
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	6.9
Phenols, total	--	--	--	--	--	--	--	< 0.005
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	1600
Total dissolved solids (TDS)	--	--	--	--	--	--	--	3200

Notes:

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* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-061 4/20/99	MW-061A 7/1/91	MW-061A 9/1/91	MW-061A 12/1/91	MW-061A 4/1/92	MW-061A 7/1/92	MW-061A 10/1/92	MW-061A 1/1/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	370	16	--	12	12	12	13	12
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	1.6	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	0.1	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	347	335	--	--	--	--	--
Total dissolved solids (TDS)	2900	805	755	--	--	--	--	--

Notes:
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-061A 4/13/93	MW-061A 4/5/94	MW-061A 7/19/94	MW-061A 10/4/94	MW-061A 1/10/95	MW-061A 1/20/96	MW-061A 4/19/96	MW-061A 7/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	15	10.7	8	11	32	9	10.2	7
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-061A 2/6/97	MW-061A 5/7/97	MW-061A 6/26/97	MW-061A 7/15/97	MW-061A 10/15/97	MW-061A 6/18/98	MW-061A 4/20/99	MW-062 9/1/91
Bicarbonate Alkalinity	266	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	0.08	--	--	--
Bromide	< 0.3	--	--	--	--	--	--	--
Carbonate Alkalinity	< 1	--	--	--	--	--	--	--
Chloride	13	11	12	10	--	4	11	--
Cyanide	--	--	--	--	--	0.025	--	--
Fluoride	0.85	--	--	--	--	0.8	--	--
Hydroxide	< 1	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	< 0.06	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	0.4	--	--	--
Orthophosphate	--	--	--	--	< 2.5	--	--	--
pH*	7.5	--	--	--	--	7.3	--	--
Phenols, total	--	--	--	--	--	< 0.005	--	--
Specific conductivity**	1020	--	--	--	--	--	--	--
Sulfate	340	--	--	--	--	300	--	19
Total dissolved solids (TDS)	840	--	--	--	--	690	730	1120

Notes:
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May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-062 12/1/91	MW-062 4/1/92	MW-062 7/1/92	MW-062 10/1/92	MW-062 1/1/93	MW-062 4/13/93	MW-062 7/14/93	MW-062 10/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	247	218	236	285	202	207	459	181
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-062 1/11/94	MW-062 4/5/94	MW-062 7/19/94	MW-062 10/6/94	MW-062 1/11/95	MW-062 4/8/95	MW-062 2/11/97	MW-062 7/18/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	160	139	129	130	152	128	150	100
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-062 6/26/98	MW-062 4/21/99	MW-063 12/1/91	MW-063 4/1/92	MW-063 7/1/92	MW-063 10/1/92	MW-063 1/1/93	MW-063 4/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	91	82	8	14	7	1	3	5.6
Cyanide	< 0.005	--	--	--	--	--	--	--
Fluoride	0.8	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	7.1	--	--	--	--	--	--	--
Phenols, total	< 0.005	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	140	--	--	--	--	--	--	--
Total dissolved solids (TDS)	650	550	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-063 7/13/93	MW-063 10/12/93	MW-063 1/11/94	MW-063 4/6/94	MW-063 7/18/94	MW-063 10/4/94	MW-063 1/9/95	MW-063 4/7/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	3	4	5.7	5.5	< 5	6.2	9	6.9
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-063 7/18/95	MW-063 10/10/95	MW-063 1/18/96	MW-063 4/17/96	MW-063 7/1/96	MW-063 10/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	7	12	10	10.2	10	7
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-063 2/5/97	MW-063 7/15/97	MW-063 10/15/97	MW-063 6/25/98	MW-063 10/11/98	MW-063 10/11/98
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	< 0.03	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	7	9	--	10	--	15
Cyanide	--	--	--	< 0.005	--	--
Fluoride	--	--	--	0.4	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	6.6	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	< 0.2	--	--	--
Orthophosphate	--	--	0.25	--	--	--
pH*	--	--	--	7.4	--	--
Phenols, total	--	--	--	0.005	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	39	28.1	--
Total dissolved solids (TDS)	--	--	--	370	--	340

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-064 12/1/91	MW-064 4/1/92	MW-064 7/1/92	MW-064 10/1/92	MW-064 1/1/93	MW-064 4/13/93	MW-064 7/13/93	MW-064 10/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	18	13	13	12	10.2	10	12	8
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-064 1/12/94	MW-064 4/6/94	MW-064 7/19/94	MW-064 10/5/94	MW-064 1/10/95	MW-064 4/7/95	MW-064 7/19/95	MW-064 10/11/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	10	10	< 5	10.2	20	12	11	12
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-064 1/19/96	MW-064 4/18/96	MW-064 2/11/97	MW-064 7/16/97	MW-064 6/23/98	MW-064 4/21/99	MW-065 12/1/91	MW-065 7/15/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	12	11.6	11	12	15	11	3	4
Cyanide	--	--	--	--	< 0.005	--	--	--
Fluoride	--	--	--	--	0.7	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	7.3	--	--	--
Phenols, total	--	--	--	--	< 0.005	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	< 5	--	--	--
Total dissolved solids (TDS)	--	--	--	--	600	530	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-065 10/5/94	MW-065 7/1/96	MW-065 10/1/96	MW-065 2/11/97	MW-065 5/7/97	MW-065A 12/1/91	MW-065A 4/1/92	MW-065A 7/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	5.9	5	3	1.3	2	22	33	18
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-065A 10/1/92	MW-065A 1/1/93	MW-065A 4/13/93	MW-065A 7/13/93	MW-065A 10/13/93	MW-065A 1/11/94	MW-065A 4/5/94	MW-065A 7/19/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	35	35	26	19	17	18	15	10
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-065A 10/6/94	MW-065A 1/11/95	MW-065A 4/8/95	MW-065A 1/20/96	MW-065A 4/18/96	MW-065A 6/25/98	MW-066 12/1/91	MW-066 4/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	18	12	13	93	12.6	24	9	8
Cyanide	--	--	--	--	--	< 0.005	--	--
Fluoride	--	--	--	--	--	0.7	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	7.2	--	--
Phenols, total	--	--	--	--	--	0.005	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	250	--	--
Total dissolved solids (TDS)	--	--	--	--	--	550	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-066 7/1/92	MW-066 10/1/92	MW-066 1/1/93	MW-066 4/13/93	MW-066 7/13/93	MW-066 10/12/93	MW-066 1/11/94	MW-066 4/7/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	8	8	12	8	15	7	9	8.7
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled	MW-066 7/19/94	MW-066 10/4/94	MW-066 1/9/95	MW-066 4/11/95	MW-066 7/19/95	MW-066 10/10/95	MW-066 1/19/96	MW-066 4/17/96
Bicarbonate Alkalinity		--	--	--	--	--	--	--	--
Ammonia (as N)		--	--	--	--	--	--	--	--
Bromide		--	--	--	--	--	--	--	--
Carbonate Alkalinity		--	--	--	--	--	--	--	--
Chloride		< 5	8.8	6	8.9	8	9	10	9.6
Cyanide		--	--	--	--	--	--	--	--
Fluoride		--	--	--	--	--	--	--	--
Hydroxide		--	--	--	--	--	--	--	--
Carbon Dioxide		--	--	--	--	--	--	--	--
Nitrate		--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)		--	--	--	--	--	--	--	--
Orthophosphate		--	--	--	--	--	--	--	--
pH*		--	--	--	--	--	--	--	--
Phenols, total		--	--	--	--	--	--	--	--
Specific conductivity**		--	--	--	--	--	--	--	--
Sulfate		--	--	--	--	--	--	--	--
Total dissolved solids (TDS)		--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-066 7/1/96	MW-066 10/1/96	MW-066 2/5/97	MW-066 5/6/97	MW-066 7/16/97	MW-066 10/15/97	MW-066 6/17/98	MW-066 4/21/99
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	< 0.03	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	6	7	9	9	8	--	13	10
Cyanide	--	--	--	--	--	--	0.761	--
Fluoride	--	--	--	--	--	--	0.8	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	0.33	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	< 0.2	--	--
Orthophosphate	--	--	--	--	--	0.22	--	--
pH*	--	--	--	--	--	--	7.2	--
Phenols, total	--	--	--	--	--	--	< 0.005	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	430	--
Total dissolved solids (TDS)	--	--	--	--	--	--	760	730

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	MW-067 12/1/91	MW-067 4/1/92	MW-067 7/1/92	MW-067 10/1/92	MW-067 1/1/93	MW-067 4/13/93
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	7	6	3	9	4	8
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-067 7/13/93	MW-067 10/13/93	MW-067 1/12/94	MW-067 4/7/94	MW-067 7/19/94	MW-067 10/5/94
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	6	9.5	8.6	7.6	< 5	7.9
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< *Constituent not detected above noted laboratory detection limit.*

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-067 1/11/95	MW-067 4/7/95	MW-067 7/21/95	MW-067 10/11/95	MW-067 1/19/96	MW-067 4/18/96	MW-067 7/1/96	MW-067 2/10/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	< 5	13	6	6	11	7.4	7	9
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-067 7/16/97	MW-067 6/24/98	MW-067 4/22/99	MW-068 12/1/91	MW-068 4/1/92	MW-068 7/1/92	MW-068 10/1/92	MW-068 1/1/93
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	7	11	6.8	39	82	15	30	27
Cyanide	--	< 0.005	--	--	--	--	--	--
Fluoride	--	0.7	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	7.3	--	--	--	--	--	--
Phenols, total	--	0.005	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	140	--	--	--	--	--	--
Total dissolved solids (TDS)	--	480	460	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-068 4/13/93	MW-068 7/13/93	MW-068 10/13/93	MW-068 1/11/94	MW-068 4/5/94	MW-068 7/19/94	MW-068 10/6/94	MW-068 1/11/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	27	28	27	31	30	29	32	34
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-068 10/17/97	MW-068 6/26/98	MW-068 10/12/98	MW-069 12/1/91	MW-069 7/1/92	MW-069 10/1/92	MW-069 2/7/97	MW-069 7/18/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	< 0.03	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	--	29	--	154	15	43	70	64
Cyanide	--	< 0.005	--	--	--	--	--	--
Fluoride	--	0.6	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	0.08	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	1.8	--	--	--	--	--	--	--
Orthophosphate	0.41	--	--	--	--	--	--	--
pH*	--	7.3	--	--	--	--	--	--
Phenols, total	--	0.025	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	100	70	--	--	--	--	--
Total dissolved solids (TDS)	--	480	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled	MW-069 6/29/98	MW-070 12/1/91	MW-070 4/1/92	MW-070 7/1/92	MW-070 10/1/92	MW-070 1/1/93	MW-070 4/14/93	MW-070 7/13/93
Bicarbonate Alkalinity		--	--	--	--	--	--	--	--
Ammonia (as N)		--	--	--	--	--	--	--	--
Bromide		--	--	--	--	--	--	--	--
Carbonate Alkalinity		--	--	--	--	--	--	--	--
Chloride		120	10	8	9.2	17	8	8	8
Cyanide		< 0.005	--	--	--	--	--	--	--
Fluoride		0.3	--	--	--	--	--	--	--
Hydroxide		--	--	--	--	--	--	--	--
Carbon Dioxide		--	--	--	--	--	--	--	--
Nitrate		--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)		--	--	--	--	--	--	--	--
Orthophosphate		--	--	--	--	--	--	--	--
pH*		6.9	--	--	--	--	--	--	--
Phenols, total		0.015	--	--	--	--	--	--	--
Specific conductivity**		--	--	--	--	--	--	--	--
Sulfate		< 5	--	--	--	--	--	--	--
Total dissolved solids (TDS)		860	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-070 10/12/93	MW-070 1/11/94	MW-070 4/6/94	MW-070 7/18/94	MW-070 10/4/94	MW-070 1/9/95	MW-070 4/5/95	MW-070 7/18/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	11	10	9.5	8	9.5	9	9.7	9
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-070 10/10/95	MW-070 1/18/96	MW-070 4/17/96	MW-070 7/1/96	MW-070 10/1/96	MW-070 2/5/97	MW-070 10/15/97	MW-070 6/16/98
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	< 0.03	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	10	11	9.7	8	10	10	--	12
Cyanide	--	--	--	--	--	--	--	< 0.005
Fluoride	--	--	--	--	--	--	--	0.6
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	2.7	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	< 0.2	--
Orthophosphate	--	--	--	--	--	--	0.3	--
pH*	--	--	--	--	--	--	--	7.5
Phenols, total	--	--	--	--	--	--	--	< 0.005
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	80
Total dissolved solids (TDS)	--	--	--	--	--	--	--	370

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-070 4/22/99	MW-071 9/1/93	MW-071 10/12/93	MW-071 1/11/94	MW-071 4/6/94	MW-071 7/18/94	MW-071 10/4/94	MW-071 1/10/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	11	9	15	18	17	< 5	22	< 5
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	310	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-071 6/23/95	MW-071 7/18/95	MW-071 10/10/95	MW-071 1/18/96	MW-071 4/17/96	MW-071 7/1/96	MW-071 10/1/96	MW-071 2/9/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	16	22	21	18	23	26	30	24
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-071 5/6/97	MW-071 7/17/97	MW-071 10/16/97	MW-071 6/19/98	MW-071 10/11/98	MW-071 4/21/99
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	0.63	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	17	16	--	4	--	22
Cyanide	--	--	--	< 0.005	--	--
Fluoride	--	--	--	2.2	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	0.06	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	0.6	--	--	--
Orthophosphate	--	--	0.18	--	--	--
pH*	--	--	--	7.2	--	--
Phenols, total	--	--	--	< 0.005	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	650	550	--
Total dissolved solids (TDS)	--	--	--	1100	--	1100

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-072 4/5/94	MW-072 7/19/94	MW-072 1/11/95	MW-072 6/30/98	MW-073 6/30/98	MW-074 7/18/97
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	32	32	52	49	320	260
Cyanide	--	--	--	< 0.005	< 0.005	--
Fluoride	--	--	--	0.8	1.3	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	6.9	6.9	--
Phenols, total	--	--	--	0.015	< 0.005	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	530	2800	--
Total dissolved solids (TDS)	--	--	--	890	3700	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-074 6/24/98	MW-075 6/30/98	MW-076 6/29/98	MW-077 7/21/95	MW-077 1/20/96	MW-077 4/19/96	MW-077 7/1/96	MW-077 10/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	340	54	23	110	120	120	100	140
Cyanide	< 0.005	< 0.005	< 0.005	--	--	--	--	--
Fluoride	1.1	1.2	0.5	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	7	7.3	7.3	--	--	--	--	--
Phenols, total	0.025	0.077	0.008	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	13	390	51	--	--	--	--	--
Total dissolved solids (TDS)	1500	870	400	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-077 5/7/97	MW-077 7/18/97	MW-078 10/1/96	MW-078 2/10/97	MW-078 5/7/97	MW-078 7/17/97	MW-078 6/19/98	MW-078 4/22/99
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	150	150	31	75	59	48	47	42
Cyanide	--	--	--	--	--	--	< 0.005	--
Fluoride	--	--	--	--	--	--	< 0.2	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	7.1	--
Phenols, total	--	--	--	--	--	--	< 0.005	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	< 5	--
Total dissolved solids (TDS)	--	--	--	--	--	--	490	470

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-079 1/11/95	MW-079 4/6/95	MW-079 7/21/95	MW-079 10/10/95	MW-079 1/18/96	MW-079 4/19/96	MW-079 7/1/96	MW-079 10/1/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	36	33	31	30	23	30	17	20
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-079 2/10/97	MW-079 5/7/97	MW-079 7/17/97	MW-081 6/29/98	MW-082 10/11/95	MW-082 6/25/98	MW-082 10/12/98	MW-083 6/25/98
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	24	24	24	16	76	72	--	49
Cyanide	--	--	--	< 0.005	--	< 0.005	--	< 0.005
Fluoride	--	--	--	0.7	--	0.7	--	0.7
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	7.4	--	7.1	--	7.2
Phenols, total	--	--	--	< 0.005	--	0.006	--	< 0.005
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	450	--	390	190	270
Total dissolved solids (TDS)	--	--	--	800	--	730	--	640

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* *Measured in standard units (su)*
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-084 6/23/98	MW-085 6/23/98	MW-086 10/17/97	MW-086 6/26/98	MW-087 8/1/96	MW-087 8/22/96	MW-087 10/1/96	MW-087 2/9/97
Bicarbonate Alkalinity	--	--	--	--	--	--	--	222
Ammonia (as N)	--	--	2.77	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	< 0.3
Carbonate Alkalinity	--	--	--	--	--	--	--	< 1
Chloride	7	120	--	330	--	11	12	11
Cyanide	< 0.005	< 0.005	--	< 0.005	--	--	--	--
Fluoride	0.5	1.3	--	1.1	--	--	--	0.63
Hydroxide	--	--	--	--	--	--	--	< 1
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	1.91	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	14	--	--	--	--	--
Orthophosphate	--	--	0.5	--	--	--	--	--
pH*	7.5	7.5	--	7	--	--	--	7.8
Phenols, total	0.008	0.034	--	0.068	--	--	--	--
*Specific conductivity***	--	--	--	--	--	--	--	814
Sulfate	< 5	< 5	--	29	--	--	--	230
Total dissolved solids (TDS)	370	1100	--	1500	810	--	--	580

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-087 5/6/97	MW-087 10/16/97	MW-087 6/19/98	MW-087 10/12/98	MW-087 4/20/99	MW-087A 10/1/96	MW-087A 2/9/97	MW-087A 5/7/97
Bicarbonate Alkalinity	--	--	--	--	--	--	352	--
Ammonia (as N)	--	< 0.03	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	1.2	--
Carbonate Alkalinity	--	--	--	--	--	--	< 1	--
Chloride	13	--	13	--	10	110	150	140
Cyanide	--	--	< 0.005	--	--	--	--	--
Fluoride	--	--	0.9	--	--	--	1.9	--
Hydroxide	--	--	--	--	--	--	< 1	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	0.52	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	< 0.2	--	--	--	--	--	--
Orthophosphate	--	0.06	--	--	--	--	--	--
pH*	--	--	7.4	--	--	--	7.2	--
Phenols, total	--	--	< 0.005	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	3350	--
Sulfate	--	--	360	260	--	--	1900	--
Total dissolved solids (TDS)	--	--	710	--	680	--	3200	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-087A 10/16/97	MW-088 2/5/97	MW-088 4/30/97	MW-088 10/15/97	MW-088 6/18/98	MW-088 4/21/99	MW-089 8/1/96	MW-089 8/22/96
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	0.17	--	--	1.2	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	--	30	26	--	22	24	--	63
Cyanide	--	--	--	--	< 0.005	--	--	--
Fluoride	--	1.13	--	--	1.1	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	< 0.06	--	--	< 0.06	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	0.9	--	--	1.1	--	--	--	--
Orthophosphate	0.09	--	--	< 0.5	--	--	--	--
pH*	--	--	--	--	7.2	--	--	--
Phenols, total	--	--	--	--	< 0.005	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	390	--	--	450	--	--	--
Total dissolved solids (TDS)	--	970	--	--	840	800	900	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-089 10/1/96	MW-089 2/5/97	MW-089 4/30/97	MW-089 10/15/97	MW-089 6/17/98	MW-089 4/21/99	MW-090 2/10/97	MW-090 5/7/97
Bicarbonate Alkalinity	--	--	--	--	--	--	370	--
Ammonia (as N)	--	--	--	< 0.03	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	< 1	--
Chloride	63	60	58	--	61	55	26	25
Cyanide	--	--	--	--	0.247	--	--	--
Fluoride	--	0.8	--	--	0.7	--	0.36	--
Hydroxide	--	--	--	--	--	--	< 1	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	< 0.06	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	< 0.2	--	--	--	--
Orthophosphate	--	--	--	0.24	--	--	--	--
pH*	--	--	--	--	7.1	--	7.4	--
Phenols, total	--	--	--	--	< 0.005	--	--	--
Specific conductivity**	--	--	--	--	--	--	749	--
Sulfate	--	250	--	--	340	--	25	--
Total dissolved solids (TDS)	--	840	--	--	780	710	460	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
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Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-090 7/17/97	MW-090 6/17/98	MW-090 4/23/99	MW-091 2/11/97	MW-091 4/23/99	MW-094 10/17/97	MW-094 6/26/98	MW-094 6/26/98
Bicarbonate Alkalinity	--	--	--	510	--	--	--	--
Ammonia (as N)	--	--	--	--	--	< 0.03	--	--
Bromide	--	--	--	0.5	--	--	--	--
Carbonate Alkalinity	--	--	--	< 1	--	--	--	--
Chloride	19	35	51	80	58	--	24	20
Cyanide	--	< 0.005	--	--	--	--	< 0.005	--
Fluoride	--	0.5	--	0.19	--	--	0.7	--
Hydroxide	--	--	--	< 1	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	2.4	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	< 0.2	--	--
Orthophosphate	--	--	--	--	--	< 0.05	--	--
pH*	--	7.5	--	7.5	--	--	7.3	--
Phenols, total	--	< 0.005	--	--	--	--	0.008	--
Specific conductivity**	--	--	--	1010	--	--	--	--
Sulfate	--	130	--	< 5	--	--	240	--
Total dissolved solids (TDS)	--	530	740	590	640	--	600	530

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-095 4/30/97	MW-095 6/22/98	MW-095 10/12/98	MW-095 4/22/99	MW-096 4/30/97	MW-096 10/16/97
Bicarbonate Alkalinity	310	--	--	--	300	--
Ammonia (as N)	--	--	--	--	--	< 0.03
Bromide	< 0.3	--	--	--	< 0.3	--
Carbonate Alkalinity	1	--	--	--	< 1	--
Chloride	--	5	--	5.6	--	--
Cyanide	--	< 0.005	--	--	--	--
Fluoride	0.4	0.4	--	--	0.8	--
Hydroxide	< 1	--	--	--	< 1	--
Carbon Dioxide	31	--	--	--	48	--
Nitrate	--	--	--	--	--	0.38
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	< 0.2
Orthophosphate	--	--	--	--	--	0.08
pH*	7.3	7.5	--	--	7.1	--
Phenols, total	--	< 0.005	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	19	21	19	--	160	--
Total dissolved solids (TDS)	370	360	--	340	560	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-096 6/21/98	MW-096 4/22/99	MW-097 4/30/97	MW-097 10/17/97	MW-097 6/21/98	MW-097 10/12/98
Bicarbonate Alkalinity	--	--	270	--	--	--
Ammonia (as N)	--	--	--	< 0.03	--	--
Bromide	--	--	< 0.3	--	--	--
Carbonate Alkalinity	--	--	1	--	--	--
Chloride	14	13	--	--	8	--
Cyanide	< 0.005	--	--	--	< 0.005	--
Fluoride	0.4	--	0.5	--	0.7	--
Hydroxide	--	--	< 1	--	--	--
Carbon Dioxide	--	--	27	--	--	--
Nitrate	--	--	--	1.71	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	< 0.2	--	--
Orthophosphate	--	--	--	0.43	--	--
pH*	7.2	--	7.3	--	7.2	--
Phenols, total	< 0.005	--	--	--	< 0.005	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	210	--	150	--	190	200
Total dissolved solids (TDS)	560	520	550	--	520	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-097 10/12/98	MW-098 4/30/97	MW-098 6/29/98	MW-104 7/17/97	MW-104 6/21/98	MW-106 2/11/97	MW-106 5/7/97	MW-106 7/18/97
Bicarbonate Alkalinity	--	240	--	268	--	315	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	< 0.3	--	< 0.3	--	< 0.3	--	--
Carbonate Alkalinity	--	1	--	< 1	--	< 1	--	--
Chloride	6.7	--	14	11.6	14	10	4	5
Cyanide	--	--	< 0.005	--	< 0.005	--	--	--
Fluoride	--	0.4	0.3	0.8	1.4	0.24	--	--
Hydroxide	--	< 1	--	< 1	--	< 1	--	--
Carbon Dioxide	--	19	--	--	--	--	--	--
Nitrate	--	--	--	0.72	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	7.4	7.6	7.6	7.3	7.4	--	--
Phenols, total	--	--	0.01	--	< 0.005	--	--	--
Specific conductivity**	--	--	--	815	--	636	--	--
Sulfate	--	25	32	200	230	37	--	--
Total dissolved solids (TDS)	530	330	310	580	560	430	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	MW-106 6/18/98	MW-106 4/29/99	MW-108 7/17/97	MW-108 6/22/98	MW-108 4/22/99	MW-110 6/30/98	MW-111 6/29/98	MW-111 4/21/99
Bicarbonate Alkalinity	--	--	297	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	< 0.3	--	--	--	--	--
Carbonate Alkalinity	--	--	< 1	--	--	--	--	--
Chloride	4	12	3.2	5	4.3	54	100	120
Cyanide	< 0.005	--	--	< 0.005	--	< 0.005	< 0.005	--
Fluoride	0.3	--	0.4	0.4	--	0.7	0.7	--
Hydroxide	--	--	< 1	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	2.6	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	7.3	--	7.6	7.4	--	7.2	7.2	--
Phenols, total	< 0.005	--	--	< 0.005	--	0.01	< 0.005	--
Specific conductivity**	--	--	585	--	--	--	--	--
Sulfate	33	--	33	35	--	130	310	--
Total dissolved solids (TDS)	380	--	360	340	340	600	900	760

Notes:
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** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	PIPELINE_4 5/1/91	SUMP-16A 5/1/91	SUMP-16A 7/1/91	SUMP-16A 9/1/91	SUMP-16A 12/1/91	SUMP-16A 4/1/92	SUMP-16A 7/1/92	SUMP-16A 10/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	9000	190	49	--	683	522	82	225
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	1860	--	--	< 10	--	--	--	--
Total dissolved solids (TDS)	18500	876	--	263	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	SUMP-16A 1/1/93	SUMP-16A 4/14/93	SUMP-16A 10/5/94	SUMP-16A 1/11/95	SUMP-16A 10/12/95	SUMP-16A 7/1/96	SHAL-ZONE-MAX 4/1/92	SHAL-ZONE-MAX 7/1/92
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	229	218	128	90	63	14	1240	455
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	SHAL-ZONE-MAX 10/1/92	SHAL-ZONE-MAX 1/1/93	SHAL-ZONE-MAX 4/1/93	SHAL-ZONE-MAX 7/1/93	SHAL-ZONE-MAX 10/1/93	SHAL-ZONE-MAX 1/1/94	SHAL-ZONE-MAX 4/1/94	SHAL-ZONE-MAX 7/1/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	420	544	955	445	543	490	450	430
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	SHAL-ZONE-MAX 10/1/94	SHAL-ZONE-MAX 1/1/95	SHAL-ZONE-MAX 4/1/95	SUMP-A10 4/1/91	SUMP-A10 5/1/91	SUMP-A10 10/5/94	SUMP-A10 10/12/95	SW-01 7/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	400	439	439	17000	3750	4.2	3	19
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	1.3
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	3
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	164
Total dissolved solids (TDS)	--	--	--	--	--	--	--	583

Notes:
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	SW-01 4/1/92	SW-01 7/1/92	SW-01 10/1/92	SW-01 4/15/93	SW-01 5/12/93	SW-01 4/23/99	SW-02 5/12/93	SW-02 1/11/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	16	19	25	20	19.5	22	522	81
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	530	--	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
< Constituent not detected above noted laboratory detection limit.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	SW-02 6/24/98	SW-02 4/23/99	SW-03 7/1/96	SW-03 10/1/96	SW-03 6/24/98	SW-03 4/23/99	TH-21A 5/1/91	TH-21A 7/1/91
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	150	44	24	11	9	24	8250	636
Cyanide	< 0.005	--	--	--	< 0.005	--	--	--
Fluoride	0.5	--	--	--	0.7	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	7.2	--	--	--	7.5	--	--	--
Phenols, total	< 0.005	--	--	--	< 0.005	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	120	--	--	--	110	--	--	--
Total dissolved solids (TDS)	730	670	--	380	410	--	16000	--

Notes:
Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.
* Measured in standard units (su)
** Measured in micro-mhos per centimeter (umho/cm)
-- Not analyzed or not reported.
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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter	Well ID / Date Sampled	TH-A11 4/1/91	TH-A11 7/1/91	TH-A11 9/1/91	TH-A11 12/1/91	TH-A11 4/1/92	TH-A11 7/1/92	TH-A11 10/1/92	UIHS_ARROYO 4/1/92
Bicarbonate Alkalinity		--	--	--	--	--	--	--	--
Ammonia (as N)		--	--	--	--	--	--	--	--
Bromide		--	--	--	--	--	--	--	--
Carbonate Alkalinity		--	--	--	--	--	--	--	--
Chloride		12800	1470	--	670	433	60	124	16.2
Cyanide		--	--	--	--	--	--	--	--
Fluoride		--	--	--	--	--	--	--	--
Hydroxide		--	--	--	--	--	--	--	--
Carbon Dioxide		--	--	--	--	--	--	--	--
Nitrate		--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)		--	--	--	--	--	--	--	--
Orthophosphate		--	--	--	--	--	--	--	--
pH*		--	--	--	--	--	--	--	--
Phenols, total		--	--	--	--	--	--	--	--
Specific conductivity**		--	--	--	--	--	--	--	--
Sulfate		613	--	< 10	--	--	--	--	--
Total dissolved solids (TDS)		26200	--	1050	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

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Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	UIHS_ARROYO 7/1/92	UIHS_ARROYO 10/1/92	UIHS_ARROYO 1/1/93	UIHS_ARROYO 4/15/93	UIHS_ARROYO 5/12/93	UIHS_ARROYO 6/28/93
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	8.5	13.5	11.4	13.5	11	11.4
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	UIHS_ARROYO 7/15/93	UIHS_ARROYO 8/3/93	UIHS_ARROYO 9/21/93	UIHS_ARROYO 10/14/93	UIHS_ARROYO 11/10/93	UIHS_ARROYO 12/6/93
Bicarbonate Alkalinity	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--
Bromide	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--
Chloride	12.9	11.8	11.5	10.3	493	10.7
Cyanide	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--
pH*	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	UIHS_ARROYO 1/13/94	UIHS_ARROYO 2/9/94	UIHS_ARROYO 3/16/94	UIHS_ARROYO 4/5/94	UIHS_ARROYO 5/19/94	UIHS_ARROYO 6/23/94	UIHS_ARROYO 7/21/94	UIHS_ARROYO 8/24/94
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	11	11.6	13	14	12.2	13	8	12.7
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Parameter / Well ID / Date Sampled	UIHS_ARROYO 9/20/94	UIHS_ARROYO 10/6/94	UIHS_ARROYO 11/30/94	UIHS_ARROYO 12/16/94	UIHS_ARROYO 1/11/95	UIHS_ARROYO 3/9/95	UIHS_ARROYO 4/7/95	UIHS_ARROYO 5/18/95
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	11	13	11.1	12.2	10	11.5	13	9
Cyanide	--	--	--	--	--	--	--	--
Fluoride	--	--	--	--	--	--	--	--
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	--
Phenols, total	--	--	--	--	--	--	--	--
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--
Total dissolved solids (TDS)	--	--	--	--	--	--	--	--

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.

Appendix G

Historical General Chemistry Analytical Data
May 1991 - December 1999
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Well ID / Date Sampled / Parameter	UIHS_ARROYO 7/21/95	UIHS_ARROYO 10/12/95	UIHS_ARROYO 1/19/96	UIHS_ARROYO 4/24/96	UIHS_ARROYO 7/1/96	UIHS_ARROYO 10/1/96	UIHS_ARROYO 2/10/97	UIHS_ARROYO 6/26/98
Bicarbonate Alkalinity	--	--	--	--	--	--	--	--
Ammonia (as N)	--	--	--	--	--	--	--	--
Bromide	--	--	--	--	--	--	--	--
Carbonate Alkalinity	--	--	--	--	--	--	--	--
Chloride	12	14	10	10.9	10	8	11	13
Cyanide	--	--	--	--	--	--	--	< 0.005
Fluoride	--	--	--	--	--	--	--	0.7
Hydroxide	--	--	--	--	--	--	--	--
Carbon Dioxide	--	--	--	--	--	--	--	--
Nitrate	--	--	--	--	--	--	--	--
Nitrogen, Kjeldahl, total (as N)	--	--	--	--	--	--	--	--
Orthophosphate	--	--	--	--	--	--	--	--
pH*	--	--	--	--	--	--	--	7.2
Phenols, total	--	--	--	--	--	--	--	0.006
Specific conductivity**	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	590
Total dissolved solids (TDS)	--	--	--	--	--	--	--	940

Notes:

Concentrations listed in milligrams per liter (mg/L), except where noted otherwise.

* Measured in standard units (su)

** Measured in micro-mhos per centimeter (umho/cm)

-- Not analyzed or not reported.

< Constituent not detected above noted laboratory detection limit.