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ARCADIS

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Year 2002 Annual Groundwater Monitoring Report

Former Bertha Barber Tank Battery Lea County, New Mexico

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Introduction

ARCADIS G & M, Inc. (ARCADIS) prepared this Annual Groundwater Monitoring Report for 2002 on behalf of Marathon Oil Company (Marathon) to present the results of quarterly groundwater monitoring and additional field investigation activities conducted at the former Bertha Barber Tank Battery (site) in Lea County, New Mexico. Figure 1 shows the location of the site situated in Section 5, Township 20 South, Range 37 East. Quarterly groundwater monitoring was conducted in March, June, September and December 2002 as recommended in the Site Investigation Report, and approved by the New Mexico Energy, Minerals, and Natural Resources Department, Oil Conservation Division (OCD).

Geology/Hydrogeology

Sixteen monitor wells are currently located at the former Bertha Barber Tank Battery facility. Three new monitor wells (MW-14, MW-15 and MW-16) were installed in December 2002. Additionally, three soil borings were installed in an abandoned saltwater evaporation pit as part of additional field investigation activities conducted in December 2002. The thirteen original monitor wells were installed during the course of a site-wide assessment performed in 1999 by ARCADIS (formerly AG&M). Soil boring logs from the wells indicate that the site is underlain by sand of varying colors, grain sizes and sorting. At most locations, the sand is mixed with some gravel, the presence of which tends to increase with depth. In the northern and eastern portions of the site, the surficial sands and gravel are underlain by caliche at depths ranging from 4 to 9 feet below land surface. Groundwater at the site is generally found between 35 and 40 feet below ground level.

Field Activities

Quarterly groundwater monitoring events were conducted in March, June, September and December 2002. During each monitoring event, a site-wide gauging event was completed prior to sampling. During the March, June and September events, the monitoring included only the original thirteen monitor wells. Sixteen monitor wells (including the three new wells) were monitored during the December event. One offsite livestock water well was also included in the sampling events.

Three wetted casing volumes of water were removed from each well prior to sample collection. The fluid was removed from each well using a submersible pump and dedicated tubing or a dedicated disposable bailer. In some cases, the wells were pumped (or bailed) dry and allowed to recover prior to sampling. When a submersible

pump was utilized, it was decontaminated by washing and pumping with water and laboratory-grade detergent. The washing was followed by a clean water rinse.

During each quarterly monitoring event, groundwater samples were collected and analyzed for BTEX (benzene, toluene, ethylbenzene and total xylene) using EPA Method 8021B. During the September sampling event, groundwater samples were collected and analyzed for chloride using EPA Method 325.2. During the September event, groundwater samples were also collected and analyzed for total dissolved solids (TDS) using EPA Method 160.1, three dissolved metals (iron, manganese and barium) using EPA Method 6010B, and polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8310. In addition to the above samples, one rinsate sample (field blank) and one replicate sample were submitted during each sampling event, and a trip blank sample was included in each cooler utilized to transport samples for BTEX analysis to the laboratory. All samples were preserved with ice immediately after collection and shipped within 24 hours to Severn Trent Laboratories in Valparaiso, Indiana for analysis of the March and June sampling events. Trace Analysis, Inc. (Trace) in Lubbock, Texas analyzed the September and December samples. Trace will be used on subsequent sampling events.

December 2002 Investigation

In December, an additional field investigation was conducted to more fully understand the hydrogeologic conditions of the site, further delineate the dissolved BTEX plume and evaluate the presence (or lack thereof) of hydrocarbons and chloride in an abandoned produced water evaporation pit.

In 2001 PSH was observed and recorded in monitor wells MW-4, MW-5, MW-7 and MW-9. Based on this information, it was determined that additional monitor wells should be installed to further delineate the phase-separated hydrocarbon plume. Three monitor wells (MW-14, MW-15 and MW-16) were installed in December 2002 as down-gradient and cross-gradient wells to monitor possible migration of the hydrocarbon plume (Figure 2).

Borings were installed using air rotary and core barrel sampling technology to catch discrete, relatively undisturbed core samples for lithologic descriptions and to provide samples for analysis. Samples were collected on a one-foot interval and split between a laboratory sample container and a Ziploc® bag. The soil jar was immediately placed on ice in a cooler to preserve the sample and the Ziploc® bag sealed; a photo-ionization detector (PID) reading was recorded from the headspace in the bag after allowing for volatilization. The sample with the highest PID reading and the sample

immediately above the groundwater in the vadose zone were submitted to Trace to be analyzed for BTEX utilizing Method 8021B and total petroleum hydrocarbons by EPA Method 8015 (TPH DRO/GRO). Following the sampling of the borings to groundwater, the holes were reamed using air rotary techniques and completed approximately 10 feet below the groundwater contact with 20 feet of screened interval.

MW-14 was drilled to a depth of 50 feet below ground surface. The two samples submitted to the lab for analysis were the 33-34 foot sample and the 36-37 foot sample. MW-15 was drilled and completed to a depth of 45 feet below ground surface. The 30-31 foot sample interval and the 34-35 foot intervals were submitted to the lab for analysis. MW-16 was drilled and completed to a depth of 50 feet below ground surface. The two samples submitted for analysis were the 37-38 foot interval and the 39-40 foot interval. Monitoring well logs are provided in Appendix B.

All discrete soil sample results from the monitor well installation were below OCD action levels of 50 parts per million (ppm or mg/kg) BTEX and 100 ppm TPH. Total BTEX and TPH DRO/GRO analytical results are located in Table 5 for all monitor well sample intervals. Detectable concentrations of BTEX, chloride or TPH are noted on Table 5 in bold print; any BTEX, chloride or TPH concentrations above OCD limits are shaded.

In addition to the three monitor wells installed in December 2002, three soil borings (SB-1, SB-2, SB-3) were drilled to investigate potential hydrocarbon and chloride impact in a former produced water evaporation pit that had been backfilled by windblown sand and partially re-vegetated, but was confirmed by historic aerial photographs (Figure 2). The three soil borings were advanced in a similar manner as the monitor wells. Discrete samples were collected continuously to the top of groundwater. The samples were then split between laboratory containers and Ziploc® bags. The containers were immediately placed on ice and the Ziploc® bags were allowed to volatilize. Headspace readings were collected from the bags with a PID meter. Three sample intervals were submitted to Trace for analysis of BTEX, TPH DRO/GRO and chloride. The highest PID reading, the sample immediately above the water table and a sample from the stained soil in the shallow subsurface were submitted for analysis. Soil boring logs are provided in Appendix B. The analytical results from the soil samples are presented in Table 5. The analytical results show that all total BTEX levels are well below 50 mg/kg; however, there are three sample intervals that are above the OCD groundwater protection standard of 100 mg/kg for TPH:

- The TPH DRO result for SB-1 (1-2') was 359 mg/kg;

- SB-2 (1-2') reported 531 mg/kg; and
- SB-3 (14-15') reported 1320 mg/kg.

The only chloride result above the 250 mg/kg OCD limit was in SB-3 immediately above groundwater at 34-35 feet with a reported concentration of 314 mg/kg. The chloride values from the three soil borings ranged from 6.17 mg/kg to 314 mg/kg. The analytical results noted in Table 5 indicate that the hydrocarbon and chloride levels found in the groundwater at this site are most probably not due to leakage from this pit, since the hydrocarbon concentrations generally decrease with depth below the pit, and the chloride levels increase with depth to their highest concentrations immediately above groundwater.

Surface Restoration Plan

A surface restoration plan is scheduled to be implemented as part of the 2003 field activities at the Site. The plan was proposed in the December 8, 2000 letter from Mr. M. Paul Peacock of Marathon to Mr. Bill Olson of the OCD. The following is an excerpt from that letter.

> "The surface restoration plan will consist of removing approximately three feet of the surface petroleum contaminated soils from the former tank battery and pit areas as outlined in Section 7 of the Stage 2 Abatement Plan. Prior to replacement of clean soils, a six inch layer of clay material will be placed in the excavation to ensure that residual hydrocarbons in the subsurface will not migrate to groundwater."

The scope of this surface restoration plan includes the pits around MW-1, MW-2, the former tank battery site (MW-3 and MW-4 areas) and the area around MW-5 (Figure 8). In addition to the areas in the original plan, the recently assessed produced water pit area will be included. The OCD approved the surface restoration plan in a letter dated June 18, 2001. The current plan is the same as the original outlined above, except that instead of clean soils, the surficial hydrocarbon impacted soils will be mixed and blended on-site and placed on top of the clay liner.

With respect to the possible impact of TPH left in subsurface soils, there are several studies that indicate that 1% TPH (10,000 parts per million or 10,000 mg/kg) is an acceptable cleanup level for TPH in regards to groundwater protection and plant growth. Those studies are *Technical Basis for Current Soil Management Levels of Total Petroleum Hydrocarbons*, by Wayne A. Hamilton et al. In this article Hamilton

et al state, "...therefore one percent hydrocarbon guidance level is justifiable, for weathered and crude oils, from a lack of mobility and leaching to a groundwater receptor" (page 6). Also, the study *Crude Oil Hydrocarbon Bioremediation and Soil Ecotoxicity Assessment*, by Joseph P. Salanitro et al., reports "these non-toxic soils contain 1000-8600 mg/kg residual hydrocarbons as TPH. Furthermore, these compounds may be bound or unavailable in that they are not (a) biodegradable further, (b) toxic to soil dwelling species (earthworms and plants), and (c) susceptible to leaching and subsequent impact to groundwater." (1997 Environmental Science and Technology Vol. 31, No 6, p 1769). Finally in the book, *Risk Based Decision Making for Assessing Petroleum Impacts at Exploration and Production Site*, edited by Sara J. McMillen et al., "the 1% TPH level used by...regulators has been shown to be protective of groundwater resources and plant life. Also, the 1% TPH management level was shown to be achievable, specifically through bioremediation" (Page 42).

Gauging Results and Groundwater Flow

Fluid levels were gauged in all monitor wells during each quarterly groundwater monitoring event. Table 1 contains historical fluid level data for all monitor wells at the site. Figure 2 is a map showing groundwater elevation contours based on gauging data collected during the most recent event (December 2002). Passive skimmers (absorbent socks) had been maintained in monitor wells MW-1, MW-2, MW-7 and MW-10 to recover phase-separated hydrocarbons (PSH). However, due to their ineffectiveness at removing the very thin amounts of PSH, the socks were removed in June of 2002 and will not be replaced in the wells unless PSH levels increase to a point where the socks will be effective. Phase-separated hydrocarbons measured during 2002 ranged between 0.01 to 0.12 feet during the four quarterly events.

In the March gauging event, PSH was measured in MW-1, MW-4, MW-7, MW-9 and MW-10. The PSH thickness ranged from 0.01 to 0.04 feet. Additionally, a sheen of hydrocarbon was observed in monitor wells MW-2, and MW-5.

In June 2002, PSH was measured in monitor wells MW-1, MW-4, MW-5, MW-9 and MW-10. The PSH thickness ranged from 0.01 to 0.03 feet.

In the September gauging event, PSH was measured in monitor wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-7, MW-9 and MW-10. The PSH thickness ranged from 0.01 feet to 0.12 feet.

In December 2002, PSH was measured in monitor wells MW-1, MW-2, MW-4, MW-5 and MW-10. The PSH thickness ranged from 0.01 feet to 0.02 feet.

Phase-separated hydrocarbons were measured in MW-1, MW-4, and MW-10 during all four quarterly groundwater gauging events.

Based on the groundwater elevation contours shown on Figure 2, groundwater appears to flow in an east and southeast direction off of a groundwater elevation high beneath the site.

Sampling Results

BTEX samples were collected from each well (except for MW-1, MW-4 and MW-10 which contained measurable PSH) during each quarterly event. No sample was collected from any monitor well that contained measurable amounts of PSH. The results are summarized in Table 2 along with historical results from each well. Appendix A contains laboratory analytical reports for the four quarterly sampling events. Based on the historical BTEX database, the following observations were made:

- None of the monitor wells sampled during the calendar year 2002 contained detectable levels of benzene above the laboratory detection limit of 5 ug/L, which is below the New Mexico Water Quality Control Commission (WQCC) Ground Water Standards of 10 micrograms per liter (ug/L). Also, during this last quarterly monitoring period, a fewer number of wells contained PSH than previously;

- MW-10 is the only monitor well that contained toluene concentrations above the WQCC standard of 750 ug/L based on sampling in 1999. However, no water samples have been collected from this well since 1999 due to the presence of PSH. As previously documented, this PSH is condensate most likely resulting from a historical pipeline leak from a nearby Warren (Dynegy) pipeline (Figure 2);

- No wells have contained ethylbenzene or total xylenes concentrations above the WQCC standards of 750 ug/L and 620 ug/L, respectively; and

- MW-6 did not have a history of containing benzene until the September and December 2000 monitoring events when benzene was reported at 11 ug/L and 14 ug/L, respectively. Condensate released from the above mentioned Warren (Dynegy) pipeline leak northwest of the site is most likely the source of benzene in MW-6, because MW-10 is located up-gradient from MW-6. However, MW-6 currently contains no BTEX constituents above the laboratory detection limit.

The concentration of benzene in the groundwater was mapped for each quarterly event conducted in 2002 (Figures 3 through 6). Figure 7 shows the apparent net change in benzene concentration from December 2001 to December 2002. It should be noted that monitor wells MW-1, MW-4, and MW-10 were not sampled during any of the quarterly events because they contained PSH. However, historical data from MW-1 does not show benzene above WQCC standards, indicating a weathered hydrocarbon source. The quarterly benzene data, as summarized on the quarterly benzene concentration maps, showed the following:

- In March 2002, no monitor wells contained benzene concentrations exceeding the laboratory detection limit of 5 ug/L. However, PSH was recorded in monitor wells MW-1, MW-4, MW-7, MW-9 and MW-10. Additionally, a sheen of hydrocarbons was observed in monitor wells MW-2 and MW-5. Monitor wells MW-2 and MW-5 were not sampled due to the presence of the hydrocarbons.

- During the June 2002 sampling event, benzene was not detected above the laboratory detection limit of 5 ug/L in any monitor wells. PSH was recorded in MW-1, MW-4, MW-5, MW-9 and MW-10.

- In September 2002, MW-1, MW-2, MW-3, MW-4, MW-5, MW-7, MW-9 and MW-10 were found to have PSH and were not sampled. None of the sampled wells indicated a benzene concentration above the laboratory detection limit of 5 ug/L.

- During the December 2002 sampling event, only MW-1, MW-2, MW-5 and MW-10 were found to have PSH and were not sampled. None of the sampled wells indicated a benzene concentration above the laboratory detection limit of 5 ug/L.

- Figure 7 is a graphical representation of apparent net change in benzene concentrations over the period of December 2001 through December 2002. None of the wells that were sampled show any net change in benzene concentrations over that period. No well that was sampled in 2002 contained detectable levels of benzene. However, at times a given well may contain phase-separated hydrocarbons and therefore was not sampled. The wells that were sampled in the quarterly events, but at some time during 2002 contained PSH, included MW-2, MW-3, MW-5, MW-7, and MW-9. Additionally, monitor wells MW-14, MW-15 and MW-16 have only one quarterly sampling event (December 2002), and therefore, there is no data with which to compare.

During the September 2002 sampling event, samples were collected and analyzed for chloride, TDS, dissolved metals (iron, manganese and barium) and PAHs. Chloride, TDS and dissolved metals data are summarized in Table 3. PAH data is presented in Table 4.

Chloride and TDS data collected during the 2002 monitoring confirmed the poor quality of the groundwater in and around the site. Most wells had lower reported TDS values as compared to data collected in 2001, but generally slightly higher chloride values. However, values were still generally lower than chloride analyses reported in 1999. All values reported in 2002 were above WQCC standards of 250 milligrams per liter (mg/L) chlorides and 1,000 mg/L TDS.

Dissolved metals data collected during 2002 contained only one sample location (livestock water well) with manganese and iron detected above the WQCC standard of 0.2 and 1.0 mg/L, respectively, and no samples with barium reported above the WQCC standard of 1.0 mg/L. The manganese and iron concentrations in the livestock water well during the September sampling event were 0.224 mg/L and 4.52 mg/L, respectively, but were lower than the September 2001 concentrations of 0.25 mg/L and 13.4 mg/L, respectively. The collection point for the livestock water well is downstream from an old steel storage tank. This is most likely the cause of the elevated iron detections from that well.

PAHs were not detected in any monitor well that was sampled during the September sampling event.

Conclusions / Recommendations

Several conclusions can be made from the sampling data collected through the Year 2002. The conclusions are summarized as follows:

- Monitor wells MW-1, MW-4 and MW-10 contained PSH during each quarterly monitoring event in 2001. Monitor wells MW-2, MW-3, MW-4, MW-5, MW-7 and MW-9 each contained PSH during at least one quarterly monitoring event in 2002.

- With the local groundwater gradient being to the east and southeast, there is little concern at this time that on-site impacts may migrate toward the livestock water well. However, impacts from the MW-10 area may migrate towards the water well.

- Chloride and TDS data in the area shows levels well above WQCC standards; however, all of the monitoring wells have shown a decrease in TDS concentration over the last year. Only the livestock water well indicated a slight increase.

- Dissolved metals data (for iron, manganese and barium) and PAH data is available for seven historical events. The only dissolved metals detected above WQCC standards in 2002 were from the livestock water well and these metals were iron and manganese. Wells MW-4 and MW-5 contained dissolved barium exceeding WQCC standards in 2000, but these wells were not sampled in 2002 due to the presence of PSH. Historically, PAHs were found in MW-1 and MW-4, but neither of these wells was sampled in 2002 due to the presence of PSH. The presence of the elevated iron detections in the livestock water well is most likely due to the sample collection point being located downstream of an old steel storage tank.

Based on the above conclusions, the following recommendations are made:

- Passive skimmers will not be maintained in monitor wells containing PSH in the future unless PSH increases to thicknesses that enable the skimmers to be effective. The passive skimmers are currently inefficient at removing the very thin amount of PSH in the monitoring wells;

- It is recommended to continue the groundwater monitoring plan as originally proposed in the Site Investigation Report. Any changes to the groundwater monitoring plan will only be implemented after receipt of written authorization; and

- The surface restoration plan summarized in this report and previously approved by the OCD will be implemented to expedite the site cleanup for closure.

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Table 1. Historical Fluid Level Data
Marathon Oil Company, Former Bertha Barber Tank Battery, Lea County, New Mexico

Well ID	Date	Measuring Point Elevation (feet-amsl)	Depth to Product (feet)	Depth to Water (feet-bmp)	Measured Product Thickness (feet-condensate)	Product Thickness (equiv. feet-water)	Corrected Water Level Elevation (feet-amsl)
MW-1	12/30/98	3561.20		35.83			3525.37
	03/31/99	3561.20	35.77	35.82	0.05	0.04	3525.42
	07/16/99	3561.20		35.48	sheen	sheen	3525.72
	08/27/99	3561.20	35.64	35.66	0.02	0.02	3525.56
	09/22/99	3561.20		35.79	sheen	sheen	3525.41
	12/14/99	3561.20	36.00	36.03	0.03	0.02	3525.19
	03/30/00	3561.20	36.19	36.20	0.01	0.01	3525.01
	09/27/00	3561.20	37.65	37.70	0.05	0.04	3523.54
	12/21/00	3561.20	37.13	37.14	0.01	0.01	3524.07
	03/19/01	3561.20	37.14	37.15	0.01	0.01	3524.06
	06/28/01	3561.20	37.14	37.15	0.01	0.01	3524.06
	09/27/01	3561.20	37.48	37.55	0.07	0.06	3523.71
	12/26/01	3561.20	37.19	37.33	0.14	0.11	3523.98
	03/22/02	3561.20	37.30	37.34	0.04	0.03	3523.89
	06/28/02	3561.20	37.37	37.38	0.01	0.01	3523.83
	09/25/02	3561.20	37.55	37.67	0.12	0.10	3523.63
	12/18/2002*	3561.57	37.60	37.62	0.02	0.02	3523.97
MW-2	12/30/98	3561.69		36.34			3525.35
	03/31/99	3561.69		36.33			3525.36
	07/16/99	3561.69		35.95			3525.74
	08/27/99	3561.69	36.12	36.13	0.01	0.01	3525.57
	09/22/99	3561.69		36.27			3525.42
	12/14/99	3561.69		36.62			3525.07
	03/30/00	3561.69	36.59	36.60	0.01	0.01	3525.10
	06/20/00	3561.69	38.10	38.12	0.02	0.02	3523.59
	09/27/00	3561.69	38.11	38.12	0.01	0.01	3523.58
	12/21/00	3561.69	37.59	37.60	0.01	0.01	3524.10
	03/19/01	3561.69	37.60	37.61	0.01	0.01	3524.09
	06/28/01	3561.69	37.15	37.16	0.01	0.01	3524.54
	09/27/01	3561.69	37.48	37.49	0.01	0.01	3524.21
	12/26/01	3561.69	37.69	37.70	0.01	0.01	3524.00
	03/22/02	3561.69		38.78	sheen	sheen	3522.91
	06/28/02	3561.69		37.85			3523.84
	09/25/02	3561.69	38.06	38.10	0.04	0.03	3523.62
	12/18/2002*	3562.10	38.14	38.15	0.01	0.01	3523.96
MW-3	12/30/98	3563.00		37.65			3525.35
	03/31/99	3563.00		37.67			3525.33
	07/16/99	3563.00		37.31			3525.69
	08/27/99	3563.00		37.48			3525.52
	09/22/99	3563.00		37.59			3525.41
	12/14/99	3563.00		38.10			3524.90
	03/30/00	3563.00		38.10			3524.90
	06/20/00	3563.00		38.56			3524.44
	09/27/00	3563.00		37.88			3525.12
	12/21/00	3563.00		38.11			3524.89
	03/19/01	3563.00		38.19			3524.81
	06/28/01	3563.00		38.63			3524.37
	09/27/01	3563.00		38.95			3524.05

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Well ID	Date	Measuring Point Elevation (feet-amsl)	Depth to Product (feet)	Depth to Water (feet-bmp)	Measured Product Thickness (feet-condensate)	Product Thickness (equiv. feet-water)	Corrected Water Level Elevation (feet-amsl)
	12/26/01	3563.00		39.05			3523.95
	03/22/02	3563.00		39.11			3523.89
	06/28/02	3563.00		39.19			3523.81
	09/25/02	3563.00	39.41	39.42	0.01	0.01	3523.59
	12/18/2002*	3563.40		39.49			3523.91
MW-4	12/30/98	3563.01		37.66			3525.35
	03/31/99	3563.01		37.66			3525.35
	07/16/99	3563.01		37.28			3525.73
	08/27/99	3563.01		37.46			3525.55
	09/22/99	3563.01		37.57			3525.44
	12/14/99	3563.01		37.85			3525.16
	03/30/00	3563.01		38.10			3524.91
	06/20/00	3563.01		38.26			3524.75
	09/27/00	3563.01		37.86			3525.15
	12/21/00	3563.01		38.10			3524.91
	03/19/01	3563.01		38.16			3524.85
	06/28/01	3563.01		38.60			3524.41
	09/27/01	3563.01	38.82	38.92	0.10	0.08	3524.17
	12/26/01	3563.01	39.03	39.05	0.02	0.02	3523.98
	03/22/02	3563.01	39.10	39.11	0.01	0.01	3523.91
	06/28/02	3563.01	38.63	38.66	0.03	0.02	3524.37
	09/25/02	3563.01	38.61	38.65	0.04	0.03	3524.39
	12/18/2002*	3563.43		39.45			3523.98
MW-5	12/30/98	3561.10		35.73			3525.37
	03/31/99	3561.10		35.75			3525.35
	07/16/99	3561.10		35.38			3525.72
	08/27/99	3561.10		35.56			3525.54
	09/22/99	3561.10		35.68			3525.42
	12/14/99	3561.10		35.95			3525.15
	03/30/00	3561.10		36.10			3525.00
	06/20/00	3561.10		36.34			3524.76
	09/27/00	3561.10		35.98			3525.12
	12/21/00	3561.10		36.15			3524.95
	03/19/01	3561.10		36.13			3524.97
	06/28/01	3561.10		36.69			3524.41
	09/27/01	3561.10	36.47	36.98	0.51	0.41	3524.53
	12/26/01	3561.10	37.10	37.21	0.11	0.09	3523.98
	03/22/02	3561.10		37.20	sheen	sheen	3523.90
	06/28/02	3561.10	37.29	37.31	0.02	0.02	3523.81
	09/25/02	3561.10	37.48	37.52	0.04	0.03	3523.61
	12/18/2002*	3561.49	37.54	37.56	0.02	0.02	3523.95
MW-6	08/27/99	3561.25		35.69			3525.56
	09/22/99	3561.25		35.75			3525.50
	12/14/99	3561.25		36.10			3525.15
	03/30/00	3561.25		36.29			3524.96
	06/20/00	3561.25		36.39			3524.86
	09/27/00	3561.25		36.06			3525.19

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Well ID	Date	Measuring Point Elevation (feet-amsl)	Depth to Product (feet)	Depth to Water (feet-bmp)	Measured Product Thickness (feet-condensate)	Product Thickness (equiv. feet-water)	Corrected Water Level Elevation (feet-amsl)
	12/21/00	3561.25		36.13			3525.12
	03/19/01	3561.25		36.80			3524.45
	06/28/01	3561.25		36.54			3524.71
	09/27/01	3561.25		37.02			3524.23
	12/26/01	3561.25		37.25			3524.00
	03/22/02	3561.25		37.32			3523.93
	06/28/02	3561.25		37.40			3523.85
	09/25/02	3561.25		37.63			3523.62
	12/18/2002*	3561.65		37.70			3523.95
MW-7	08/27/99	3562.44		38.15			3524.29
	09/22/99	3562.44		38.20			3524.24
	12/14/99	3562.44		37.51			3524.93
	03/30/00	3562.44	37.55	37.60	0.05	0.04	3524.88
	06/20/00	3562.44	37.73	37.91	0.18	0.14	3524.67
	09/27/00	3562.44	37.75	37.76	0.01	0.01	3524.69
	12/21/00	3562.44	37.65	37.70	0.05	0.04	3524.78
	03/19/01	3562.44	37.57	37.58	0.01	0.01	3524.87
	06/28/01	3562.44	37.89	37.90	0.01	0.01	3524.55
	09/27/01	3562.44	38.42	38.43	0.01	0.01	3524.02
	12/26/01	3562.44	38.61	38.62	0.01	0.01	3523.83
	03/22/02	3562.44	38.64	38.65	0.01	0.01	3523.80
	06/28/02	3562.44		38.76			3523.68
	09/25/02	3562.44	38.99	39.01	0.02	0.02	3523.45
	12/18/2002*	3562.70		39.07			3523.63
MW-8	08/27/99	3561.39		37.21			3524.18
	09/22/99	3561.39		37.26			3524.13
	12/14/99	3561.39		36.44			3524.95
	03/30/00	3561.39		36.65			3524.74
	06/20/00	3561.39		36.88			3524.51
	09/27/00	3561.39		36.61			3524.78
	12/21/00	3561.39		36.50			3524.89
	03/19/01	3561.39		36.51			3524.88
	06/28/01	3561.39		36.98			3524.41
	09/27/01	3561.39		37.51			3523.88
	12/26/01	3561.39		37.74			3523.65
	03/22/02	3561.39		37.80			3523.59
	06/28/02	3561.39		37.87			3523.52
	09/25/02	3561.39		38.15			3523.24
	12/18/2002*	3561.82		38.20			3523.62
MW-9	08/27/99	3563.59		36.14			3527.45
	09/22/99	3563.59		36.23			3527.36
	12/14/99	3563.59		38.48			3525.11
	03/30/00	3563.59		38.70			3524.89
	06/20/00	3563.59		38.89			3524.70
	09/27/00	3563.59		38.60			3524.99
	12/21/00	3563.59		38.60			3524.99
	03/19/01	3563.59		38.65			3524.94

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Table 1. Historical Fluid Level Data
Marathon Oil Company, Former Bertha Barber Tank Battery, Lea County, New Mexico

Well ID	Date	Measuring Point Elevation (feet-amsl)	Depth to Product (feet)	Depth to Water (feet-bmp)	Measured Product Thickness (feet-condensate)	Product Thickness (equiv. feet-water)	Corrected Water Level Elevation (feet-amsl)
	06/28/01	3563.59		38.99			3524.60
	09/27/01	3563.59	39.40	39.62	0.22	0.18	3524.15
	12/26/01	3563.59	39.65	39.82	0.17	0.14	3523.91
	03/22/02	3563.59	39.37	39.39	0.02	0.02	3524.22
	06/28/02	3563.59	39.85	39.87	0.02	0.02	3523.74
	09/25/02	3563.59	41.09	41.11	0.02	0.02	3522.50
	12/18/2002*	3563.95		40.15			3523.80
MW-10	08/27/99	3560.51		34.87			3525.64
	09/22/99	3560.51		34.96			3525.55
	12/14/99	3560.51		35.33			3525.18
	03/30/00	3560.51	35.49	35.50	0.01	0.01	3525.02
	06/20/00	3560.51	35.54	35.55	0.01	0.01	3524.97
	09/27/00	3560.51	35.55	35.56	0.01	0.01	3524.96
	12/21/00	3560.51	35.52	35.53	0.01	0.01	3524.99
	03/19/01	3560.51	35.48	35.52	0.04	0.03	3525.02
	06/28/01	3560.51	35.63	36.26	0.63	0.47	3524.72
	09/27/01	3560.51	36.12	36.75	0.63	0.47	3524.23
	12/26/01	3560.51	36.34	36.98	0.64	0.48	3524.01
	03/22/02	3560.51	36.53	36.55	0.02	0.01	3523.98
	06/28/02	3560.51	36.60	36.61	0.01	0.01	3523.91
	09/25/02	3560.51	36.82	36.84	0.02	0.02	3523.69
	12/18/2002*	3560.88	36.91	36.92	0.01	0.01	3523.97
MW-11	08/27/99	3565.44		40.34			3525.10
	09/22/99	3565.44		40.37			3525.07
	12/14/99	3565.44		40.61			3524.83
	03/30/00	3565.44		39.80			3525.64
	06/20/00	3565.44		40.10			3525.34
	09/27/00	3565.44		39.82			3525.62
	12/21/00	3565.44		40.01			3525.43
	03/19/01	3565.44		39.76			3525.68
	06/28/01	3565.44		41.16			3524.28
	09/27/01	3565.44		41.71			3523.73
	12/26/01	3565.44		41.91			3523.53
	03/22/02	3565.44		41.95			3523.49
	06/28/02	3565.44		42.04			3523.40
	09/25/02	3565.44		42.32			3523.12
	12/18/2002*	3565.81		42.34			3523.47
MW-12 (PZ-2)	08/27/99	3562.11		36.65			3525.46
	09/22/99	3562.11		36.69			3525.42
	12/14/99	3562.11		36.95			3525.16
	03/30/00	3562.11		37.23			3524.88
	06/20/00	3562.11		37.34			3524.77
	09/27/00	3562.11		37.09			3525.02
	12/21/00	3562.11		37.23			3524.88
	03/19/01	3562.11		37.26			3524.85
	06/28/01	3562.11		37.45			3524.66
	09/27/01	3562.11		37.40			3524.71

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Table 1. Historical Fluid Level Data
Marathon Oil Company, Former Bertha Barber Tank Battery, Lea County, New Mexico

Well ID	Date	Measuring Point Elevation (feet-amsl)	Depth to Product (feet)	Depth to Water (feet-bmp)	Measured Product Thickness (feet-condensate)	Product Thickness (equiv. feet-water)	Corrected Water Level Elevation (feet-amsl)
	12/26/01	3562.11		37.15			3524.96
	03/22/02	3562.11		38.22			3523.89
	06/28/02	3562.11		38.30			3523.81
	09/25/02	3562.11		38.53			3523.58
	12/18/2002*	3562.46		38.62			3523.84
MW-13 (PZ-1)	08/27/99	3559.67		34.09			3525.58
	09/22/99	3559.67		34.20			3525.47
	12/14/99	3559.67		34.96			3524.71
	03/30/00	3559.67		34.80			3524.87
	06/20/00	3559.67		34.90			3524.77
	09/27/00	3559.67		34.49			3525.18
	12/21/00	3559.67		34.75			3524.92
	03/19/01	3559.67		34.84			3524.83
	06/28/01	3559.67		34.95			3524.72
	09/27/01	3559.67		35.52			3524.15
	12/26/01	3559.67		35.67			3524.00
	03/22/02	3559.67		35.76			3523.91
	06/28/02	3559.67		35.82			3523.85
	09/25/02	3559.67		36.05			3523.62
	12/18/2002*	3560.05		36.12			3523.93
MW-14	12/18/02*	3562.15		38.47			3523.68
MW-15	12/18/02*	3562.19		38.65			3523.54
MW-16	12/18/02*	3566.51		42.87			3523.64

Notes:

Water level elevations corrected for measured PSH using specific gravity of 0.80 in all wells except MW-10 with specific gravity of 0.75

feet-amsl = Feet above mean sea level

feet-bmp = Feet below measuring point

*=Dec. 2002 survey data

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Table 2. Historical BTEX Analytical Data
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	o-Xylene (ug/L)	m&p-Xylenes (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
WQCC	-----	**10**	**750**	**750**	-----	-----	**620**	-----
MW-1	4/9/1999	**5**	<5	<5	NS	NS	<10	**5**
	7/15/1999	<500	<500	<500	NS	NS	<1000	ND
MW-2	4/9/1999	<5	<5	<5	NS	NS	<10	ND
	7/15/1999	<5	<5	<5	NS	NS	<10	ND
	9/23/1999	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
MW-3	4/9/1999	**100**	**14**	<5	NS	NS	<10	**114**
	7/15/1999	<5	<5	<5	NS	NS	<10	ND
	9/23/1999	<5	<5	<5	NS	NS	<10	ND
	3/30/2000	<5	<5	**11**	<5	<10	ND	**11**
(Duplicate)**	3/30/2000	**54**	**8.6**	<5	<5	<10	ND	**62.6**
	6/20/2000	<5	<5	<5	<5	<10	<10	ND
	9/28/2000	<5	<5.0	<5	<5	<10	<10	ND
	12/21/2000	<5	<5	<5	NS	NS	**10**	**10**
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	<5	<5	NS	NS	<10	ND
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
	9/25/2002	<5	<5	<5	NS	NS	<5	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-4	4/9/1999	**121**	**77**	**43**	NS	NS	**60**	**301**
	7/15/1999	**43**	**28**	<5	NS	NS	<10	**71**
	9/23/1999	**18**	**12**	<5	NS	NS	<10	**30**
	3/30/2000	**54**	**7.5**	**8.7**	<5	<10	ND	**70.2**
	6/20/2000	**19**	<5.0	<5	<5	<10	<10	**19**
	9/28/2000	**66**	**13**	<5	<5	<10	<10	**79**
(Duplicate)	9/28/2000	**51**	<5.0	<5	<5	<10	11	**62**
	12/21/2000	**46**	**10**	<5	NS	NS	20	**76**
	3/19/2001	**37**	<5	**5.2**	<5	<10	<10	**42.2**
	6/28/2001	**14**	<5	<5	NS	NS	<10	**14**
MW-5	4/9/1999	**53**	<5	<5	NS	NS	<10	**53**
	7/15/1999	**470**	**43**	<5	NS	NS	10	**523**
	9/22/1999	**156**	**6**	<5	NS	NS	<10	**162**
	3/30/2000	**50**	<5	**9.7**	<5	<10	ND	**59.7**
	6/20/2000	**140**	<5	<5	<5	<10	<10	**140**
	9/28/2000	**110**	<5	<5	<5	<10	<10	**110**
	12/21/2000	**169**	**5**	<5	NS	NS	**20**	**194**
	3/19/2001	**32**	<5	<5	<5	<10	<10	**32**
	6/28/2001	**96**	<5	<5	NS	NS	<10	**96**

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Table 2. Historical BTEX Analytical Data
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	o-Xylene (ug/L)	m&p-Xylenes (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
WQCC	-----	**10**	**750**	**750**	-----	-----	**620**	-----
MW-6	8/17/1999	<5	<5	<5	NS	NS	<10	ND
	9/22/1999	<5	<5	<5	NS	NS	<10	ND
	3/30/2000	<5	<5	<5	<5	<10	ND	ND
	6/20/2000	<5	<5	<5	<5	<10	<10	ND
	9/28/2000	**11**	<5	<5	<5	<10	<10	**11**
	12/21/2000	**14**	<5	<5	NS	NS	**10**	**24**
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	<5	<5	NS	NS	<10	ND
Duplicate	6/28/2001	<5	<5	<5	NS	NS	<10	ND
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
Duplicate	6/28/2002	<5	<5	<5	NS	NS	<5	ND
	9/25/2002	<1	<1	<1	NS	NS	<1	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-7	8/17/1999	<5	<5	<5	NS	NS	<10	ND
	9/22/1999	<5	<5	<5	NS	NS	<10	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
MW-8	8/17/1999	<5	<5	<5	NS	NS	<10	ND
	9/23/1999	<5	<5	<5	NS	NS	<10	ND
	3/30/2000	<5	<5	**11**	<5	<10	ND	**11**
	6/20/2000	<5	<5	<5	<5	<10	<10	ND
	9/28/2000	<5	<5	<5	<5	<10	<10	ND
	12/21/2000	<5	<5	<5	NS	NS	<10	ND
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	<5	<5	NS	NS	<10	ND
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
	9/25/2002	<5	<5	<5	NS	NS	<5	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-9	8/17/1999	**20**	<5	<5	NS	NS	<10	**20**
	9/23/1999	**8**	<5	<5	NS	NS	<10	**8**
	3/30/2000	<5	<5	9.3	<5	<5	ND	**9.3**
	6/20/00*	<5	<5	<5	<5	<10	<10	ND
	9/28/00*	<5	<5	<5	<5	<10	<10	ND
	12/21/00*	<5	<5	<5	NS	NS	<10	ND
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	**28**	<5	NS	NS	<10	**28**
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-10	8/17/1999	**12100**	**160**	**1730**	NS	NS	400	**14390**
	9/22/1999	**2900**	**520**	**800**	NS	NS	600	**4820**
MW-11	8/17/1999	<5	<5	<5	NS	NS	<10	ND

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Table 2. Historical BTEX Analytical Data
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	o-Xylene (ug/L)	m&p-Xylenes (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
WQCC	-----	**10**	**750**	**750**	-----	-----	**620**	-----
	9/23/1999	<5	<5	<5	<5	<10	<10	ND
	3/30/2000	<5	<5	<5	<5	<10	ND	ND
	6/20/2000	<5	<5	<5	<5	<10	<10	ND
(Duplicate)	6/20/2000	<5	<5	<5	<5	<10	<10	ND
	9/28/2000	<5	<5	<5	<5	<10	<10	ND
	12/21/2000	<5	<5	<5	NS	NS	**20**	**20**
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
(Duplicate)	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	<5	<5	NS	NS	<10	ND
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
	9/25/2002	<5	<5	<5	NS	NS	<5	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-12 (PZ-2)	8/17/1999	<5	<5	<5	NS	NS	<10	ND
	9/22/1999	<5	<5	<5	NS	NS	<10	ND
	3/30/2000	<5	<5	<5	<5	<10	ND	ND
	6/20/2000	**7.3**	<5	<5	<5	<10	<10	**7.3**
	9/28/2000	<5	<5	<5	<5	<10	<10	ND
	12/21/2000	<5	<5	<5	NS	NS	**20**	**20**
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001^	NS	NS	NS	NS	NS	NS	NS
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
	9/25/2002	<1	<1	<1	NS	NS	<1	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-13 (PZ-1)	8/17/1999	<5	<5	<5	NS	NS	<10	ND
	9/23/1999	<5	<5	<5	NS	NS	<10	ND
	3/30/2000	<5	**5**	<5	<5	<10	ND	**5**
	6/20/2000	<5	<5	<5	<5	<10	<10	ND
	9/28/2000	<5	<5	<5	<5	<10	<10	ND
	12/21/2000	<5	<5	<5	NS	NS	<10	ND
	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	<5	<5	NS	NS	<10	ND
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<200	<200	<200	NS	NS	<200	ND
	9/25/2002	<1	<1	<1	NS	NS	<1	ND
Duplicate	9/25/2002	<1	<1	<1	NS	NS	<1	ND
	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-14	12/18/2002	<1	<1	<1	NS	NS	<1	ND
MW-15	12/18/2002	<1	<1	<1	NS	NS	<1	ND

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Table 2. Historical BTEX Analytical Data
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	o-Xylene (ug/L)	m&p-Xylenes (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
WQCC	-----	**10**	**750**	**750**	-----	-----	**620**	-----
MW-16	12/18/2002	<1	<1	<1	NS	NS	<1	ND
Livestock WW	3/19/2001	<5	<5	<5	<5	<10	<10	ND
	6/28/2001	<5	<5	<5	NS	NS	<10	ND
	9/27/2001	<5	<5	<5	NS	NS	<10	ND
	12/26/2001	<5	<5	<5	NS	NS	<10	ND
	3/22/2002	<5	<5	<5	NS	NS	<10	ND
	6/28/2002	<5	<5	<5	NS	NS	<5	ND
	9/25/2002	<1	<1	<1	NS	NS	<1	ND
	12/18/2002	<5	<5	<5	NS	NS	<5	ND

Footnotes:

WQCC - New Mexico Water Quality Control Commission Ground Water Standards.
BTEX - Benzene, Toluene, Ethylbenzene and Total Xylenes.
ug/L - micrograms per liter.
NS - Constituent not speciated.
ND - Constituent was not detected during laboratory testing, and laboratory reporting limits are variable.
* - Data was originally labeled as MW-7, but is actually MW-9.
MW-7 was not sampled in 2000 due to the presence of phase separate hydrocarbon (PSH).
** - Question data because it appears to be more representative of the sample for MW-4 for the same event.

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Table 3. Historical Analytical Data for Selected Dissolved Metals, Chlorides and TDS
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Dissolved Metals			Chloride (mg/L)	TDS (mg/L)
		Iron (mg/L)	Manganese (mg/L)	Barium (mg/L)		
WQCC	-----	**1.0**	**0.2**	**1.0**	**250**	**1,000**
MW-1	4/9/1999	**3.86**	**0.48**	**2.74**	**3600**	**6,100**
MW-2	4/9/1999	**1.54**	**0.26**	0.39	**2700**	**4,400**
	9/23/1999	NS	NS	NS	**2500**	NS
MW-3	4/9/1999	**4.66**	**0.37**	0.69	**2000**	**3,500**
	9/23/1999	NS	NS	NS	**1300**	NS
	9/28/2000	NS	NS	NS	**400**	NS
	12/21/2000	0.07	0.05	0.13	**490**	**1,300**
	3/19/2001	NS	NS	NS	**530**	NS
	9/27/2001	0.2	0.08	0.09	**620**	**1,600**
	9/25/2002	0.196	0.0865	<.100	**506**	**1,518**
MW-4	4/9/1999	**1.46**	**0.32**	**1.63**	**800**	**1,900**
	9/23/1999	NS	NS	NS	**510**	NS
	9/28/2000	NS	NS	NS	**600**	NS
(Duplicate)	9/28/2000	NS	NS	NS	**760**	NS
	12/21/2000	<0.05	0.06	**2.07**	**350**	**1,100**
	3/19/2001	NS	NS	NS	**660**	NS
	9/25/2002	NS	NS	NS	NS	NS
MW-5	4/9/1999	**47.2**	**0.97**	**15.3**	**2400**	**4,000**
	9/22/1999	NS	NS	NS	860	NS
	9/28/2000	NS	NS	NS	1200	NS
	12/21/2000	0.27	0.06	**2.84**	**760**	**1,700**
	3/19/2001	NS	NS	NS	**1600**	NS
	9/25/2002	NS	NS	NS	NS	NS
MW-6	8/17/1999	<0.05	**0.21**	0.14	**2460**	**4,700**
	9/22/1999	NS	NS	NS	**2400**	NS
	9/28/2000	NS	NS	NS	**1200**	NS
	12/21/2000	0.37	0.4	0.14	**1300**	**2,400**
	3/19/2001	NS	NS	NS	**1400**	NS
	9/27/2001	0.16	0.08	0.13	**2500**	**5,400**
	9/25/2002	0.118	0.0581	0.153	**2500**	**5,080**

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Table 3. Historical Analytical Data for Selected Dissolved Metals, Chlorides and TDS
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Dissolved Metals			Chloride (mg/L)	TDS (mg/L)
		Iron (mg/L)	Manganese (mg/L)	Barium (mg/L)		
WQCC	-----	**1.0**	**0.2**	**1.0**	**250**	**1,000**
MW-7	8/17/1999	<0.05	0.06	0.44	**1400**	**2,800**
	9/22/1999	NS	NS	NS	**1100**	NS
	9/25/2002	NS	NS	NS	NS	NS
MW-8	8/17/1999	0.8	**0.34**	**6.16**	**1860**	**3,300**
	9/23/1999	NS	NS	NS	**1900**	NS
	9/28/2000	NS	NS	NS	**1300**	NS
	12/21/2000	0.32	0.12	0.14	**1000**	**2,100**
	3/19/2001	NS	NS	NS	**970**	NS
	9/27/2001	0.36	0.08	0.25	**1000**	**2,500**
	9/25/2002	0.138	0.0797	0.189	**1090**	**2,392**
MW-9	8/17/1999	0.11	**0.22**	0.21	**1100**	**2,300**
	9/23/1999	NS	NS	NS	**1100**	NS
	9/28/00*	NS	NS	NS	**820**	NS
	12/21/00*	<0.05	0.04	0.26	**520**	**1,400**
	3/19/2001	NS	NS	NS	**640**	NS
	9/25/2002	NS	NS	NS	NS	NS
MW-10	8/17/1999	0.61	0.17	0.14	**2370**	**4,400**
	9/22/1999	NS	NS	NS	**2200**	NS
	9/25/2002	NS	NS	NS	NS	NS
MW-11	8/17/1999	<0.05	0.17	0.14	**1020**	**2,300**
	9/23/1999	NS	NS	NS	**1100**	NS
	9/28/2000	NS	NS	NS	**1300**	NS
	12/21/2000	<0.05	0.09	0.14	**1400**	**2,700**
	3/19/2001	NS	NS	NS	**1500**	NS
	9/25/2002	0.255		0.271	**1620**	3,605
Duplicate	3/19/2001	NS	NS	NS	**1700**	NS
	9/27/2001	0.26	0.12	0.24	**1600**	**3,800**
	9/25/2002	0.255	0.141	0.271	**1620**	**3,605**
MW-12 (PZ-2)	8/17/1999	0.11	0.13	0.16	**4160**	**7,100**
	9/22/1999	NS	NS	NS	**4400**	NS
	9/28/2000	NS	NS	NS	**3800**	NS
	12/21/2000	0.1	0.05	0.15	**4000**	**6,100**
	3/19/2001	NS	NS	NS	**3700**	NS
	9/27/2001	0.23	0.06	0.13	**3200**	**6,500**
	9/25/2002	<0.050	0.0297	0.111	**3220**	**6,225**
MW-13 (PZ-1)	8/17/1999	<0.05	0.09	0.16	**1920**	**3,500**
	9/23/1999	NS	NS	NS	**1600**	NS
	9/28/2000	NS	NS	NS	**2200**	NS
	12/21/2000	0.06	0.02	0.05	**1700**	**2,900**
	3/19/2001	NS	NS	NS	**630**	NS
	9/27/2001	0.79	0.17	0.14	**3000**	**5,900**
	9/25/2002	0.476	0.147	0.107	**1670**	**3,660**
	DUP-1	0.355	0.109	<.100	**1130**	**2,625**
Livestock WW	3/19/2001	NS	NS	NS	**660**	NS
	9/27/2001	**13.4**	**0.25**	0.21	**600**	**1,600**
	9/25/2002	**4.52**	**0.224**	0.192	**671**	**1,866**

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Table 3. Historical Analytical Data for Selected Dissolved Metals, Chlorides and TDS
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Dissolved Metals			Chloride (mg/L)	TDS (mg/L)
		Iron (mg/L)	Manganese (mg/L)	Barium (mg/L)		
WQCC	-----	1.0	0.2	1.0	250	1,000

Footnotes:

WQCC - New Mexico Water Quality Control Commission Ground Water Standards.
TDS - Total Dissolved Solids.
mg/L - milligrams per liter.
NS - Constituent not sampled during the sampling event.
* - Data was originally labeled as MW-7, but is actually MW-9.
MW-7 was not sampled in 2000 due to the presence of phase separate hydrocarbon (PSH).

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Table 4. Historical PAH Analytical Data
Former Bertha Barber Tank Battery, Lea County, New Mexico

WELL ID	Sample Date	Fluorene (ug/L)	Indeno(1,2,3-cd)pyrene (ug/L)	Naphthalene (ug/L)	Phenanthrene (ug/L)	Pyrene (ug/L)	Anthracene (ug/L)	Benzo(b)fluoranthene (ug/L)	Fluoranthene (ug/L)	Chrysene (ug/L)	Benzo(a)anthracene (ug/L)	Benzo(a)pyrene (ug/L)	Benzo(ghi)perylene (ug/L)	Acenaphthylene (ug/L)	Acenaphthene (ug/L)	Dibenzo(a,h)anthracene (ug/L)	Benzo(k)fluoranthene (ug/L)
MW-1	4/9/1999	<15	<1.5	<75	<15	<15	<15	**1.6**	<41	<15	**6.5**	<1.5	<1.5	<75	<75	<1.5	<1.5
MW-2	4/9/1999	<1.0	<0.1	<5	<1.0	<1.0	<1	<0.1	<1.0	<1.0	<0.10	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-3	4/9/1999	<1.0	<0.1	<5.0	<1.0	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/2001	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-4	4/9/1999	1.2	<0.1	**18.1**	**1**	<1.0	<1.0	<0.1	**1.4**	<1.0	**0.12**	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	1.5	<0.1	<5.0	**1.6**	<1	<1.0	<0.1	**4.2**	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-5	4/9/1999	<1.0	<0.1	<5.0	<1.0	<1.0	<1	<0.1	<1.0	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5.0	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-6	8/17/1999	<1	<0.1	<5	<1	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5	<1	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/2001	<1	<0.1	<5	<1	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-7	8/17/1999	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-8	8/17/1999	<1.0	<0.1	<5	<1.0	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/2001	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-9	8/17/1999	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/00*	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-10	8/17/1999	<1	<0.1	<5.0	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-11	8/17/1999	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/2001	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<.02	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-12 (PZ-2)	8/17/1999	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/2001	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW-13 (PZ-1)	8/17/1999	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/2000	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/2001	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Duplicate	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Livestock WW	9/27/2001	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/25/2002	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Footnotes:
PAH - Polynuclear aromatic hydrocarbons.
ug/L - micrograms per liter.
NS - Constituent not sampled during the sampling event.
ND - Constituent was not detected during laboratory testing, and laboratory reporting limits are variable.
* - Data was originally labeled as MW-7, but is actually MW-9.

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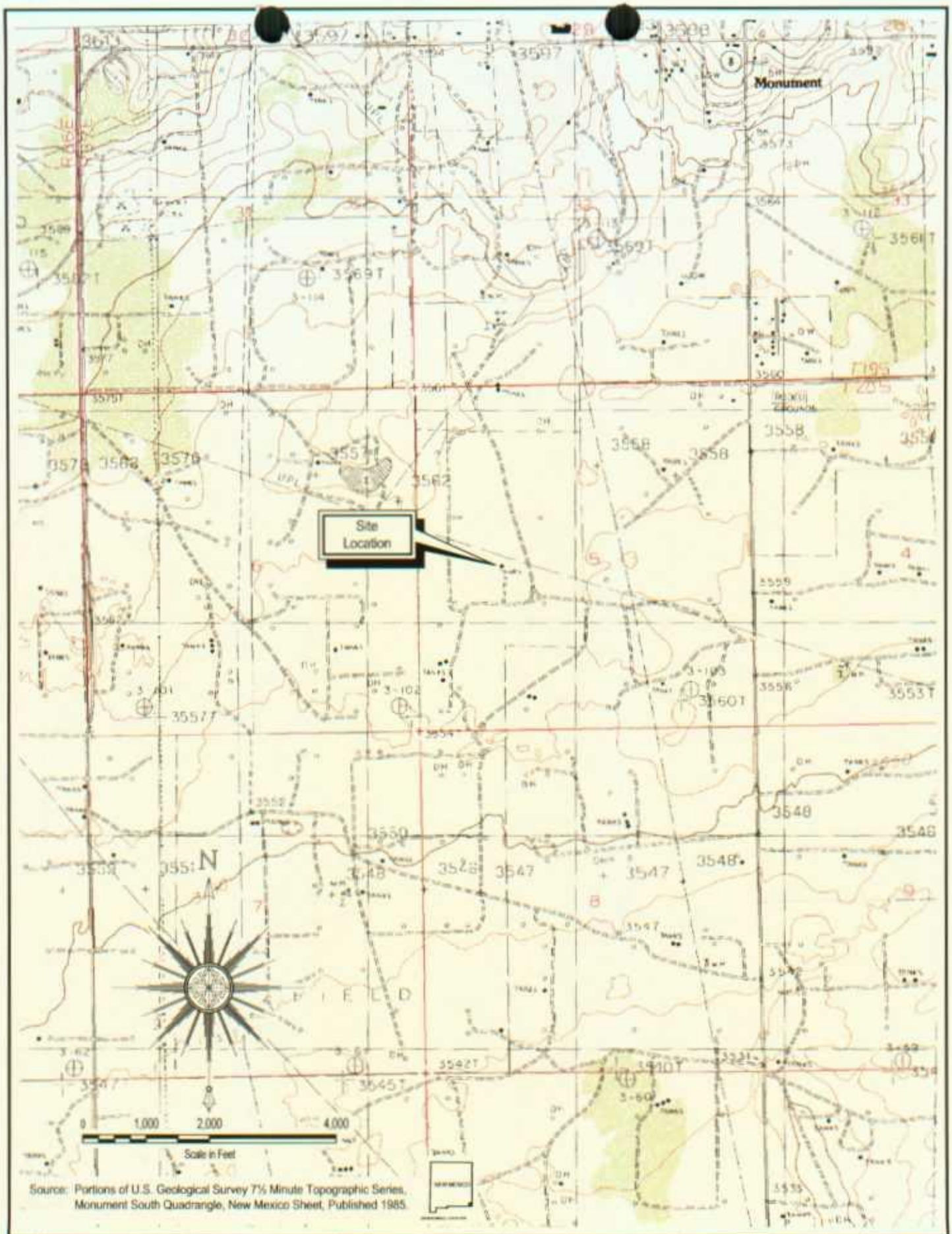
Table 5. December 2002 Soil Analytical
Former Bertha Barber Tank Battery, Lea County, New Mexico

Sample ID	Sample Date	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	M,P,O-Xylenes mg/kg	Total BTEX mg/kg	TPH DRO mg/kg	TPH GRO mg/kg	Chloride mg/kg
MW-14(33-34')	12/12/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	NS
MW-14(36-37')	12/12/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	NS
MW-15(30-31')	12/11/2002	<0.010	<0.010	<0.010	**0.011**	**0.011**	<50.0	<1	NS
MW-15(34-35')	12/11/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	NS
MW-16(37-38')	12/11/2002	<0.010	**0.011**	**0.014**	**0.051**	**0.076**	<50.0	**7.16**	NS
MW-16(39-40')	12/11/2002	<0.010	<0.010	<0.010	**0.018**	**0.018**	<50.0	<1	NS
SB-1(1-2')	12/12/2002	<0.010	<0.010	<0.010	<0.010	<0.010	**359**	<1	**6.17**
SB-1(4-5')	12/12/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	**6.64**
SB-1(35-36')	12/12/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	**204**
SB-2(1-2')	12/13/2002	<0.010	**0.011**	<0.010	<0.010	**0.011**	**531**	<1	**8.52**
SB-2(6-7')	12/13/2002	<0.010	<0.010	<0.010	<0.010	<0.010	**73.1**	<1	**166**
SB-2(33-34')	12/13/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	**229**
SB-3(1-2')	12/13/2002	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1	**33.6**
SB-3(13-14')	12/13/2002	<0.050	<0.050	**0.181**	**0.229**	**0.41**	**1320**	**93.4**	**93.3**
SB-3(34-35')	12/13/2002	<0.010	<0.010	**0.043**	<0.010	**0.043**	<50	<1	**314**

Note: Bold indicates detectable concentration, shaded indicates concentration above OCD action level

Low
cl



Source: Portions of U.S. Geological Survey 7½ Minute Topographic Series, Monument South Quadrangle, New Mexico Sheet, Published 1985.

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Drawing Date	File Name	File Location	Task Manager	Project Director	Area Manager
24 February 2002	MT788101.dwg	\AutoCAD\DWG\Marathon Oil\MT000788.000	B. Kolb	A. Schmidt	A. Schmidt

Marathon Oil Company
Year 2002 Annual Groundwater Monitoring Report

Site Location Map
Former Bertha Barber Tank Battery
Lea County, New Mexico

Technical Review	Unique Number
S. Tischer	31-014-00442
Project Number	**Figure**
MT000788.000	1

Area Of Recent Excavation And Pipeline Repair

MW-10
3,523.97'
PSH

Warren (Dynegy) Pipeline

MW-6
3,523.95'

Livestock Water Well

MW-13
3,523.93'

3,523.90'

3,523.80'

3,523.70'

3,523.60'

3,523.50'

MW-14
3,523.68'

Former Tank Pad

Old Flare Sluice

Overhead Electric Line

Approximate Extent of Former Tank Bottoms Pit (Large Pit)

MW-1
3,523.97'
PSH

MW-2
3,523.96'
PSH

Approximate Extent of Former Tank Bottoms Pit (Small Pit)

MW-4
3,523.98'

SB-1

Approximate Extent of Old Evaporation Pit

SB-2

SB-3

MW-5
3,523.95'
PSH

MW-3
3,523.91'

Former Oil/Water Separator Pad

MW-8
3,523.62'

Overhead Electric Line

Rice Engr. Monitor Well

3,523.90'

MW-12
3,523.84'

Former Rice Engineering Water Disposal Line Connection Point

MW-9
3,523.80'

MW-7
3,523.63'

MW-15
3,523.54'

Bertha Barber Well No. 16

New Tank Battery

Treaters

Tanks

Sid Richardson Pipeline

MW-16
3,523.64'

MW-11
3,523.47'

3,523.80'

3,523.70'

3,523.60'

3,523.50'

Explanation

- Soil Boring
- Monitoring Well
- Livestock Water Well
- Oil Production Well
- Buried Petroleum Pipeline
- Overhead Electric Line
- Fence
- 3,523.97' Groundwater Elevation In Feet
- Groundwater Elevation Contour (Dashed Where Inferred)
- PSH Phase Separated Hydrocarbons
- Groundwater Flow Direction

N

0 70 140 280

Scale in Feet

Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

ARCADIS
1004 N. Big Spring Street, Suite 300
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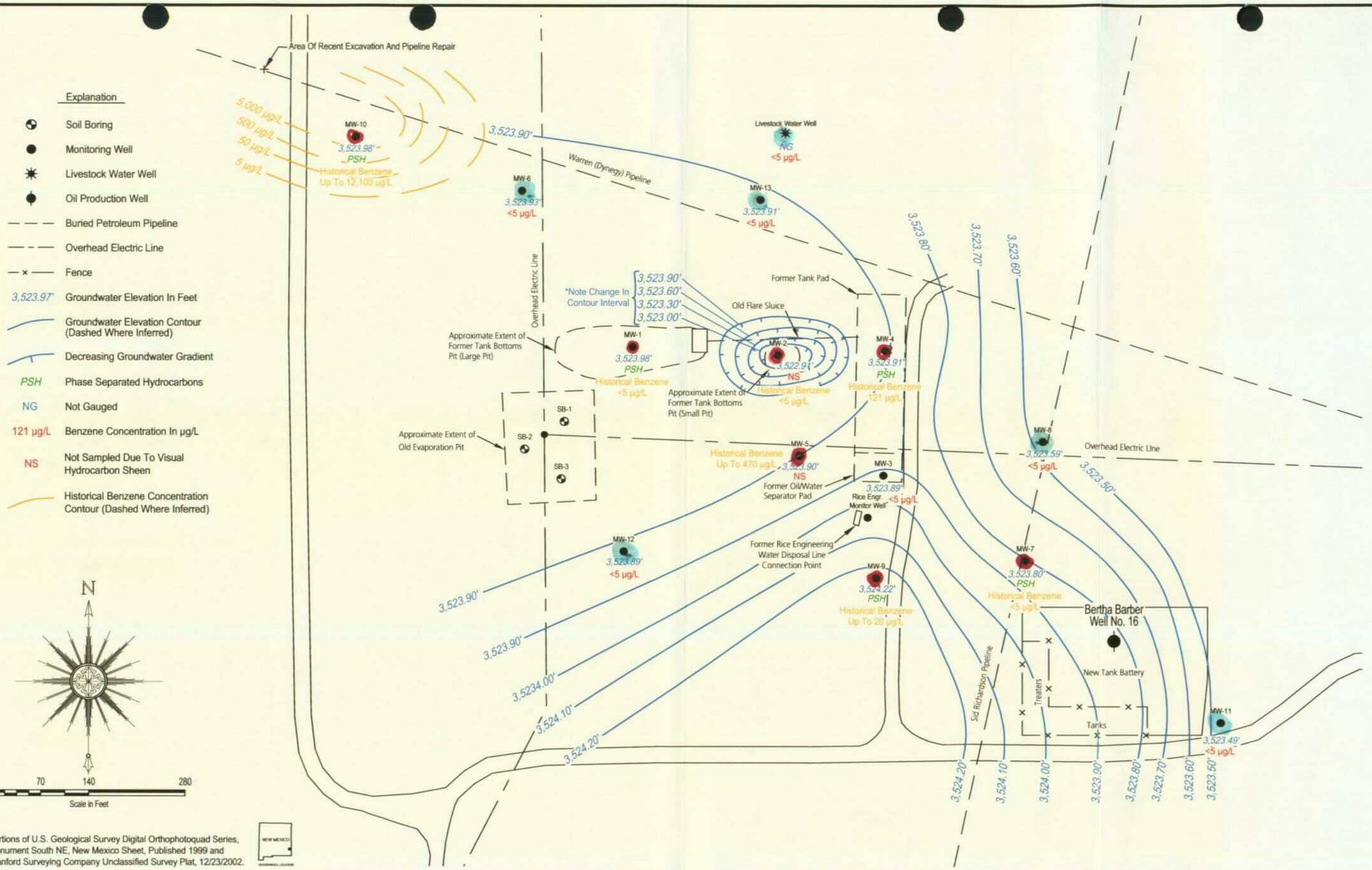
Drawing Date: 21 February 2003	File Name: MT788102.dwg	File Location: \AutoCAD\DWG\Marathon Oil\MT000788.001	Unique Number: 31-013-00435	Project Director: A. Schmidt	Area Manager: A. Schmidt
				Task Manager: B. Kolb	Technical Review: S. Tischer
				Project Number: MT000788.0001	Figure: 2

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

Groundwater Elevation Contour Map
December, 2002

Lea County, New Mexico



Explanation

- Soil Boring
- Monitoring Well
- Livestock Water Well
- Oil Production Well
- Buried Petroleum Pipeline
- Overhead Electric Line
- Fence
- 3,523.97' — Groundwater Elevation In Feet
- Groundwater Elevation Contour (Dashed Where Inferred)
- Decreasing Groundwater Gradient
- PSH — Phase Separated Hydrocarbons
- NG — Not Gauged
- 121 µg/L — Benzene Concentration In µg/L
- NS — Not Sampled Due To Visual Hydrocarbon Sheen
- Historical Benzene Concentration Contour (Dashed Where Inferred)

Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

ARCADIS
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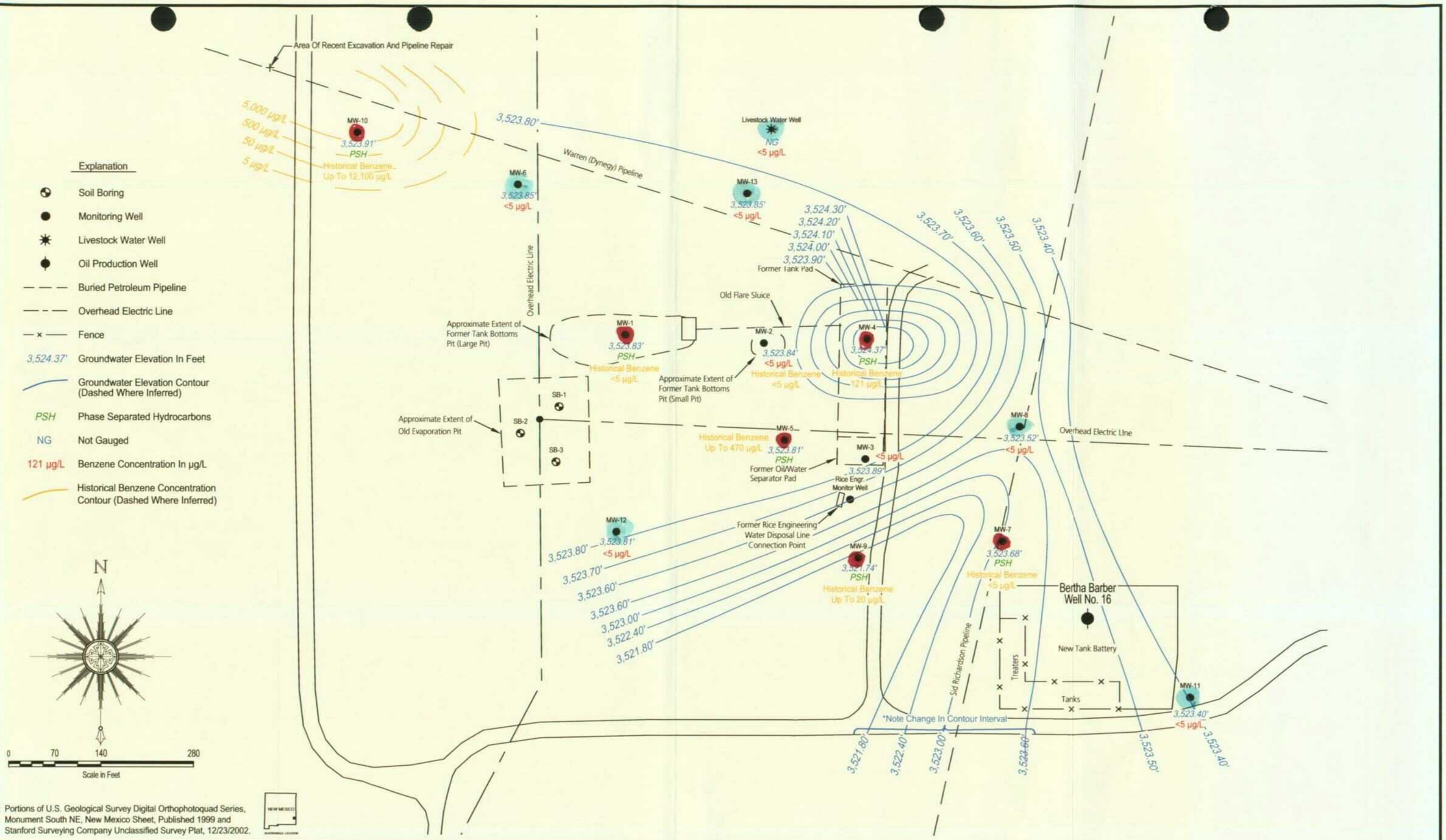
Drawing Date	File Name	File Location	Unique Number	Project Director	Area Manager
21 February 2003	MT788103.dwg	\AutoCAD\DWG\Marathon Oil\MT000788.001	31-014-00436	A. Schmidt	A. Schmidt

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

Benzene Concentrations In Groundwater
March, 2002

Lea County, New Mexico

Task Manager	Technical Review	Project Number	Figure
B. Kolb	S. Tischer	MT000788.0001	3



Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

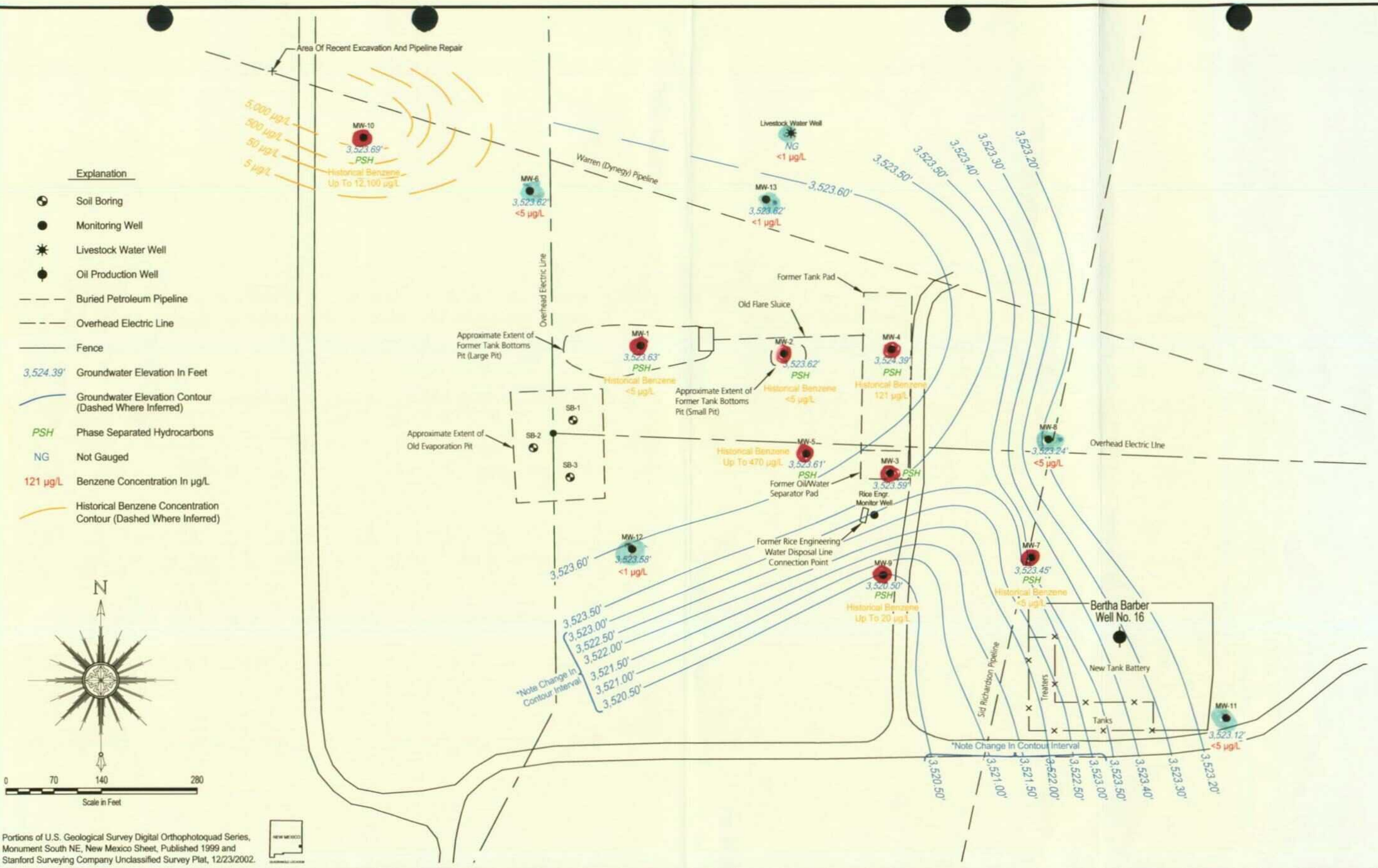
ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 915 687 5400 Fax 915 687 5401

Drawing Date: 24 February 2003	File Name: MT788104.dwg	File Location: \AutoCAD\DWG\Marathon Oil\MT000788.001	Unique Number: 31-014-00437	Project Director: A. Schmidt / Area Manager: A. Schmidt
				Task Manager: B. Kolb / Technical Review: S. Tischer
				Project Number: MT000788.0001 / Figure: 4

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

Benzene Concentrations In Groundwater
June, 2002

Lea County, New Mexico



Explanation

- Soil Boring
- Monitoring Well
- Livestock Water Well
- Oil Production Well
- Buried Petroleum Pipeline
- Overhead Electric Line
- Fence
- 3,524.39' Groundwater Elevation In Feet
- Groundwater Elevation Contour (Dashed Where Inferred)
- PSH Phase Separated Hydrocarbons
- NG Not Gauged
- 121 µg/L Benzene Concentration In µg/L
- Historical Benzene Concentration Contour (Dashed Where Inferred)

N

0 70 140 280

Scale in Feet

Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

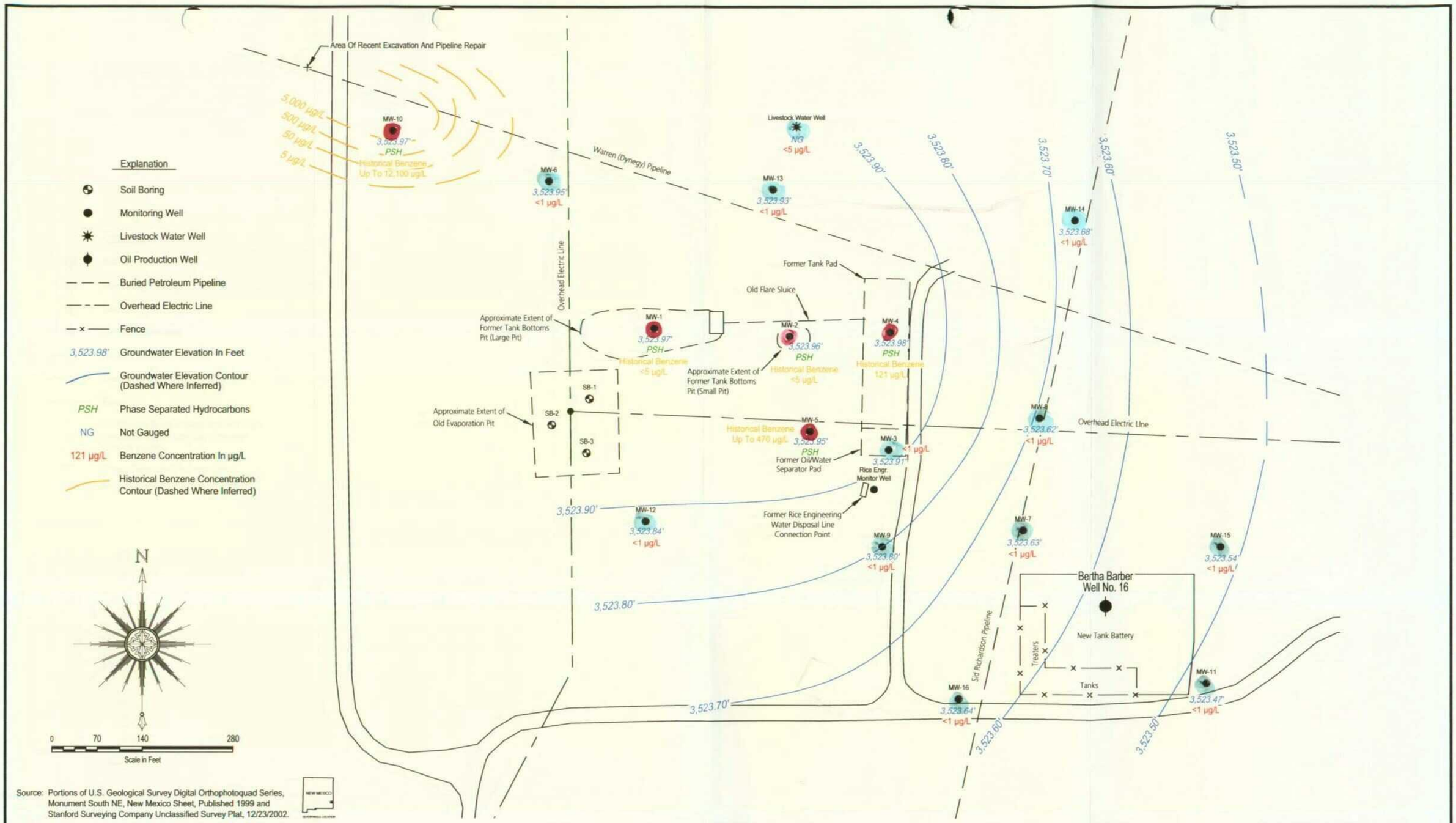
ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 915 687 5400 Fax 915 687 5401

Drawing Date: 24 February 2003	File Name: MT788105.dwg	File Location: \AutoCAD\DWG\Marathon Oil\MT000788.001	Unique Number: 31-014-00438	Project Director: A. Schmidt	Area Manager: A. Schmidt
				Task Manager: B. Kolb	Technical Review: S. Tischer
				Project Number: MT000788.0001	Figure: 5

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

Benzene Concentrations In Groundwater
September, 2002

Lea County, New Mexico



Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 915 687 5400 Fax 915 687 5401

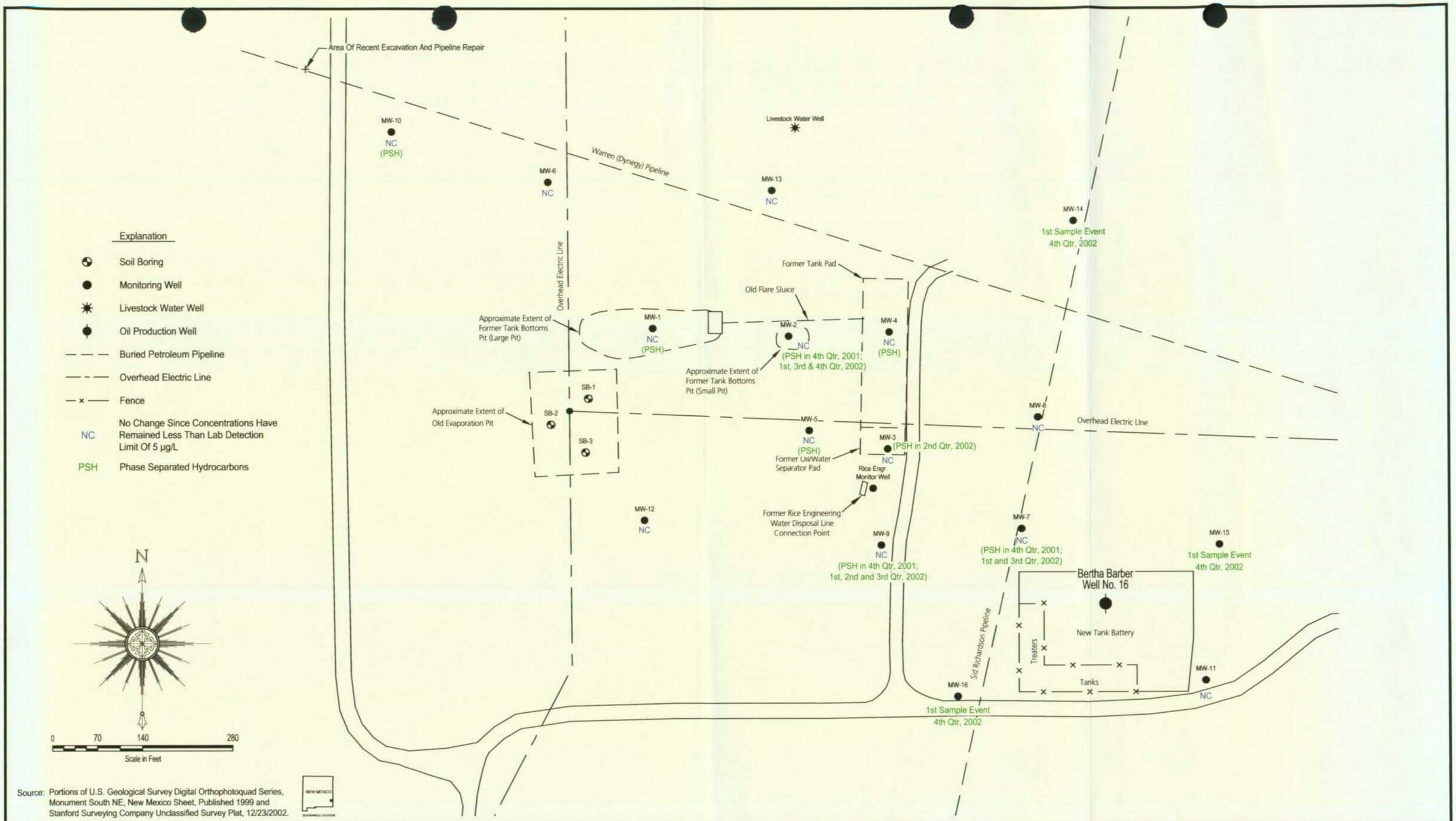
Drawing Date	File Name	File Location	Unique Number	Project Director	Area Manager
24 February 2003	MT788106.dwg	\AutoCAD\DWG\Marathon Oil\MT000788.001	31-014-00439	A. Schmidt	A. Schmidt

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

Benzene Concentrations In Groundwater
December, 2002

Lea County, New Mexico

Task Manager	Technical Review	Project Number	Figure
B. Kolb	S. Tischer	MT000788.0001	6



Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 915 687 5400 Fax 915 687 5401

Drawing Date 24 February 2003	File Name MT788107.dwg	File Location \AutoCAD\DWG\Marathon Oil\MT000788.001	Unique Number 31-014-00440	Project Director A. Schmidt	Area Manager A. Schmidt
				Task Manager B. Kolb	Technical Review S. Tischer
				Project Number MT000788.0001	Figure 7

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

Apparent Net Change In Benzene Concentrations From December, 2001 — December, 2002

Lea County, New Mexico

Source: Portions of U.S. Geological Survey Digital Orthophotoquad Series, Monument South NE, New Mexico Sheet, Published 1999 and Stanford Surveying Company Unclassified Survey Plat, 12/23/2002.

No.	Date	Revision Description	By	Ckd

ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 915 687 5400 Fax 915 687 5401

Drawing Date: 24 February 2003	File Name: MT788108.dwg	File Location: \AutoCAD\DWG\Marathon Oil\MT000788.001	Unique Number: 31-014-00441	Project Director: A. Schmidt	Area Manager: A. Schmidt
				Task Manager: B. Kolb	Technical Review: S. Tischer
				Project Number: MT000788.0001	Figure: 8

Marathon Oil Company
Former Bertha Barber Tank Battery — 2002 Annual Report

2003 Surface Restoration Plan

Lea County, New Mexico

ARCADIS

Appendix A

Laboratory Reports

SEVERN TRENT SERVICES

ANALYTICAL REPORT

JOB NUMBER: 203117

Prepared For:

Marathon Oil Company
125 West Missouri Street
P.O. Box 552
Midland, TX 79702-0552

Attention: Paul Peacock

Date: 03/29/2002

Adrienne Byrnes
Signature

3/29/02
Date

Name: Adrienne R. Byrnes

Title: Project Manager

E-Mail: arbyrnes@stl-inc.com

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383

PHONE: 219-464-2389
FAX..: 219-462-2953

SEVERN TRENT SERVICES

SAMPLE INFORMATION
Date: 03/29/2002

Job Number.: 203117
Customer...: Marathon Oil Company
Attn.....: Paul Peacock

Project Number.....: 96000651
Customer Project ID....: BERTHA BARBER
Project Description....: Marathon Oil Co., Midland, Tx

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
203117-1	MW #11	Water	03/22/2002	09:02	03/25/2002	14:00
203117-2	MW #8	Water	03/22/2002	09:20	03/25/2002	14:00
203117-3	MW #13	Water	03/22/2002	09:45	03/25/2002	14:00
203117-4	Livestock Water Well Offsite	Water	03/22/2002	09:50	03/25/2002	14:00
203117-5	MW #12	Water	03/22/2002	10:30	03/25/2002	14:00
203117-6	MW #3	Water	03/22/2002	11:00	03/25/2002	14:00
203117-7	MW #6	Water	03/22/2002	11:20	03/25/2002	14:00

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117

Date: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

Customer Sample ID: MW #11
Date Sampled.....: 03/22/2002
Time Sampled.....: 09:02
Sample Matrix.....: Water

Laboratory Sample ID: 203117-1
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117

Date: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

Customer Sample ID: MW #8
Date Sampled.....: 03/22/2002
Time Sampled.....: 09:20
Sample Matrix.....: Water

Laboratory Sample ID: 203117-2
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117

Date: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

Customer Sample ID: MW #13
Date Sampled.....: 03/22/2002
Time Sampled.....: 09:45
Sample Matrix.....: Water

Laboratory Sample ID: 203117-3
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117 Date: 03/29/2002

CUSTOMER: Marathon Oil Company PROJECT: BERTHA BARBER ATTN: Paul Peacock

Customer Sample ID: Livestock Water Well Offsite
Date Sampled.....: 03/22/2002
Time Sampled.....: 09:50
Sample Matrix.....: Water

Laboratory Sample ID: 203117-4
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117

Date: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

Customer Sample ID: MW #12
Date Sampled.....: 03/22/2002
Time Sampled.....: 10:30
Sample Matrix.....: Water

Laboratory Sample ID: 203117-5
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117

Date: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

Customer Sample ID: MW #3
Date Sampled.....: 03/22/2002
Time Sampled.....: 11:00
Sample Matrix.....: Water

Laboratory Sample ID: 203117-6
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 203117

Date: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

Customer Sample ID: MW #6
Date Sampled.....: 03/22/2002
Time Sampled.....: 11:20
Sample Matrix.....: Water

Laboratory Sample ID: 203117-7
Date Received.....: 03/25/2002
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	03/28/02	weh
	Ethylbenzene	ND	5	ug/L	03/28/02	weh
	Toluene	ND	5	ug/L	03/28/02	weh
	Xylenes (total)	ND	10	ug/L	03/28/02	weh

SEVERN TRENT SERVICES

QUALITY CONTROL RESULTS

Job Number.: 203117

Report Date.: 03/29/2002

CUSTOMER: Marathon Oil Company | PROJECT: BERTHA BARBER | ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: EPA 8260B
Method Description.: Volatile Organic Compounds

Units.....: ug/L
Batch.....: 90311

Analyst...: weh

LCS	Laboratory Control Sample	LCS2002			03/28/2002	1540

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	51.62		50		103.2	%	70-130
Ethylbenzene	50.82		50		101.6	%	70-130
Toluene	50.41		50		100.8	%	70-130
Xylenes (total)	150.46		150		100.3	%	70-130

MB	Method Blank				03/28/2002	1447

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	ND						
Ethylbenzene	ND						
Toluene	ND						
Xylenes (total)	ND						

MS	Matrix Spike	CLPVOAMS3	203227-1		03/28/2002	1633

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	48.59		50	2.32	92.5	%	67-130
Toluene	47.77		50	ND	95.5	%	75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	203227-1		03/28/2002	1700

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	47.91	48.59	50	2.32	91.2	%	67-130
					1.4	R	30
Toluene	46.52	47.77	50	ND	93.0	%	75-114
					2.7	R	30

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 203117 Report Date.: 03/29/2002

CUSTOMER: Marathon Oil Company PROJECT: BERTHA BARBER ATTN: Paul Peacock

Method.....: Volatile Organic Compounds Method Code.....: 8260V1
Batch.....: 90311 Analyst.....: weh Equipment Code:

Surrogate	Units
1,2-Dichloroethane-d4 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		49.01	50.00	98.0	89-113		03/28/2002	1447
		LCS		47.43	50.00	94.9	89-113		03/28/2002	1540
203227-1		MS		48.35	50.00	96.7	89-113		03/28/2002	1633
203227-1		MSD		48.55	50.00	97.1	89-113		03/28/2002	1700
203217-5				47.10	50.00	94.2	89-113		03/28/2002	1726
203117-4				48.32	50.00	96.6	89-113		03/28/2002	1753
203117-5				49.55	50.00	99.1	89-113		03/28/2002	1819
203117-3				48.23	50.00	96.5	89-113		03/28/2002	1845
203117-2				47.02	50.00	94.0	89-113		03/28/2002	1912
203117-1				47.29	50.00	94.6	89-113		03/28/2002	1938
203117-6				47.56	50.00	95.1	89-113		03/28/2002	2005
203117-7				48.26	50.00	96.5	89-113		03/28/2002	2031

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		52.55	50.00	105.1	82-112		03/28/2002	1447
		LCS		49.85	50.00	99.7	82-112		03/28/2002	1540
203227-1		MS		52.28	50.00	104.6	82-112		03/28/2002	1633
203227-1		MSD		52.03	50.00	104.1	82-112		03/28/2002	1700
203217-5				52.25	50.00	104.5	82-112		03/28/2002	1726
203117-4				54.64	50.00	109.3	82-112		03/28/2002	1753
203117-5				52.02	50.00	104.0	82-112		03/28/2002	1819
203117-3				52.73	50.00	105.5	82-112		03/28/2002	1845
203117-2				53.74	50.00	107.5	82-112		03/28/2002	1912
203117-1				53.73	50.00	107.5	82-112		03/28/2002	1938
203117-6				54.95	50.00	109.9	82-112		03/28/2002	2005
203117-7				54.61	50.00	109.2	82-112		03/28/2002	2031

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		49.69	50.00	99.4	89-110		03/28/2002	1447
		LCS		48.55	50.00	97.1	89-110		03/28/2002	1540
203227-1		MS		48.51	50.00	97.0	89-110		03/28/2002	1633
203227-1		MSD		48.58	50.00	97.2	89-110		03/28/2002	1700
[illegible]217-5				48.46	50.00	96.9	89-110		03/28/2002	1726
[illegible]17-4				48.26	50.00	96.5	89-110		03/28/2002	1753

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 203117 Report Date.: 03/29/2002

CUSTOMER: Marathon Oil Company PROJECT: BERTHA BARBER ATTN: Paul Peacock

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
203117-5				49.06	50.00	98.1	89-110		03/28/2002	1819
203117-3				47.89	50.00	95.8	89-110		03/28/2002	1845
203117-2				47.96	50.00	95.9	89-110		03/28/2002	1912
203117-1				48.18	50.00	96.4	89-110		03/28/2002	1938
203117-6				49.00	50.00	98.0	89-110		03/28/2002	2005
203117-7				47.33	50.00	94.7	89-110		03/28/2002	2031

SEVERN TRENT SERVICES

QUALITY ASSURANCE FOOTER

METHOD REFERENCES

1. EPA SW-846, Test Methods for Evaluating Solid Waste Update I, IIA, IIB, III
2. Standard Methods for the Examination of Water and Wastewater, 18th Edition
3. EPA 600/4-79-020, Methods of Chemical Analysis for Waters and Wastes, March 1983
4. Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
5. American Society for Testing and Materials, Volumes 5.01, 5.02, 5.03, 11.01,11.02,11.03,11.04
6. EPA Methods for Environmental Samples

COMMENTS

All methods of chemical analysis have a statistical uncertainty associated with the results. Unless otherwise indicated, the data in this report are within the limits of uncertainty as specified in the referenced method. Quality Control acceptance criteria are based either on actual laboratory performance or on limits specified in the referenced method. The date and time of analysis indicated on the QA report may not reflect the actual time of analysis for QC samples. All data are reported on an "as received" basis unless otherwise indicated. Data reported in the QA report may be lower than sample data due to dilution of samples into the calibration range of the analysis. Sample concentration for solid samples are calculated on an as received (wet) basis. Unless otherwise indicated, volatiles by gas chromatography (GC) are reported from a single column. Volatile analysis by GC on low level soil extractions are conducted at room temperature.

FLAGS, FOOTNOTES AND ABBREVIATIONS (as needed)

NA	=	Not Analyzed	ND	=	Not detected at a value greater than the reporting limit
N/A	=	Not applicable	NC	=	Not calculable due to values lower than the reporting limit
ug/L	=	Micrograms per liter	mg/L	=	Milligrams per liter
ug/Kg	=	Micrograms per kilogram	mg/kg	=	Milligrams per kilogram
U	=	Undetected			
J	=	Indicates value is > MDL, but < Reporting Limit			
B	=	Analyte was detected in the method blank analyzed with this sample.			
D	=	Surrogate recoveries are not calculated due to sample dilution.			
X	=	Surrogate recovery is outside quality control limits.			
Y	=	Spike or spike duplicate recovery is outside quality control limits.			
Z	=	Relative percent difference for a spike and spike duplicate is outside quality control limits. The precision of the method was impacted by matrix.			
^	=	Indicates value is above QC acceptance criteria.			

QC SAMPLE IDENTIFICATIONS

MB	=	Method Blank	SB	=	Storage Blank
RB	=	Reagent Blank	EB	=	Extraction Blank
PB	=	Preparation Blank	CALB	=	Calibration Blank
MD	=	Method Duplicate	RS	=	Reference Standard
LCS	=	Laboratory Control Sample	LCSD	=	Laboratory Control Sample Duplicate
MS	=	Matrix Spike	MSD	=	Matrix Spike Duplicate
ICB	=	Initial Calibration Blank	CCB	=	Continuing Calibration Blank
ICV	=	Initial Calibration Verification	ICB	=	Initial Calibration Blank
PDS	=	Post Digestion Spike	SS	=	Surrogate Spike
ISA	=	Interference Check standard "A"	ISB	=	Interference Check Standard "B"
ISCAB	=	Interference Check Sample AB	MSA	=	Method of Standard Additions
CAL	=	Calibration standard	SD	=	Serial Dilution
MST	=	TCLP Matrix Spike	MSQ	=	TCLP Matrix Spike Duplicate
PST	=	TCLP Post Digestion Spike	LCT	=	TCLP Laboratory Control Sample

jsckl | Job Sample Receipt Checklist Report 03/25/2002 | V2

Job Number.: 203117 Location.: 57211 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.:
Project Number.: 96000651 Project Description.: Marathon Oil Co., Midland, Tx Project Manager.....: arb
Customer.....: Marathon Oil Company Contact.: Paul Peacock

Questions ?	(Y/N)	Comments
Chain-of-Custody Present?	Y	
Custody seal on shipping container?	N	
...If "yes", custody seal intact?		
Custody seals on sample containers?	N	
...If "yes", custody seal intact?		
Samples chilled?	N	REC'D WARM
Temperature of cooler acceptable? (4 deg C +/- 2).	N	13.2 DEG C IR
Samples received intact (good condition)?	Y	
Volatile samples acceptable? (no headspace)	N	HEADSPACE IN BOTH VIALS MW 13
Correct containers used?	Y	
Adequate sample volume provided?	Y	
Samples preserved correctly?	Y	
Samples received within holding-time?	Y	
Agreement between COC and sample labels?	Y	
Additional		
Comments		
Sample Custodian Signature		

SEVERN TRENT SERVICES

STL Valparaiso
2400 Cumberland Drive
Valparaiso, IN 46383
Phone: 219-464-2389
Fax: 219-462-2953

Report To:

Contact: _____
Company: _____
Address: Same
_____
Phone: as
Fax: _____
E-Mail: _____

Bill To:

Contact: _____
Company: Marathon Oil Company
Address: 115 W Missouri St.
Midland Tx. 79702-8012
Phone: _____
Fax: _____
PO#: _____ Quote: _____

Shaded Areas For Internal Use Only ____ of ____

Package Sealed	Samples Sealed
Yes No	Yes No
Received on Ice	**Samples Intact**
Yes No	Yes No

Temperature °C of Cooler
13.2°C

Within Hold Time	Preserv. Indicated
Yes No	Yes No NA
pH Check OK	**Res Cl_2 Check OK**
Yes No NA	Yes No NA

Sample Labels and COC Agree
Yes No COC not present

Sampler Name: Gabriel N Terrazas
Signature:
Project Name: Bertha Barber TB
Project Number:
Project Location: Monument, NM
Lab PM:
Date Required
Hard Copy: ___/___/___
Fax: ___/___/___

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Refrg # / # / Cont. / Volume / Preserv: BTEX	Additional Analyses / Remarks
203117-1		MW. #11	3-21-02	9:02	W		✓	
-2		M.W. #6	3-21-02	9:20	W		✓	
-3		M.W. #13	3-21-02	9:45	W		✓	2B
-4		Livestock Water Well	3-21-02	9:50	W		✓	
-5		MW. #12	3-21-02	10:30	W		✓	
-6		M.W. #3	3-21-02	11:00	W		✓	
-7		M.W. #6	3-21-02	11:20	W		✓	

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	SBC Laboratories	3-22-02		[signature]	STL	3/25/02	1400
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous
OL = Oil
A = Air
SE = Sediment
SO = Solid
DS = Drum Solid
DL = Drum Liquid
L = Leachate
WI = Wipe
O = _____

Container Key
1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widemouth Glass
6. Other
_____

Preservative Key
1. HCl, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. Cool to 4°
7. None

COMMENTS

Date Received ___/___/___
Courier: **Hand Delivered** ☐
Bill of Lading

SEVERN TRENT SERVICES

ANALYTICAL REPORT

JOB NUMBER: 207333

Prepared For:

ARCADIS G & M
1030 Andrews Highway
Suite 120
Midland, TX 79701

Attention: Brady Kolb

Date: 07/18/2002

Adrienne Byrnes
Signature

7/18/02
Date

Name: Adrienne R. Byrnes

Title: Project Manager

E-Mail: arbyrnes@stl-inc.com

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383

PHONE: 219-464-2389
FAX..: 219-462-2953

SEVERN TRENT SERVICES

SAMPLE INFORMATION
Date: 07/15/2002

Job Number.: 207333
Customer...: Marathon Oil Company
Attn.....: Aaron Wilson

Project Number.....: 96000703
Customer Project ID....: MOC - BERTHA BARBER
Project Description....: MOC - Bertha Barber

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
207333-1	MW #11	Water	06/28/2002	11:20	06/29/2002	13:45
207333-2	MW #8	Water	06/28/2002	11:56	06/29/2002	13:45
207333-3	MW #13	Water	06/28/2002	12:55	06/29/2002	13:45
207333-4	LSWW	Water	06/28/2002	13:00	06/29/2002	13:45
207333-5	MW #6	Water	06/28/2002	12:30	06/29/2002	13:45
207333-6	MW #3	Water	06/28/2002	14:30	06/29/2002	13:45
207333-7	MW #3 RINISITE	Water	06/28/2002	14:30	06/29/2002	13:45
207333-8	MW #7	Water	06/28/2002	15:15	06/29/2002	13:45
207333-9	MW #2	Water	06/28/2002	15:00	06/29/2002	13:45
207333-10	DUP-1	Water	06/28/2002	00:00	06/29/2002	13:45
207333-11	MW #12	Water	06/28/2002	00:00	06/29/2002	13:45

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333

Date: 07/15/2002

CUSTOMER: Marathon Oil Company | PROJECT: MOC - BERTHA BARBER | ATTN: Aaron Wilson

Customer Sample ID: MW #11
Date Sampled.....: 06/28/2002
Time Sampled.....: 11:20
Sample Matrix.....: Water

Laboratory Sample ID: 207333-1
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/01/02	wds
	Ethylbenzene	ND	5	ug/L	07/01/02	wds
	Toluene	ND	5	ug/L	07/01/02	wds
	Xylenes (total)	ND	5	ug/L	07/01/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333 Date: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Customer Sample ID: MW #8
Date Sampled.....: 06/28/2002
Time Sampled.....: 11:56
Sample Matrix.....: Water

Laboratory Sample ID: 207333-2
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/03/02	wds
	Ethylbenzene	ND	5	ug/L	07/03/02	wds
	Toluene	ND	5	ug/L	07/03/02	wds
	Xylenes (total)	ND	5	ug/L	07/03/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333 Date: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Customer Sample ID: MW #13
Date Sampled.....: 06/28/2002
Time Sampled.....: 12:55
Sample Matrix.....: Water

Laboratory Sample ID: 207333-3
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	200	ug/Kg	07/10/02	wds
	Ethylbenzene	ND	200	ug/Kg	07/10/02	wds
	Toluene	ND	200	ug/Kg	07/10/02	wds
	Xylenes (total)	ND	200	ug/Kg	07/10/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333 Date: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Customer Sample ID: LSWW
Date Sampled.....: 06/28/2002
Time Sampled.....: 13:00
Sample Matrix.....: Water

Laboratory Sample ID: 207333-4
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/03/02	wds
	Ethylbenzene	ND	5	ug/L	07/03/02	wds
	Toluene	ND	5	ug/L	07/03/02	wds
	Xylenes (total)	ND	5	ug/L	07/03/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333 Date: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Customer Sample ID: MW #6
Date Sampled.....: 06/28/2002
Time Sampled.....: 12:30
Sample Matrix.....: Water

Laboratory Sample ID: 207333-5
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/03/02	wds
	Ethylbenzene	ND	5	ug/L	07/03/02	wds
	Toluene	ND	5	ug/L	07/03/02	wds
	Xylenes (total)	ND	5	ug/L	07/03/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333

Date: 07/15/2002

CUSTOMER: Marathon Oil Company | PROJECT: MOC - BERTHA BARBER | ATTN: Aaron Wilson

Customer Sample ID: MW #3
Date Sampled.....: 06/28/2002
Time Sampled.....: 14:30
Sample Matrix.....: Water

Laboratory Sample ID: 207333-6
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/05/02	wds
	Ethylbenzene	ND	5	ug/L	07/05/02	wds
	Toluene	ND	5	ug/L	07/05/02	wds
	Xylenes (total)	ND	5	ug/L	07/05/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333 Date: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Customer Sample ID: MW #3 RINISITE
Date Sampled.....: 06/28/2002
Time Sampled.....: 14:30
Sample Matrix.....: Water

Laboratory Sample ID: 207333-7
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/05/02	wds
	Ethylbenzene	ND	5	ug/L	07/05/02	wds
	Toluene	ND	5	ug/L	07/05/02	wds
	Xylenes (total)	ND	5	ug/L	07/05/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333

Date: 07/15/2002

CUSTOMER: Marathon Oil Company | PROJECT: MOC - BERTHA BARBER | ATTN: Aaron Wilson

Customer Sample ID: MW #7
Date Sampled.....: 06/28/2002
Time Sampled.....: 15:15
Sample Matrix.....: Water

Laboratory Sample ID: 207333-8
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/05/02	wds
	Ethylbenzene	ND	5	ug/L	07/05/02	wds
	Toluene	ND	5	ug/L	07/05/02	wds
	Xylenes (total)	ND	5	ug/L	07/05/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333

Date: 07/15/2002

CUSTOMER: Marathon Oil Company | PROJECT: MOC - BERTHA BARBER | ATTN: Aaron Wilson

Customer Sample ID: MW #2
Date Sampled.....: 06/28/2002
Time Sampled.....: 15:00
Sample Matrix.....: Water

Laboratory Sample ID: 207333-9
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/05/02	wds
	Ethylbenzene	ND	5	ug/L	07/05/02	wds
	Toluene	ND	5	ug/L	07/05/02	wds
	Xylenes (total)	ND	5	ug/L	07/05/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333 Date: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Customer Sample ID: DUP-1
Date Sampled.....: 06/28/2002
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 207333-10
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/05/02	wds
	Ethylbenzene	ND	5	ug/L	07/05/02	wds
	Toluene	ND	5	ug/L	07/05/02	wds
	Xylenes (total)	ND	5	ug/L	07/05/02	wds

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 207333

Date: 07/15/2002

CUSTOMER: Marathon Oil Company | PROJECT: MOC - BERTHA BARBER | ATTN: Aaron Wilson

Customer Sample ID: MW #12
Date Sampled.....: 06/28/2002
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 207333-11
Date Received.....: 06/29/2002
Time Received.....: 13:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/05/02	wds
	Ethylbenzene	ND	5	ug/L	07/05/02	wds
	Toluene	ND	5	ug/L	07/05/02	wds
	Xylenes (total)	ND	5	ug/L	07/05/02	wds

SEVERN TRENT SERVICES

QUALITY CONTROL RESULTS

Job Number.: 207333 — Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company — PROJECT: MOC - BERTHA BARBER — ATTN: Aaron Wilson

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: EPA 8260B — Units.....: ug/L — Analyst...: wds
Method Description.: Volatile Organic Compounds — Batch.....: 95319

LCS	Laboratory Control Sample	LCS2002			07/01/2002	1100

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	52.95		50		105.9	%	70-130
Ethylbenzene	50.80		50		101.6	%	70-130
Toluene	53.70		50		107.4	%	70-130
Xylenes (total)	153.56		150		102.4	%	70-130

MB	Method Blank				07/01/2002	1033

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	ND						
Ethylbenzene	ND						
Toluene	ND						
Xylenes (total)	ND						

MS	Matrix Spike	CLPVOAMS3	207333-1		07/01/2002	1154

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	56.11		50	ND	112.2	%	67-130
Toluene	56.30		50	ND	112.6	%	75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	207333-1		07/01/2002	1220

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	56.58	56.11	50	ND	113.2	%	67-130
					0.8	R	30
Toluene	56.95	56.30	50	ND	113.9	%	75-114
					1.1	R	30

Test Method.....: EPA 8260B — Units.....: ug/L — Analyst...: wds
Method Description.: Volatile Organic Compounds — Batch.....: 95512

LCS	Laboratory Control Sample	LCS2002			07/03/2002	1119

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	49.94		50		99.9	%	70-130
Ethylbenzene	47.30		50		94.6	%	70-130
Toluene	49.99		50		100.0	%	70-130

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

QUALITY CONTROL RESULTS

Job Number.: 207333

Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company | PROJECT: MOC - BERTHA BARBER | ATTN: Aaron Wilson

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MB	Method Blank				07/03/2002	1052

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	ND						
Ethylbenzene	ND						
Toluene	ND						

MS	Matrix Spike	CLPVOAMS3	207444-1		07/03/2002	1212

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	55.15		50	ND	110.3	%	67-130
Toluene	54.93		50	ND	109.9	%	75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	207444-1		07/03/2002	1239

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	55.59	55.15	50	ND	111.2	%	67-130
					0.8	R	30
Toluene	55.59	54.93	50	ND	111.2	%	75-114
					1.2	R	30

Test Method.....: EPA 8260B | Units.....: ug/L | Analyst...: wds

Method Description.: Volatile Organic Compounds | Batch.....: 95621

LCS	Laboratory Control Sample	LCS2002			07/05/2002	1111

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	52.12		50		104.2	%	70-130
Ethylbenzene	48.64		50		97.3	%	70-130
Toluene	51.59		50		103.2	%	70-130
Xylenes (total)	145.32		150		96.9	%	70-130

MB	Method Blank				07/05/2002	1044

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	ND						
Ethylbenzene	ND						
Toluene	ND						
Xylenes (total)	ND						

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

QUALITY CONTROL RESULTS

Job Number.: 207333 — Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company — PROJECT: MOC - BERTHA BARBER — ATTN: Aaron Wilson

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MS	Matrix Spike	CLPVOAMS3	207559-1		07/05/2002	1204

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	55.79		50	ND	111.6	%	67-130
Toluene	55.47		50	ND	110.9	%	75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	207559-1		07/05/2002	1236

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	54.63	55.79	50	ND	109.3	%	67-130
					2.1	R	30
Toluene	54.25	55.47	50	ND	108.5	%	75-114
					2.2	R	30

Test Method.....: EPA 8260B — Units.....: ug/L — Analyst...: wds
Method Description.: Volatile Organic Compounds — Batch.....: 95784

[redacted]	Laboratory Control Sample	LCS2002			07/10/2002	1023

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	53.63		50		107.3	%	70-130
Ethylbenzene	49.07		50		98.1	%	70-130
Toluene	53.31		50		106.6	%	70-130
Xylenes (total)	144.08		150		96.1	%	70-130

MB	Method Blank				07/10/2002	0942

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	ND						
Ethylbenzene	ND						
Toluene	ND						
Xylenes (total)	ND						

MS	Matrix Spike	CLPVOAMS3	207680-1		07/10/2002	1116

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	59.32		50	3.12	112.4	%	67-130
Toluene	58.21		50	ND	116.4	%	75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	207680-1		07/10/2002	1143

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Benzene	59.83	59.32	50	3.12	113.4	%	67-130
					0.9	R	30
[redacted]ne	58.03	58.21	50	ND	116.1	%	75-114
					0.3	R	30

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 207333 Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Method.....: Volatile Organic Compounds Method Code.....: 8260V1
Batch.....: 95319 Analyst.....: wds Equipment Code:

Surrogate	Units
1,2-Dichloroethane-d4 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.22	50.00	100.4	89-113		07/01/2002	1033
		LCS		49.89	50.00	99.8	89-113		07/01/2002	1100
207333-1				50.26	50.00	100.5	89-113		07/01/2002	1127
207333-1		MS		48.85	50.00	97.7	89-113		07/01/2002	1154
207333-1		MSD		50.01	50.00	100.0	89-113		07/01/2002	1220
207216-4				51.33	50.00	102.7	89-113		07/01/2002	1247
207216-2			5	51.11	50.00	102.2	89-113		07/01/2002	1314
207309-1				50.30	50.00	100.6	89-113		07/01/2002	1340
207306-1			40000	45.48	50.00	91.0	89-113		07/01/2002	1450
206957-7	Solid		4000	50.24	50.00	100.5	78-122		07/01/2002	1637
206957-5	Solid		400	48.07	50.00	96.1	78-122		07/01/2002	1823

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		49.66	50.00	99.3	82-112		07/01/2002	1033
		LCS		47.14	50.00	94.3	82-112		07/01/2002	1100
207333-1				50.56	50.00	101.1	82-112		07/01/2002	1127
207333-1		MS		49.55	50.00	99.1	82-112		07/01/2002	1154
207333-1		MSD		48.92	50.00	97.8	82-112		07/01/2002	1220
207216-4				49.47	50.00	98.9	82-112		07/01/2002	1247
207216-2			5	48.99	50.00	98.0	82-112		07/01/2002	1314
207309-1				49.56	50.00	99.1	82-112		07/01/2002	1340
207306-1			40000	47.49	50.00	95.0	82-112		07/01/2002	1450
206957-7	Solid		4000	47.80	50.00	95.6	71-121		07/01/2002	1637
206957-5	Solid		400	53.86	50.00	107.7	71-121		07/01/2002	1823

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.99	50.00	102.0	89-110		07/01/2002	1033
		LCS		51.25	50.00	102.5	89-110		07/01/2002	1100
207333-1				50.72	50.00	101.4	89-110		07/01/2002	1127
207333-1		MS		50.51	50.00	101.0	89-110		07/01/2002	1154
207333-1		MSD		50.28	50.00	100.6	89-110		07/01/2002	1220
207216-4				50.80	50.00	101.6	89-110		07/01/2002	1247
207216-2			5	51.00	50.00	102.0	89-110		07/01/2002	1314
207309-1				50.91	50.00	101.8	89-110		07/01/2002	1340

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 207333 Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
207306-1			40000	50.57	50.00	101.1	89-110		07/01/2002	1450
206957-7	Solid		4000	50.64	50.00	101.3	87-109		07/01/2002	1637
206957-5	Solid		400	50.66	50.00	101.3	87-109		07/01/2002	1823

Method.....: Volatile Organic Compounds Method Code.....: 8260V1
Batch.....: 95512 Analyst.....: wds Equipment Code:

Surrogate	Units
1,2-Dichloroethane-d4 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		49.08	50.00	98.2	89-113		07/03/2002	1052
		LCS		48.80	50.00	97.6	89-113		07/03/2002	1119
207444-1				49.62	50.00	99.2	89-113		07/03/2002	1145
207444-1		MS		48.93	50.00	97.9	89-113		07/03/2002	1212
207444-1		MSD		48.95	50.00	97.9	89-113		07/03/2002	1239
207444-9				48.75	50.00	97.5	89-113		07/03/2002	1306
207444-2				49.68	50.00	99.4	89-113		07/03/2002	1332
207444-3				49.82	50.00	99.6	89-113		07/03/2002	1359
207444-4				49.45	50.00	98.9	89-113		07/03/2002	1426
207444-5				49.04	50.00	98.1	89-113		07/03/2002	1453
207444-6				49.32	50.00	98.6	89-113		07/03/2002	1519
207444-7				49.58	50.00	99.2	89-113		07/03/2002	1546
207444-8				49.09	50.00	98.2	89-113		07/03/2002	1613
207333-2				49.84	50.00	99.7	89-113		07/03/2002	1640
207333-4				50.02	50.00	100.0	89-113		07/03/2002	1706
207333-5				49.13	50.00	98.3	89-113		07/03/2002	1733

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		54.50	50.00	109.0	82-112		07/03/2002	1052
		LCS		54.06	50.00	108.1	82-112		07/03/2002	1119
207444-1				54.59	50.00	109.2	82-112		07/03/2002	1145
207444-1		MS		54.34	50.00	108.7	82-112		07/03/2002	1212
207444-1		MSD		55.45	50.00	110.9	82-112		07/03/2002	1239
207444-9				54.77	50.00	109.5	82-112		07/03/2002	1306
207444-2				54.09	50.00	108.2	82-112		07/03/2002	1332
207444-3				54.52	50.00	109.0	82-112		07/03/2002	1359
207444-4				55.43	50.00	110.9	82-112		07/03/2002	1426
[illegible]44-5				53.84	50.00	107.7	82-112		07/03/2002	1453
[illegible]44-6				55.00	50.00	110.0	82-112		07/03/2002	1519

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 207333 Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
207444-7				54.36	50.00	108.7	82-112		07/03/2002	1546
207444-8				54.87	50.00	109.7	82-112		07/03/2002	1613
207333-2				54.60	50.00	109.2	82-112		07/03/2002	1640
207333-4				54.84	50.00	109.7	82-112		07/03/2002	1706
207333-5				56.17	50.00	112.3	82-112	X	07/03/2002	1733

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.02	50.00	100.0	89-110		07/03/2002	1052
		LCS		50.32	50.00	100.6	89-110		07/03/2002	1119
2[illegible]4-1				50.24	50.00	100.5	89-110		07/03/2002	1145
2[illegible]4-1		MS		50.02	50.00	100.0	89-110		07/03/2002	1212
207444-1		MSD		49.74	50.00	99.5	89-110		07/03/2002	1239
207444-9				50.09	50.00	100.2	89-110		07/03/2002	1306
207444-2				49.97	50.00	99.9	89-110		07/03/2002	1332
207444-3				50.49	50.00	101.0	89-110		07/03/2002	1359
207444-4				49.99	50.00	100.0	89-110		07/03/2002	1426
207444-5				49.70	50.00	99.4	89-110		07/03/2002	1453
207444-6				49.96	50.00	99.9	89-110		07/03/2002	1519
207444-7				50.00	50.00	100.0	89-110		07/03/2002	1546
207444-8				50.26	50.00	100.5	89-110		07/03/2002	1613
207333-2				50.01	50.00	100.0	89-110		07/03/2002	1640
207333-4				50.73	50.00	101.5	89-110		07/03/2002	1706
207333-5				50.13	50.00	100.3	89-110		07/03/2002	1733

Method.....: Volatile Organic Compounds Method Code.....: 8260V1
Batch.....: 95621 Analyst.....: wds Equipment Code:

Surrogate	Units
1,2-Dichloroethane-d4 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		48.43	50.00	96.9	89-113		07/05/2002	1044
		LCS		49.64	50.00	99.3	89-113		07/05/2002	1111
207559-1				49.59	50.00	99.2	89-113		07/05/2002	1137
207559-1		MS		49.38	50.00	98.8	89-113		07/05/2002	1204
207559-1		MSD		49.54	50.00	99.1	89-113		07/05/2002	1236
207333-6				49.68	50.00	99.4	89-113		07/05/2002	1303
207333-7				49.39	50.00	98.8	89-113		07/05/2002	1329
[illegible]3-8				49.35	50.00	98.7	89-113		07/05/2002	1356
[illegible]3-9				49.27	50.00	98.5	89-113		07/05/2002	1422

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 207333 Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Surrogate	Units
1,2-Dichloroethane-d4 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
207333-10				49.71	50.00	99.4	89-113		07/05/2002	1449
207333-11				50.11	50.00	100.2	89-113		07/05/2002	1516
207559-2				50.50	50.00	101.0	89-113		07/05/2002	1542
207559-3				49.63	50.00	99.3	89-113		07/05/2002	1609
207559-4				49.79	50.00	99.6	89-113		07/05/2002	1635
207559-5				50.57	50.00	101.1	89-113		07/05/2002	1702
207559-6				49.57	50.00	99.1	89-113		07/05/2002	1729
207559-7				50.89	50.00	101.8	89-113		07/05/2002	1755

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		53.92	50.00	107.8	82-112		07/05/2002	1044
		LCS		53.29	50.00	106.6	82-112		07/05/2002	1111
207559-1				54.98	50.00	110.0	82-112		07/05/2002	1137
207559-1		MS		55.24	50.00	110.5	82-112		07/05/2002	1204
207559-1		MSD		54.70	50.00	109.4	82-112		07/05/2002	1236
207333-6				55.06	50.00	110.1	82-112		07/05/2002	1303
207333-7				54.61	50.00	109.2	82-112		07/05/2002	1329
207333-8				53.65	50.00	107.3	82-112		07/05/2002	1356
207333-9				54.23	50.00	108.5	82-112		07/05/2002	1422
207333-10				55.07	50.00	110.1	82-112		07/05/2002	1449
207333-11				54.66	50.00	109.3	82-112		07/05/2002	1516
207559-2				54.96	50.00	109.9	82-112		07/05/2002	1542
207559-3				54.70	50.00	109.4	82-112		07/05/2002	1609
207559-4				54.02	50.00	108.0	82-112		07/05/2002	1635
207559-5				53.99	50.00	108.0	82-112		07/05/2002	1702
207559-6				54.82	50.00	109.6	82-112		07/05/2002	1729
207559-7				54.33	50.00	108.7	82-112		07/05/2002	1755

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.18	50.00	100.4	89-110		07/05/2002	1044
		LCS		50.35	50.00	100.7	89-110		07/05/2002	1111
207559-1				50.34	50.00	100.7	89-110		07/05/2002	1137
207559-1		MS		50.50	50.00	101.0	89-110		07/05/2002	1204
207559-1		MSD		50.18	50.00	100.4	89-110		07/05/2002	1236
207333-6				50.55	50.00	101.1	89-110		07/05/2002	1303
207333-7				50.44	50.00	100.9	89-110		07/05/2002	1329
207333-8				50.20	50.00	100.4	89-110		07/05/2002	1356
207333-9				50.46	50.00	100.9	89-110		07/05/2002	1422

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 207333 Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
207333-10				50.20	50.00	100.4	89-110		07/05/2002	1449
207333-11				50.41	50.00	100.8	89-110		07/05/2002	1516
207559-2				50.15	50.00	100.3	89-110		07/05/2002	1542
207559-3				50.02	50.00	100.0	89-110		07/05/2002	1609
207559-4				50.31	50.00	100.6	89-110		07/05/2002	1635
207559-5				50.46	50.00	100.9	89-110		07/05/2002	1702
207559-6				49.93	50.00	99.9	89-110		07/05/2002	1729
207559-7				50.81	50.00	101.6	89-110		07/05/2002	1755

Method.....: Volatile Organic Compounds Method Code.....: 8260V1
Batch.....: 95784 Analyst.....: wds Equipment Code:

Surrogate	Units
[redacted]Dichloroethane-d4 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		48.63	50.00	97.3	89-113		07/10/2002	0942
		LCS		49.96	50.00	99.9	89-113		07/10/2002	1023
207680-1		MS		49.94	50.00	99.9	89-113		07/10/2002	1116
207680-1		MSD		49.74	50.00	99.5	89-113		07/10/2002	1143
207559-11			100	49.38	50.00	98.8	89-113		07/10/2002	1210
207333-3			50	47.76	50.00	95.5	80-120		07/10/2002	1303
207557-1			20	48.61	50.00	97.2	89-113		07/10/2002	1347
207559-1			50	50.19	50.00	100.4	89-113		07/10/2002	1440
207559-7			10	49.51	50.00	99.0	89-113		07/10/2002	1507
207559-8				50.49	50.00	101.0	89-113		07/10/2002	1533
207470-1			5	49.33	50.00	98.7	89-113		07/10/2002	1627
207557-2				49.76	50.00	99.5	89-113		07/10/2002	1653
207593-2	Oil		4000	49.11	50.00	98.2	80-120		07/10/2002	1747
207593-3	Oil		4000	49.26	50.00	98.5	80-120		07/10/2002	1814
207693-1				49.68	50.00	99.4	89-113		07/10/2002	1840
207693-2				49.19	50.00	98.4	89-113		07/10/2002	1907
207693-3				49.34	50.00	98.7	89-113		07/10/2002	1933
207781-1			10	49.02	50.00	98.0	89-113		07/10/2002	2000
207760-1			10	47.16	50.00	94.3	89-113		07/10/2002	2027

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		54.57	50.00	109.1	82-112		07/10/2002	0942
		LCS		55.37	50.00	110.7	82-112		07/10/2002	1023
[redacted]80-1		MS		52.82	50.00	105.6	82-112		07/10/2002	1116

SEVERN TRENT SERVICES

SURROGATE RECOVERIES REPORT

Job Number.: 207333 Report Date.: 07/15/2002

CUSTOMER: Marathon Oil Company PROJECT: MOC - BERTHA BARBER ATTN: Aaron Wilson

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
207680-1		MSD		54.10	50.00	108.2	82-112		07/10/2002	1143
207559-11			100	54.23	50.00	108.5	82-112		07/10/2002	1210
207333-3			50	52.41	50.00	104.8	71-121		07/10/2002	1303
207557-1			20	55.01	50.00	110.0	82-112		07/10/2002	1347
207559-1			50	53.56	50.00	107.1	82-112		07/10/2002	1440
207559-7			10	54.52	50.00	109.0	82-112		07/10/2002	1507
207559-8				53.58	50.00	107.2	82-112		07/10/2002	1533
207470-1			5	54.15	50.00	108.3	82-112		07/10/2002	1627
207557-2				52.25	50.00	104.5	82-112		07/10/2002	1653
207593-2	Oil		4000	50.72	50.00	101.4	71-121		07/10/2002	1747
207593-3	Oil		4000	50.69	50.00	101.4	71-121		07/10/2002	1814
207693-1				53.87	50.00	107.7	82-112		07/10/2002	1840
207693-2				54.39	50.00	108.8	82-112		07/10/2002	1907
207693-3				54.65	50.00	109.3	82-112		07/10/2002	1933
207781-1			10	54.13	50.00	108.3	82-112		07/10/2002	2000
207760-1			10	51.60	50.00	103.2	82-112		07/10/2002	2027

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		51.62	50.00	103.2	89-110		07/10/2002	0942
		LCS		51.45	50.00	102.9	89-110		07/10/2002	1023
207680-1		MS		50.87	50.00	101.7	89-110		07/10/2002	1116
207680-1		MSD		51.62	50.00	103.2	89-110		07/10/2002	1143
207559-11			100	51.98	50.00	104.0	89-110		07/10/2002	1210
207333-3			50	51.97	50.00	103.9	85-112		07/10/2002	1303
207557-1			20	51.06	50.00	102.1	89-110		07/10/2002	1347
207559-1			50	51.58	50.00	103.2	89-110		07/10/2002	1440
207559-7			10	51.76	50.00	103.5	89-110		07/10/2002	1507
207559-8				51.83	50.00	103.7	89-110		07/10/2002	1533
207470-1			5	51.78	50.00	103.6	89-110		07/10/2002	1627
207557-2				51.67	50.00	103.3	89-110		07/10/2002	1653
207593-2	Oil		4000	53.21	50.00	106.4	85-112		07/10/2002	1747
207593-3	Oil		4000	52.99	50.00	106.0	85-112		07/10/2002	1814
207693-1				51.39	50.00	102.8	89-110		07/10/2002	1840
207693-2				51.83	50.00	103.7	89-110		07/10/2002	1907
207693-3				51.77	50.00	103.5	89-110		07/10/2002	1933
207781-1			10	51.88	50.00	103.8	89-110		07/10/2002	2000
207760-1			10	51.48	50.00	103.0	89-110		07/10/2002	2027

SEVERN TRENT SERVICES

QUALITY ASSURANCE FOOTER

METHOD REFERENCES

1. EPA SW-846, Test Methods for Evaluating Solid Waste Update I, IIA, IIB, III
2. Standard Methods for the Examination of Water and Wastewater, 18th Edition
3. EPA 600/4-79-020, Methods of Chemical Analysis for Waters and Wastes, March 1983
4. Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
5. American Society for Testing and Materials, Volumes 5.01, 5.02, 5.03, 11.01,11.02,11.03,11.04
6. EPA Methods for Environmental Samples

COMMENTS

All methods of chemical analysis have a statistical uncertainty associated with the results. Unless otherwise indicated, the data in this report are within the limits of uncertainty as specified in the referenced method. Quality Control acceptance criteria are based either on actual laboratory performance or on limits specified in the referenced method. The date and time of analysis indicated on the QA report may not reflect the actual time of analysis for QC samples. All data are reported on an "as received" basis unless otherwise indicated. Data reported in the QA report may be lower than sample data due to dilution of samples into the calibration range of the analysis. Sample concentration for solid samples are calculated on an as received (wet) basis. Unless otherwise indicated, volatiles by gas chromatography (GC) are reported from a single column. Volatile analysis by GC on low level soil extractions are conducted at room temperature.

FLAGS, FOOTNOTES AND ABBREVIATIONS (as needed)

NA	=	Not Analyzed	ND	=	Not detected at a value greater than the reporting limit
N/A	=	Not applicable	NC	=	Not calculable due to values lower than the reporting limit
ug/L	=	Micrograms per liter	mg/L	=	Milligrams per liter
ug/Kg	=	Micrograms per kilogram	mg/kg	=	Milligrams per kilogram
U	=	Undetected			
J	=	Indicates value is > MDL, but < Reporting Limit			
B	=	Analyte was detected in the method blank analyzed with this sample.			
D	=	Surrogate recoveries are not calculated due to sample dilution.			
X	=	Surrogate recovery is outside quality control limits.			
Y	=	Spike or spike duplicate recovery is outside quality control limits.			
Z	=	Relative percent difference for a spike and spike duplicate is outside quality control limits. The precision of the method was impacted by matrix.			
^	=	Indicates value is above QC acceptance criteria.			

QC SAMPLE IDENTIFICATIONS

MB	=	Method Blank	SB	=	Storage Blank
RB	=	Reagent Blank	EB	=	Extraction Blank
PB	=	Preparation Blank	CALB	=	Calibration Blank
MD	=	Method Duplicate	RS	=	Reference Standard
LCS	=	Laboratory Control Sample	LCSD	=	Laboratory Control Sample Duplicate
MS	=	Matrix Spike	MSD	=	Matrix Spike Duplicate
ICB	=	Initial Calibration Blank	CCB	=	Continuing Calibration Blank
ICV	=	Initial Calibration Verification	ICB	=	Initial Calibration Blank
PDS	=	Post Digestion Spike	SS	=	Surrogate Spike
ISA	=	Interference Check standard "A"	ISB	=	Interference Check Standard "B"
ISCAB	=	Interference Check Sample AB	MSA	=	Method of Standard Additions
CAL	=	Calibration standard	SD	=	Serial Dilution
MST	=	TCLP Matrix Spike	MSQ	=	TCLP Matrix Spike Duplicate
PST	=	TCLP Post Digestion Spike	LCT	=	TCLP Laboratory Control Sample

rl Job Sample Receipt Checklist Report V2
06/29/2002

Job Number.: 207333 Location.: 57211 Check List Number.: 1 Description.:
Customer Job ID.....: Job Check List Date.: 06/29/2002
Project Number.: 96000703 Project Description.: MOC - Bertha Barber Project Manager.....: arb
Customer.....: Marathon Oil Company Contact.: PETE GALUSKY

Questions ?	(Y/N)	Comments
Chain-of-Custody Present?	Y	
Custody seal on shipping container?	N	
...If "yes", custody seal intact?		
Custody seals on sample containers?	N	
...If "yes", custody seal intact?		
Samples chilled?	Y	ON ICE
Temperature of cooler acceptable? (4 deg C +/- 2).	N	11.1 DEG C IR
Samples received intact (good condition)?	N	3 VIALS BROKEN
Volatile samples acceptable? (no headspace)	N	BUBBLES IN 7 VIALS
Correct containers used?	Y	
Adequate sample volume provided?	Y	
Samples preserved correctly?	Y	
Samples received within holding-time?	Y	
Agreement between COC and sample labels?	N	MW 12 NOT ON COC
Additional		
Comments		
Sample Custodian Signature		

SEVERN TRENT SERVICES

STL Valparaiso
2400 Cumberland Drive
Valparaiso, IN 46383
Phone: 219-464-2389
Fax: 219-462-2953

Report To:
Contact:
Company: SAME
Address:
Phone:
Fax:
E-Mail:

Bill To:
Contact:
Company: Marathon Oil Company
Address: 125 West Missouri St
Midland Texas 79702-05
Phone:
Fax:
PO#: Quote:

Shaded Areas For Internal Use Only 1 of 1

Lab Lot#

Package Sealed Yes No	Samples Sealed Yes No
Received on Ice Yes No	Samples Intact Yes No
Temperature °C of Cooler 11.1 (on ice)	

Sampler Name: Gabriel R Terrazas
Signature:
Project Name: Bertha Barber
Project Number:
Project Location: Bertha Barber
Lab PM:
Date Required Hard Copy: ___/___/___ Fax: ___/___/___

Within Hold Time Yes No	Preserv. Indicated Yes No NA
pH Check OK Yes No NA	Res Cl_2 Check OK Yes No NA
Sample Labels and COC Agree Yes No	COC not present

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	BTEX Method 602	Additional Analyses / Remarks
207333-1	2	M.W #11	6-28-02	11:20	W		✓	
-2	2	M.W.# 8		11:56	W		✓	1 Br
-3	2	M.W.#13		12:55	W		✓	1B 1Br
-4	2	LSWW		1:00	W		✓	1B 1Br
-5	2	M.W.#6		12:30	W		✓	
	2	~~MW#9~~		~~1:28~~	W		✓	
-6	2	M.W.#3		2:30	W		✓	
-7	2	M.W #3 Rinsate		2:30	W		✓	2B
-8	2	M.W.#7		3:15	W		✓	1B/5
-9		M.W.#2		3:00	W		✓	1B
-10		Dup-1						1B
-11		MW#12						added by Login

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
	BSC International	6-28-02			STL	6/28/02	1345
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous
OL = Oil
A = Air
SE = Sediment
SO = Solid
DS = Drum Solid
DL = Drum Liquid
L = Leachate
WI = Wipe
O = _____

Container Key
1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widemouth Glass
6. Other _____

Preservative Key
1. HCl, Cool to 4°
2. H2SO4, Cool to 4°
3. HNO3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn, Cool to 4°
6. Cool to 4°
7. None

COMMENTS

Date Received / /
Courier: **Hand Delivered** ☐
Bill of Lading

Summary Report

Aaron Wilson
Marathon Oil Co.
P. O. Box 552
Midland, TX 79702

Report Date: November 8, 2002

Order ID Number: A02092719

Project Number: Bertha Barber
Project Name: N/A
Project Location: Monument

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
209018	MW-11	Water	9/25/02	:	9/27/02
209019	MW-8	Water	9/25/02	:	9/27/02
209020	MW-13	Water	9/25/02	:	9/27/02
209021	LSWW	Water	9/25/02	:	9/27/02
209022	MW-12	Water	9/25/02	:	9/27/02
209023	MW-3	Water	9/25/02	:	9/27/02
209024	MW-6	Water	9/25/02	:	9/27/02
209025	Dup-1	Water	9/25/02	:	9/27/02
209026	Rinsate	Water	9/25/02	:	9/27/02

0 This report consists of a total of 6 page(s) and is intended only as a summary of results for the sample(s) listed above.

	BTEX				
Sample - Field Code	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)
209018 - MW-11	<0.005	<0.005	<0.005	<0.005	<0.005
209019 - MW-8	<0.005	<0.005	<0.005	<0.005	<0.005
209020 - MW-13	<0.001	<0.001	<0.001	<0.001	<0.001
209021 - LSWW	<0.001	<0.001	<0.001	<0.001	<0.001
209022 - MW-12	<0.001	<0.001	<0.001	<0.001	<0.001
209023 - MW-3	<0.005	<0.005	<0.005	<0.005	<0.005
209024 - MW-6	<0.001	<0.001	<0.001	<0.001	<0.001
209025 - Dup-1	<0.001	<0.001	<0.001	<0.001	<0.001
209026 - Rinsate	<0.001	<0.001	<0.001	<0.001	<0.001

Sample: 209018 - MW-11

Param	Flag	Result	Units
Chloride		1620	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L

Continued on next page ...

Sample 209018 continued ...

Param	Flag	Result	Units
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		3605	mg/L
Total Barium		0.271	mg/L
Total Iron		0.255	mg/L
Total Manganese		0.141	mg/L

Sample: 209019 - MW-8

Param	Flag	Result	Units
Chloride		1090	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		2392	mg/L
Total Barium		0.189	mg/L
Total Iron		0.138	mg/L
Total Manganese		0.0797	mg/L

Sample: 209020 - MW-13

Param	Flag	Result	Units
Chloride		1670	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L

Continued on next page ...

Sample 209020 continued ...

Param	Flag	Result	Units
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		3660	mg/L
Total Barium		0.107	mg/L
Total Iron		0.476	mg/L
Total Manganese		0.147	mg/L

Sample: 209021 - LSWW

Param	Flag	Result	Units
Chloride		671	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		1866	mg/L
Total Barium		0.192	mg/L
Total Iron		4.52	mg/L
Total Manganese		0.224	mg/L

Sample: 209022 - MW-12

Param	Flag	Result	Units
Chloride		3220	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		6225	mg/L
Total Barium		0.111	mg/L
Total Iron		<0.050	mg/L
Total Manganese		0.0297	mg/L

Sample: 209023 - MW-3

Param	Flag	Result	Units
Chloride		506	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		1518	mg/L
Total Barium		<0.100	mg/L
Total Iron		0.196	mg/L
Total Manganese		0.0865	mg/L

Sample: 209024 - MW-6

Param	Flag	Result	Units
Chloride		2500	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		5080	mg/L
Total Barium		0.153	mg/L
Total Iron		0.118	mg/L
Total Manganese		0.0581	mg/L

Sample: 209025 - Dup-1

Param	Flag	Result	Units
Chloride		1130	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		2625	mg/L
Total Barium		<0.100	mg/L
Total Iron		0.355	mg/L
Total Manganese		0.109	mg/L

Sample: 209026 - Rinsate

Param	Flag	Result	Units
Chloride		< 5	mg/L
Naphthalene		<0.0002	mg/L
Acenaphthylene		<0.0002	mg/L
Acenaphthene		<0.0002	mg/L
Fluorene		<0.0002	mg/L
Phenanthrene		<0.0002	mg/L
Anthracene		<0.0002	mg/L
Fluoranthene		<0.0002	mg/L
Pyrene		<0.0002	mg/L
Benzo(a)anthracene		<0.0002	mg/L
Chrysene		<0.0002	mg/L
Benzo(b)fluoranthene		<0.0002	mg/L
Benzo(k)fluoranthene		<0.0002	mg/L
Benzo(a)pyrene		<0.0002	mg/L
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L
Dibenzo(a,h)anthracene		<0.0002	mg/L
Benzo(g,h,i)perylene		<0.0002	mg/L
Total Dissolved Solids		25	mg/L
Total Barium		<0.100	mg/L
Total Iron		<0.050	mg/L
Total Manganese		<0.025	mg/L

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Aaron Wilson
Marathon Oil Co.
P. O. Box 552
Midland, TX 79702

Report Date: November 8, 2002

Order ID Number: A02092719

Project Number: Bertha Barber
Project Name: N/A
Project Location: Monument

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
209018	MW-11	Water	9/25/02	:	9/27/02
209019	MW-8	Water	9/25/02	:	9/27/02
209020	MW-13	Water	9/25/02	:	9/27/02
209021	LSWW	Water	9/25/02	:	9/27/02
209022	MW-12	Water	9/25/02	:	9/27/02
209023	MW-3	Water	9/25/02	:	9/27/02
209024	MW-6	Water	9/25/02	:	9/27/02
209025	Dup-1	Water	9/25/02	:	9/27/02
209026	Rinsate	Water	9/25/02	:	9/27/02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

Note: Samples will be disposed of 30 days from the report date unless the lab is contacted before the 30 days has past.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 209018 - MW-11

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC23840 | Date Analyzed: 9/27/02
Analyst: CG | Preparation Method: S 5030B | Prep Batch: PB22285 | Date Prepared: 9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0805	mg/L	5	0.10	80	70 - 130
4-BFB		0.0728	mg/L	5	0.10	72	70 - 130

Sample: 209018 - MW-11

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC23885 | Date Analyzed: 9/30/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22333 | Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		1620	mg/L	100	1

Sample: 209018 - MW-11

Analysis: PAH | Analytical Method: S 8270C | QC Batch: QC24038 | Date Analyzed: 10/9/02
Analyst: RC | Preparation Method: E 3510C | Prep Batch: PB22450 | Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		65.11	mg/L	1	80	81	35 - 114
2-Fluorobiphenyl		63.1	mg/L	1	80	78	43 - 116
Terphenyl-d14		66.54	mg/L	1	80	83	33 - 141

Sample: 209018 - MW-11

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC23933 Date Analyzed: 10/3/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22365 Date Prepared: 10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		3605	mg/L	5	10

Sample: 209018 - MW-11

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC23934 Date Analyzed: 10/3/02
Analyst: RR Preparation Method: S 3010A Prep Batch: PB22293 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		0.271	mg/L	1	0.10
Total Iron		0.255	mg/L	1	0.05
Total Manganese		0.141	mg/L	1	0.02

Sample: 209019 - MW-8

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC23860 Date Analyzed: 9/30/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB22306 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0944	mg/L	5	0.10	94	70 - 130
4-BFB		0.0759	mg/L	5	0.10	75	70 - 130

Sample: 209019 - MW-8

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC23885 Date Analyzed: 9/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22333 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		1090	mg/L	50	1

Sample: 209019 - MW-8

Analysis:	PAH	Analytical Method:	S 8270C	QC Batch:	QC24038	Date Analyzed:	10/9/02
Analyst:	RC	Preparation Method:	E 3510C	Prep Batch:	PB22450	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		61.65	mg/L	1	80	77	35 - 114
2-Fluorobiphenyl		61.9	mg/L	1	80	77	43 - 116
Terphenyl-d14		54.97	mg/L	1	80	68	33 - 141

Sample: 209019 - MW-8

Analysis:	TDS	Analytical Method:	E 160.1	QC Batch:	QC23933	Date Analyzed:	10/3/02
Analyst:	JSW	Preparation Method:	N/A	Prep Batch:	PB22365	Date Prepared:	10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		2392	mg/L	2	10

Sample: 209019 - MW-8

Analysis:	Total Metals	Analytical Method:	S 6010B	QC Batch:	QC23934	Date Analyzed:	10/3/02
Analyst:	RR	Preparation Method:	S 3010A	Prep Batch:	PB22293	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		0.189	mg/L	1	0.10
Total Iron		0.138	mg/L	1	0.05
Total Manganese		0.0797	mg/L	1	0.02

Sample: 209020 - MW-13

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC23833	Date Analyzed:	9/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB22282	Date Prepared:	9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0935	mg/L	1	0.10	94	70 - 130
4-BFB		0.0911	mg/L	1	0.10	91	70 - 130

Sample: 209020 - MW-13

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC23885 Date Analyzed: 9/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22333 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		1670	mg/L	100	1

Sample: 209020 - MW-13

Analysis: PAH Analytical Method: S 8270C QC Batch: QC24038 Date Analyzed: 10/9/02
Analyst: RC Preparation Method: E 3510C Prep Batch: PB22450 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	[1]	23.6	mg/L	1	80	29	35 - 114
2-Fluorobiphenyl	[2]	26.01	mg/L	1	80	32	43 - 116
Terphenyl-d14	[3]	25.09	mg/L	1	80	31	33 - 141

[1]Sample surrogate recovery out of limits due to sample matrix.
[2]Sample surrogate recovery out of limits due to sample matrix.
[3]Sample surrogate recovery out of limits due to sample matrix.

Sample: 209020 - MW-13

Analysis:	TDS	Analytical Method:	E 160.1	QC Batch:	QC23933	Date Analyzed:	10/3/02
Analyst:	JSW	Preparation Method:	N/A	Prep Batch:	PB22365	Date Prepared:	10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		3660	mg/L	5	10

Sample: 209020 - MW-13

Analysis:	Total Metals	Analytical Method:	S 6010B	QC Batch:	QC23934	Date Analyzed:	10/3/02
Analyst:	RR	Preparation Method:	S 3010A	Prep Batch:	PB22293	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		0.107	mg/L	1	0.10
Total Iron		0.476	mg/L	1	0.05
Total Manganese		0.147	mg/L	1	0.02

Sample: 209021 - LSWW

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC23833	Date Analyzed:	9/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB22282	Date Prepared:	9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0981	mg/L	1	0.10	98	70 - 130
4-BFB		0.0934	mg/L	1	0.10	93	70 - 130

Sample: 209021 - LSWW

Analysis:	Ion Chromatography (IC)	Analytical Method:	E 300.0	QC Batch:	QC23885	Date Analyzed:	9/30/02
Analyst:	JSW	Preparation Method:	N/A	Prep Batch:	PB22333	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		671	mg/L	50	1

Sample: 209021 - LSWW

Analysis:	PAH	Analytical Method:	S 8270C	QC Batch:	QC24038	Date Analyzed:	10/9/02
Analyst:	RC	Preparation Method:	E 3510C	Prep Batch:	PB22450	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002

Continued ...

... *Continued* Sample: 209021 Analysis: PAH

Param	Flag	Result	Units	Dilution	RDL
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		78.91	mg/L	1	80	98	35 - 114
2-Fluorobiphenyl		73.55	mg/L	1	80	91	43 - 116
Terphenyl-d14		71.73	mg/L	1	80	89	33 - 141

Sample: 209021 - LSWW

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC23933 Date Analyzed: 10/3/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22365 Date Prepared: 10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		1866	mg/L	2	10

Sample: 209021 - LSWW

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC23934 Date Analyzed: 10/3/02
Analyst: RR Preparation Method: S 3010A Prep Batch: PB22293 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		0.192	mg/L	1	0.10
Total Iron		4.52	mg/L	1	0.05
Total Manganese		0.224	mg/L	1	0.02

Sample: 209022 - MW-12

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC23833 Date Analyzed: 9/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB22282 Date Prepared: 9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001

Continued ...

... *Continued* Sample: 209022 Analysis: BTEX

Param	Flag	Result	Units	Dilution	RDL
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.196	mg/L	1	0.10	98	70 - 130
4-BFB		0.188	mg/L	1	0.10	94	70 - 130

Sample: 209022 - MW-12

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC23885 Date Analyzed: 9/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22333 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		3220	mg/L	500	1

Sample: 209022 - MW-12

Analysis: PAH Analytical Method: S 8270C QC Batch: QC24038 Date Analyzed: 10/9/02
Analyst: RC Preparation Method: E 3510C Prep Batch: PB22450 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		67.24	mg/L	1	80	84	35 - 114
2-Fluorobiphenyl		62.72	mg/L	1	80	78	43 - 116
Terphenyl-d14		46.5	mg/L	1	80	58	33 - 141

Sample: 209022 - MW-12

Analysis: TDS | Analytical Method: E 160.1 | QC Batch: QC23933 | Date Analyzed: 10/3/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22365 | Date Prepared: 10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		6225	mg/L	5	10

Sample: 209022 - MW-12

Analysis: Total Metals | Analytical Method: S 6010B | QC Batch: QC23934 | Date Analyzed: 10/3/02
Analyst: RR | Preparation Method: S 3010A | Prep Batch: PB22293 | Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		0.111	mg/L	1	0.10
Total Iron		<0.050	mg/L	1	0.05
Total Manganese		0.0297	mg/L	1	0.02

Sample: 209023 - MW-3

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC23860 | Date Analyzed: 9/30/02
Analyst: CG | Preparation Method: S 5030B | Prep Batch: PB22306 | Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0956	mg/L	5	0.10	95	70 - 130
4-BFB		0.0782	mg/L	5	0.10	78	70 - 130

Sample: 209023 - MW-3

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC23885 | Date Analyzed: 9/30/02
Analyst: JSW | Preparation Method: N/A | Prep Batch: PB22333 | Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		506	mg/L	50	1

Sample: 209023 - MW-3

Analysis: PAH | Analytical Method: S 8270C | QC Batch: QC24038 | Date Analyzed: 10/9/02
Analyst: RC | Preparation Method: E 3510C | Prep Batch: PB22450 | Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002

Continued ...

... *Continued* Sample: 209023 Analysis: PAH

Param	Flag	Result	Units	Dilution	RDL
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		37.95	mg/L	1	80	47	35 - 114
2-Fluorobiphenyl		34.76	mg/L	1	80	43	43 - 116
Terphenyl-d14		49.74	mg/L	1	80	62	33 - 141

Sample: 209023 - MW-3

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC23933 Date Analyzed: 10/3/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22365 Date Prepared: 10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		1518	mg/L	2	10

Sample: 209023 - MW-3

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC23934 Date Analyzed: 10/3/02
Analyst: RR Preparation Method: S 3010A Prep Batch: PB22293 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		<0.100	mg/L	1	0.10
Total Iron		0.196	mg/L	1	0.05
Total Manganese		0.0865	mg/L	1	0.02

Sample: 209024 - MW-6

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC23833 Date Analyzed: 9/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB22282 Date Prepared: 9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001

Continued ...

... *Continued* Sample: 209024 Analysis: BTEX

Param	Flag	Result	Units	Dilution	RDL
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0999	mg/L	1	0.10	100	70 - 130
4-BFB		0.0946	mg/L	1	0.10	95	70 - 130

Sample: 209024 - MW-6

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC23885 Date Analyzed: 9/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22333 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		2500	mg/L	100	1

Sample: 209024 - MW-6

Analysis: PAH Analytical Method: S 8270C QC Batch: QC24038 Date Analyzed: 10/9/02
Analyst: RC Preparation Method: E 3510C Prep Batch: PB22450 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		69.89	mg/L	1	80	87	35 - 114
2-Fluorobiphenyl		65.8	mg/L	1	80	82	43 - 116
Terphenyl-d14		59.61	mg/L	1	80	74	33 - 141

Sample: 209024 - MW-6

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC23933 Date Analyzed: 10/3/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22365 Date Prepared: 10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		5080	mg/L	5	10

Sample: 209024 - MW-6

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC23934 Date Analyzed: 10/3/02
Analyst: RR Preparation Method: S 3010A Prep Batch: PB22293 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		0.153	mg/L	1	0.10
Total Iron		0.118	mg/L	1	0.05
Total Manganese		0.0581	mg/L	1	0.02

Sample: 209025 - Dup-1

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC23833 Date Analyzed: 9/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB22282 Date Prepared: 9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0812	mg/L	1	0.10	81	70 - 130
4-BFB		0.0751	mg/L	1	0.10	75	70 - 130

Sample: 209025 - Dup-1

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC23885 Date Analyzed: 9/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22333 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		1130	mg/L	100	1

Sample: 209025 - Dup-1

Analysis: PAH Analytical Method: S 8270C QC Batch: QC24038 Date Analyzed: 10/9/02
Analyst: RC Preparation Method: E 3510C Prep Batch: PB22450 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002

Continued ...

... *Continued* Sample: 209025 Analysis: PAH

Param	Flag	Result	Units	Dilution	RDL
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		34.53	mg/L	1	80	43	35 - 114
2-Fluorobiphenyl		32.86	mg/L	1	80	41	43 - 116
Terphenyl-d14		54.26	mg/L	1	80	67	33 - 141

Sample: 209025 - Dup-1

Analysis:	TDS	Analytical Method:	E 160.1	QC Batch:	QC23933	Date Analyzed:	10/3/02
Analyst:	JSW	Preparation Method:	N/A	Prep Batch:	PB22365	Date Prepared:	10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		2625	mg/L	5	10

Sample: 209025 - Dup-1

Analysis:	Total Metals	Analytical Method:	S 6010B	QC Batch:	QC23934	Date Analyzed:	10/3/02
Analyst:	RR	Preparation Method:	S 3010A	Prep Batch:	PB22293	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		<0.100	mg/L	1	0.10
Total Iron		0.355	mg/L	1	0.05
Total Manganese		0.109	mg/L	1	0.02

Sample: 209026 - Rinsate

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC23833	Date Analyzed:	9/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB22282	Date Prepared:	9/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0922	mg/L	1	0.10	92	70 - 130
4-BFB		0.0792	mg/L	1	0.10	79	70 - 130

Sample: 209026 - Rinsate

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC23885 Date Analyzed: 9/30/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22333 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		< 5	mg/L	5	1

Sample: 209026 - Rinsate

Analysis: PAH Analytical Method: S 8270C QC Batch: QC24038 Date Analyzed: 10/9/02
Analyst: RC Preparation Method: E 3510C Prep Batch: PB22450 Date Prepared: 9/30/02

Param	Flag	Result	Units	Dilution	RDL
Naphthalene		<0.0002	mg/L	1	0.0002
Acenaphthylene		<0.0002	mg/L	1	0.0002
Acenaphthene		<0.0002	mg/L	1	0.0002
Fluorene		<0.0002	mg/L	1	0.0002
Phenanthrene		<0.0002	mg/L	1	0.0002
Anthracene		<0.0002	mg/L	1	0.0002
Fluoranthene		<0.0002	mg/L	1	0.0002
Pyrene		<0.0002	mg/L	1	0.0002
Benzo(a)anthracene		<0.0002	mg/L	1	0.0002
Chrysene		<0.0002	mg/L	1	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	1	0.0002
Benzo(a)pyrene		<0.0002	mg/L	1	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	1	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	1	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	1	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		45.62	mg/L	1	80	57	35 - 114
2-Fluorobiphenyl		45.79	mg/L	1	80	57	43 - 116
Terphenyl-d14		46.13	mg/L	1	80	57	33 - 141

Sample: 209026 - Rinsate

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC23933 Date Analyzed: 10/3/02
Analyst: JSW Preparation Method: N/A Prep Batch: PB22365 Date Prepared: 10/1/02

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		25	mg/L	1	10

Sample: 209026 - Rinsate

Analysis:	Total Metals	Analytical Method:	S 6010B	QC Batch:	QC23934	Date Analyzed:	10/3/02
Analyst:	RR	Preparation Method:	S 3010A	Prep Batch:	PB22293	Date Prepared:	9/30/02

Param	Flag	Result	Units	Dilution	RDL
Total Barium		<0.100	mg/L	1	0.10
Total Iron		<0.050	mg/L	1	0.05
Total Manganese		<0.025	mg/L	1	0.02

Quality Control Report
Method Blank

Method Blank

QCBatch: QC23833

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0945	mg/L	1	0.10	94	70 - 130
4-BFB		0.0885	mg/L	1	0.10	88	70 - 130

Method Blank

QCBatch: QC23840

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0981	mg/L	1	0.10	98	70 - 130
4-BFB		0.0739	mg/L	1	0.10	74	70 - 130

Method Blank

QCBatch: QC23860

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Continued ...

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT	[4]	0.0481	mg/L	1	0.10	48	70 - 130
4-BFB	[5]	0.0411	mg/L	1	0.10	41	70 - 130

Method Blank

QCBatch: QC23885

Param	Flag	Results	Units	Reporting Limit
Chloride		<1.0	mg/L	1

Method Blank

QCBatch: QC23933

Param	Flag	Results	Units	Reporting Limit
Total Dissolved Solids		<10	mg/L	10

Method Blank

QCBatch: QC23934

Param	Flag	Results	Units	Reporting Limit
Total Barium		<0.100	mg/L	0.10
Total Iron		<0.050	mg/L	0.05
Total Manganese		<0.025	mg/L	0.02

Method Blank

QCBatch: QC24038

Param	Flag	Results	Units	Reporting Limit
Naphthalene		<0.0002	mg/L	0.0002
Acenaphthylene		<0.0002	mg/L	0.0002
Acenaphthene		<0.0002	mg/L	0.0002
Fluorene		<0.0002	mg/L	0.0002
Phenanthrene		<0.0002	mg/L	0.0002
Anthracene		<0.0002	mg/L	0.0002
Fluoranthene		<0.0002	mg/L	0.0002
Pyrene		<0.0002	mg/L	0.0002
Benzo(a)anthracene		<0.0002	mg/L	0.0002
Chrysene		<0.0002	mg/L	0.0002
Benzo(b)fluoranthene		<0.0002	mg/L	0.0002
Benzo(k)fluoranthene		<0.0002	mg/L	0.0002

Continued ...

[4]Low surrogate recovery due to prep. ICV, CCV show the method to be in control.
[5]Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

... *Continued*

Param	Flag	Results	Units	Reporting Limit
Benzo(a)pyrene		<0.0002	mg/L	0.0002
Indeno(1,2,3-cd)pyrene		<0.0002	mg/L	0.0002
Dibenzo(a,h)anthracene		<0.0002	mg/L	0.0002
Benzo(g,h,i)perylene		<0.0002	mg/L	0.0002

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		66.96	mg/L	1	80	83	35 - 114
2-Fluorobiphenyl		67.1	mg/L	1	80	83	43 - 116
Terphenyl-d14		72.29	mg/L	1	80	90	33 - 141

Quality Control Report
Duplicate Samples

Duplicate

QCBatch: QC23933

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids		826	776	mg/L	1	6	9.7

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC23833

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.0895	0.0967	mg/L	1	0.10	<0.001	90	8	70 - 130	20
Benzene	0.0956	0.0983	mg/L	1	0.10	<0.001	96	3	70 - 130	20
Toluene	0.0954	0.0981	mg/L	1	0.10	<0.001	95	3	70 - 130	20
Ethylbenzene	0.0945	0.0968	mg/L	1	0.10	<0.001	94	2	70 - 130	20
M,P,O-Xylene	0.278	0.285	mg/L	1	0.30	<0.001	93	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.0928	0.0956	mg/L	1	0.10	93	96	70 - 130
4-BFB	0.089	0.0929	mg/L	1	0.10	89	93	70 - 130

Laboratory Control Spikes

QCBatch: QC23840

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.0999	0.0932	mg/L	1	0.10	<0.001	100	7	70 - 130	20
Benzene	0.104	0.0999	mg/L	1	0.10	<0.001	104	4	70 - 130	20
Toluene	0.0978	0.0959	mg/L	1	0.10	<0.001	98	2	70 - 130	20
Ethylbenzene	0.0922	0.0897	mg/L	1	0.10	<0.001	92	3	70 - 130	20
M,P,O-Xylene	0.276	0.270	mg/L	1	0.30	<0.001	92	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.0948	0.0892	mg/L	1	0.10	95	89	70 - 130
4-BFB	0.081	0.0805	mg/L	1	0.10	81	80	70 - 130

Laboratory Control Spikes

QCBatch: QC23860

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.0979	0.0926	mg/L	1	0.10	<0.001	98	6	70 - 130	20
Benzene	0.0983	0.0945	mg/L	1	0.10	<0.001	98	4	70 - 130	20
Toluene	0.0944	0.0931	mg/L	1	0.10	<0.001	94	1	70 - 130	20
Ethylbenzene	0.0913	0.0928	mg/L	1	0.10	<0.001	91	2	70 - 130	20
M,P,O-Xylene	0.265	0.276	mg/L	1	0.30	<0.001	88	4	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.103	0.0992	mg/L	1	0.10	103	99	70 - 130
4-BFB	0.090	0.0908	mg/L	1	0.10	90	91	70 - 130

Laboratory Control Spikes

QCBatch: QC23885

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	11.71	11.71	mg/L	1	12.50	<1.0	93	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC23934

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Barium	1.00	1.01	mg/L	1	1	<0.100	100	0	75 - 125	20
Total Iron	0.500	0.502	mg/L	1	0.50	<0.050	100	0	75 - 125	20
Total Magnesium	83.6	81.6	mg/L	1	100	<0.5	83	2	75 - 125	20
Total Manganese	0.251	0.252	mg/L	1	0.25	<0.025	100	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC24038

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Naphthalene	65.18	71.51	mg/L	1	80	<0.0002	81	9	16 - 96	20
Acenaphthylene	73.11	79.35	mg/L	1	80	<0.0002	91	8	20 - 110	20
Acenaphthene	70.47	76.54	mg/L	1	80	<0.0002	88	8	18 - 108	20
Fluorene	68.76	75.8	mg/L	1	80	<0.0002	85	9	22 - 102	20
Phenanthrene	73.98	81.11	mg/L	1	80	<0.0002	92	9	25 - 103	20
Anthracene	72.33	78.14	mg/L	1	80	<0.0002	90	7	22 - 110	20
Fluoranthene	82.02	89.53	mg/L	1	80	<0.0002	102	8	21 - 110	20
Pyrene	74.85	81.97	mg/L	1	80	<0.0002	93	9	22 - 100	20
Benzo(a)anthracene	73.33	81.15	mg/L	1	80	<0.0002	91	10	30 - 99	20
Chrysene	54.61	60.46	mg/L	1	80	<0.0002	68	10	27 - 108	20
Benzo(b)fluoranthene	71.66	79.36	mg/L	1	80	<0.0002	89	10	19 - 102	20
Benzo(k)fluoranthene	73.37	78.75	mg/L	1	80	<0.0002	91	7	35 - 103	20
Benzo(a)pyrene	71.76	79.26	mg/L	1	80	<0.0002	89	9	24 - 105	20
Indeno(1,2,3-cd)pyrene	72.81	85.47	mg/L	1	80	<0.0002	91	15	22 - 108	20
Dibenzo(a,h)anthracene	53.31	61.3	mg/L	1	80	<0.0002	66	13	23 - 77	20
Benzo(g,h,i)perylene	77.82	91.84	mg/L	1	80	<0.0002	97	16	19 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
Nitrobenzene-d5	73.29	77.61	mg/L	1	80	91	97	35 - 114
2-Fluorobiphenyl	71.87	78.31	mg/L	1	80	89	97	43 - 116
Terphenyl-d14	76.00	83.23	mg/L	1	80	95	104	33 - 141

Quality Control Report
Matrix Spikes and Duplicate Spikes

Matrix Spikes

QCBatch: QC23885

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	8980	9010	mg/L	1	6250	3220	92	0	48 - 127	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC23934

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Barium	1.20	1.21	mg/L	1	1		92	1	75 - 125	20
Total Barium	1.20	1.21	mg/L	1	1	0.271	92	1	75 - 125	20
Total Iron	0.720	0.763	mg/L	1	0.50		92	8	75 - 125	20

Continued ...

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Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Iron	0.720	0.763	mg/L	1	0.50	0.255	92	8	75 - 125	20
Total Manganese	0.370	0.374	mg/L	1	0.25		91	1	75 - 125	20
Total Manganese	0.370	0.374	mg/L	1	0.25	0.141	91	1	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Quality Control Report
Continuing Calibration Verification Standards

CCV (1) QCBatch: QC23833

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.098	98	85 - 115	9/27/02
Benzene		mg/L	0.10	0.0997	100	85 - 115	9/27/02
Toluene		mg/L	0.10	0.0987	99	85 - 115	9/27/02
Ethylbenzene		mg/L	0.10	0.0978	98	85 - 115	9/27/02
M,P,O-Xylene		mg/L	0.30	0.286	95	85 - 115	9/27/02

CCV (2) QCBatch: QC23833

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.098	98	85 - 115	9/27/02
Benzene		mg/L	0.10	0.1	100	85 - 115	9/27/02
Toluene		mg/L	0.10	0.0992	99	85 - 115	9/27/02
Ethylbenzene		mg/L	0.10	0.1	100	85 - 115	9/27/02
M,P,O-Xylene		mg/L	0.30	0.292	97	85 - 115	9/27/02

ICV (1) QCBatch: QC23833

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0979	98	85 - 115	9/27/02
Benzene		mg/L	0.10	0.0983	98	85 - 115	9/27/02
Toluene		mg/L	0.10	0.0975	98	85 - 115	9/27/02
Ethylbenzene		mg/L	0.10	0.0977	98	85 - 115	9/27/02
M,P,O-Xylene		mg/L	0.30	0.288	96	85 - 115	9/27/02

CCV (1) QCBatch: QC23840

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0894	89	85 - 115	9/27/02
Benzene		mg/L	0.10	0.0918	92	85 - 115	9/27/02
Toluene		mg/L	0.10	0.0903	90	85 - 115	9/27/02
Ethylbenzene		mg/L	0.10	0.089	89	85 - 115	9/27/02
M,P,O-Xylene		mg/L	0.30	0.272	91	85 - 115	9/27/02

CCV (2) QCBatch: QC23840

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0947	94	85 - 115	9/27/02
Benzene		mg/L	0.10	0.0971	97	85 - 115	9/27/02
Toluene		mg/L	0.10	0.0941	94	85 - 115	9/27/02
Ethylbenzene		mg/L	0.10	0.0915	91	85 - 115	9/27/02
M,P,O-Xylene		mg/L	0.30	0.279	93	85 - 115	9/27/02

ICV (1) QCBatch: QC23840

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.095	95	85 - 115	9/27/02
Benzene		mg/L	0.10	0.0963	96	85 - 115	9/27/02
Toluene		mg/L	0.10	0.0938	94	85 - 115	9/27/02
Ethylbenzene		mg/L	0.10	0.0919	92	85 - 115	9/27/02
M,P,O-Xylene		mg/L	0.30	0.280	93	85 - 115	9/27/02

CCV (1) QCBatch: QC23860

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.093	93	85 - 115	9/30/02
Benzene		mg/L	0.10	0.0936	94	85 - 115	9/30/02
Toluene		mg/L	0.10	0.0911	91	85 - 115	9/30/02
Ethylbenzene		mg/L	0.10	0.0909	91	85 - 115	9/30/02
M,P,O-Xylene		mg/L	0.30	0.271	90	85 - 115	9/30/02

CCV (2) QCBatch: QC23860

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0908	90	85 - 115	9/30/02
Benzene		mg/L	0.10	0.0894	89	85 - 115	9/30/02
Toluene		mg/L	0.10	0.0886	88	85 - 115	9/30/02
Ethylbenzene		mg/L	0.10	0.0884	88	85 - 115	9/30/02
M,P,O-Xylene		mg/L	0.30	0.265	88	85 - 115	9/30/02

ICV (1) QCBatch: QC23860

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0866	87	85 - 115	9/30/02
Benzene		mg/L	0.10	0.0854	85	85 - 115	9/30/02
Toluene		mg/L	0.10	0.0853	85	85 - 115	9/30/02
Ethylbenzene		mg/L	0.10	0.0867	87	85 - 115	9/30/02
M,P,O-Xylene		mg/L	0.30	0.263	88	85 - 115	9/30/02

CCV (1) QCBatch: QC23885

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.68	93	90 - 110	9/30/02

ICV (1) QCBatch: QC23885

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.64	93	90 - 110	9/30/02

CCV (1) QCBatch: QC23933

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	997	99	90 - 110	10/3/02

ICV (1) QCBatch: QC23933

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	989	98	90 - 110	10/3/02

CCV (1) QCBatch: QC23934

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Barium		mg/L	2	1.86	93	90 - 110	10/3/02
Total Iron		mg/L	1	0.930	93	90 - 110	10/3/02
Total Magnesium		mg/L	25	23.7	94	90 - 110	10/3/02
Total Manganese		mg/L	0.50	0.473	95	90 - 110	10/3/02

ICV (1) QCBatch: QC23934

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Barium		mg/L	2	1.88	94	90 - 110	10/3/02
Total Iron		mg/L	1	0.930	93	90 - 110	10/3/02
Total Magnesium		mg/L	25	26.5	106	90 - 110	10/3/02
Total Manganese		mg/L	0.50	0.470	94	90 - 110	10/3/02

CCV (1) QCBatch: QC24038

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60	59.05	98	80 - 120	10/9/02
Acenaphthylene		mg/L	60	59.4	99	80 - 120	10/9/02
Acenaphthene		mg/L	60	60.4	100	80 - 120	10/9/02
Fluorene		mg/L	60	57.91	96	80 - 120	10/9/02
Phenanthrene		mg/L	60	59.8	99	80 - 120	10/9/02
Anthracene		mg/L	60	59.17	98	80 - 120	10/9/02
Fluoranthene		mg/L	60	55.51	92	80 - 120	10/9/02
Pyrene		mg/L	60	57.39	95	80 - 120	10/9/02
Benzo(a)anthracene		mg/L	60	59.72	99	80 - 120	10/9/02
Chrysene		mg/L	60	61.69	102	80 - 120	10/9/02
Benzo(b)fluoranthene		mg/L	60	60.6	101	80 - 120	10/9/02
Benzo(k)fluoranthene		mg/L	60	57.18	95	80 - 120	10/9/02
Benzo(a)pyrene		mg/L	60	63.59	105	80 - 120	10/9/02
Indeno(1,2,3-cd)pyrene		mg/L	60	58.75	97	80 - 120	10/9/02
Dibenzo(a,h)anthracene		mg/L	60	56.9	94	80 - 120	10/9/02
Benzo(g,h,i)perylene		mg/L	60	63.42	105	80 - 120	10/9/02
Nitrobenzene-d5		mg/L	60	62.27	103	80 - 120	10/9/02
2-Fluorobiphenyl		mg/L	60	61.22	102	80 - 120	10/9/02
Terphenyl-d14		mg/L	60	58.77	97	80 - 120	10/9/02

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # AO2092719

Company Name: Marathon Oil Company
Phone #:
Address: (Street, City, Zip) 125 W. Missouri St Midland TX 797-0552
Fax #:
Contact Person: Arron Wilson 915-687-8305
Invoice to: (If different from above) N/C
Project #: Bertha Barber
Project Name: Bertha Barber
Project Location: Monument
Sampler Signature:

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME
209018	M.W.#11	1	1 liter	✓								✓		9-25-02	11:15
	M.W#11	2	VOA	✓				✓						9-25-02	11:17
	MW#11	1	250mL	✓					✓					9-25-02	11:13
	MW#11	1	250mL	✓								✓		9-25-02	11:13
209019	M.W.#8	1	1 liter	✓								✓		9-25-02	12:15
	M.W#8	2	VOA	✓				✓						9-25-02	12:20
	MW#8	1	250mL	✓					✓					9-25-02	12:16
	M.W#8	1	250mL	✓								✓		9-25-02	12:21
209020	MW#13	1	liter	✓								✓		9-25-02	12:45
	M.W#13	2	VOA	✓				✓						9-25-02	12:53
	MW#13	1	250mL	✓					✓					9-25-02	12:59

ANALYSIS REQUEST	Turn Around Time if different from standard	Hold
MTBE 8021B/602		
BTEX 8021B/602		
TPH 418.1/TX1005		
PAH 8270C		
Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7		
TCLP Metals Ag As Ba Cd Cr Pb Se Hg		
TCLP Volatiles		
TCLP Semi Volatiles		
TCLP Pesticides		
RCI		
GC/MS Vol. 8260B/624		
GC/MS Semi. Vol. 8270C/625		
PCB's 8082/608		
Pesticides 8081A/608		
BOD, TSS, pH		
Metals Fe, Mg, Ba, Mn per Bard 11/88		
Cl, TDS		

Relinquished by: Date: 9-25-02 Time: 1:00
Received by: Date: Time:

Relinquished by: Date: Time:
Received by: Date: Time:

Relinquished by: Date: Time:
Received at Laboratory by: Date: 9.27.02 Time: 11:00AM

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp -1 °
Log-In Review MA

REMARKS:
PAF 10/15/02

☐ Check If Special Reporting Limits Are Needed

Carrier # Fed Ex 7900 8372 2932

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155 McCutcheon, Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # A0209279

Company Name: Marathon Oil Company, 125 W Missouri St Midland TX 797-0552
Phone #:
Address: (Street, City, Zip)
Fax #:
Contact Person: SAME
Invoice to: (If different from above)
Project #:
Project Name:
Project Location:
Sampler Signature:

ANALYSIS REQUEST (Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Metals Fe, ~~Ag~~, Ba	Cl, TDS Mn diss 11/05/02			Turn Around Time if different from standard	Hold
209020	M.W.#13	1	250ml	✓								✓		9-25-02	1:00																	✓				
21	LSWW	1	liter	✓								✓			1:22				✓																	
	LSWW	2	VOA	✓				✓							1:22		✓																			
	LSWW	1	250ml	✓					✓						1:24																✓					
	LSWW	1	250ml	✓								✓			1:20																	✓				
22	M.W#12	1	liter	✓								✓			1:51				✓																	
	MW#12	2	VOA	✓				✓							1:52		✓																			
	M.W.#12	1	250ml	✓					✓						1:53																✓					
	M.W#12	1	250ml	✓								✓			1:50																	✓				
23	M.W#3	1	liter	✓								✓			2:30				✓																	
	M.W#3	2	VOA	✓				✓							2:33		✓																			

Relinquished by: [signature] Date: 9-26-02 Time: 1:00
Received by: Date: Time:

Relinquished by: Date: Time:
Received by: Date: Time:

Relinquished by: Date: Time:
Received at Laboratory by: [signature] Date: 9-04-02 Time: 11:09AM

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp -1 °
Log-in Review NA

REMARKS:

☐ Check If Special Reporting Limits Are Needed

Carrier # Fed Ex 7900 8372 1832

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Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # AD209279

Company Name: SAME
Phone #:
Address: (Street, City, Zip)
Fax #:
Contact Person:
Invoice to: (If different from above)
Project #:
Project Name:
Project Location:
Sampler Signature:

ANALYSIS REQUEST (Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Metals Fe, Mg, Ba, Mn	Cl, TDS	Turn Around Time if different from standard	Hold
209023	M.W#3	1	250ml	✓					✓					9-25-02	2:36																✓			
	M.W#3	1	250ml	✓								✓		9-25-02	3:00																	✓		
24	M.W.#6	1	liter	✓								✓			3:40				✓															
	M.W.#6	2	VOA	✓				✓							3:41		✓																	
	M.W.#6	1	250ml	✓					✓						3:43																✓			
	M.W.#6	1	250ml	✓								✓			3:43																	✓		
25	Dup1	1	liter																✓															
	Dup1	2	VOA														✓																	
	Dup1	1	250ml																												✓			
	Dup1	1	250ml																													✓		
26	Rinsate	1	liter																✓															

Relinquished by: [signature] Date: 9-26-02 Time: 1:00
Received by: Date: Time:

Relinquished by: Date: Time:
Received by: Date: Time:

Relinquished by: Date: Time:
Received at Laboratory by: [signature] Date: 9-27-02 Time: 11:00 AM

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp -1 °
Log-in Review [initials]

REMARKS:

☐ Check If Special Reporting Limits Are Needed

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1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID #: A0209271 9

Company Name: SAIC Phone #:

Address: (Street, City, Zip) Fax #:

Contact Person:

Invoice to:
(If different from above)

Project #: Project Name:

Project Location: Sampler Signature:

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7 Cl, TDS	Turn Around Time if different from standard	Hold
209026	Rinsate	2	40ml	✓				✓						9-25-02	350		✓		✓															
	Rinsate	1	250ml	✓					✓						3:52															✓				
	Rinsate	1	250ml	✓								✓			355																✓			

Relinquished by: Date: Time:
9-26-02 1:00

Received by: Date: Time:

Relinquished by: Date: Time:

Received by: Date: Time:

Relinquished by: Date: Time:

Received at Laboratory by: Date: Time:
9.27.02 11:00am

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LAB USE ONLY

Intact Y / N

Headspace Y / N

Temp -1 °

Log-in Review

REMARKS:

☐ Check If Special Reporting Limits Are Needed

Carrier # Fed Ex 7900 8372 2832

Summary Report

Aaron Wilson
Marathon Oil Co.
P. O. Box 552
Midland, TX 79702

Report Date: January 2, 2003

Order ID Number: A02122314

Project Number: Bertha Barber
Project Name: N/A
Project Location: Monument

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
217160	LSW	Water	12/18/02	8:45	12/21/02
217161	MW-3	Water	12/18/02	9:00	12/21/02
217162	MW-6	Water	12/18/02	9:45	12/21/02
217163	Rinsate	Water	12/18/02	9:45	12/21/02
217164	MW-8	Water	12/18/02	10:10	12/21/02
217165	MW-11	Water	12/18/02	10:30	12/21/02
217166	MW-12	Water	12/18/02	12:00	12/21/02
217167	MW-13	Water	12/18/02	12:30	12/21/02
217168	MW-14	Water	12/18/02	13:30	12/21/02
217169	MW-15	Water	12/18/02	13:50	12/21/02
217170	MW-16	Water	12/18/02	14:30	12/21/02
217171	MW-7	Water	12/18/02	15:20	12/21/02
217172	MW-9	Water	12/18/02	15:35	12/21/02
217173	Dup	Water	12/18/02	:	12/21/02

0 This report consists of a total of 1 page(s) and is intended only as a summary of results for the sample(s) listed above.

	BTEX				
Sample - Field Code	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)
217160 - LSW	<0.005	<0.005	<0.005	<0.005	<0.005
217161 - MW-3	<0.001	<0.001	<0.001	<0.001	<0.001
217162 - MW-6	<0.001	<0.001	<0.001	<0.001	<0.001
217163 - Rinsate	<0.001	<0.001	<0.001	<0.001	<0.001
217164 - MW-8	<0.001	<0.001	<0.001	<0.001	<0.001
217165 - MW-11	<0.001	<0.001	<0.001	<0.001	<0.001
217166 - MW-12	<0.001	<0.001	<0.001	<0.001	<0.001
217167 - MW-13	<0.001	<0.001	<0.001	<0.001	<0.001
217168 - MW-14	<0.001	<0.001	<0.001	<0.001	<0.001
217169 - MW-15	<0.001	<0.001	<0.001	<0.001	<0.001
217170 - MW-16	<0.001	<0.001	<0.001	<0.001	<0.001
217171 - MW-7	<0.001	<0.001	<0.001	<0.001	<0.001
217172 - MW-9	<0.005	<0.005	<0.005	<0.005	<0.005
217173 - Dup	<0.001	<0.001	<0.001	<0.001	<0.001

This is only a summary. Please, refer to the complete report package for quality control data.

TRACEANALYSIS, INC.

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155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Aaron Wilson
Marathon Oil Co.
P. O. Box 552
Midland, TX 79702

Report Date: January 2, 2003

Order ID Number: A02122314

Project Number: Bertha Barber
Project Name: N/A
Project Location: Monument

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
217160	LSW	Water	12/18/02	8:45	12/21/02
217161	MW-3	Water	12/18/02	9:00	12/21/02
217162	MW-6	Water	12/18/02	9:45	12/21/02
217163	Rinsate	Water	12/18/02	9:45	12/21/02
217164	MW-8	Water	12/18/02	10:10	12/21/02
217165	MW-11	Water	12/18/02	10:30	12/21/02
217166	MW-12	Water	12/18/02	12:00	12/21/02
217167	MW-13	Water	12/18/02	12:30	12/21/02
217168	MW-14	Water	12/18/02	13:30	12/21/02
217169	MW-15	Water	12/18/02	13:50	12/21/02
217170	MW-16	Water	12/18/02	14:30	12/21/02
217171	MW-7	Water	12/18/02	15:20	12/21/02
217172	MW-9	Water	12/18/02	15:35	12/21/02
217173	Dup	Water	12/18/02	:	12/21/02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

Note: Samples will be disposed of 30 days from the report date unless the lab is contacted before the 30 days has past.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 217160 - LSW

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25905	Date Analyzed:	12/30/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23988	Date Prepared:	12/30/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.092	mg/L	5	0.10	92	70 - 130
4-BFB		0.082	mg/L	5	0.10	82	70 - 130

Sample: 217161 - MW-3

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25866	Date Analyzed:	12/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23963	Date Prepared:	12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0937	mg/L	1	0.10	94	70 - 130
4-BFB		0.0862	mg/L	1	0.10	86	70 - 130

Sample: 217162 - MW-6

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25866	Date Analyzed:	12/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23963	Date Prepared:	12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0894	mg/L	1	0.10	89	70 - 130
4-BFB		0.0831	mg/L	1	0.10	83	70 - 130

Sample: 217163 - Rinsate

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25866	Date Analyzed:	12/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23963	Date Prepared:	12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0944	mg/L	1	0.10	94	70 - 130
4-BFB		0.0806	mg/L	1	0.10	81	70 - 130

Sample: 217164 - MW-8

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25866	Date Analyzed:	12/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23963	Date Prepared:	12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0908	mg/L	1	0.10	91	70 - 130
4-BFB		0.0823	mg/L	1	0.10	82	70 - 130

Sample: 217165 - MW-11

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25866	Date Analyzed:	12/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23963	Date Prepared:	12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0867	mg/L	1	0.10	87	70 - 130
4-BFB		0.0782	mg/L	1	0.10	78	70 - 130

Sample: 217166 - MW-12

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25866 Date Analyzed: 12/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23963 Date Prepared: 12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0874	mg/L	1	0.10	87	70 - 130
4-BFB		0.0779	mg/L	1	0.10	78	70 - 130

Sample: 217167 - MW-13

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25866 Date Analyzed: 12/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23963 Date Prepared: 12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0922	mg/L	1	0.10	92	70 - 130
4-BFB		0.0822	mg/L	1	0.10	82	70 - 130

Sample: 217168 - MW-14

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25866 Date Analyzed: 12/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23963 Date Prepared: 12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0919	mg/L	1	0.10	92	70 - 130
4-BFB		0.0832	mg/L	1	0.10	83	70 - 130

Sample: 217169 - MW-15

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25866 Date Analyzed: 12/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23963 Date Prepared: 12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0852	mg/L	1	0.10	85	70 - 130
4-BFB		0.0863	mg/L	1	0.10	86	70 - 130

Sample: 217170 - MW-16

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25866 Date Analyzed: 12/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23963 Date Prepared: 12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0887	mg/L	1	0.10	89	70 - 130
4-BFB		0.0817	mg/L	1	0.10	82	70 - 130

Sample: 217171 - MW-7

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25866 Date Analyzed: 12/27/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23963 Date Prepared: 12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.090	mg/L	1	0.10	90	70 - 130
4-BFB		0.0823	mg/L	1	0.10	82	70 - 130

Sample: 217172 - MW-9

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25905	Date Analyzed:	12/30/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23988	Date Prepared:	12/30/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.093	mg/L	5	0.10	93	70 - 130
4-BFB		0.084	mg/L	5	0.10	84	70 - 130

which well Duped

Sample: 217173 - Dup

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25866	Date Analyzed:	12/27/02
Analyst:	CG	Preparation Method:	S 5030B	Prep Batch:	PB23963	Date Prepared:	12/27/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0906	mg/L	1	0.10	91	70 - 130
4-BFB		0.0921	mg/L	1	0.10	92	70 - 130

Quality Control Report
Method Blank

Method Blank

QCBatch: QC25866

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.000	mg/L	1	0.10	97	70 - 130
4-BFB		0.0003	mg/L	1	0.10	89	70 - 130

Method Blank

QCBatch: QC25905

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.101	mg/L	1	0.10	101	70 - 130
4-BFB		0.0919	mg/L	1	0.10	92	70 - 130

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC25866

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.0959	0.0913	mg/L	1	0.10	<0.001	96	5	70 - 130	20
Benzene	0.0929	0.092	mg/L	1	0.10	<0.001	93	1	70 - 130	20
Toluene	0.0928	0.0925	mg/L	1	0.10	<0.001	93	0	70 - 130	20
Ethylbenzene	0.0941	0.0935	mg/L	1	0.10	<0.001	94	1	70 - 130	20
M,P,O-Xylene	0.285	0.284	mg/L	1	0.30	<0.001	94	0	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.0955	0.0945	mg/L	1	0.10	96	94	70 - 130
4-BFB	0.0954	0.0937	mg/L	1	0.10	95	94	70 - 130

Laboratory Control Spikes

QCBatch: QC25905

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.0992	0.103	mg/L	1	0.10	<0.001	99	4	70 - 130	20
Benzene	0.104	0.104	mg/L	1	0.10	<0.001	104	0	70 - 130	20
Toluene	0.104	0.103	mg/L	1	0.10	<0.001	104	1	70 - 130	20
Ethylbenzene	0.103	0.103	mg/L	1	0.10	<0.001	103	0	70 - 130	20
M,P,O-Xylene	0.308	0.310	mg/L	1	0.30	<0.001	103	1	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.104	0.104	mg/L	1	0.10	104	104	70 - 130
4-BFB	0.100	0.103	mg/L	1	0.10	100	103	70 - 130

Quality Control Report
Continuing Calibration Verification Standards

CCV (1)

QCBatch: QC25866

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.085	85	85 - 115	12/27/02
Benzene		mg/L	0.10	0.0886	89	85 - 115	12/27/02
Toluene		mg/L	0.10	0.090	90	85 - 115	12/27/02
Ethylbenzene		mg/L	0.10	0.0918	92	85 - 115	12/27/02
M,P,O-Xylene		mg/L	0.30	0.278	92	85 - 115	12/27/02

CCV (2)

QCBatch: QC25866

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.086	86	85 - 115	12/27/02
Benzene		mg/L	0.10	0.089	89	85 - 115	12/27/02
Toluene		mg/L	0.10	0.090	90	85 - 115	12/27/02
Ethylbenzene		mg/L	0.10	0.092	92	85 - 115	12/27/02
M,P,O-Xylene		mg/L	0.30	0.278	92	85 - 115	12/27/02

ICV (1) QCBatch: QC25866

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0948	95	85 - 115	12/27/02
Benzene		mg/L	0.10	0.0928	93	85 - 115	12/27/02
Toluene		mg/L	0.10	0.0955	96	85 - 115	12/27/02
Ethylbenzene		mg/L	0.10	0.0958	96	85 - 115	12/27/02
M,P,O-Xylene		mg/L	0.30	0.290	96	85 - 115	12/27/02

CCV (1) QCBatch: QC25905

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.101	101	85 - 115	12/30/02
Benzene		mg/L	0.10	0.104	104	85 - 115	12/30/02
Toluene		mg/L	0.10	0.104	104	85 - 115	12/30/02
Ethylbenzene		mg/L	0.10	0.104	104	85 - 115	12/30/02
M,P,O-Xylene		mg/L	0.30	0.312	104	85 - 115	12/30/02

CCV (2) QCBatch: QC25905

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.096	96	85 - 115	12/30/02
Benzene		mg/L	0.10	0.1	100	85 - 115	12/30/02
Toluene		mg/L	0.10	0.099	99	85 - 115	12/30/02
Ethylbenzene		mg/L	0.10	0.099	99	85 - 115	12/30/02
M,P,O-Xylene		mg/L	0.30	0.297	99	85 - 115	12/30/02

ICV (1) QCBatch: QC25905

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.0983	98	85 - 115	12/30/02
Benzene		mg/L	0.10	0.108	108	85 - 115	12/30/02
Toluene		mg/L	0.10	0.106	106	85 - 115	12/30/02
Ethylbenzene		mg/L	0.10	0.106	106	85 - 115	12/30/02
M,P,O-Xylene		mg/L	0.30	0.320	107	85 - 115	12/30/02

6701 Aberdeen Avenue, Ste. 9
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1 (800) 378-1296

TraceAnalysis, Inc.

155 McCutcheon,Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # A021223-14

Company Name: Marathon Oil Company
Phone #:
Address: (Street, City, Zip) 125 W. Missouri St. Midland Tx
Fax #: 397-0552
Contact Person: Aaron Wilson
Invoice to: (If different from above) NO
Project #: Bertha Barber
Project Name: Bertha Barber
Project Location: Monument
Sampler Signature:

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Turn Around Time if different from standard	Hold
217160	LSW	2	VOA	✓				✓						12-18-02	9:45		✓															
61	MW #3	2	VOA	✓				✓						12-18-02	9:00		"															
62	MW #6	2	VOA	✓				✓						12-18-02	9:45		"															
63	Rinsate	2	VOA	✓				✓						12-18-02	9:45		"															
64	MW #8	2	VOA	✓				✓						12-18-02	10:10		"															
65	MW #11	2	VOA	✓				✓						12-18-02	10:30		"															
66	MW #12	2	VOA	✓				✓						12-18-02	12:00		"															
67	MW #13	2	VOA	✓				✓						12-18-02	1:30		"															
68	MW #14	2	VOA	✓				✓						12-18-02	1:30		"															
69	MW #15	2	VOA	✓				✓						12-18-02	1:50		"															
70	MW #16	2	VO	✓				✓						12-18-02	2:30		"															

Relinquished by:	Date: ~~12-20~~ 12-20-02	Time: 8:00	Received by:
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received at Laboratory by: Date: 12/20/02 Time: 9:00

LAB USE ONLY
Intact: Y / N
Headspace: Y / N
Temp: 4 °
Log-In Review:

REMARKS:
1/2F

☐ Check If Special Reporting Limits Are Needed

Carrier # FedEx 902928 5287

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

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6701 Aberdeen Avenue, Ste. 9
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TraceAnalysis, Inc.

4725 Ripley Dr., Ste A
El Paso, Texas 79922-1028
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # AD2122314

Company Name: Marthon Oil Company
Phone #:
Address: (Street, City, Zip) 125 W Missouri St Midland TX
Fax #: 797-0552
Contact Person: Aaron Wilson
Invoice to: (If different from above) NO
Project #: Bertha Barber
Project Name: Bertha Barber
Project Location: Monument
Sampler Signature:

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	SAMPLING: DATE	TIME	MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC-MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Turn Around Time if different from standard	Hold
21771	M.W#7	2	VOA	✓				✓				12/8/02	3:20		✓															
72	M.W#9	2	VOA	✓				✓				12-8-02	3:35		✓															
73	Dup	2	VOA	✓				✓							✓															

Relinquished by: Date: 12-20-02 Time: 8:00
Received by: Date: Time:
Relinquished by: Date: Time:
Received by: Date: Time:
Relinquished by: Date: Time:
Received at Laboratory by: Date: 12/20/02 Time: 1100

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp 4 °
Log-in Review

REMARKS:

Carrier # UPS 902978 5287

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

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ARCADIS

Appendix B

Monitor Well Logs and Soil Boring Logs

WELL LOG

WELL NO. MW-14

ARCADIS 1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915/687-5400 Fax: 915/687-5401

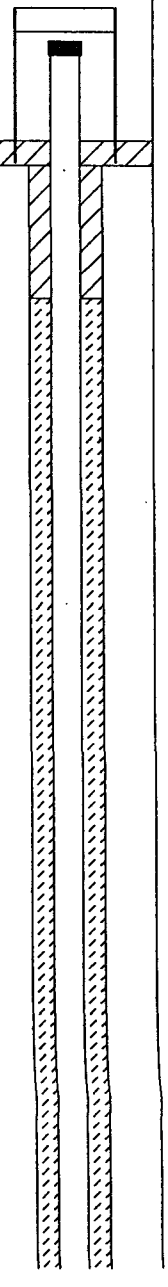
PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
—
DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
SAMPLING METHOD: Core Barrel/Cuttings
DATE BEGUN: 12/12/02 DATE COMPLETED: 12/12/02
DRILLER: Raymond Straub ELEVATION (SURF.): —
LOGGER: B. Kolb ELEVATION (T.O.C.): —
FILE NAME: MW-14.dat UNIQUE NUMBER: 31-014-00432

STATIC WATER LEVEL: — MEAS. PT.: — DATE: —
HOLE SIZE(S): 8" TOTAL DEPTH: -50.0'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	Cement	-3.0' to Surface
SEAL TYPE:	Bentonite	-27.0' to -3.0'
SCREEN PACK:	12/20 Brady Sand	-50.0' to -27.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-30.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" Slots	-50.0' to -30.0'
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0									SAND: 2.5 YR 7/3 pale red, medium-grained to very fine-grained, 20% SILT, poorly sorted, loose.
		Cuttings				2.1			
5									CALICHE: 5 YR 8/1 white, 20-25% fine-grained to very fine-grained, subrounded SAND.
		Cuttings				2.9			SAND: 2.5 YR 6/3 weak red, fine-grained to very fine-grained, well rounded, loose.
									CALICHE: 5 YR 8/1 white, 40% fine-grained, SAND.
10									SAND: 2.5 YR 6/3 weak red, fine-grained to very fine-grained, well rounded, loose.
		Cuttings				3.5			
									CALICHE: 7.5 YR 8/1 white, 30% SAND, very fine-grained SAND interbeds.
15									SAND: 2.5 YR 6/6 red, 70% fine-grained to very fine-grained, 20% SILT, 10% CLAY, loose.
		Cuttings				2.7			
									SILTY SAND: SILTY CLAYEY SAND, damp, 2.5 YR 6/6 red, 70% fine-grained to very fine-grained, 20% SILT, 10% CLAY, loose.
20									
		Cuttings				5.2			

WELL INSTALLATION



WELL LOG

WELL NO.
MW-14
Page 2 of 2

ARCADIS
1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915/687-5400 Fax: 915/687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
—
DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
SAMPLING METHOD: Core Barrel/Cuttings
DATE BEGUN: 12/12/02 DATE COMPLETED: 12/12/02
DRILLER: Raymond Straub ELEVATION (SURF.): —
LOGGER: B. Kolb ELEVATION (T.O.C.): —
FILE NAME: MW-14.dat UNIQUE NUMBER: 31-014-00432

STATIC WATER LEVEL: — MEAS. PT.: — DATE: —
HOLE SIZE(S): 8" TOTAL DEPTH: -50.0'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	Cement	-3.0' to Surface
SEAL TYPE:	Bentonite	-27.0' to -3.0'
SCREEN PACK:	12/20 Brady Sand	-50.0' to -27.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-30.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" Slots	-50.0' to -30.0'
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
25		Cuttings				5.5				
		Core Barrel				5.4				
30		Core Barrel				6.7				
		Core Barrel				7.0				
		Core Barrel				7.4				
		Core Barrel				6.8			CALICHE: very SANDY, moist 2.5 Y 8/1 white, 40% fine-grained, well rounded SAND, 10% CLAY.	
		Core Barrel				7.6				
35		Core Barrel				5.5				
		Core Barrel				6.5				
		Core Barrel		⊠		9.9				
		Core Barrel				6.7				
		Core Barrel				7.3				
40		Core Barrel				5.4			SAND: 7.5 YR 8/3 pink, 50% fine-grained to very fine-grained SAND, well rounded, 50% SILT/CLAY, loose, making water @ 49.0', cavity 49.0' to 49.7'.	
		Core Barrel				6.8				
		Core Barrel				7.0				
45										
50										

WELL LOG

WELL NO. MW-15

ARCADIS 1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915/687-5400 Fax: 915/687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
—
DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
SAMPLING METHOD: Core Barrel/Cuttings
DATE BEGUN: 12/11/02 DATE COMPLETED: 12/11/02
DRILLER: Raymond Straub ELEVATION (SURF.): —
LOGGER: B. Kolb ELEVATION (T.O.C.): —
FILE NAME: MW-15.dat UNIQUE NUMBER: 31-014-00433

STATIC WATER LEVEL: — MEAS. PT.: — DATE: —
HOLE SIZE(S): 8" TOTAL DEPTH: -45.0'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	Cement	-3.0' to Surface
SEAL TYPE:	Bentonite	-21.0' to -3.0'
SCREEN PACK:	12/20 Brady Sand	-45.0' to -21.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-25.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" Slots	-45.0' to -25.0'
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SAND: 2.5 YR 7/3 pale red, medium-grained to very fine-grained, 20% SILT, poorly sorted, loose, dry.	
		Cuttings				1.4			CALICHE: 5 YR 8/1 white, 20% very fine-grained SAND.	
5									SAND: 2.5 YR 6/3 weak red, fine-grained to very fine-grained, well rounded, loose.	
		Cuttings				2.9			SAND: 2.5 YR 6/3 weak red, 80% fine-grained to very fine-grained, 20% SILT, well rounded, moderately sorted.	
10									CALICHE: 5 YR 8/1 white, 40% fine-grained SAND, friable.	
		Cuttings				3.5			CALICHE: 7.5 YR 8/1 white, 30% SAND, very fine-grained SAND well rounded.	
15									CALICHE: 5 YR 8/1, 10% SAND, very hard @ 18.0' to 19.0'.	
		Cuttings				3.6			CALICHE: 2.5 Y 8/1 white, 40% fine-grained, well rounded SAND.	
20										

WELL LOG

WELL NO.
MW-15
Page 2 of 2

ARCADIS
1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915/687-5400 Fax: 915/687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
—
DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
SAMPLING METHOD: Core Barrel/Cuttings
DATE BEGUN: 12/11/02 DATE COMPLETED: 12/11/02
DRILLER: Raymond Straub ELEVATION (SURF.): —
LOGGER: B. Kolb ELEVATION (T.O.C.): —
FILE NAME: MW-15.dat UNIQUE NUMBER: 31-014-00433

STATIC WATER LEVEL: — MEAS. PT.: — DATE: —
HOLE SIZE(S): 8" TOTAL DEPTH: -45.0'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	Cement	-3.0' to Surface
SEAL TYPE:	Bentonite	-21.0' to -3.0'
SCREEN PACK:	12/20 Brady Sand	-45.0' to -21.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-25.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" Slots	-45.0' to -25.0'
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
25		Cuttings				3.2				
		Cuttings				2.7				
30		Core Barrel				3.0			CALICHE: 5 YR 8/1 white.	
		Core Barrel				2.6				
		Core Barrel				3.0				
35		Core Barrel		▽		2.7				
		Core Barrel				2.4				
		Core Barrel				1.8				
		Core Barrel				1.7				
		Core Barrel				1.6			SAND: 7.5 YR 8/3 pink, 70% fine-grained to very fine-grained SAND, well rounded, poorly sorted, 30% CLAY, sticky.	
40		Core Barrel				1.3				
		Cuttings								
45										

WELL LOG

WELL NO.
MW-16
Page 1 of 2

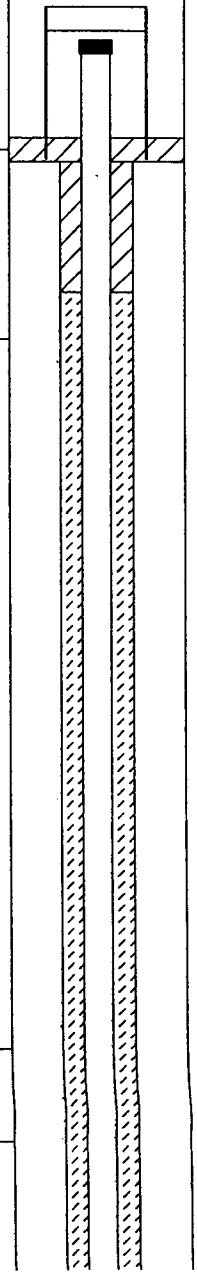
ARCADIS
1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915/687-5400 Fax: 915/687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
—
DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
SAMPLING METHOD: Core Barrel/Cuttings
DATE BEGUN: 12/11/02 DATE COMPLETED: 12/11/02
DRILLER: Raymond Straub ELEVATION (SURF.): —
LOGGER: B. Kolb ELEVATION (T.O.C.): —
FILE NAME: MW-16.dat UNIQUE NUMBER: 31-014-00434

STATIC WATER LEVEL: — MEAS. PT.: — DATE: —
HOLE SIZE(S): 8" TOTAL DEPTH: -50.0'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	Cement	-3.0' to Surface
SEAL TYPE:	Bentonite	-27.0' to -3.0'
SCREEN PACK:	12/20 Brady Sand	-50.0' to -27.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-30.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" Slots	-50.0' to -30.0'
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
0									SAND: 2.5 YR 7/4 light pale red, 90% fine-grained to very fine-grained, 10% sticky, loose.	
		Cuttings				0.4				
5									CALICHE: very SANDY, 5 YR 8/1 white, 30% SAND, 10% CLAY, friable.	
		Cuttings				0.1				
10										
		Cuttings				0.8				
15										
		Cuttings				1.3				
20									SAND: 2.5 YR 7/8 light red, 80% fine-grained to medium-grained, subrounded, loose, poorly sorted, 20% CLAY.	
									CALICHE: 5 YR 8/1 white, 20% SAND, hard.	
		Cuttings				0.4				



WELL LOG

WELL NO. MW-16

ARCADIS 1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915/687-5400 Fax: 915/687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
—
DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
SAMPLING METHOD: Core Barrel/Cuttings
DATE BEGUN: 12/11/02 DATE COMPLETED: 12/11/02
DRILLER: Raymond Straub ELEVATION (SURF.): —
LOGGER: B. Kolb ELEVATION (T.O.C.): —
FILE NAME: MW-16.dat UNIQUE NUMBER: 31-014-00434

STATIC WATER LEVEL: — MEAS. PT.: — DATE: —
HOLE SIZE(S): 8" TOTAL DEPTH: -50.0'
SURFACE COMPLETION:

	TYPES	DEPTHS
GROUT TYPE:	Cement	-3.0' to Surface
SEAL TYPE:	Bentonite	-27.0' to -3.0'
SCREEN PACK:	12/20 Brady Sand	-50.0' to -27.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-30.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" Slots	-50.0' to -30.0'
PLUG BACK:		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
25		Cuttings				0.8				
30		Cuttings				5.9				
35		Core Barrel				15.1			SAND: 7.5 YR 8/3 pink, 60% fine-grained to very fine-grained, 20% SILT/CLAY, subangular to subrounded, poorly sorted, tight calcite cement, water @ 40.0'.	
		Core Barrel				38.1				
		Core Barrel				69.1				
		Core Barrel				9.3				
40		Core Barrel		▽		9.7				
		Cuttings				10.6				
45										
50										

BORING LOG

BORING NO. SB-1

ARCADIS
1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915 687-5400 Fax: 915 687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
UNIQUE NUMBER: 31-014-00429 FILE NAME: SB-1.dat

DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
DRILLER: Raymond Straub
LOGGER: B. Kolb
DATE BEGUN: 12/12/02 DATE COMPLETED: 12/12/02

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0		Core Barrel				0.7			SAND: stained to dark brown, medium-grained to fine-grained, subrounded, well sorted, heavy odor.
		Core Barrel				3.2			
		Core Barrel				1.4			
		Core Barrel				1.7			
-5		Core Barrel				3.3			
		Core Barrel				3.2			CALICHE: 5 YR 8/1 white, 20% fine-grained SAND, friable.
		Core Barrel				0.2			
		Core Barrel				0.2			
		Core Barrel				0.4			
-10		Core Barrel				0.1			
		Core Barrel				2.7			
		Core Barrel				0.0			
		Core Barrel				0.0			SAND: 2.5 YR 6/3 weak red, fine-grained to very fine-grained, well rounded, well sorted, loose.
		Core Barrel				0.1			
-15		Core Barrel				0.3			
		Core Barrel				0.4			
		Core Barrel				1.1			
		Core Barrel				1.3			
		Core Barrel				0.1			CALICHE: 5 YR 8/1 white, 35-40% fine-grained SAND, hard, slight odor @ 22.0'.

BORING LOG

BORING NO. SB-1

ARCADIS
1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915 687-5400 Fax: 915 687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
UNIQUE NUMBER: 31-014-00429 FILE NAME: SB-1.dat

DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
DRILLER: Raymond Straub
LOGGER: B. Kolb
DATE BEGUN: 12/12/02 DATE COMPLETED: 12/12/02

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
-20		Core Barrel				0.3			
		Core Barrel				0.5			
		Core Barrel				0.9			
		Core Barrel				1.5			
		Core Barrel				1.3			
-25		Core Barrel				1.1			
		Core Barrel				1.3			
		Core Barrel				1.2			
		Core Barrel				1.0			
		Core Barrel				1.0			
-30		Core Barrel				1.1			
		Core Barrel				0.9			
		Core Barrel				1.3			
		Core Barrel				1.1			
		Core Barrel				1.3			
-35		Core Barrel				1.0			
		Core Barrel		▽		1.5			SAND: 7.5 YR 8/3 pink, 60% fine-grained to very fine-grained, 40% CLAY, well rounded, poorly sorted, water @ 36.0'.
		Core Barrel				2.0			Boring plugged to surface with Portland cement containing 3-5% Bentonite.

BORING LOG

BORING NO. SB-2

ARCADIS
1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915 687-5400 Fax: 915 687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
UNIQUE NUMBER: 31-014-00430 FILE NAME: SB-2.dat

DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
DRILLER: Raymond Straub
LOGGER: B. Kolb
DATE BEGUN: 12/12/02 DATE COMPLETED: 12/12/02

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0		Core Barrel				3.6			SAND: stained reddish brown, 90% fine-grained to very fine-grained SAND, 10% SILTY SAND, windblown, loose, strong, odor/stain.
		Core Barrel				4.1			
		Core Barrel				5.5			
		Core Barrel				3.9			
		Core Barrel				5.3			
-5		Core Barrel				4.3			CALICHE: 5 YR 8/1 white, 30% very fine-grained, well rounded SAND, seam of stained SAND @ 6.0'.
		Core Barrel				6.3			
		Cuttings				5.8			
-10									
		Cuttings				4.9			
-15									SAND: 2.5 YR 6/3 weak red, fine-grained to very fine-grained, well rounded, well sorted, loose.
		Cuttings				4.5			

ARCADIS

BORING LOG

BORING NO. SB-2

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915 687-5400 Fax: 915 687-5401

PROJECT NUMBER:	MT000749.0001	DRILLING CO:	Straub Drilling
CLIENT NAME:	Marathon Oil Company	DRILLING METHOD:	Rotary/Air
PROJECT NAME:	Former Bertha Barber Tank Battery	DRILLER:	Raymond Straub
SITE LOCATION:	Lea County, New Mexico	LOGGER:	B. Kolb
UNIQUE NUMBER:	31-014-00430 FILE NAME: SB-2.dat	DATE BEGUN: 12/12/02	DATE COMPLETED: 12/12/02

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
-20		Cuttings				5.8			
-25		Cuttings				4.1			
-30		Cuttings				6.0			CALICHE: 2.5 YR 8/1 white, 40% fine-grained SAND, very hard from 31.0' to 33.0', water @ 34.0'.
		Core Barrel		⊠		4.7			
-35		Core Barrel				5.1			Boring plugged to surface with Portland cement containing 3-5% Bentonite.

BORING LOG

BORING NO. SB-3

ARCADIS 1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915 687-5400 Fax: 915 687-5401

PROJECT NUMBER:	MT000749.0001	DRILLING CO:	Straub Drilling
CLIENT NAME:	Marathon Oil Company	DRILLING METHOD:	Rotary/Air
PROJECT NAME:	Former Bertha Barber Tank Battery	DRILLER:	Raymond Straub
SITE LOCATION:	Lea County, New Mexico	LOGGER:	B. Kolb
UNIQUE NUMBER:	31-014-00431 FILE NAME: SB-3.dat	DATE BEGUN: 12/12/02	DATE COMPLETED: 12/12/02

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
0		Core Barrel				2.2			SAND: stained dark brown, medium-grained to fine-grained, well rounded, moderately sorted, blowsand, loose.
		Core Barrel				2.0			
		Core Barrel				2.4			
		Core Barrel				2.2			
		Core Barrel				2.0			CALICHE: 5 YR 8/1 white, 20% fine-grained SAND, slight stain/odor @ 11.0'.
-5		Core Barrel				2.4			
		Cuttings				2.8			
-10		Cuttings				12.1			SAND: stained gray, fine-grained to very fine-grained, well rounded, well sorted, caving, very strong odor.
		Core Barrel				87.6			CALICHE: stained gray, 7.5 YR 8/1 white, at depth, fine-grained to very fine-grained SAND as interbeds.
		Core Barrel				121.0			
-15		Core Barrel				97.5			
		Core Barrel				18.2			
		Core Barrel				10.2			
		Core Barrel				13.6			
		Core Barrel				6.6			

ARCADIS

BORING LOG

BORING NO. SB-3

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 915 687-5400 Fax: 915 687-5401

PROJECT NUMBER: MT000749.0001
CLIENT NAME: Marathon Oil Company
PROJECT NAME: Former Bertha Barber Tank Battery
SITE LOCATION: Lea County, New Mexico
UNIQUE NUMBER: 31-014-00431 FILE NAME: SB-3.dat

DRILLING CO: Straub Drilling
DRILLING METHOD: Rotary/Air
DRILLER: Raymond Straub
LOGGER: B. Kolb
DATE BEGUN: 12/12/02 DATE COMPLETED: 12/12/02

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	PID READING	U.S.C.S. CLASS	LITHOLOGY	DESCRIPTION
-20		Core Barrel				6.0			
		Core Barrel				7.4			
		Core Barrel				7.6			
		Core Barrel				9.8			
		Core Barrel				4.7			
-25		Core Barrel				3.9			
		Cuttings				1.7			SAND: 2.5 YR 6/6 red, 65% fine-grained to very fine-grained, 25% SILT, 10% CLAY, loose, no odor.
-30									
		Cuttings				3.9			
		Core Barrel		▽		1.7			CALICHE: 7.5 YR 8/1 white, 30% SAND, fine-grained to very fine-grained, well rounded, top of water @ 35.0'.
-35		Core Barrel				3.6			Boring plugged to surface with Portland cement containing 3-5% Bentonite.

ARCADIS

Appendix C

Soil Sample Analytical Data

Summary Report

Judy Reeves
Arcadis Geraghty & Miller
1004 N Big Spring St. Suite 300
Midland, TX 79701

Report Date: January 2, 2003

Order ID Number: A02121626

Project Number: MT000749.0001.00003
Project Name: N/A
Project Location: Marathon Bertha Barber

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
216156	MW-16 (37-38')	Soil	12/11/02	13:00	12/14/02
216157	MW-16 (39-40')	Soil	12/11/02	13:30	12/14/02
216158	MW-15 (30'-31')	Soil	12/11/02	17:05	12/14/02
216159	MW-15 (34-35')	Soil	12/11/02	17:12	12/14/02
216160	MW-14 (33-34')	Soil	12/12/02	10:23	12/14/02
216161	MW-14 (36-37')	Soil	12/12/02	10:40	12/14/02
216162	SB-1 (1-2')	Soil	12/12/02	18:22	12/14/02
216163	SB-1 (4-5')	Soil	12/12/02	18:26	12/14/02
216164	SB-1 (35-36')	Soil	12/12/02	18:28	12/14/02
216165	SB-3 (1-2')	Soil	12/13/02	11:02	12/14/02
216166	SB-3 (13-14')	Soil	12/13/02	11:05	12/14/02
216167	SB-3 (34-35')	Soil	12/13/02	11:07	12/14/02
216168	SB-2 (1-2')	Soil	12/13/02	12:17	12/14/02
216169	SB-2 (6-7')	Soil	12/13/02	12:21	12/14/02
216170	SB-2 (33-34')	Soil	12/13/02	12:28	12/14/02
216171	Trip Blank	Water	12/11/02	:	12/14/02

0 This report consists of a total of 3 page(s) and is intended only as a summary of results for the sample(s) listed above.

	BTEX					TPH DRO	TPH GRO
Sample - Field Code	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)	DRO (ppm)	GRO (ppm)
216156 - MW-16 (37-38')	<0.010	0.011	0.014	0.051	0.076	<50.0	7.16
216157 - MW-16 (39-40')	<0.010	<0.010	<0.010	0.018	0.018	<50.0	<1
216158 - MW-15 (30'-31')	<0.010	<0.010	<0.010	0.011	0.011	<50.0	<1
216159 - MW-15 (34-35')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216160 - MW-14 (33-34')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216161 - MW-14 (36-37')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216162 - SB-1 (1-2')	<0.010	<0.010	<0.010	<0.010	<0.010	359	<1
216163 - SB-1 (4-5')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216164 - SB-1 (35-36')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216165 - SB-3 (1-2')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216166 - SB-3 (13-14')	<0.050	<0.050	0.181	0.229	0.410	1320	93.4
216167 - SB-3 (34-35')	<0.010	<0.010	0.043	<0.010	0.043	<50.0	<1
216168 - SB-2 (1-2')	<0.010	0.011	<0.010	<0.010	0.011	531	<1
216169 - SB-2 (6-7')	<0.010	<0.010	<0.010	<0.010	<0.010	73.1	<1

Continued ...

This is only a summary. Please, refer to the complete report package for quality control data.

Continued ...

	BTEX					TPH DRO	TPH GRO
Sample - Field Code	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)	DRO (ppm)	GRO (ppm)
216170 - SB-2 (33-34')	<0.010	<0.010	<0.010	<0.010	<0.010	<50.0	<1
216171 - Trip Blank	<0.001	<0.001	<0.001	<0.001	<0.001	-	-

Sample: 216162 - SB-1 (1-2')

Param	Flag	Result	Units
Chloride		6.17	mg/Kg

Sample: 216163 - SB-1 (4-5')

Param	Flag	Result	Units
Chloride		6.64	mg/Kg

Sample: 216164 - SB-1 (35-36')

Param	Flag	Result	Units
Chloride		204	mg/Kg

Sample: 216165 - SB-3 (1-2')

Param	Flag	Result	Units
Chloride		33.6	mg/Kg

Sample: 216166 - SB-3 (13-14')

Param	Flag	Result	Units
Chloride		93.3	mg/Kg

Sample: 216167 - SB-3 (34-35')

Param	Flag	Result	Units
Chloride		314	mg/Kg

Sample: 216168 - SB-2 (1-2')

Param	Flag	Result	Units
Chloride		8.52	mg/Kg

This is only a summary. Please, refer to the complete report package for quality control data.

Sample: 216169 - SB-2 (6-7')

Param	Flag	Result	Units
Chloride		166	mg/Kg

Sample: 216170 - SB-2 (33-34')

Param	Flag	Result	Units
Chloride		229	mg/Kg

This is only a summary. Please, refer to the complete report package for quality control data.

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Judy Reeves
Arcadis Geraghty & Miller
1004 N Big Spring St. Suite 300
Midland, TX 79701

Report Date: January 2, 2003

Order ID Number: A02121626

Project Number: MT000749.0001.00003
Project Name: N/A
Project Location: Marathon Bertha Barber

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
216156	MW-16 (37-38')	Soil	12/11/02	13:00	12/14/02
216157	MW-16 (39-40')	Soil	12/11/02	13:30	12/14/02
216158	MW-15 (30'-31')	Soil	12/11/02	17:05	12/14/02
216159	MW-15 (34-35')	Soil	12/11/02	17:12	12/14/02
216160	MW-14 (33-34')	Soil	12/12/02	10:23	12/14/02
216161	MW-14 (36-37')	Soil	12/12/02	10:40	12/14/02
216162	SB-1 (1-2')	Soil	12/12/02	18:22	12/14/02
216163	SB-1 (4-5')	Soil	12/12/02	18:26	12/14/02
216164	SB-1 (35-36')	Soil	12/12/02	18:28	12/14/02
216165	SB-3 (1-2')	Soil	12/13/02	11:02	12/14/02
216166	SB-3 (13-14')	Soil	12/13/02	11:05	12/14/02
216167	SB-3 (34-35')	Soil	12/13/02	11:07	12/14/02
216168	SB-2 (1-2')	Soil	12/13/02	12:17	12/14/02
216169	SB-2 (6-7')	Soil	12/13/02	12:21	12/14/02
216170	SB-2 (33-34')	Soil	12/13/02	12:28	12/14/02
216171	Trip Blank	Water	12/11/02	:	12/14/02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.
The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

Note: Samples will be disposed of 30 days from the report date unless the lab is contacted before the 30 days has past.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 216156 - MW-16 (37-38')

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25661	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	S 5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		0.011	mg/Kg	10	0.001
Ethylbenzene		0.014	mg/Kg	10	0.001
M,P,O-Xylene		0.051	mg/Kg	10	0.001
Total BTEX		0.076	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.748	mg/Kg	10	1	75	70 - 130
4-BFB		0.832	mg/Kg	10	1	83	70 - 130

Sample: 216156 - MW-16 (37-38')

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	QC Batch:	QC25690	Date Analyzed:	12/19/02
Analyst:	BP	Preparation Method:	3550 B	Prep Batch:	PB23805	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		122	mg/Kg	1	150	81	70 - 130

Sample: 216156 - MW-16 (37-38')

Analysis:	TPH GRO	Analytical Method:	8015B	QC Batch:	QC25662	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		7.16	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.91	mg/Kg	10	0.10	91	70 - 130
4-BFB	[1]	1.42	mg/Kg	10	0.10	142	70 - 130

[1]High surrogate recovery due to peak interference.

Sample: 216157 - MW-16 (39-40')

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25661	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	S 5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		0.018	mg/Kg	10	0.001
Total BTEX		0.018	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT	[2]	0.520	mg/Kg	10	1	52	70 - 130
4-BFB	[3]	0.502	mg/Kg	10	1	50	70 - 130

Sample: 216157 - MW-16 (39-40')

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	QC Batch:	QC25690	Date Analyzed:	12/19/02
Analyst:	BP	Preparation Method:	3550 B	Prep Batch:	PB23805	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		116	mg/Kg	1	150	77	70 - 130

Sample: 216157 - MW-16 (39-40')

Analysis:	TPH GRO	Analytical Method:	8015B	QC Batch:	QC25662	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.722	mg/Kg	10	0.10	72	70 - 130
4-BFB	[4]	0.507	mg/Kg	10	0.10	51	70 - 130

Sample: 216158 - MW-15 (30'-31')

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25661	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	S 5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

[2]Surrogate within acceptable limits according to GC-2 soil control chart.
[3]Surrogate within acceptable limits according to GC-2 soil control chart.
[4]Surrogate within acceptable limits according to GC-2 soil control chart.

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		0.011	mg/Kg	10	0.001
Total BTEX		0.011	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT	[5]	0.699	mg/Kg	10	1	69	70 - 130
4-BFB	[6]	0.685	mg/Kg	10	1	68	70 - 130

Sample: 216158 - MW-15 (30'-31')

Analysis: TPH DRO Analytical Method: Mod. 8015B QC Batch: QC25690 Date Analyzed: 12/19/02
Analyst: BP Preparation Method: 3550 B Prep Batch: PB23805 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		119	mg/Kg	1	150	79	70 - 130

Sample: 216158 - MW-15 (30'-31')

Analysis: TPH GRO Analytical Method: 8015B QC Batch: QC25662 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT	[7]	0.641	mg/Kg	10	0.10	64	70 - 130
4-BFB	[8]	0.694	mg/Kg	10	0.10	69	70 - 130

Sample: 216159 - MW-15 (34-35')

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25661 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: S 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001

Continued ...

[5]Surrogate within acceptable limits according to GC-2 soil control chart.
[6]Surrogate within acceptable limits according to GC-2 soil control chart.
[7]Surrogate within acceptable limits according to GC-2 soil control chart.
[8]Surrogate within acceptable limits according to GC-2 soil control chart.

... Continued Sample: 216159 Analysis: BTEX

Param	Flag	Result	Units	Dilution	RDL
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.898	mg/Kg	10	1	90	70 - 130
4-BFB		0.895	mg/Kg	10	1	89	70 - 130

Sample: 216159 - MW-15 (34-35')

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	QC Batch:	QC25690	Date Analyzed:	12/19/02
Analyst:	BP	Preparation Method:	3550 B	Prep Batch:	PB23805	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		118	mg/Kg	1	150	78	70 - 130

Sample: 216159 - MW-15 (34-35')

Analysis:	TPH GRO	Analytical Method:	8015B	QC Batch:	QC25662	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.814	mg/Kg	10	0.10	81	70 - 130
4-BFB		0.892	mg/Kg	10	0.10	89	70 - 130

Sample: 216160 - MW-14 (33-34')

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25661	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	S 5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.836	mg/Kg	10	1	84	70 - 130
4-BFB		0.755	mg/Kg	10	1	75	70 - 130

Sample: 216160 - MW-14 (33-34')

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC25690 | Date Analyzed: 12/19/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB23805 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		124	mg/Kg	1	150	82	70 - 130

Sample: 216160 - MW-14 (33-34')

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC25662 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.799	mg/Kg	10	0.10	80	70 - 130
4-BFB		0.757	mg/Kg	10	0.10	76	70 - 130

Sample: 216161 - MW-14 (36-37')

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC25661 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: S 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.925	mg/Kg	10	1	92	70 - 130
4-BFB		0.916	mg/Kg	10	1	92	70 - 130

Sample: 216161 - MW-14 (36-37')

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC25690 | Date Analyzed: 12/19/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB23805 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		124	mg/Kg	1	150	82	70 - 130

Sample: 216161 - MW-14 (36-37')

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC25662 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.864	mg/Kg	10	0.10	86	70 - 130
4-BFB		0.911	mg/Kg	10	0.10	91	70 - 130

Sample: 216162 - SB-1 (1-2')

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC25661 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: S 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.831	mg/Kg	10	1	83	70 - 130
4-BFB		0.802	mg/Kg	10	1	80	70 - 130

Sample: 216162 - SB-1 (1-2')

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC25674 | Date Analyzed: 12/18/02
Analyst: CG | Preparation Method: N/A | Prep Batch: PB23780 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		6.17	mg/Kg	5	1

Sample: 216162 - SB-1 (1-2')

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC25690 | Date Analyzed: 12/19/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB23805 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		359	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		160	mg/Kg	1	150	106	70 - 130

Sample: 216162 - SB-1 (1-2')

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC25662 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.723	mg/Kg	10	0.10	72	70 - 130
4-BFB		0.806	mg/Kg	10	0.10	81	70 - 130

Sample: 216163 - SB-1 (4-5')

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC25661 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: S 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.834	mg/Kg	10	1	83	70 - 130
4-BFB		0.810	mg/Kg	10	1	81	70 - 130

Sample: 216163 - SB-1 (4-5')

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC25674 | Date Analyzed: 12/18/02
Analyst: CG | Preparation Method: N/A | Prep Batch: PB23780 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		6.64	mg/Kg	5	1

Sample: 216163 - SB-1 (4-5')

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC25690 | Date Analyzed: 12/19/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB23805 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		126	mg/Kg	1	150	84	70 - 130

Sample: 216163 - SB-1 (4-5')

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC25662 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.943	mg/Kg	10	0.10	94	70 - 130
4-BFB		0.818	mg/Kg	10	0.10	82	70 - 130

Sample: 216164 - SB-1 (35-36')

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC25661 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: S 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.899	mg/Kg	10	1	90	70 - 130
4-BFB		0.887	mg/Kg	10	1	89	70 - 130

Sample: 216164 - SB-1 (35-36')

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC25674 | Date Analyzed: 12/18/02
Analyst: CG | Preparation Method: N/A | Prep Batch: PB23780 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		204	mg/Kg	5	1

Sample: 216164 - SB-1 (35-36')

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC25690 | Date Analyzed: 12/19/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB23805 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		124	mg/Kg	1	150	82	70 - 130

Sample: 216164 - SB-1 (35-36')

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC25662 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.813	mg/Kg	10	0.10	81	70 - 130
4-BFB		0.872	mg/Kg	10	0.10	87	70 - 130

Sample: 216165 - SB-3 (1-2')

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC25661 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: S 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.872	mg/Kg	10	1	87	70 - 130
4-BFB		0.859	mg/Kg	10	1	86	70 - 130

Sample: 216165 - SB-3 (1-2')

Analysis: Ion Chromatography (IC) | Analytical Method: E 300.0 | QC Batch: QC25674 | Date Analyzed: 12/18/02
Analyst: CG | Preparation Method: N/A | Prep Batch: PB23780 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		33.6	mg/Kg	5	1

Sample: 216165 - SB-3 (1-2')

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	QC Batch:	QC25690	Date Analyzed:	12/19/02
Analyst:	BP	Preparation Method:	3550 B	Prep Batch:	PB23805	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		125	mg/Kg	1	150	83	70 - 130

Sample: 216165 - SB-3 (1-2')

Analysis:	TPH GRO	Analytical Method:	8015B	QC Batch:	QC25662	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		1.22	mg/Kg	10	0.10	122	70 - 130
4-BFB		0.863	mg/Kg	10	0.10	86	70 - 130

Sample: 216166 - SB-3 (13-14')

Analysis:	BTEX	Analytical Method:	S 8021B	QC Batch:	QC25661	Date Analyzed:	12/17/02
Analyst:	CG	Preparation Method:	S 5035	Prep Batch:	PB23784	Date Prepared:	12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.050	mg/Kg	50	0.001
Toluene		<0.050	mg/Kg	50	0.001
Ethylbenzene		0.181	mg/Kg	50	0.001
M,P,O-Xylene		0.229	mg/Kg	50	0.001
Total BTEX		0.410	mg/Kg	50	0.001
Test Comments	[9]	*	mg/Kg	1	

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.927	mg/Kg	10	1	93	70 - 130
4-BFB	[10]	1.85	mg/Kg	10	1	185	70 - 130

Sample: 216166 - SB-3 (13-14')

Analysis:	Ion Chromatography (IC)	Analytical Method:	E 300.0	QC Batch:	QC25674	Date Analyzed:	12/18/02
Analyst:	CG	Preparation Method:	N/A	Prep Batch:	PB23780	Date Prepared:	12/17/02

[9]Sample diluted due to hydrocarbons beyond xylene. Sample has a Benzene concentration of less than 0.0118 which is the MDL.
[10]High surrogate recovery due to peak interference.

Param	Flag	Result	Units	Dilution	RDL
Chloride		93.3	mg/Kg	10	1

Sample: 216166 - SB-3 (13-14')

Analysis: TPH DRO | Analytical Method: Mod. 8015B | QC Batch: QC25690 | Date Analyzed: 12/19/02
Analyst: BP | Preparation Method: 3550 B | Prep Batch: PB23805 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		1320	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		182	mg/Kg	1	150	121	70 - 130

Sample: 216166 - SB-3 (13-14')

Analysis: TPH GRO | Analytical Method: 8015B | QC Batch: QC25662 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		93.4	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.889	mg/Kg	10	0.10	89	70 - 130
4-BFB	[11]	3	mg/Kg	10	0.10	300	70 - 130

Sample: 216167 - SB-3 (34-35')

Analysis: BTEX | Analytical Method: S 8021B | QC Batch: QC25661 | Date Analyzed: 12/17/02
Analyst: CG | Preparation Method: S 5035 | Prep Batch: PB23784 | Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		0.043	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		0.043	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.880	mg/Kg	10	1	88	70 - 130
4-BFB		1.06	mg/Kg	10	1	106	70 - 130

[11] High surrogate recovery due to peak interference.

Sample: 216167 - SB-3 (34-35')

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC25674 Date Analyzed: 12/18/02
Analyst: CG Preparation Method: N/A Prep Batch: PB23780 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		314	mg/Kg	10	1

Sample: 216167 - SB-3 (34-35')

Analysis: TPH DRO Analytical Method: Mod. 8015B QC Batch: QC25690 Date Analyzed: 12/19/02
Analyst: BP Preparation Method: 3550 B Prep Batch: PB23805 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		127	mg/Kg	1	150	84	70 - 130

Sample: 216167 - SB-3 (34-35')

Analysis: TPH GRO Analytical Method: 8015B QC Batch: QC25662 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.808	mg/Kg	10	0.10	81	70 - 130
4-BFB		0.913	mg/Kg	10	0.10	91	70 - 130

Sample: 216168 - SB-2 (1-2')

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25661 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: S 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		0.011	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		0.011	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.962	mg/Kg	10	1	96	70 - 130
4-BFB		0.919	mg/Kg	10	1	92	70 - 130

Sample: 216168 - SB-2 (1-2')

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC25674 Date Analyzed: 12/18/02
Analyst: CG Preparation Method: N/A Prep Batch: PB23780 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		8.52	mg/Kg	5	1

Sample: 216168 - SB-2 (1-2')

Analysis: TPH DRO Analytical Method: Mod. 8015B QC Batch: QC25690 Date Analyzed: 12/19/02
Analyst: BP Preparation Method: 3550 B Prep Batch: PB23805 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		531	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	[12]	213	mg/Kg	1	150	142	70 - 130

Sample: 216168 - SB-2 (1-2')

Analysis: TPH GRO Analytical Method: 8015B QC Batch: QC25662 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.853	mg/Kg	10	0.10	85	70 - 130
4-BFB		0.939	mg/Kg	10	0.10	94	70 - 130

Sample: 216169 - SB-2 (6-7')

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25661 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: S 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.910	mg/Kg	10	1	91	70 - 130

Continued ...

[12]Surrogate recovery out of range due to peak interference. QC are within sampling parameters.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
4-BFB		0.894	mg/Kg	10	1	89	70 - 130

Sample: 216169 - SB-2 (6-7')

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC25674 Date Analyzed: 12/18/02
Analyst: CG Preparation Method: N/A Prep Batch: PB23780 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		166	mg/Kg	100	1

Sample: 216169 - SB-2 (6-7')

Analysis: TPH DRO Analytical Method: Mod. 8015B QC Batch: QC25690 Date Analyzed: 12/19/02
Analyst: BP Preparation Method: 3550 B Prep Batch: PB23805 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		73.1	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		145	mg/Kg	1	150	96	70 - 130

Sample: 216169 - SB-2 (6-7')

Analysis: TPH GRO Analytical Method: 8015B QC Batch: QC25662 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.795	mg/Kg	10	0.10	79	70 - 130
4-BFB		0.919	mg/Kg	10	0.10	92	70 - 130

Sample: 216170 - SB-2 (33-34')

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25661 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: S 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.010	mg/Kg	10	0.001
Toluene		<0.010	mg/Kg	10	0.001
Ethylbenzene		<0.010	mg/Kg	10	0.001
M,P,O-Xylene		<0.010	mg/Kg	10	0.001
Total BTEX		<0.010	mg/Kg	10	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.791	mg/Kg	10	1	79	70 - 130
4-BFB		0.802	mg/Kg	10	1	80	70 - 130

Sample: 216170 - SB-2 (33-34')

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC25674 Date Analyzed: 12/18/02
Analyst: CG Preparation Method: N/A Prep Batch: PB23780 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
Chloride		229	mg/Kg	5	1

Sample: 216170 - SB-2 (33-34')

Analysis: TPH DRO Analytical Method: Mod. 8015B QC Batch: QC25690 Date Analyzed: 12/19/02
Analyst: BP Preparation Method: 3550 B Prep Batch: PB23805 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
DRO		<50.0	mg/Kg	1	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		126	mg/Kg	1	150	84	70 - 130

Sample: 216170 - SB-2 (33-34')

Analysis: TPH GRO Analytical Method: 8015B QC Batch: QC25662 Date Analyzed: 12/17/02
Analyst: CG Preparation Method: 5035 Prep Batch: PB23784 Date Prepared: 12/17/02

Param	Flag	Result	Units	Dilution	RDL
GRO		<1	mg/Kg	10	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		1.25	mg/Kg	10	0.10	125	70 - 130
4-BFB		0.795	mg/Kg	10	0.10	79	70 - 130

Sample: 216171 - Trip Blank

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25620 Date Analyzed: 12/16/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23744 Date Prepared: 12/16/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.120	mg/L	1	0.10	120	70 - 130
4-BFB		0.122	mg/L	1	0.10	122	70 - 130

Quality Control Report
Method Blank

Method Blank

QCBatch: QC25620

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.111	mg/L	1	0.10	111	70 - 130
4-BFB		0.107	mg/L	1	0.10	107	70 - 130

Method Blank

QCBatch: QC25661

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.010	mg/Kg	0.001
Toluene		<0.010	mg/Kg	0.001
Ethylbenzene		<0.010	mg/Kg	0.001
M,P,O-Xylene		<0.010	mg/Kg	0.001
Total BTEX		<0.010	mg/Kg	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.993	mg/Kg	10	1	99	70 - 130
4-BFB		0.985	mg/Kg	10	1	99	70 - 130

Method Blank

QCBatch: QC25662

Param	Flag	Results	Units	Reporting Limit
GRO		<1	mg/Kg	0.10

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		1.1	mg/Kg	1	0.10	110	70 - 130
4-BFB		1.07	mg/Kg	1	0.10	107	70 - 130

Method Blank

QCBatch: QC25674

Param	Flag	Results	Units	Reporting Limit
Chloride		<1.0	mg/Kg	1

Method Blank

QCBatch: QC25690

Param	Flag	Results	Units	Reporting Limit
DRO		<50.0	mg/Kg	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		120	mg/Kg	1	150	81	70 - 130

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC25620

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.110	0.104	mg/L	1	0.10	<0.001	110	6	70 - 130	20
Benzene	0.108	0.110	mg/L	1	0.10	<0.001	108	2	70 - 130	20
Toluene	0.108	0.110	mg/L	1	0.10	<0.001	108	2	70 - 130	20
Ethylbenzene	0.109	0.111	mg/L	1	0.10	<0.001	109	2	70 - 130	20
M,P,O-Xylene	0.326	0.331	mg/L	1	0.30	<0.001	109	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.110	0.112	mg/L	1	0.10	110	112	70 - 130
4-BFB	0.112	0.112	mg/L	1	0.10	112	112	70 - 130

Laboratory Control Spikes

QCBatch: QC25661

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	1.04	1.04	mg/Kg	10	1	<0.010	104	0	70 - 130	20
Benzene	1.01	1.03	mg/Kg	10	1	<0.010	101	1	70 - 130	20
Toluene	1.01	1.03	mg/Kg	10	1	<0.010	101	1	70 - 130	20
Ethylbenzene	1.02	1.04	mg/Kg	10	1	<0.010	102	1	70 - 130	20
M,P,O-Xylene	3.11	3.18	mg/Kg	10	3	<0.010	103	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.949	0.927	mg/Kg	10	1	94	92	70 - 130
4-BFB	0.974	0.956	mg/Kg	10	1	97	95	70 - 130

Laboratory Control Spikes

QCBatch: QC25662

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
GRO	10.8	11.6	mg/Kg	1	1	<1	108	7	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.875	1.06	mg/Kg	1	0.10	88	106	70 - 130
4-BFB	0.969	1.03	mg/Kg	1	0.10	97	103	70 - 130

Laboratory Control Spikes

QCBatch: QC25674

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	[13] 35.08	[14] 35.10	mg/Kg	1	12.50	<1.0	280	0	90 - 110	20
Nitrate-N	2.73	2.72	mg/Kg	1	2.50	<0.2	109	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes

QCBatch: QC25690

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
DRO	265	276	mg/Kg	1	250	<50.0	106	4	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
n-Triacontane	131	133	mg/Kg	1	150	87	88	70 - 130

Quality Control Report
Matrix Spikes and Duplicate Spikes

Matrix Spikes

QCBatch: QC25661

[13]Soil blank should be subtracted from LCS. %EA = 97 and RPD = 0.
[14]Soil blank should be subtracted from LCS. %EA = 97 and RPD = 0.

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Benzene	0.845	0.864	mg/Kg	10	1	<0.010	84	2	70 - 130	20
Toluene	0.865	0.902	mg/Kg	10	1	<0.010	86	4	70 - 130	20
Ethylbenzene	0.896	0.936	mg/Kg	10	1	<0.010	89	4	70 - 130	20
M,P,O-Xylene	2.7	2.83	mg/Kg	10	3	<0.010	90	4	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dilution	Spike Amount	MS % Rec	MSD % Rec	Recovery Limits
TFT	0.795	0.796	mg/Kg	10	1	79	79	70 - 130
4-BFB	0.804	0.814	mg/Kg	10	1	80	81	70 - 130

Matrix Spikes

QCBatch: QC25662

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
GRO	9.64	11.3	mg/Kg	1	1	<1	96	15	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dilution	Spike Amount	MS % Rec	MSD % Rec	Recovery Limits
TFT	0.987	1.1	mg/Kg	1	0.10	99	110	70 - 130
4-BFB	0.794	0.915	mg/Kg	1	0.10	79	92	70 - 130

Matrix Spikes

QCBatch: QC25674

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	1350	1330	mg/Kg	1	1250	166	94	1	35 - 144	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes

QCBatch: QC25690

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
DRO	568	637	mg/Kg	1	250	359	83	28	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dilution	Spike Amount	MS % Rec	MSD % Rec	Recovery Limits
n-Triacontane	186	176	mg/Kg	1	150	124	117	70 - 130

Quality Control Report
Continuing Calibration Verification Standards

CCV (1) QCBatch: QC25620

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.112	112	85 - 115	12/16/02
Benzene		mg/L	0.10	0.110	110	85 - 115	12/16/02
Toluene		mg/L	0.10	0.110	110	85 - 115	12/16/02
Ethylbenzene		mg/L	0.10	0.111	111	85 - 115	12/16/02
M,P,O-Xylene		mg/L	0.30	0.332	111	85 - 115	12/16/02

CCV (2) QCBatch: QC25620

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.113	113	85 - 115	12/16/02
Benzene		mg/L	0.10	0.110	110	85 - 115	12/16/02
Toluene		mg/L	0.10	0.111	111	85 - 115	12/16/02
Ethylbenzene		mg/L	0.10	0.110	110	85 - 115	12/16/02
M,P,O-Xylene		mg/L	0.30	0.331	110	85 - 115	12/16/02

ICV (1) QCBatch: QC25620

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.110	110	85 - 115	12/16/02
Benzene		mg/L	0.10	0.109	109	85 - 115	12/16/02
Toluene		mg/L	0.10	0.109	109	85 - 115	12/16/02
Ethylbenzene		mg/L	0.10	0.111	111	85 - 115	12/16/02
M,P,O-Xylene		mg/L	0.30	0.331	110	85 - 115	12/16/02

CCV (1) QCBatch: QC25661

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.087	87	85 - 115	12/17/02

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Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.1	100	85 - 115	12/17/02
Toluene		mg/L	0.10	0.1	100	85 - 115	12/17/02
Ethylbenzene		mg/L	0.10	0.100	100	85 - 115	12/17/02
M,P,O-Xylene		mg/L	0.30	0.3	100	85 - 115	12/17/02

CCV (2) QCBatch: QC25661

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.107	107	85 - 115	12/17/02
Benzene		mg/L	0.10	0.103	103	85 - 115	12/17/02
Toluene		mg/L	0.10	0.103	103	85 - 115	12/17/02
Ethylbenzene		mg/L	0.10	0.103	103	85 - 115	12/17/02
M,P,O-Xylene		mg/L	0.30	0.313	104	85 - 115	12/17/02

ICV (1) QCBatch: QC25661

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.106	106	85 - 115	12/17/02
Benzene		mg/L	0.10	0.101	101	85 - 115	12/17/02
Toluene		mg/L	0.10	0.104	104	85 - 115	12/17/02
Ethylbenzene		mg/L	0.10	0.103	103	85 - 115	12/17/02
M,P,O-Xylene		mg/L	0.30	0.316	93	85 - 115	12/17/02

CCV (1) QCBatch: QC25662

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1	0.957	95	85 - 115	12/17/02

CCV (2) QCBatch: QC25662

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1	1.08	108	85 - 115	12/17/02

ICV (1) QCBatch: QC25662

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1	1.15	115	85 - 115	12/17/02

CCV (1) QCBatch: QC25674

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	12.19	97	90 - 110	12/18/02
Nitrate-N		mg/L	2.50	2.57	102	90 - 110	12/18/02

ICV (1) QCBatch: QC25674

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	12.15	97	90 - 110	12/18/02
Nitrate-N		mg/L	2.50	2.52	100	90 - 110	12/18/02

CCV (1) QCBatch: QC25690

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	263	105	75 - 125	12/19/02

CCV (2) QCBatch: QC25690

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	282	112	75 - 125	12/19/02

ICV (1) QCBatch: QC25690

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	258	103	75 - 125	12/19/02

216156-11

AO2121624

ARCADIS

Laboratory Task Order No./P.O. No. _____

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Project Number/Name: MT000749.0001.00003

Project Location: Marathon Bertha Barber

Laboratory: Trace Analysis

Project Manager: Judy Reeves

Sampler(s)/Affiliation: ARCADIS/BK

Sample ID/Location	Matrix	Date Sampled	Time	GRO/DRO 8015 BTEX 8021B Neat 4 oz glass	Chloride 9192A Neat 4 oz glass	BTEX 8021B 40ml vial	Remarks	Total
MW-16(37-38')	S	12/11/02	1300	1	—	216156		1
MW-16(39-40')	S	12/11/02	1330	1	—	57		1
MW-15(30-31')	S	12/11/02	1705	1	—	58		1
MW-15(34-35')	S	12/11/02	1812	1	—	59		1
MW-14(33-34')	S	12/12/02	1023	1	—	60		1
MW-14(36-37')	S	12/12/02	1040	1	—	61		1
SB-1(1-2')	S	12/12/02	1822	1	1	62		2
SB-1(4-5')	S	12/12/02	1826	1	1	63		2
SB-1(35-36')	S	12/12/02	1828	1	1	64		2
SB-3(1-2')	S	12/13/02	1102	1	1	65		2
SB-3(13-14')	S	12/13/02	1105	1	1	66		2
SB-3(34-35')	S	12/13/02	1107	1	1	67		2
SB-2(1-2')	S	12/13/02	1217	1	1	68		2
SB-2(6')	S	12/13/02	1221	1	1	69		2
SB-2(33-34')	S	12/13/02	1228	1	1	70		2
TRIP Blank						71		2
						1		25

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

Total No. of Bottles/ Containers

Relinquished by: Judy Reeves	Organization: ARCADIS	Date 12/13/02	Time 1700	Seal Intact?	
Received by: Helen Shelton	Organization: Trace Analysis	Date 12/13/02	Time 1700	Yes No N/A	
Relinquished by: Helen Shelton	Organization: Trace Analysis	Date 12/13/02	Time 1845	Seal Intact?	
Received by: Baylor	Organization: Trace Analysis	Date 12/14/02	Time 11:20	(Yes) No N/A	4°C

Special Instructions/Remarks: Questions? Please call Judy Reeves @ 866 799 4467
Please run Trip Blank for BTEX 8021B

Delivery Method: ☐ In Person ☒ Common Carrier Greyhound (SPECIFY) ☐ Lab Courier XXX ☐ Other _____ (SPECIFY)

RVF 1/3/03

AG 05-12/01