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2001

ARCADIS

Year 2001 Annual Groundwater Monitoring Report Former Bertha Barber Tank Battery

Lea County, New Mexico

26 April 2002

P R E P A R E D F O R

Marathon Oil Company

ARCADIS

**Year 2001 Annual
Groundwater Monitoring
Report
Former Bertha Barber Tank
Battery**

Lea County, New Mexico

Prepared for:
Marathon Oil Company

Prepared by:
ARCADIS G & M, Inc
1030 Andrews Hwy., Suite 120
Suite 120
Midland
Texas 79701
Tel 915 699 1381
Fax 915 699 1978

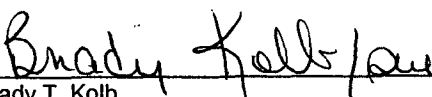
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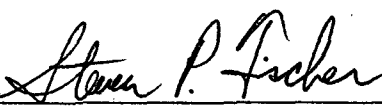
**Year 2001 Annual Groundwater
Monitoring Report
Former Bertha Barber Tank
Battery
Lea County, New Mexico**



Brady T. Kolb
Task Manager



Alan J. Reed, Jr., P.E.
Project Manager



Steven P. Fischer
Remediation Business Practice Manager

Prepared for:
Marathon Oil Company

Prepared by:
ARCADIS G&M, Inc.
1030 Andrews Hwy.
Suite 120
Midland Texas 79701
Tel 915-699-1381
Fax 915-699-1978

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Introduction

Lea County, New Mexico

ARCADIS G & M, Inc. (ARCADIS) prepared this Year 2001 Annual Groundwater Monitoring Report on behalf of Marathon Oil Company (Marathon) to present the results of quarterly groundwater monitoring 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 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

Thirteen monitor wells are located at the former Bertha Barber Tank Battery facility. The 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 2001. During each monitoring event, a site-wide gauging event was completed prior to sampling. All thirteen monitor wells located at the site were included in the gauging events. 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 were allowed to recover prior to sampling. When a submersible pump was utilized, it was decontaminated by washing with water and laboratory-grade detergent 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 March and September events, 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.

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 September 2001 event. Throughout calendar year 2001, passive skimmers (absorbent booms) were maintained in monitor wells MW-1, MW-2, MW-7 and MW-10 to recover phase-separated hydrocarbons (PSH). Phase-separated hydrocarbons measured during 2001 ranged between 0.01 to 0.14 feet in MW-1 during the four quarterly events. Wells MW-2 and MW-7 each contained 0.01 feet of PSH during the four quarterly events conducted in calendar year 2001. Phase-separated hydrocarbons measured in MW-10 ranged between 0.04 feet in March 2001 and 0.64 feet in December 2001. During the September and December gauging events, monitor wells MW-4, MW-5 and MW-9 contained measurable amounts of PSH. Phase-separated hydrocarbons had not previously been recorded in any of these wells. Absorbent booms were placed in monitor wells MW-4, MW-5 and MW-9 after the PSH were detected. Phase-separated hydrocarbons ranged between 0.01 to 0.08 feet in MW-4, between 0.08 to 0.38 feet in MW-5, and between 0.13 to 0.16 feet in MW-9 in September and December 2001.

Based on the groundwater elevation contours shown on Figure 2, the local groundwater gradient is generally to the east and northeast. Along the southern portion of the site, the gradient appears to bend slightly toward the southeast.

Sampling Results

BTEX samples were collected from each well (except for MW-1, MW-2, MW-7 and MW-10 which contained measurable PSH) during each quarterly event. 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:

- Monitor wells MW-3, MW-4, MW-5, MW-6, MW-9 and MW-10 have had at least one measurement of benzene that exceeds the New Mexico Water Quality Control Commission Ground Water Standards (WQCC) of 10 micrograms per liter (ug/L). However, during this last annual monitoring period, the concentrations appear to be stable, and in some cases declining.
- 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.
- No wells have contained ethylbenzene or total xylenes concentrations above the WQCC standards of 750 ug/L and 620 ug/L, respectively.
- 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 a pipeline break northwest of the site is most likely the source of benzene in MW-6, because MW-10, located up-gradient from MW-6, currently contains condensate.

The concentration of benzene in the groundwater was mapped for each quarterly event conducted in 2001 (Figures 3 through 6). Figure 7 shows the apparent net change in benzene concentration from December 2000 to December 2001. It should be noted that monitor wells MW-1, MW-2, MW-7 and MW-10 were not sampled during any of the quarterly events because they contained PSH. However, historical data from MW-1, MW-2 and MW-7 do 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 2001, only MW-4 and MW-5 contained benzene concentrations exceeding WQCC standards. The concentration of benzene in MW-4 was 37 ug/L and 32 ug/L in MW-5.
- During the June 2001 sampling event, benzene was detected in MW-4 and MW-5. The concentration of benzene in MW-4 was 14 ug/L and 96 ug/L in

MW-5. The sample containers for MW-12 arrived at the lab broken; therefore no sample data is available for this event.

- In September 2001, MW-4, MW-5 and MW-9 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 2001 sampling event, again MW-4, MW-5 and MW-9 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 shows three monitor wells sampled during the year where benzene concentrations had a net change between December 2000 and June 2001 (MW-4 and MW-5) and December 2000 and December 2001 (MW-6). MW-4 showed a decrease in benzene concentration of 32 ug/L during the year. However, PSH were found in the September and December gauging events. MW-5 showed a decrease in benzene concentration of 73 ug/L. MW-5 also contained PSH in both the September and December gauging events. No samples were collected from MW-4 and MW-5 during the September and December 2001 events. The benzene concentration in MW-6 decreased from 14 ug/L to below the laboratory detection limit of 5 ug/L between December 2000 and December 2001. The other monitor wells at the site were either not sampled because they contained PSH throughout the year, or had no net change in benzene concentration during the year.

During the September 2001 sampling event, samples were collected and analyzed for chloride, TDS, dissolved metals (iron, manganese and barium) and PAHs. Chlorides were also analyzed during the March 2001 event. Chloride, TDS and dissolved metals data are summarized in Table 3. PAH data is presented in Table 4.

Chloride and TDS data collected during Year 2001 monitoring confirmed the poor quality of the groundwater in and around the site. Most wells had higher reported chloride and TDS values as compared to data collected in 2000. However, values were still generally lower than chloride analyses reported in 1999. All values reported in 2001 were above WQCC standards of 250 milligrams per liter (mg/L) chlorides and 1,000 mg/L TDS.

Dissolved metals data collected during the Year 2001 contained only one sample (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 level in the livestock water well during the September sampling event was 0.25 mg/L. There is no previous data with which to compare this detection.

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 2001. The conclusions are summarized as follows:

- Monitor wells MW-1, MW-2, MW-7 and MW-10 contained PSH during each quarterly monitoring event in 2001. Monitor wells MW-4, MW-5 and MW-9 contained PSH in the third and fourth quarterly monitoring events in 2001.
- MW-6 may be impacted by benzene resulting from condensate that is present in MW-10. This is a concern because of the apparent groundwater gradient and location of the off-site livestock water well.
- With the local gradient to the east and northeast, and the off-site livestock water well pulling groundwater from the site toward it, there is some concern that on-site contamination may migrate toward the well.
- Chloride and TDS data in the area shows levels well above WQCC standards, however, some wells have shown a decrease in concentration over the last year.
- Dissolved metals data (for iron, manganese and barium) and PAH data is limited to three events. The only dissolved metals detected above WQCC standards in 2001 were from the livestock water well. The dissolved metals detected in the livestock water well 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 2001 due to the presence of PSH. Historically, PAHs were found in MW-1 and MW-4, but neither of these wells were sampled in 2001 due to the presence of PSH.

Based on the above conclusions the following recommendations are made:

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- Passive skimmers should be maintained in monitor wells MW-1, MW-2, MW-4, MW-5, MW-7, MW-9 and MW-10 as long as they contain PSH. The skimmers should be removed at least 14 days prior to each monitoring event to allow fluid levels to stabilize prior to gauging.
- It is recommended to continue the groundwater monitoring plan as originally proposed in the Site Investigation Report. However, a Human Health Risk Assessment may be conducted and the groundwater monitoring plan may need to be revised to meet the requirements of the risk assessment. Any changes to the groundwater monitoring plan will only be implemented after receipt of written authorization.

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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	12/26/01	3561.20	37.19	37.33	0.14	0.11	3523.98
	09/27/01	3561.20	37.48	37.55	0.07	0.06	3523.71
	06/28/01	3561.20	37.14	37.15	0.01	0.01	3524.06
	03/19/01	3561.20	37.14	37.15	0.01	0.01	3524.06
	12/21/00	3561.20	37.13	37.14	0.01	0.01	3524.07
	09/27/00	3561.20	37.65	37.70	0.05	0.04	3523.54
	06/20/00	3561.20	37.70	37.77	0.07	0.06	3523.49
	03/30/00	3561.20	36.19	36.20	0.01	0.01	3525.01
	12/14/99	3561.20	36.00	36.03	0.03	0.02	3525.19
	09/22/99	3561.20		35.79	sheen	sheen	3525.41
	08/27/99	3561.20	35.64	35.66	0.02	0.02	3525.56
	07/16/99	3561.20		35.48	sheen	sheen	3525.72
	03/31/99	3561.20	35.77	35.82	0.05	0.04	3525.42
	12/30/98	3561.20		35.83			3525.37
MW-2	12/26/01	3561.69	37.69	37.70	0.01	0.01	3524.00
	09/27/01	3561.69	37.48	37.49	0.01	0.01	3524.21
	06/28/01	3561.69	37.15	37.16	0.01	0.01	3524.54
	03/19/01	3561.69	37.60	37.61	0.01	0.01	3524.09
	12/21/00	3561.69	37.59	37.60	0.01	0.01	3524.10
	09/27/00	3561.69	38.11	38.12	0.01	0.01	3523.58
	06/20/00	3561.69	38.10	38.12	0.02	0.02	3523.59
	03/30/00	3561.69	36.59	36.60	0.01	0.01	3525.10
	12/14/99	3561.69		36.62			3525.07
	09/22/99	3561.69		36.27			3525.42
	08/27/99	3561.69	36.12	36.13	0.01	0.01	3525.57
	07/16/99	3561.69		35.95			3525.74
	03/31/99	3561.69		36.33			3525.36
	12/30/98	3561.69		36.34			3525.35
MW-3	12/26/01	3563.00		39.05			3523.95
	09/27/01	3563.00		38.95			3524.05
	06/28/01	3563.00		38.63			3524.37
	03/19/01	3563.00		38.19			3524.81
	12/21/00	3563.00		38.11			3524.89
	09/27/00	3563.00		37.88			3525.12
	06/20/00	3563.00		38.56			3524.44
	03/30/00	3563.00		38.10			3524.90
	12/14/99	3563.00		38.10			3524.90
	09/22/99	3563.00		37.59			3525.41
	08/27/99	3563.00		37.48			3525.52
	07/16/99	3563.00		37.31			3525.69
	03/31/99	3563.00		37.67			3525.33
	12/30/98	3563.00		37.65			3525.35

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

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-4	12/26/01	3563.01	39.03	39.05	0.02	0.02	3523.98
	09/27/01	3563.01	38.82	38.92	0.10	0.08	3524.17
	06/28/01	3563.01		38.60			3524.41
	03/19/01	3563.01		38.16			3524.85
	12/21/00	3563.01		38.10			3524.91
	09/27/00	3563.01		37.86			3525.15
	06/20/00	3563.01		38.26			3524.75
	03/30/00	3563.01		38.10			3524.91
	12/14/99	3563.01		37.85			3525.16
	09/22/99	3563.01		37.57			3525.44
	08/27/99	3563.01		37.46			3525.55
	07/16/99	3563.01		37.28			3525.73
	03/31/99	3563.01		37.66			3525.35
	12/30/98	3563.01		37.66			3525.35
MW-5	12/26/01	3561.10	37.10	37.21	0.11	0.09	3523.98
	09/27/01	3561.10	36.47	36.98	0.51	0.41	3524.53
	06/28/01	3561.10		36.69			3524.41
	03/19/01	3561.10		36.13			3524.97
	12/21/00	3561.10		36.15			3524.95
	09/27/00	3561.10		35.98			3525.12
	06/20/00	3561.10		36.34			3524.76
	03/30/00	3561.10		36.10			3525.00
	12/14/99	3561.10		35.95			3525.15
	09/22/99	3561.10		35.68			3525.42
	08/27/99	3561.10		35.56			3525.54
	07/16/99	3561.10		35.38			3525.72
	03/31/99	3561.10		35.75			3525.35
	12/30/98	3561.10		35.73			3525.37
MW-6	12/26/01	3561.25		37.25			3524.00
	09/27/01	3561.25		37.02			3524.23
	06/28/01	3561.25		36.54			3524.71
	03/19/01	3561.25		36.80			3524.45
	12/21/00	3561.25		36.13			3525.12
	09/27/00	3561.25		36.06			3525.19
	06/20/00	3561.25		36.39			3524.86
	03/30/00	3561.25		36.29			3524.96
	12/14/99	3561.25		36.10			3525.15
	09/22/99	3561.25		35.75			3525.50
	08/27/99	3561.25		35.69			3525.56

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

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-7	12/26/01	3562.44	38.61	38.62	0.01	0.01	3523.83
	09/27/01	3562.44	38.42	38.43	0.01	0.01	3524.02
	06/28/01	3562.44	37.89	37.90	0.01	0.01	3524.55
	03/19/01	3562.44	37.57	37.58	0.01	0.01	3524.87
	12/21/00	3562.44	37.65	37.70	0.05	0.04	3524.78
	09/27/00	3562.44	37.75	37.76	0.01	0.01	3524.69
	06/20/00	3562.44	37.73	37.91	0.18	0.14	3524.67
	03/30/00	3562.44	37.55	37.60	0.05	0.04	3524.88
	12/14/99	3562.44		37.51			3524.93
	09/22/99	3562.44		38.20			3524.24
	08/27/99	3562.44		38.15			3524.29
MW-8	12/26/01	3561.39		37.74			3523.65
	09/27/01	3561.39		37.51			3523.88
	06/28/01	3561.39		36.98			3524.41
	03/19/01	3561.39		36.51			3524.88
	12/21/00	3561.39		36.50			3524.89
	09/27/00	3561.39		36.61			3524.78
	06/20/00	3561.39		36.88			3524.51
	03/30/00	3561.39		36.65			3524.74
	12/14/99	3561.39		36.44			3524.95
	09/22/99	3561.39		37.26			3524.13
	08/27/99	3561.39		37.21			3524.18
MW-9	12/26/01	3563.59	39.65	39.82	0.17	0.14	3523.91
	09/27/01	3563.59	39.40	39.62	0.22	0.18	3524.15
	06/28/01	3563.59		38.99			3524.60
	03/19/01	3563.59		38.65			3524.94
	12/21/00	3563.59		38.60			3524.99
	09/27/00	3563.59		38.60			3524.99
	06/20/00	3563.59		38.89			3524.70
	03/30/00	3563.59		38.70			3524.89
	12/14/99	3563.59		38.48			3525.11
	09/22/99	3563.59		36.23			3527.36
	08/27/99	3563.59		36.14			3527.45
MW-10	12/26/01	3560.51	36.34	36.98	0.64	0.48	3524.01
	09/27/01	3560.51	36.12	36.75	0.63	0.47	3524.23
	06/28/01	3560.51	35.63	36.26	0.63	0.47	3524.72
	03/19/01	3560.51	35.48	35.52	0.04	0.03	3525.02
	12/21/00	3560.51	35.52	35.53	0.01	0.01	3524.99
	09/27/00	3560.51	35.55	35.56	0.01	0.01	3524.96
	06/20/00	3560.51	35.54	35.55	0.01	0.01	3524.97
	03/30/00	3560.51	35.49	35.50	0.01	0.01	3525.02
	12/14/99	3560.51		35.33			3525.18
	09/22/99	3560.51		34.96			3525.55
	08/27/99	3560.51		34.87			3525.64

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

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

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MW-11	12/26/01	3565.44		41.91			3523.53
	09/27/01	3565.44		41.71			3523.73
	06/28/01	3565.44		41.16			3524.28
	03/19/01	3565.44		39.76			3525.68
	12/21/00	3565.44		40.01			3525.43
	09/27/00	3565.44		39.82			3525.62
	06/20/00	3565.44		40.10			3525.34
	03/30/00	3565.44		39.80			3525.64
	12/14/99	3565.44		40.61			3524.83
	09/22/99	3565.44		40.37			3525.07
	08/27/99	3565.44		40.34			3525.10
MW-12 (PZ-2)	12/26/01	3562.11		37.15			3524.96
	09/27/01	3562.11		37.40			3524.71
	06/28/01	3562.11		37.45			3524.66
	03/19/01	3562.11		37.26			3524.85
	12/21/00	3562.11		37.23			3524.88
	09/27/00	3562.11		37.09			3525.02
	06/20/00	3562.11		37.34			3524.77
	03/30/00	3562.11		37.23			3524.88
	12/14/99	3562.11		36.95			3525.16
	09/22/99	3562.11		36.69			3525.42
	08/27/99	3562.11		36.65			3525.46
MW-13 (PZ-1)	12/26/01	3559.67		35.67			3524.00
	09/27/01	3559.67		35.52			3524.15
	06/28/01	3559.67		34.95			3524.72
	03/19/01	3559.67		34.84			3524.83
	12/21/00	3559.67		34.75			3524.92
	09/27/00	3559.67		34.49			3525.18
	06/20/00	3559.67		34.90			3524.77
	03/30/00	3559.67		34.80			3524.87
	12/14/99	3559.67		34.96			3524.71
	09/22/99	3559.67		34.20			3525.47
	08/27/99	3559.67		34.09			3525.58

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

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	4/9/99	5	<5	<5	NS	NS	<10	5
	7/15/99	<500	<500	<500	NS	NS	<1000	ND
MW-2	4/9/99	<5	<5	<5	NS	NS	<10	ND
	7/15/99	<5	<5	<5	NS	NS	<10	ND
	9/23/99	<5	<5	<5	NS	NS	<10	ND
MW-3	4/9/99	100	14	<5	NS	NS	<10	114
	7/15/99	<5	<5	<5	NS	NS	<10	ND
	9/23/99	<5	<5	<5	NS	NS	<10	ND
	3/30/00	<5	<5	11	<5	<10	ND	11
(Duplicate)**	3/30/00	54	8.6	<5	<5	<10	ND	62.6
	6/20/00	<5	<5	<5	<5	<10	<10	ND
	9/28/00	<5	<5.0	<5	<5	<10	<10	ND
	12/21/00	<5	<5	<5	NS	NS	10	10
	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	<5	<5	NS	NS	<10	ND
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<5	<5	<5	NS	NS	<10	ND
MW-4	4/9/99	121	77	43	NS	NS	60	301
	7/15/99	43	28	<5	NS	NS	<10	71
	9/23/99	18	12	<5	NS	NS	<10	30
	3/30/00	54	7.5	8.7	<5	<10	ND	70.2
	6/20/00	19	<5.0	<5	<5	<10	<10	19
	9/28/00	66	13	<5	<5	<10	<10	79
(Duplicate)	9/28/00	51	<5.0	<5	<5	<10	11	62
	12/21/00	46	10	<5	NS	NS	20	76
	3/19/01	37	<5	5.2	<5	<10	<10	42.2
	6/28/01	14	<5	<5	NS	NS	<10	14
MW-5	4/9/99	53	<5	<5	NS	NS	<10	53
	7/15/99	470	43	<5	NS	NS	10	523
	9/22/99	156	6	<5	NS	NS	<10	162
	3/30/00	50	<5	9.7	<5	<10	ND	59.7
	6/20/00	140	<5	<5	<5	<10	<10	140
	9/28/00	110	<5	<5	<5	<10	<10	110
	12/21/00	169	5	<5	NS	NS	20	194
	3/19/01	32	<5	<5	<5	<10	<10	32
	6/28/01	96	<5	<5	NS	NS	<10	96

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	8/17/99	<5	<5	<5	NS	NS	<10	ND
	9/22/99	<5	<5	<5	NS	NS	<10	ND
	3/30/00	<5	<5	<5	<5	<10	ND	ND
	6/20/00	<5	<5	<5	<5	<10	<10	ND
	9/28/00	11	<5	<5	<5	<10	<10	11
	12/21/00	14	<5	<5	NS	NS	10	24
	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	<5	<5	NS	NS	<10	ND
Duplicate	6/28/01	<5	<5	<5	NS	NS	<10	ND
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<5	<5	<5	NS	NS	<10	ND
MW-7	8/17/99	<5	<5	<5	NS	NS	<10	ND
	9/22/99	<5	<5	<5	NS	NS	<10	ND
MW-8	8/17/99	<5	<5	<5	NS	NS	<10	ND
	9/23/99	<5	<5	<5	NS	NS	<10	ND
	3/30/00	<5	<5	11	<5	<10	ND	11
	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
	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	<5	<5	NS	NS	<10	ND
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<5	<5	<5	NS	NS	<10	ND
MW-9	8/17/99	20	<5	<5	NS	NS	<10	20
	9/23/99	8	<5	<5	NS	NS	<10	8
	3/30/00	<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
	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	28	<5	NS	NS	<10	28
MW-10	8/17/99	12100	160	1730	NS	NS	400	14390
	9/22/99	2900	520	800	NS	NS	600	4820
MW-11	8/17/99	<5	<5	<5	NS	NS	<10	ND
	9/23/99	<5	<5	<5	<5	<10	<10	ND
	3/30/00	<5	<5	<5	<5	<10	ND	ND
	6/20/00	<5	<5	<5	<5	<10	<10	ND
(Duplicate)	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	20	20
	3/19/01	<5	<5	<5	<5	<10	<10	ND
(Duplicate)	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	<5	<5	NS	NS	<10	ND
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<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	-----
MW-12 (PZ-2)	8/17/99	<5	<5	<5	NS	NS	<10	ND
	9/22/99	<5	<5	<5	NS	NS	<10	ND
	3/30/00	<5	<5	<5	<5	<10	ND	ND
	6/20/00	7.3	<5	<5	<5	<10	<10	7.3
	9/28/00	<5	<5	<5	<5	<10	<10	ND
	12/21/00	<5	<5	<5	NS	NS	20	20
	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/2001^	NS	NS	NS	NS	NS	NS	NS
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<5	<5	<5	NS	NS	<10	ND
MW-13 (PZ-1)	8/17/99	<5	<5	<5	NS	NS	<10	ND
	9/23/99	<5	<5	<5	NS	NS	<10	ND
	3/30/00	<5	5	<5	<5	<10	ND	5
	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
	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	<5	<5	NS	NS	<10	ND
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<5	<5	<5	NS	NS	<10	ND
Livestock WW	3/19/01	<5	<5	<5	<5	<10	<10	ND
	6/28/01	<5	<5	<5	NS	NS	<10	ND
	9/27/01	<5	<5	<5	NS	NS	<10	ND
	12/26/01	<5	<5	<5	NS	NS	<10	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.

**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	4/9/99	3.86	0.48	2.74	3600	6,100
MW-2	4/9/99	1.54	0.26	0.39	2700	4,400
	9/23/99	NS	NS	NS	2500	NS
MW-3	4/9/99	4.66	0.37	0.69	2000	3,500
	9/23/99	NS	NS	NS	1300	NS
	9/28/00	NS	NS	NS	400	NS
	12/21/00	0.07	0.05	0.13	490	1,300
	3/19/01	NS	NS	NS	530	NS
	9/27/01	0.2	0.08	0.09	620	1,600
MW-4	4/9/99	1.46	0.32	1.63	800	1,900
	9/23/99	NS	NS	NS	510	NS
	9/28/00	NS	NS	NS	600	NS
(Duplicate)	9/28/00	NS	NS	NS	760	NS
	12/21/00	<0.05	0.06	2.07	350	1,100
	3/19/01	NS	NS	NS	660	NS
MW-5	4/9/99	47.2	0.97	15.3	2400	4,000
	9/22/99	NS	NS	NS	860	NS
	9/28/00	NS	NS	NS	1200	NS
	12/21/00	0.27	0.06	2.84	760	1,700
	3/19/01	NS	NS	NS	1600	NS
MW-6	8/17/99	<0.05	0.21	0.14	2460	4,700
	9/22/99	NS	NS	NS	2400	NS
	9/28/00	NS	NS	NS	1200	NS
	12/21/00	0.37	0.4	0.14	1300	2,400
	3/19/01	NS	NS	NS	1400	NS
	9/27/01	0.16	0.08	0.13	2500	5,400

**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	8/17/99	<0.05	0.06	0.44	1400	2,800
	9/22/99	NS	NS	NS	1100	NS
MW-8	8/17/99	0.8	0.34	6.16	1860	3,300
	9/23/99	NS	NS	NS	1900	NS
	9/28/00	NS	NS	NS	1300	NS
	12/21/00	0.32	0.12	0.14	1000	2,100
	3/19/01	NS	NS	NS	970	NS
	9/27/01	0.36	0.08	0.25	1000	2,500
MW-9	8/17/99	0.11	0.22	0.21	1100	2,300
	9/23/99	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
	3/19/01	NS	NS	NS	640	NS
MW-10	8/17/99	0.61	0.17	0.14	2370	4,400
	9/22/99	NS	NS	NS	2200	NS
MW-11	8/17/99	<0.05	0.17	0.14	1020	2,300
	9/23/99	NS	NS	NS	1100	NS
	9/28/00	NS	NS	NS	1300	NS
	12/21/00	<0.05	0.09	0.14	1400	2,700
	3/19/01	NS	NS	NS	1500	NS
Duplicate	3/19/01	NS	NS	NS	1700	NS
	9/27/01	0.26	0.12	0.24	1600	3,800
MW-12 (PZ-2)	8/17/99	0.11	0.13	0.16	4160	7,100
	9/22/99	NS	NS	NS	4400	NS
	9/28/00	NS	NS	NS	3800	NS
	12/21/00	0.1	0.05	0.15	4000	6,100
	3/19/01	NS	NS	NS	3700	NS
	9/27/01	0.23	0.06	0.13	3200	6,500
MW-13 (PZ-1)	8/17/99	<0.05	0.09	0.16	1920	3,500
	9/23/99	NS	NS	NS	1600	NS
	9/28/00	NS	NS	NS	2200	NS
	12/21/00	0.06	0.02	0.05	1700	2,900
	3/19/01	NS	NS	NS	630	NS
	9/27/01	0.79	0.17	0.14	3000	5,900
Livestock WW	3/19/01	NS	NS	NS	660	NS
	9/27/01	13.4	0.25	0.21	600	1,600

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	4/9/99	<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	4/9/99	<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	4/9/99	<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
	12/21/00	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/01	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-4	4/9/99	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
	12/21/00	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	4/9/99	<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
	12/21/00	<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	8/17/99	<1	<0.1	<5	<1	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	12/21/00	<1	<0.1	<5	<1	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/01	<1	<0.1	<5	<1	<1.0	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-7	8/17/99	<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	8/17/99	<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
	12/21/00	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
	9/27/01	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-9	8/17/99	<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	8/17/99	<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	8/17/99	<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
	9/27/01	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-12 (PZ-2)	8/17/99	<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
	9/27/01	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
MW-13 (PZ-1)	8/17/99	<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
	9/27/01	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1
Livestock WW	9/27/01	<1	<0.1	<5	<1	<1	<1	<0.1	<1	<1	<0.1	<0.1	<0.1	<5	<5	<0.1	<0.1

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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1000 Antelope Highway, Suite 120
Midland, TX 79701-3872
Tel 915.836.1381 Fax 915.836.1878

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Task Manager
S. Kuhl

Project Director
A. Schmidt

Area Manager
A. Schmidt

Marathon Oil Company
Year 2001 Annual Groundwater Monitoring Report

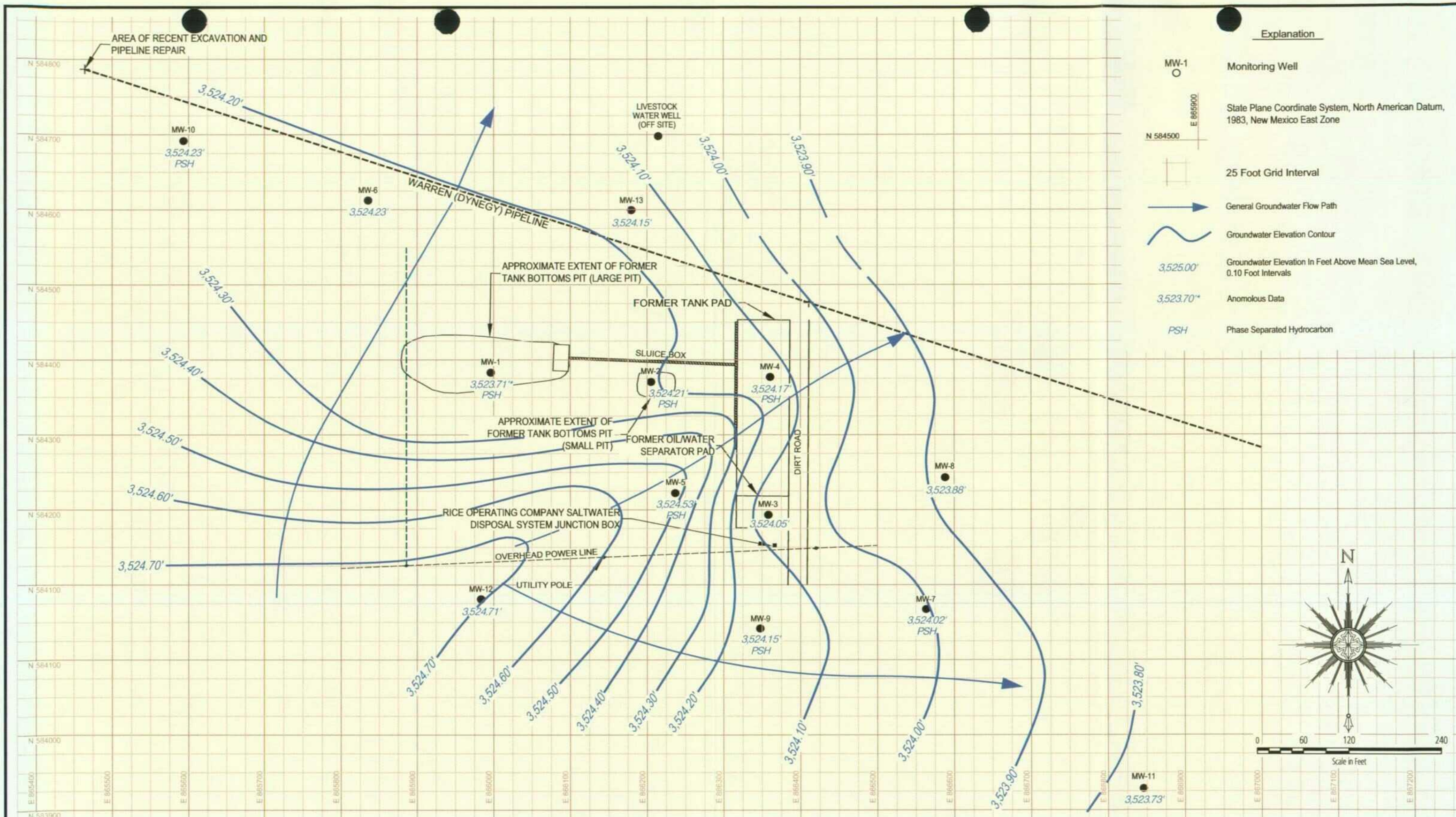
Site Location Map
Former Bertha Barber Tank Battery
Lea County, New Mexico

Technical Review
S. Tischer

Unique Number
31-014-00277

Project Number
MT000744.0001

Figure
1



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No.	Date	Revision Description	By	Ckd



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

Drawing Date
10 April 2002

File Name
MT744102.dwg

File Location
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Unique Number
31-014-00278

Project Director
A. Schmidt

Area Manager
A. Schmidt

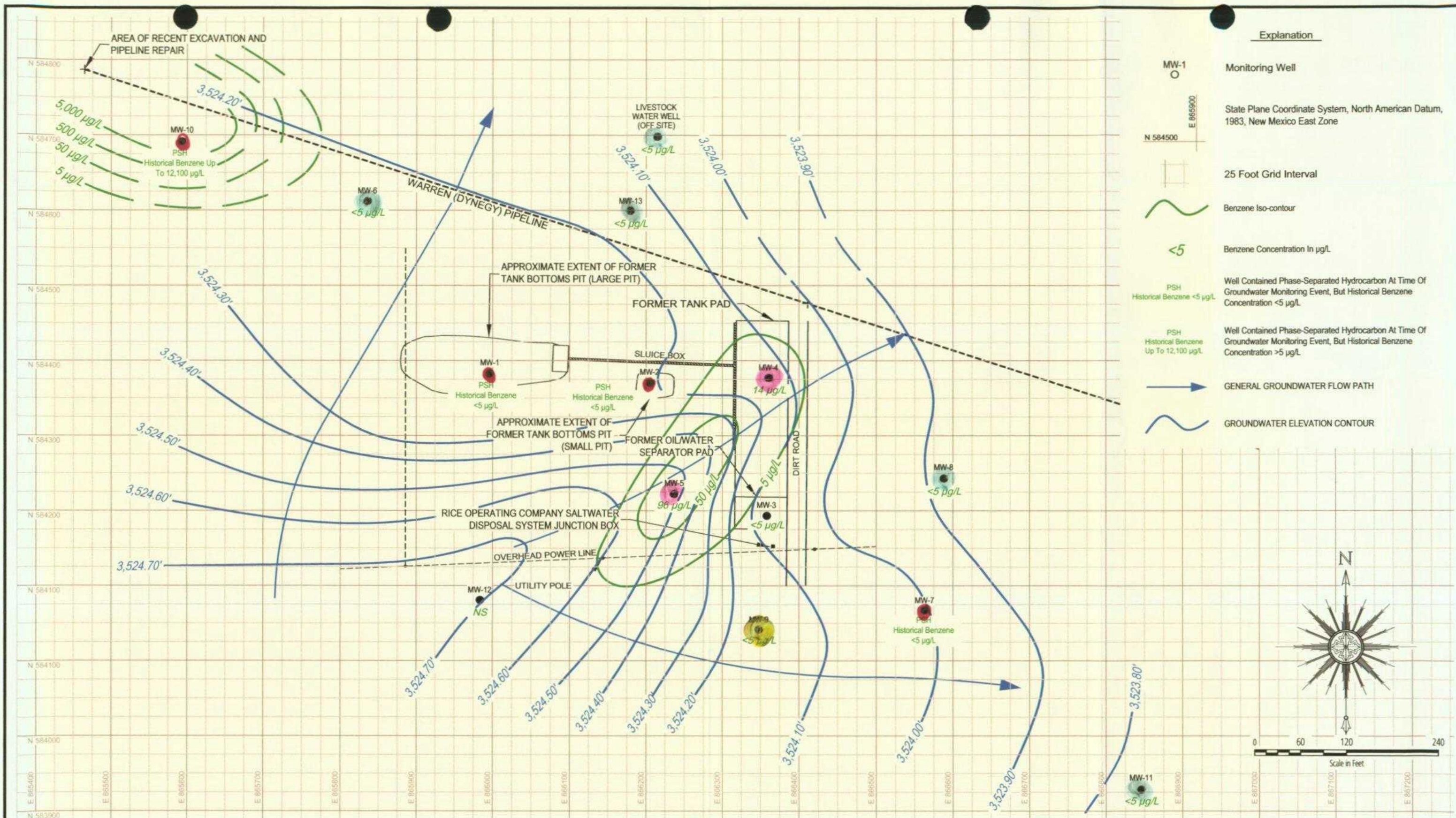
Task Manager
B. Kolb

Technical Review
S. Tischer

Project Number
MT000744.0001

Figure
2

Marathon Oil Company
Year 2001 Annual Groundwater Monitoring Report
Groundwater Elevation Contours September, 2001
Former Bertha Barber Tank Battery
Lea County, New Mexico

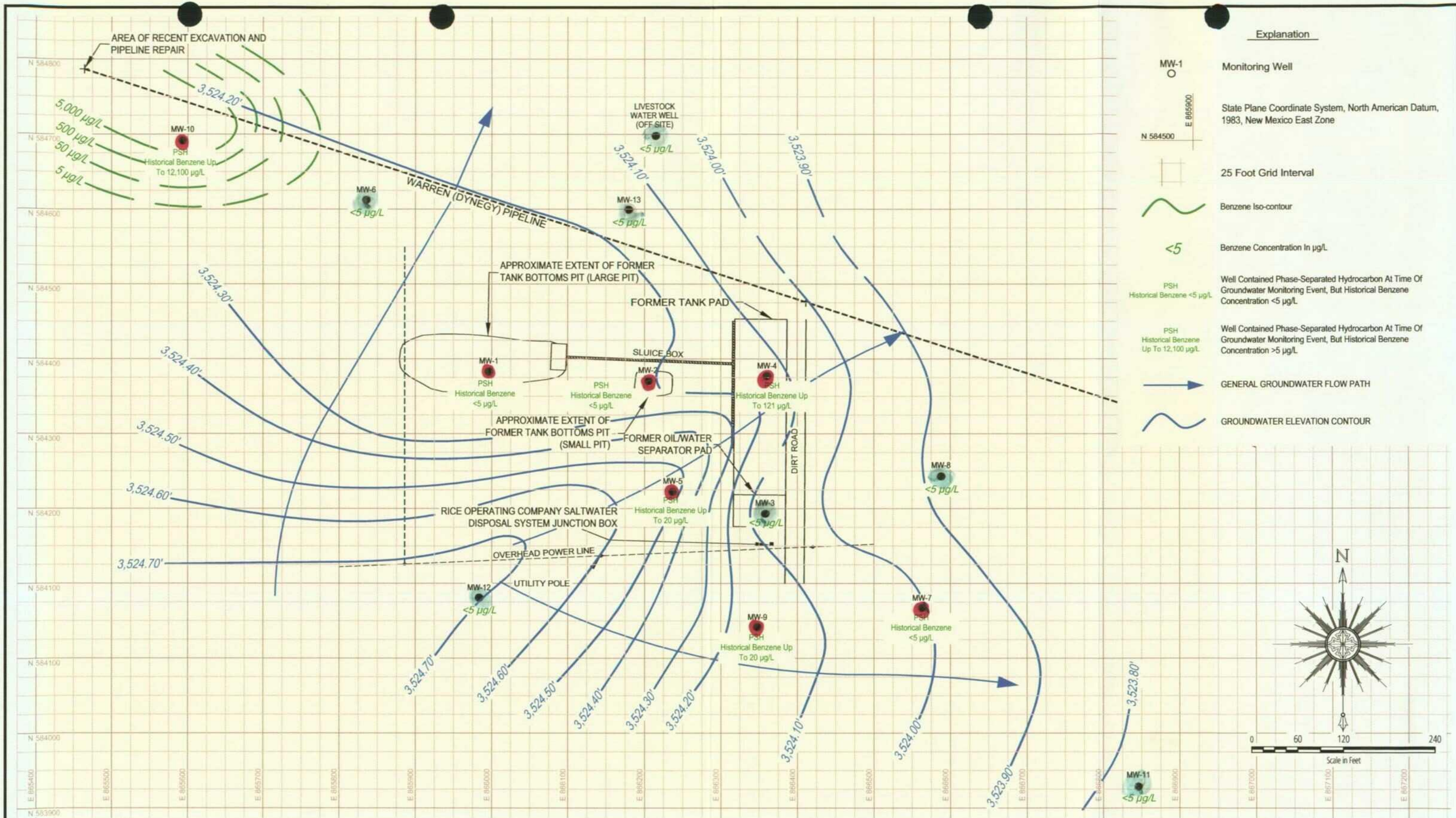


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Midland, TX 79701-3872
Tel: 915 699 1381 Fax: 915 699 1978

Drawing Date 10 April 2002	File Name MT744104.dwg	File Location \\DWG\Marathon Oil\MT000744.001	Unique Number 31-014-00280	Project Director A. Schmidt	Area Manager A. Schmidt
Marathon Oil Company Year 2001 Annual Groundwater Monitoring Report Benzene Concentrations In Groundwater June, 2001 Former Bertha Barber Tank Battery Lea County, New Mexico				Task Manager B. Kolb	Technical Review S. Tischer
				Project Number MT000744.0001	Figure 4



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No.	Date	Revision Description	By	Ckd



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Tel: 915 699 1381 Fax: 915 699 1978

Drawing Date
10 April 2002

File Name
MT744105.dwg

File Location
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Unique Number
31-014-00281

Project Director
A. Schmidt

Area Manager
A. Schmidt

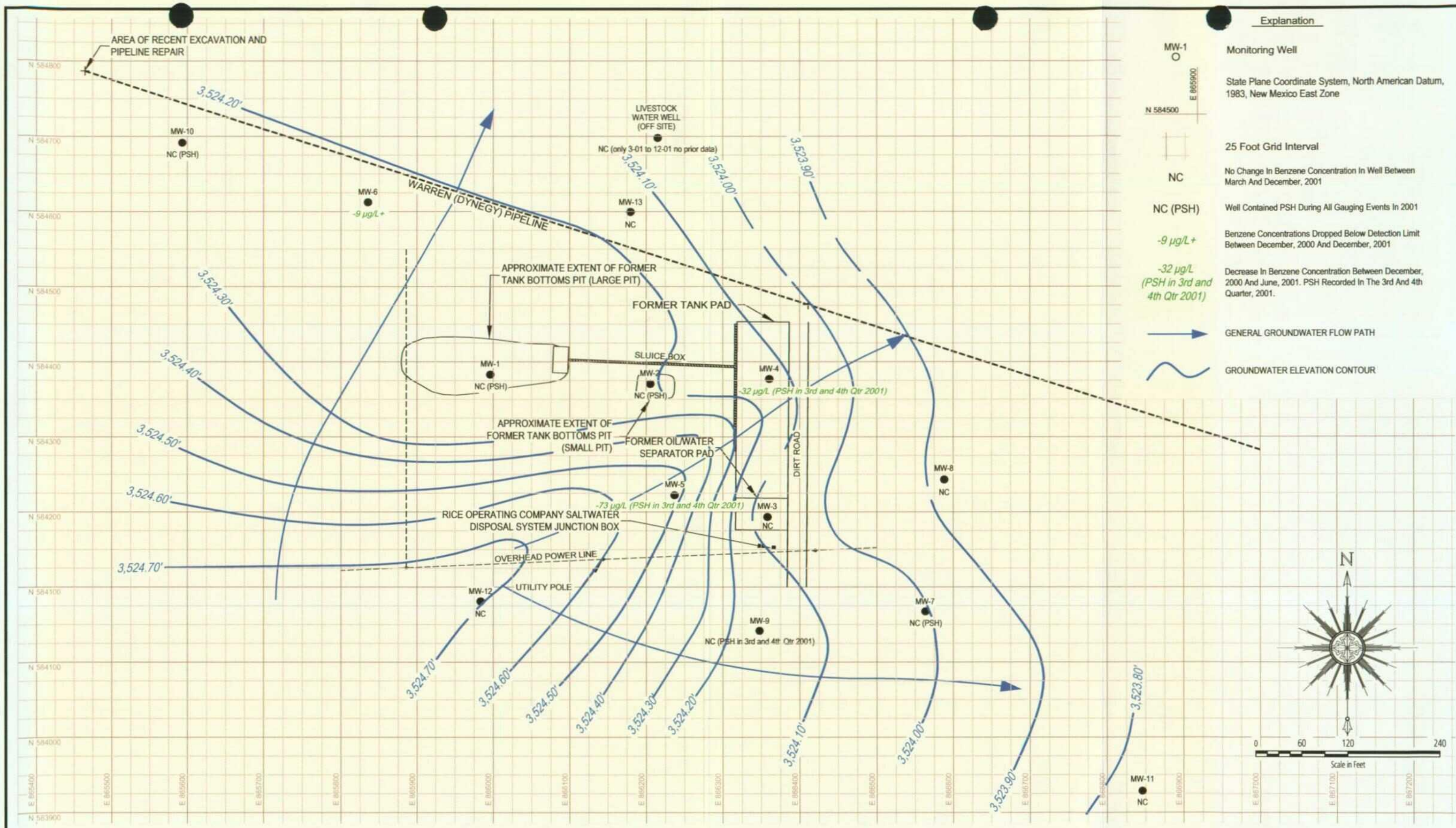
Task Manager
B. Kolb

Technical Review
S. Tischer

Project Number
MT000744.0001

Figure
5

Marathon Oil Company
Year 2001 Annual Groundwater Monitoring Report
Benzene Concentrations In Groundwater September, 2001
Former Bertha Barber Tank Battery
Lea County, New Mexico



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No.	Date	Revision Description	By	Chd



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

Drawing Date
10 April 2002

File Name
MT744107.dwg

File Location
\\DWG\\Marathon Oil\\MT000689.001

Unique Number
31-014-00283

Project Director
A. Schmidt

Area Manager
A. Schmidt

Task Manager
B. Kolb

Technical Review
S. Tischer

Project Number
MT000744.0001

Figure
7

Marathon Oil Company
Year 2001 Annual Groundwater Monitoring Report
Apparent Net Change In Benzene Concentrations
From March To December, 2001
Lea County, New Mexico

ANALYTICAL REPORT

JOB NUMBER: 602951

Prepared For:

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

Attention: PETE GALUSKY

Date: 03/27/2001



Signature

Name: Les Arnold

Title: Account Executive

3/17/01

Date

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383

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

SAMPLE INFORMATION
Date: 03/27/2001

Job Number.: 602951
Customer...: Marathon Oil Company
Attn.....: PETE GALUSKY

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

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
602951-1	BBMW-12	Water	03/19/2001	09:53	03/20/2001	12:00
602951-2	BBMW-09	Water	03/19/2001	10:30	03/20/2001	12:00
602951-3	BBMW-03	Water	03/19/2001	11:20	03/20/2001	12:00
602951-4	BBMW-05	Water	03/19/2001	11:58	03/20/2001	12:00
602951-5	BBMW-04	Water	03/19/2001	12:30	03/20/2001	12:00
602951-6	BBMW-13	Water	03/19/2001	13:15	03/20/2001	12:00
602951-7	BBMW-06	Water	03/19/2001	14:20	03/20/2001	12:00
602951-8	BBMW-08	Water	03/19/2001	14:43	03/20/2001	12:00
602951-9	LWW	Water	03/19/2001	15:23	03/20/2001	12:00
602951-10	BBMW-11	Water	03/19/2001	15:20	03/20/2001	12:00
602951-11	DUPLICATE(11)	Water	03/19/2001	15:20	03/20/2001	12:00
602951-12	RINSATE	Water	03/19/2001	15:30	03/20/2001	12:00

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: BBMW-12
Date Sampled.....: 03/19/2001
Time Sampled.....: 09:53
Sample Matrix.....: Water

Laboratory Sample ID: 602951-1
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	3700	50	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: BBMW-09
Date Sampled.....: 03/19/2001
Time Sampled.....: 10:30
Sample Matrix.....: Water

Laboratory Sample ID: 602951-2
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	640	10	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/22/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/22/01	weh
	Toluene	ND	5.0	ug/L	03/22/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/22/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/22/01	weh
	o-Xylene	ND	5.0	ug/L	03/22/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: 88MW-03
Date Sampled.....: 03/19/2001
Time Sampled.....: 11:20
Sample Matrix.....: Water

Laboratory Sample ID: 602951-3
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	530	10	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: BBMW-05
Date Sampled.....: 03/19/2001
Time Sampled.....: 11:58
Sample Matrix.....: Water

Laboratory Sample ID: 602951-4
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	1600	20	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	32	5.0	ug/L	03/22/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/22/01	weh
	Toluene	ND	5.0	ug/L	03/22/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/22/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/22/01	weh
	o-Xylene	ND	5.0	ug/L	03/22/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: 88MW-04
Date Sampled.....: 03/19/2001
Time Sampled.....: 12:30
Sample Matrix.....: Water

Laboratory Sample ID: 602951-5
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	660	10	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	37	5.0	ug/L	03/22/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/22/01	weh
	Toluene	5.2	5.0	ug/L	03/22/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/22/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/22/01	weh
	o-Xylene	ND	5.0	ug/L	03/22/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: 88MW-13
Date Sampled.....: 03/19/2001
Time Sampled.....: 13:15
Sample Matrix.....: Water

Laboratory Sample ID: 602951-6
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	630	10	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: BMW-06
Date Sampled.....: 03/19/2001
Time Sampled.....: 14:20
Sample Matrix.....: Water

Laboratory Sample ID: 602951-7
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	1400	20	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: BMW-08
Date Sampled.....: 03/19/2001
Time Sampled.....: 14:43
Sample Matrix.....: Water

Laboratory Sample ID: 602951-8
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	970	10	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: LWW
Date Sampled.....: 03/19/2001
Time Sampled.....: 15:23
Sample Matrix.....: Water

Laboratory Sample ID: 602951-9
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	660	10	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/22/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/22/01	weh
	Toluene	ND	5.0	ug/L	03/22/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/22/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/22/01	weh
	o-Xylene	ND	5.0	ug/L	03/22/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: BBMW-11
Date Sampled.....: 03/19/2001
Time Sampled.....: 15:20
Sample Matrix.....: Water

Laboratory Sample ID: 602951-10
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	1500	20	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: DUPLICATE(11)
Date Sampled.....: 03/19/2001
Time Sampled.....: 15:20
Sample Matrix.....: Water

Laboratory Sample ID: 602951-11
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 325.2	Chloride	1700	20	mg/L	03/27/01	mms
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/22/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/22/01	weh
	Toluene	ND	5.0	ug/L	03/22/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/22/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/22/01	weh
	o-Xylene	ND	5.0	ug/L	03/22/01	weh

LABORATORY TEST RESULTS

Job Number: 602951

Date: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Customer Sample ID: RINSATE
Date Sampled.....: 03/19/2001
Time Sampled.....: 15:30
Sample Matrix.....: Water

Laboratory Sample ID: 602951-12
Date Received.....: 03/20/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8021B	Volatile Organics - Aromatics					
	Benzene	ND	5.0	ug/L	03/21/01	weh
	Ethylbenzene	ND	5.0	ug/L	03/21/01	weh
	Toluene	ND	5.0	ug/L	03/21/01	weh
	Xylenes (total)	ND	10.0	ug/L	03/21/01	weh
	m&p-Xylenes	ND	10.0	ug/L	03/21/01	weh
	o-Xylene	ND	5.0	ug/L	03/21/01	weh

QUALITY CONTROL RESULTS

Job Number.: 602951

Report Date.: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Test Method.: EPA 325.2
Method Description.: Chloride (Colorimetric)
Parameter.: Chloride

Batch.: 72801
Units.: mg/L

Analyst.: nms
Test Code.: CHL

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V272397A	22.02		20		110.1	%	85-115	03/27/2001	1354
ICB			0.46							03/27/2001	1356
MD	602094-2		37.935			35.215	7.4	R 20		03/27/2001	1401
MS	602147-1	V160015303	41.72		20.000000	18.215	117.5	%	75-125	03/27/2001	1406
CCV		V272397A	20.47		20		102.3	%	85-115	03/27/2001	1427
CCB			0.42							03/27/2001	1429
CCV		V272397A	19.92		20		99.6	%	85-115	03/27/2001	1455
CCB			0.46							03/27/2001	1457
MD	603176-1		70.70			67.07	5.3	R 20		03/27/2001	1502
MS	603176-1	V160015303	87.80		20.000000	67.07	103.7	%	75-125	03/27/2001	1504
CCV		V272397A	20.14		20		100.7	%	85-115	03/27/2001	1514
CCB			0.43							03/27/2001	1516

QUALITY CONTROL RESULTS

Job Number.: 602951

Report Date.: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

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

Test Method.....: EPA 80218

Units.....: ug/L

Analyst....: weh

Method Description.: Volatile Organics - Aromatics

Batch.....: 72586

LCS	Laboratory Control Sample	8020MS00			03/21/2001	1152
-----	---------------------------	----------	--	--	------------	------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	45.956		50		91.9	% 70-119
Ethylbenzene	48.708		50		97.4	% 81-112
Toluene	50.306		50		100.6	% 78-109
Xylenes (total)	146.599		150		97.7	% 77-114
m&p-Xylenes	97.792		100		97.8	% 79-113
o-Xylene	48.807		50		97.6	% 77-114

MB	Method Blank				03/21/2001	1242
----	--------------	--	--	--	------------	------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	ND					
Ethylbenzene	ND					
Toluene	ND					
Xylenes (total)	ND					
m&p-Xylenes	ND					
o-Xylene	ND					

MS	Matrix Spike	8020MS00	602951-1		03/21/2001	1347
----	--------------	----------	----------	--	------------	------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.744		50	ND	95.5	% 70-119
Ethylbenzene	53.315		50	ND	106.6	% 81-112
Toluene	54.425		50	ND	108.8	% 78-109
Xylenes (total)	159.806		150	ND	106.5	% 77-114
m&p-Xylenes	106.603		100	ND	106.6	% 79-113
o-Xylene	53.203		50	ND	106.4	% 77-114

MSD	Matrix Spike Duplicate	8020MS00	602951-1		03/21/2001	1416
-----	------------------------	----------	----------	--	------------	------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.132	47.744	50	ND	94.3	% 70-119
					1.3	R 25
Ethylbenzene	53.780	53.315	50	ND	107.6	% 81-112
					0.9	R 25
Toluene	54.001	54.425	50	ND	108.0	% 78-109
					0.8	R 25
Xylenes (total)	161.645	159.806	150	ND	107.8	% 77-114
					1.1	R 25
m&p-Xylenes	107.830	106.603	100	ND	107.8	% 79-113
					1.1	R 25
o-Xylene	53.815	53.203	50	ND	107.6	% 77-114
					1.1	R 25

QUALITY CONTROL RESULTS					
Job Number.: 602951			Report Date.: 03/27/2001		
CUSTOMER: Marathon Oil Company		PROJECT: BERTHA BARBER TB		ATTN: PETE GALUSKY	
QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time

LCS	Laboratory Control Sample	8020MS00			03/21/2001 2033
-----	---------------------------	----------	--	--	-----------------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	44.844		50		89.7	% 70-119
Ethylbenzene	50.921		50		101.8	% 81-112
Toluene	50.224		50		100.4	% 78-109
Xylenes (total)	154.031		150		102.7	% 77-114
m&p-Xylenes	102.766		100		102.8	% 79-113
o-Xylene	51.265		50		102.5	% 77-114

Test Method.....: EPA 8021B		Units.....: ug/L		Analyst....: weh	
Method Description.: Volatile Organics - Aromatics		Batch.....: 72588			

LCS	Laboratory Control Sample	8020MS00			03/22/2001 0808
-----	---------------------------	----------	--	--	-----------------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	48.919		50		97.8	% 70-119
Ethylbenzene	53.138		50		106.3	% 81-112
Toluene	52.637		50		105.3	% 78-109
Xylenes (total)	161.239		150		107.5	% 77-114
m&p-Xylenes	107.859		100		107.9	% 79-113
o-Xylene	53.380		50		106.8	% 77-114

MB	Method Blank				03/22/2001 0839
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	ND					
Ethylbenzene	ND					
Toluene	ND					
Xylenes (total)	ND					
m&p-Xylenes	ND					
o-Xylene	ND					

MS	Matrix Spike	8020MS00	602951-2		03/22/2001 1018
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	45.229		50	ND	90.5	% 70-119
Ethylbenzene	53.713		50	ND	107.4	% 81-112
Toluene	51.589		50	ND	103.2	% 78-109
Xylenes (total)	161.658		150	ND	107.8	% 77-114
m&p-Xylenes	107.515		100	ND	107.5	% 79-113
o-Xylene	54.143		50	ND	108.3	% 77-114

QUALITY CONTROL RESULTS					
Job Number.: 602951			Report Date.: 03/27/2001		
CUSTOMER: Marathon Oil Company		PROJECT: BERTHA BARBER TB		ATTN: PETE GALUSKY	
QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time

MSD	Matrix Spike Duplicate	8020MS00	602951-2		03/22/2001 1050
-----	------------------------	----------	----------	--	-----------------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	45.916	45.229	50	ND	91.8 1.5	% 70-119 R 25
Ethylbenzene	53.893	53.713	50	ND	107.8 0.3	% 81-112 R 25
Toluene	51.594	51.589	50	ND	103.2 0.0	% 78-109 R 25
Xylenes (total)	159.949	161.658	150	ND	106.6 1.1	% 77-114 R 25
m&p-Xylenes	106.058	107.515	100	ND	106.1 1.4	% 79-113 R 25
o-Xylene	53.891	54.143	50	ND	107.8 0.5	% 77-114 R 25

LCS	Laboratory Control Sample	8020MS00			03/22/2001 1329
-----	---------------------------	----------	--	--	-----------------

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.839		50		95.7	% 70-119
Ethylbenzene	55.647		50		111.3	% 81-112
Toluene	54.573		50		109.1	% 78-109
Xylenes (total)	166.148		150		110.8	% 77-114
m&p-Xylenes	110.976		100		111.0	% 79-113
o-Xylene	55.172		50		110.3	% 77-114

SURROGATE RECOVERIES REPORT

Job Number.: 602951

Report Date.: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Method.....: Volatile Organics - Aromatics
Method Code.....: 80218

Batch.....: 72586
Analyst.....: weh

Surrogate	Units
1,4-Difluorobenzene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
602951-1		LCS		47.920	50.00	95.8	78-118		03/21/2001	1152
		MB		48.277	50.00	96.6	78-118		03/21/2001	1242
				46.842	50.00	93.7	78-118		03/21/2001	1315
		MS		47.749	50.00	95.5	78-118		03/21/2001	1347
		MSD		46.980	50.00	94.0	78-118		03/21/2001	1416
				49.007	50.00	98.0	78-118		03/21/2001	1447
				46.865	50.00	93.7	78-118		03/21/2001	1519
				44.873	50.00	89.7	78-118		03/21/2001	1550
				47.151	50.00	94.3	78-118		03/21/2001	1621
				44.413	50.00	88.8	78-118		03/21/2001	1652
602951-10				46.919	50.00	93.8	78-118		03/21/2001	1722
		LCS		44.657	50.00	89.3	78-118		03/21/2001	2033

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
602951-1		LCS		51.285	50.00	102.6	86-110		03/21/2001	1152
		MB		50.032	50.00	100.1	86-110		03/21/2001	1242
				48.525	50.00	97.0	86-110		03/21/2001	1315
		MS		50.834	50.00	101.7	86-110		03/21/2001	1347
		MSD		50.202	50.00	100.4	86-110		03/21/2001	1416
				51.290	50.00	102.6	86-110		03/21/2001	1447
				49.800	50.00	99.6	86-110		03/21/2001	1519
				48.426	50.00	96.9	86-110		03/21/2001	1550
				49.831	50.00	99.7	86-110		03/21/2001	1621
				47.656	50.00	95.3	86-110		03/21/2001	1652
602951-10				49.259	50.00	98.5	86-110		03/21/2001	1722
		LCS		48.896	50.00	97.8	86-110		03/21/2001	2033

Method.....: Volatile Organics - Aromatics
Method Code.....: 80218

Batch.....: 72588
Analyst.....: weh

Surrogate	Units
1,4-Difluorobenzene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		LCS		47.867	50.00	95.7	78-118		03/22/2001	0808
		MB		46.954	50.00	93.9	78-118		03/22/2001	0839

SURROGATE RECOVERIES REPORT

Job Number.: 602951

Report Date.: 03/27/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: PETE GALUSKY

Surrogate	Units
1,4-Difluorobenzene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
602951-2				46.600	50.00	93.2	78-118		03/22/2001	0946
602951-2		MS		45.338	50.00	90.7	78-118		03/22/2001	1018
602951-2		MSD		45.560	50.00	91.1	78-118		03/22/2001	1050
602951-4				46.498	50.00	93.0	78-118		03/22/2001	1121
602951-5				45.637	50.00	91.3	78-118		03/22/2001	1152
602951-9				46.452	50.00	92.9	78-118		03/22/2001	1224
602951-11				48.199	50.00	96.4	78-118		03/22/2001	1255
		LCS		48.184	50.00	96.4	78-118		03/22/2001	1329

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		LCS		51.363	50.00	102.7	86-110		03/22/2001	0808
		MB		50.197	50.00	100.4	86-110		03/22/2001	0839
602951-2				50.217	50.00	100.4	86-110		03/22/2001	0946
602951-2		MS		50.366	50.00	100.7	86-110		03/22/2001	1018
602951-2		MSD		50.493	50.00	101.0	86-110		03/22/2001	1050
602951-4				48.913	50.00	97.8	86-110		03/22/2001	1121
602951-5				46.587	50.00	93.2	86-110		03/22/2001	1152
602951-9				49.617	50.00	99.2	86-110		03/22/2001	1224
602951-11				51.077	50.00	102.2	86-110		03/22/2001	1255
		LCS		52.799	50.00	105.6	86-110		03/22/2001	1329

SEVERN TRENT SERVICES

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

Report To:

Bill To:

Shaded Areas For Internal Use Only 1 of 1

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

Contact: Mr. Pete galsky
Company: Marathon Oil Company
Address: 125 West Missouri, ST
Midland TX. 79702-0552
Phone: 915-687-8136
Fax: 915-687-8305
PO#: _____ Quote: _____

Lab Lot#
Package Sealed ☒ Yes ☐ No
Samples Sealed ☒ Yes ☐ No
Received on Ice ☒ Yes ☐ No
Samples Intact ☒ Yes ☐ No
Temperature °C of Cooler 1.7°C

Sampler Name: David Paul Bradley Signature: David Paul Bradley
Project Name: Bentley Barber TB Project Number: _____
Project Location: TOAUMENT Date Required: _____
Hard Copy: _____ Fax: _____

Laboratory ID	Client Sample ID	Sampling Date	Time	Matrix	Comp/Grab	Refr #	# / Cont.	Volume	Preserv	Additional Analyses / Remarks
602951-1	BBMW-12	3-19-01	9:53	W	BTEX	4020				Chlorides
-2	BBMW-9	3-19-01	10:30	W						
-3	BBMW-3	3-19-01	11:20	W						
-4	BBMW-5	3-19-01	11:58	W						
-5	BBMW-4	3-19-01	12:36	W						
-6	BBMW-13	3-19-01	1:15	W						
-7	BBMW-6	3-19-01	2:20	W						
-8	BBMW-8	3-19-01	2:43	W						
-9	LLCLD	3-19-01	1:23	W						
-10	BBMW-11	3-19-01	3:20	W						
-11	Duplicate (11)	3-19-01	3:20	W						
-12	RINUSATE	3-19-01	3:30	W						

RELINQUISHED BY: David Paul Bradley COMPANY: STL DATE: 3-19-01 TIME: 4:00 PM
RECEIVED BY: John P. Bunker COMPANY: STL DATE: 3-25-01 TIME: 12:00

Matrix Key

Container Key

Preservative Key

COMMENTS

Date Received

Hand Delivered

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 =

1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widesmouth Glass
6. Other

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

Courier: _____

Bill of Lading _____

rpjsckl

Job Sample Receipt Checklist Report
03/20/2001

V2

Job Number.....: 602951 Location.: 57211 Customer Job ID.....:
Project Number.: 96000703 Project Description.: MOC - Bertha Barber
Customer.....: Marathon Oil Company Contact.: Paul Peacock

Job Check List Date.: 03/20/2001
Project Manager.....: lpa

Questions ?

(Y/N) Comments

Chain-of-Custody Present?..... Y

Custody seal on shipping container?..... Y

...If "yes", custody seal intact?..... Y

Custody seals on sample containers?.....

...If "yes", custody seal intact?.....

Samples chilled?..... Y ON ICE

Temperature of cooler acceptable? (4 deg C +/-2). N 1.7 DEG C IR

Samples received intact (good condition)?..... Y

Volatile samples acceptable? (no headspace)..... N/A

Correct containers used?..... Y

Adequate sample volume provided?..... Y

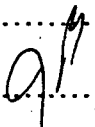
Samples preserved correctly?..... Y

Samples received within holding-time?..... Y

Agreement between COC and sample labels?..... Y

Additional.....

Comments.....

Sample Custodian Signature..... 

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

AUG 02 2001

Enviromental & Safety

ANALYTICAL REPORT

JOB NUMBER: 606932

Prepared For:

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

Attention: Paul Peacock

Date: 07/24/2001

Adrienne Byrnes
Signature

Name: Adrienn  R. Byrnes

Title: Project Manager

7/24/01
Date

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383PHONE: 219-464-2389
FAX...: 219-462-2953

SAMPLE INFORMATION
Date: 07/24/2001

Job Number.: 606932
Customer....: Marathon Oil Company
Attn.....: Paul Peacock

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

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
606932-1	MW-11	Water	06/28/2001	14:35	06/30/2001	12:00
606932-2	MW-9	Water	06/28/2001	15:01	06/30/2001	12:00
606932-3	MW-8	Water	06/28/2001	15:25	06/30/2001	12:00
606932-4	MW-13	Water	06/28/2001	15:55	06/30/2001	12:00
606932-5	OFF SITE	Water	06/28/2001	16:00	06/30/2001	12:00
606932-6	MW-12	Water	06/28/2001	16:31	06/30/2001	12:00
606932-7	MW-3	Water	06/28/2001	16:53	06/30/2001	12:00
606932-8	MW-6	Water	06/28/2001	17:40	06/30/2001	12:00
606932-9	MW-4	Water	06/28/2001	18:35	06/30/2001	12:00
606932-10	MW-5	Water	06/28/2001	18:00	06/30/2001	12:00
606932-11	DUP-1	Water	06/28/2001	00:00	06/30/2001	12:00
606932-12	RINSATE	Water	06/28/2001	00:00	06/30/2001	12:00
606932-13	TRIP BLANK	Water	06/28/2001	00:00	06/30/2001	12:00

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-11
Date Sampled.....: 06/28/2001
Time Sampled.....: 14:35
Sample Matrix.....: Water

Laboratory Sample ID: 606932-1
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-9
Date Sampled.....: 06/28/2001
Time Sampled.....: 15:01
Sample Matrix.....: Water

Laboratory Sample ID: 606932-2
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/09/01	wds
	Ethylbenzene	28	5	ug/L	07/09/01	wds
	Toluene	ND	5	ug/L	07/09/01	wds
	Xylenes (total)	ND	10	ug/L	07/09/01	wds

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-8
Date Sampled.....: 06/28/2001
Time Sampled.....: 15:25
Sample Matrix.....: Water

Laboratory Sample ID: 606932-3
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-13
Date Sampled.....: 06/28/2001
Time Sampled.....: 15:55
Sample Matrix.....: Water

Laboratory Sample ID: 606932-4
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: OFF SITE
Date Sampled.....: 06/28/2001
Time Sampled.....: 16:00
Sample Matrix.....: Water

Laboratory Sample ID: 606932-5
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-12
Date Sampled.....: 06/28/2001
Time Sampled.....: 16:31
Sample Matrix.....: Water

Laboratory Sample ID: 606932-6
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	Broken	5	ug/L	07/24/01	weh
	Ethylbenzene	Broken	5	ug/L	07/24/01	weh
	Toluene	Broken	5	ug/L	07/24/01	weh
	Xylenes (total)	Broken	10	ug/L	07/24/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-3
Date Sampled.....: 06/28/2001
Time Sampled.....: 16:53
Sample Matrix.....: Water

Laboratory Sample ID: 606932-7
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-6
Date Sampled.....: 06/28/2001
Time Sampled.....: 17:40
Sample Matrix.....: Water

Laboratory Sample ID: 606932-8
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-4
Date Sampled.....: 06/28/2001
Time Sampled.....: 18:35
Sample Matrix.....: Water

Laboratory Sample ID: 606932-9
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	14	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: MW-5
Date Sampled.....: 06/28/2001
Time Sampled.....: 18:00
Sample Matrix.....: Water

Laboratory Sample ID: 606932-10
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	96	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: DUP-1
Date Sampled.....: 06/28/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 606932-11
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/08/01	weh
	Ethylbenzene	ND	5	ug/L	07/08/01	weh
	Toluene	ND	5	ug/L	07/08/01	weh
	Xylenes (total)	ND	10	ug/L	07/08/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: RINSATE
Date Sampled.....: 06/28/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 606932-12
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	07/07/01	weh
	Ethylbenzene	ND	5	ug/L	07/07/01	weh
	Toluene	ND	5	ug/L	07/07/01	weh
	Xylenes (total)	ND	10	ug/L	07/07/01	weh

LABORATORY TEST RESULTS

Job Number: 606932

Date: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Customer Sample ID: TRIP BLANK
Date Sampled.....: 06/28/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 606932-13
Date Received.....: 06/30/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds	ND	5	ug/L	07/07/01	weh
	Benzene	ND	5	ug/L	07/07/01	weh
	Ethylbenzene	ND	5	ug/L	07/07/01	weh
	Toluene	ND	10	ug/L	07/07/01	weh
	Xylenes (total)	ND				

QUALITY CONTROL RESULTS

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: EPA 8260B

Units.....: ug/L

Analyst....: weh

Method Description.: Volatile Organic Compounds

Batch.....: 77667

LCS	Laboratory Control Sample	CLPVOAMS3				07/07/2001 0159
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.61		50		95.2	% 67-130
Toluene	46.73		50		93.5	% 75-114

MB	Method Blank					07/07/2001 0133
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	606815-7			07/07/2001 0252
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.88		50	ND	95.8	% 67-130
Toluene	47.28		50	ND	94.6	% 75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	606815-7			07/07/2001 0319
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.77	47.88	50	ND	95.5	% 67-130
					0.2	R 30
Toluene	47.08	47.28	50	ND	94.2	% 75-114
					0.4	R 30

Test Method.....: EPA 8260B

Units.....: ug/L

Analyst....: weh

Method Description.: Volatile Organic Compounds

Batch.....: 77693

LCS	Laboratory Control Sample	CLPVOAMS3				07/08/2001 0312
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.49		50		95.0	% 67-130
Toluene	46.87		50		93.7	% 75-114

QUALITY CONTROL RESULTS

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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MB	Method Blank				07/08/2001	0245
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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	607143-1		07/08/2001	0406
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	46.33		50	ND	92.7	% 67-130
Toluene	45.65		50	ND	91.3	% 75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	607143-1		07/08/2001	0432
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.25	46.33	50	ND	94.5	% 67-130
					2.0	R 30
Toluene	46.43	45.65	50	ND	92.9	% 75-114
					1.7	R 30

Test Method.....: EPA 8260B

Units.....: ug/L

Analyst....: wds

Method Description.: Volatile Organic Compounds

Batch.....: 77780

LCS	Laboratory Control Sample	CLPVOAMS3			07/09/2001	2037
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	52.32		50		104.6	% 67-130
Toluene	51.47		50		102.9	% 75-114

MB	Method Blank				07/09/2001	2010
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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	607181-2		07/09/2001	2130
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	51.92		50	ND	103.8	% 67-130
Toluene	51.21		50	ND	102.4	% 75-114

QUALITY CONTROL RESULTS

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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MSD	Matrix Spike Duplicate	CLPVOAMS3	607181-2		07/09/2001	2157
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	52.37	51.92	50	ND	104.7 0.9	% 67-130 R 30
Toluene	51.14	51.21	50	ND	102.3 0.1	% 75-114 R 30

SURROGATE RECOVERIES REPORT

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Method.....: Volatile Organic Compounds
Method Code.....: 8260V1Batch.....: 77667
Analyst.....: weh

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		47.21	50.00	94.4	76-116		07/07/2001	0133
		LCS		46.76	50.00	93.5	76-116		07/07/2001	0159
606815-7				47.40	50.00	94.8	76-116		07/07/2001	0226
606815-7		MS		47.35	50.00	94.7	76-116		07/07/2001	0252
606815-7		MSD		46.79	50.00	93.6	76-116		07/07/2001	0319
606815-9				46.71	50.00	93.4	76-116		07/07/2001	0346
606815-10				47.50	50.00	95.0	76-116		07/07/2001	0413
606815-11				47.50	50.00	95.0	76-116		07/07/2001	0439
606815-12				47.76	50.00	95.5	76-116		07/07/2001	0506
606815-14				47.60	50.00	95.2	76-116		07/07/2001	0532
606815-15				46.70	50.00	93.4	76-116		07/07/2001	0559
607126-5				46.95	50.00	93.9	76-116		07/07/2001	0626
606932-13				46.58	50.00	93.2	76-116		07/07/2001	0652
606932-12				46.75	50.00	93.5	76-116		07/07/2001	0719
606865-1			100	45.88	50.00	91.8	76-116		07/07/2001	0745
606865-2			100	45.01	50.00	90.0	76-116		07/07/2001	0812
606865-3			100	43.83	50.00	87.7	76-116		07/07/2001	0839
606866-1			400	46.53	50.00	93.1	76-116		07/07/2001	0905
606866-2			400	46.86	50.00	93.7	76-116		07/07/2001	0932
606866-3			400	46.87	50.00	93.7	76-116		07/07/2001	0959

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		47.14	50.00	94.3	85-110		07/07/2001	0133
		LCS		46.87	50.00	93.7	85-110		07/07/2001	0159
606815-7				47.06	50.00	94.1	85-110		07/07/2001	0226
606815-7		MS		46.01	50.00	92.0	85-110		07/07/2001	0252
606815-7		MSD		47.00	50.00	94.0	85-110		07/07/2001	0319
606815-9				47.08	50.00	94.2	85-110		07/07/2001	0346
606815-10				47.94	50.00	95.9	85-110		07/07/2001	0413
606815-11				47.86	50.00	95.7	85-110		07/07/2001	0439
606815-12				47.80	50.00	95.6	85-110		07/07/2001	0506
606815-14				49.08	50.00	98.2	85-110		07/07/2001	0532
606815-15				47.98	50.00	96.0	85-110		07/07/2001	0559
607126-5				47.04	50.00	94.1	85-110		07/07/2001	0626
606932-13				47.42	50.00	94.8	85-110		07/07/2001	0652
606932-12				48.96	50.00	97.9	85-110		07/07/2001	0719
606865-1			100	48.87	50.00	97.7	85-110		07/07/2001	0745
606865-2			100	47.87	50.00	95.7	85-110		07/07/2001	0812
606865-3			100	47.50	50.00	95.0	85-110		07/07/2001	0839
606866-1			400	47.75	50.00	95.5	85-110		07/07/2001	0905
606866-2			400	47.71	50.00	95.4	85-110		07/07/2001	0932

SURROGATE RECOVERIES REPORT

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
606866-3			400	47.79	50.00	95.6	85-110		07/07/2001	0959

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.19	50.00	100.4	85-112		07/07/2001	0133
		LCS		50.06	50.00	100.1	85-112		07/07/2001	0159
606815-7				50.28	50.00	100.6	85-112		07/07/2001	0226
606815-7		MS		50.14	50.00	100.3	85-112		07/07/2001	0252
606815-7		MSD		50.20	50.00	100.4	85-112		07/07/2001	0319
606815-9				50.79	50.00	101.6	85-112		07/07/2001	0346
606815-10				51.20	50.00	102.4	85-112		07/07/2001	0413
606815-11				50.42	50.00	100.8	85-112		07/07/2001	0439
606815-12				50.27	50.00	100.5	85-112		07/07/2001	0506
606815-14				50.00	50.00	100.0	85-112		07/07/2001	0532
606815-15				50.35	50.00	100.7	85-112		07/07/2001	0559
607126-5				51.28	50.00	102.6	85-112		07/07/2001	0626
606932-13				50.49	50.00	101.0	85-112		07/07/2001	0652
606932-12				50.91	50.00	101.8	85-112		07/07/2001	0719
606865-1			100	49.81	50.00	99.6	85-112		07/07/2001	0745
606865-2			100	49.47	50.00	98.9	85-112		07/07/2001	0812
606865-3			100	49.51	50.00	99.0	85-112		07/07/2001	0839
606866-1			400	49.80	50.00	99.6	85-112		07/07/2001	0905
606866-2			400	49.99	50.00	100.0	85-112		07/07/2001	0932
606866-3			400	49.91	50.00	99.8	85-112		07/07/2001	0959

Method.....: Volatile Organic Compounds
Method Code.....: 8260V1

Batch.....: 77693
Analyst.....: weh

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		51.77	50.00	103.5	76-116		07/08/2001	0245
		LCS		51.64	50.00	103.3	76-116		07/08/2001	0312
607143-1				52.60	50.00	105.2	76-116		07/08/2001	0339
607143-1		MS		51.61	50.00	103.2	76-116		07/08/2001	0406
607143-1		MSD		51.82	50.00	103.6	76-116		07/08/2001	0432
606711-1	Solid		50	51.05	50.00	102.1	78-122		07/08/2001	0459
606711-2	Solid		50	49.97	50.00	99.9	78-122		07/08/2001	0526
606711-3	Solid		50	50.16	50.00	100.3	78-122		07/08/2001	0552
606711-4	Solid		50	48.46	50.00	96.9	78-122		07/08/2001	0619

SURROGATE RECOVERIES REPORT

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

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

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
606932-1				50.65	50.00	101.3	76-116		07/08/2001	0738
606932-3				49.46	50.00	98.9	76-116		07/08/2001	0805
606932-4				50.86	50.00	101.7	76-116		07/08/2001	0832
606932-5				50.33	50.00	100.7	76-116		07/08/2001	0858
606932-7				50.15	50.00	100.3	76-116		07/08/2001	0925
606932-8				50.90	50.00	101.8	76-116		07/08/2001	0951
606932-9				48.72	50.00	97.4	76-116		07/08/2001	1018
606932-10				47.55	50.00	95.1	76-116		07/08/2001	1045
606932-11				48.92	50.00	97.8	76-116		07/08/2001	1111

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		49.25	50.00	98.5	85-110		07/08/2001	0245
		LCS		48.89	50.00	97.8	85-110		07/08/2001	0312
				49.47	50.00	98.9	85-110		07/08/2001	0339
607143-1		MS		50.42	50.00	100.8	85-110		07/08/2001	0406
607143-1		MSD		50.06	50.00	100.1	85-110		07/08/2001	0432
606711-1	Solid		50	48.30	50.00	96.6	71-121		07/08/2001	0459
606711-2	Solid		50	45.78	50.00	91.6	71-121		07/08/2001	0526
606711-3	Solid		50	47.79	50.00	95.6	71-121		07/08/2001	0552
606711-4	Solid		50	46.96	50.00	93.9	71-121		07/08/2001	0619
606932-1				50.32	50.00	100.6	85-110		07/08/2001	0738
606932-3				51.53	50.00	103.1	85-110		07/08/2001	0805
606932-4				50.87	50.00	101.7	85-110		07/08/2001	0832
606932-5				50.05	50.00	100.1	85-110		07/08/2001	0858
606932-7				49.17	50.00	98.3	85-110		07/08/2001	0925
606932-8				47.80	50.00	95.6	85-110		07/08/2001	0951
606932-9				48.30	50.00	96.6	85-110		07/08/2001	1018
606932-10				48.70	50.00	97.4	85-110		07/08/2001	1045
606932-11				47.53	50.00	95.1	85-110		07/08/2001	1111

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.89	50.00	101.8	85-112		07/08/2001	0245
		LCS		50.58	50.00	101.2	85-112		07/08/2001	0312
				50.53	50.00	101.1	85-112		07/08/2001	0339
607143-1		MS		50.87	50.00	101.7	85-112		07/08/2001	0406
607143-1		MSD		50.05	50.00	100.1	85-112		07/08/2001	0432
606711-1	Solid		50	50.86	50.00	101.7	87-109		07/08/2001	0459
606711-2	Solid		50	50.89	50.00	101.8	87-109		07/08/2001	0526

SURROGATE RECOVERIES REPORT

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

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
606711-3	Solid		50	50.72	50.00	101.4	87-109		07/08/2001	0552
606711-4	Solid		50	50.73	50.00	101.5	87-109		07/08/2001	0619
606932-1				50.76	50.00	101.5	85-112		07/08/2001	0738
606932-3				50.82	50.00	101.6	85-112		07/08/2001	0805
606932-4				50.91	50.00	101.8	85-112		07/08/2001	0832
606932-5				50.84	50.00	101.7	85-112		07/08/2001	0858
606932-7				51.20	50.00	102.4	85-112		07/08/2001	0925
606932-8				51.39	50.00	102.8	85-112		07/08/2001	0951
606932-9				51.07	50.00	102.1	85-112		07/08/2001	1018
606932-10				50.68	50.00	101.4	85-112		07/08/2001	1045
606932-11				50.54	50.00	101.1	85-112		07/08/2001	1111

Method.....: Volatile Organic Compounds
Method Code.....: 8260V1Batch.....: 77780
Analyst.....: wds

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		50.42	50.00	100.8	76-116		07/09/2001	2010
		LCS		49.70	50.00	99.4	76-116		07/09/2001	2037
607181-2				50.49	50.00	101.0	76-116		07/09/2001	2103
607181-2		MS		49.98	50.00	100.0	76-116		07/09/2001	2130
607181-2		MSD		50.19	50.00	100.4	76-116		07/09/2001	2157
607249-2				51.39	50.00	102.8	76-116		07/09/2001	2223
606932-2				50.46	50.00	100.9	76-116		07/09/2001	2250
606787-1	Solid		1000	50.25	50.00	100.5	76-116		07/09/2001	2317
606711-2	Solid		10000	50.00	50.00	100.0	76-116		07/09/2001	2344
606711-3	Solid		1000	50.19	50.00	100.4	76-116		07/10/2001	0010
606990-1			10	50.31	50.00	100.6	76-116		07/10/2001	0037
606249-1			100	50.73	50.00	101.5	76-116		07/10/2001	0104
607251-1				50.00	50.00	100.0	76-116		07/10/2001	0131
607251-2				50.58	50.00	101.2	76-116		07/10/2001	0157

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		51.25	50.00	102.5	85-110		07/09/2001	2010
		LCS		50.57	50.00	101.1	85-110		07/09/2001	2037
607181-2				50.27	50.00	100.5	85-110		07/09/2001	2103
607181-2		MS		50.66	50.00	101.3	85-110		07/09/2001	2130
607181-2		MSD		51.63	50.00	103.3	85-110		07/09/2001	2157

SURROGATE RECOVERIES REPORT

Job Number.: 606932

Report Date.: 07/24/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TB

ATTN: Paul Peacock

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
607249-2				49.74	50.00	99.5	85-110		07/09/2001	2223
606932-2				49.73	50.00	99.5	85-110		07/09/2001	2250
606787-1	Solid		1000	45.99	50.00	92.0	85-110		07/09/2001	2317
606711-2	Solid		10000	49.56	50.00	99.1	85-110		07/09/2001	2344
606711-3	Solid		1000	49.67	50.00	99.3	85-110		07/10/2001	0010
606990-1			10	49.66	50.00	99.3	85-110		07/10/2001	0037
606249-1			100	49.34	50.00	98.7	85-110		07/10/2001	0104
607251-1				48.17	50.00	96.3	85-110		07/10/2001	0131
607251-2				48.88	50.00	97.8	85-110		07/10/2001	0157

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.00	50.00	100.0	85-112		07/09/2001	2010
		LCS		49.06	50.00	98.1	85-112		07/09/2001	2037
				49.80	50.00	99.6	85-112		07/09/2001	2103
607181-2		MS		49.39	50.00	98.8	85-112		07/09/2001	2130
607181-2		MSD		49.66	50.00	99.3	85-112		07/09/2001	2157
607249-2				50.05	50.00	100.1	85-112		07/09/2001	2223
606932-2				54.04	50.00	108.1	85-112		07/09/2001	2250
606787-1	Solid		1000	50.54	50.00	101.1	85-112		07/09/2001	2317
606711-2	Solid		10000	49.56	50.00	99.1	85-112		07/09/2001	2344
606711-3	Solid		1000	49.86	50.00	99.7	85-112		07/10/2001	0010
606990-1			10	50.15	50.00	100.3	85-112		07/10/2001	0037
606249-1			100	49.83	50.00	99.7	85-112		07/10/2001	0104
607251-1				50.69	50.00	101.4	85-112		07/10/2001	0131
607251-2				50.34	50.00	100.7	85-112		07/10/2001	0157

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

rpjsckl

Job Sample Receipt Checklist Report
06/30/2001

V2

Job Number..... 000932 Location.: 57211 Customer Job ID.....
Project Number.: 00000651 Project Description.: Marathon Oil Co., Midland, Tx
Customer..... Marathon Oil Company Contact.: Paul Peacock

Job Check List Date.: 06/30/2001
Project Manager..... arb

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 20 DEG C IR

Samples received intact (good condition)?..... Y

Volatile samples acceptable? (no headspace)..... Y

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..... 

MCR

OCT 29 2001

Environmental & Safety

ANALYTICAL REPORT

JOB NUMBER: 610759

Prepared For:

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

Attention: Paul Peacock

Date: 10/19/2001

Adrienne Byrnes
Signature

Name: Adrienne R. Byrnes

Title: Project Manager

E-Mail: arbyrnes@stl-inc.com

10/19/01
Date

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383

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

SAMPLE INFORMATION
Date: 10/19/2001

Job Number.: 610759
Customer....: Marathon Oil Company
Attn.....: Paul Peacock

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

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
610759-1	BBMW-11	Water	09/27/2001	13:58	09/29/2001	12:00
610759-2	BBMW-8	Water	09/27/2001	14:55	09/29/2001	12:00
610759-3	BBMW-13	Water	09/27/2001	15:10	09/29/2001	12:00
610759-4	LLW	Water	09/27/2001	15:30	09/29/2001	12:00
610759-5	BBMW-12	Water	09/27/2001	16:19	09/29/2001	12:00
610759-6	BBMW-3	Water	09/27/2001	17:20	09/29/2001	12:00
610759-7	BBMW-6	Water	09/27/2001	18:15	09/29/2001	12:00

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: BBMW-11
Date Sampled.....: 09/27/2001
Time Sampled.....: 13:58
Sample Matrix.....: Water

Laboratory Sample ID: 610759-1
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	3800	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	1600	10	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.24	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	0.26	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.12	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/06/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/06/01	rm
	Anthracene	ND	1.0	ug/L	10/06/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/06/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/06/01	rm
	Chrysene	ND	1.0	ug/L	10/06/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/06/01	rm
	Fluoranthene	ND	1.0	ug/L	10/06/01	rm
	Fluorene	ND	1.0	ug/L	10/06/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/06/01	rm
	Naphthalene	ND	5.0	ug/L	10/06/01	rm
	Phenanthrene	ND	1.0	ug/L	10/06/01	rm
	Pyrene	ND	1.0	ug/L	10/06/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/08/01	weh
	Ethylbenzene	ND	5	ug/L	10/08/01	weh
	Toluene	ND	5	ug/L	10/08/01	weh
	Xylenes (total)	ND	10	ug/L	10/08/01	weh

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: BBMW-8
Date Sampled.....: 09/27/2001
Time Sampled.....: 14:55
Sample Matrix.....: Water

Laboratory Sample ID: 610759-2
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	2500	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	1000	10	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.25	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	0.36	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.08	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/06/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/06/01	rm
	Anthracene	ND	1.0	ug/L	10/06/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/06/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/06/01	rm
	Chrysene	ND	1.0	ug/L	10/06/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/06/01	rm
	Fluoranthene	ND	1.0	ug/L	10/06/01	rm
	Fluorene	ND	1.0	ug/L	10/06/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/06/01	rm
	Naphthalene	ND	5.0	ug/L	10/06/01	rm
	Phenanthrene	ND	1.0	ug/L	10/06/01	rm
	Pyrene	ND	1.0	ug/L	10/06/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/08/01	weh
	Ethylbenzene	ND	5	ug/L	10/08/01	weh
	Toluene	ND	5	ug/L	10/08/01	weh
	Xylenes (total)	ND	10	ug/L	10/08/01	weh

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: BMW-13
Date Sampled.....: 09/27/2001
Time Sampled.....: 15:10
Sample Matrix.....: Water

Laboratory Sample ID: 610759-3
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	5900	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	3000	100	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.14	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	0.79	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.17	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/17/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/17/01	rm
	Anthracene	ND	1.0	ug/L	10/17/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/17/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/17/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/17/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/17/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/17/01	rm
	Chrysene	ND	1.0	ug/L	10/17/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/17/01	rm
	Fluoranthene	ND	1.0	ug/L	10/17/01	rm
	Fluorene	ND	1.0	ug/L	10/17/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/17/01	rm
	Naphthalene	ND	5.0	ug/L	10/17/01	rm
	Phenanthrene	ND	1.0	ug/L	10/17/01	rm
	Pyrene	ND	1.0	ug/L	10/17/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/05/01	wds
	Ethylbenzene	ND	5	ug/L	10/05/01	wds
	Toluene	ND	5	ug/L	10/05/01	wds
	Xylenes (total)	ND	10	ug/L	10/05/01	wds

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: LLW
Date Sampled.....: 09/27/2001
Time Sampled.....: 15:30
Sample Matrix.....: Water

Laboratory Sample ID: 610759-4
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	1600	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	600	10	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.21	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	13.4	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.25	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/06/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/06/01	rm
	Anthracene	ND	1.0	ug/L	10/06/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/06/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/06/01	rm
	Chrysene	ND	1.0	ug/L	10/06/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/06/01	rm
	Fluoranthene	ND	1.0	ug/L	10/06/01	rm
	Fluorene	ND	1.0	ug/L	10/06/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/06/01	rm
	Naphthalene	ND	5.0	ug/L	10/06/01	rm
	Phenanthrene	ND	1.0	ug/L	10/06/01	rm
	Pyrene	ND	1.0	ug/L	10/06/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/08/01	weh
	Ethylbenzene	ND	5	ug/L	10/08/01	weh
	Toluene	ND	5	ug/L	10/08/01	weh
	Xylenes (total)	ND	10	ug/L	10/08/01	weh

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: 88MW-12
Date Sampled.....: 09/27/2001
Time Sampled.....: 16:19
Sample Matrix.....: Water

Laboratory Sample ID: 610759-5
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	6500	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	3200	100	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.13	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	0.23	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.06	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/06/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/06/01	rm
	Anthracene	ND	1.0	ug/L	10/06/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/06/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/06/01	rm
	Chrysene	ND	1.0	ug/L	10/06/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/06/01	rm
	Fluoranthene	ND	1.0	ug/L	10/06/01	rm
	Fluorene	ND	1.0	ug/L	10/06/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/06/01	rm
	Naphthalene	ND	5.0	ug/L	10/06/01	rm
	Phenanthrene	ND	1.0	ug/L	10/06/01	rm
	Pyrene	ND	1.0	ug/L	10/06/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/08/01	weh
	Ethylbenzene	ND	5	ug/L	10/08/01	weh
	Toluene	ND	5	ug/L	10/08/01	weh
	Xylenes (total)	ND	10	ug/L	10/08/01	weh

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: BMW-3
Date Sampled.....: 09/27/2001
Time Sampled.....: 17:20
Sample Matrix.....: Water

Laboratory Sample ID: 610759-6
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	1600	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	620	10	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.09	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	0.20	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.08	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/06/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/06/01	rm
	Anthracene	ND	1.0	ug/L	10/06/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/06/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/06/01	rm
	Chrysene	ND	1.0	ug/L	10/06/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/06/01	rm
	Fluoranthene	ND	1.0	ug/L	10/06/01	rm
	Fluorene	ND	1.0	ug/L	10/06/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/06/01	rm
	Naphthalene	ND	5.0	ug/L	10/06/01	rm
	Phenanthrene	ND	1.0	ug/L	10/06/01	rm
	Pyrene	ND	1.0	ug/L	10/06/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/08/01	weh
	Ethylbenzene	ND	5	ug/L	10/08/01	weh
	Toluene	ND	5	ug/L	10/08/01	weh
	Xylenes (total)	ND	10	ug/L	10/08/01	weh

LABORATORY TEST RESULTS

Job Number: 610759

Date: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Customer Sample ID: 88MW-6
Date Sampled.....: 09/27/2001
Time Sampled.....: 18:15
Sample Matrix.....: Water

Laboratory Sample ID: 610759-7
Date Received.....: 09/29/2001
Time Received.....: 12:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	5400	10	mg/L	10/05/01	ejp
EPA 325.2	Chloride	2500	100	mg/L	10/01/01	tdc
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			10/04/01	mls
EPA 6010B	Metals Analysis (ICAP)					
	Barium (Ba), Dissolved	0.13	0.01	mg/L	10/01/01	pal
	Iron (Fe), Dissolved	0.16	0.05	mg/L	10/01/01	pal
	Manganese (Mn), Dissolved	0.08	0.01	mg/L	10/05/01	pal
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	10/06/01	rm
	Acenaphthylene	ND	5.0	ug/L	10/06/01	rm
	Anthracene	ND	1.0	ug/L	10/06/01	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)anthracene	ND	0.10	ug/L	10/06/01	rm
	Benzo(a)pyrene	ND	0.10	ug/L	10/06/01	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	10/06/01	rm
	Chrysene	ND	1.0	ug/L	10/06/01	rm
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	10/06/01	rm
	Fluoranthene	ND	1.0	ug/L	10/06/01	rm
	Fluorene	ND	1.0	ug/L	10/06/01	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	10/06/01	rm
	Naphthalene	ND	5.0	ug/L	10/06/01	rm
	Phenanthrene	ND	1.0	ug/L	10/06/01	rm
	Pyrene	ND	1.0	ug/L	10/06/01	rm
EPA 8260B	Volatile Organic Compounds					
	Benzene	ND	5	ug/L	10/05/01	wds
	Ethylbenzene	ND	5	ug/L	10/05/01	wds
	Toluene	ND	5	ug/L	10/05/01	wds
	Xylenes (total)	ND	10	ug/L	10/05/01	wds

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Test Method.....: EPA 325.2
Method Description.: Chloride (Colorimetric)
Parameter.....: Chloride

Batch.....: 81906
Units.....: mg/L

Analyst....: tdc
Test Code.: CHL

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V283616A	19.32		20PPM		96.6	%	85-115	10/01/2001	1545
ICB			0.44							10/01/2001	1546
CCV		V283616A	19.41		20PPM		97.0	%	85-115	10/01/2001	1558
CCB			0.49							10/01/2001	1559
MS	610565-2	V160015303	46.44		20.000000	25.93	102.5	%	75-125	10/01/2001	1605
MSD	610565-2	V160015303	46.192	46.44	20.000000	25.93	101.3	%	75-125	10/01/2001	1606
							0.5	R	20		
CCV		V283616A	19.25		20PPM		96.2	%	85-115	10/01/2001	1610
CCB			0.39							10/01/2001	1612
MS	610707-2	V160015303	49.814		20.000000	49.814	0.0	%	75-125	10/01/2001	1618
MSD	610707-2	V160015303	49.7	49.7	20.000000	49.814	-0.6	%	75-125	10/01/2001	1619
							0.0	R	20		
CCV		V283616A	19.61		20PPM		98.0	%	85-115	10/01/2001	1623
CCB			0.35							10/01/2001	1624
CCV		V283616A	18.89		20PPM		94.5	%	85-115	10/01/2001	1636
CCB			0.35							10/01/2001	1637
CCV		V283616A	19.47		20PPM		97.3	%	85-115	10/01/2001	1649
CCB			0.35							10/01/2001	1650
MS	610263-9	V160015303	33.415		20.000000	12.621	104.0	%	75-125	10/01/2001	1651
MSD	610263-9	V160015303	33.291	33.415	20.000000	12.621	103.3	%	75-125	10/01/2001	1652
							0.4	R	20		
CCV		V283616A	19.23		20PPM		96.2	%	85-115	10/01/2001	1653
CCB			0.44							10/01/2001	1654

Test Method.....: EPA 160.1
Method Description.: Solids, Total Dissolved (TDS)
Parameter.....: Solids, Total Dissolved (TDS)

Batch.....: 82154
Units.....: mg/L

Analyst....: ejp
Test Code.: TDS

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MB			-1.0							10/05/2001	1545
LCS		V289915A	9955		10013		99.4	%	80-120	10/05/2001	1550
MS	610698-1	V289915A	3643		500.650000	3086	111.3	%	75-125	10/05/2001	1626
MSD	610698-1	V289915A	3593	3643	500.650000	3086	101.3	%	75-125	10/05/2001	1631
							1.4	R	20		

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Barium (Ba)

Batch.....: 81899
Units.....: mg/L

Analyst....: pal
Test Code.: BA

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	-0.00109		0.00					10/01/2001	0954
CAL		ICPCALSTD	1.27400		1.00					10/01/2001	1015
ICV		V263054C	3.92494		4.00		98.1	%	90-110	10/01/2001	1143
ICV		V263054B	1.91530		2.00		95.8	%	90-110	10/01/2001	1208
ICB			0.00015							10/01/2001	1214
ISB		V263053F	0.46459		0.50		92.9	%	80-120	10/01/2001	1217
MS	610759-1	V160019204	1.21629		1.000000	0.23998	97.6	%	75-125	10/01/2001	1227
MSD	610759-1	V160019204	1.22437	1.21629	1.000000	0.23998	98.4	%	75-125	10/01/2001	1231
							0.7	R	20		

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Barium (Ba)

Batch.....: 81899
Units.....: mg/L

Analyst....: pal
Test Code.: BA

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ISB		V263053F	0.48505		0.50		97.0	%	80-120	10/01/2001	1259
CCV		V263054B	1.97443		2.00		98.7	%	90-110	10/01/2001	1308
CCB			0.00078							10/01/2001	1312

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Iron (Fe)

Batch.....: 81899
Units.....: mg/L

Analyst....: pal
Test Code.: FE

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00199		0.00					10/01/2001	0954
CAL		ICPCALSTD	60.77269		100.00					10/01/2001	1015
ICV		V263054C	4.00942		4.00		100.2	%	90-110	10/01/2001	1143
ICV		V263054B	2.02611		2.002		101.2	%	90-110	10/01/2001	1208
ICB			0.01332							10/01/2001	1214
ISB		V263053F	177.29544		200.0		88.6	%	80-120	10/01/2001	1217
S	610759-1	V160019204	1.22635		1.000000	0.25884	96.8	%	75-125	10/01/2001	1227
SD	610759-1	V160019204	1.23030	1.22635	1.000000	0.25884	97.1	%	75-125	10/01/2001	1231
							0.3	R 20			
ISB		V263053F	183.10910		200.0		91.6	%	80-120	10/01/2001	1259
CCV		V263054B	2.09980		2.002		104.9	%	90-110	10/01/2001	1308
CCB			0.01102							10/01/2001	1312

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Manganese (Mn)

Batch.....: 82133
Units.....: mg/L

Analyst....: pal
Test Code.: MN

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.01500		0.00					10/05/2001	1002
CAL		ICPCALSTD	0.63459		2.00					10/05/2001	1013
ICV		V263056D	0.59065		0.60		98.4	%	90-110	10/05/2001	1028
ICV		V263056C	1.97091		1.99		99.0	%	90-110	10/05/2001	1034
ICB			0.00031							10/05/2001	1039
ISB		V263053F	0.45572		0.50		91.1	%	80-120	10/05/2001	1043
PB	1001-1		-0.00064							10/05/2001	1058
LCS	1001-1	ICPSPK01A	0.49458		0.5000		98.9	%	80-120	10/05/2001	1103
MS	610756-1	ICPSPK01A	0.54994		0.5000	0.01854	106.3	%	75-125	10/05/2001	1111
MSD	610756-1	ICPSPK01A	0.53442	0.54994	0.5000	0.01854	103.2	%	75-125	10/05/2001	1115
							2.9	R 20			
EB	926-1		0.00032							10/05/2001	1127
CCV		V263056C	1.99771		1.99		100.4	%	90-110	10/05/2001	1139
CCB			0.00064							10/05/2001	1143
CCV		V263056C	2.00998		1.99		101.0	%	90-110	10/05/2001	1219
CCB			0.00161							10/05/2001	1223
MS	610759-7	V160019205	0.22967		0.150000	0.08039	99.5	%	75-125	10/05/2001	1231
MSD	610759-7	V160019205	0.22515	0.22967	0.150000	0.08039	96.5	%	75-125	10/05/2001	1235
							2.0	R 20			
ISB		V263053F	0.46389		0.50		92.8	%	80-120	10/05/2001	1239
CV		V263056C	1.93218		1.99		97.1	%	90-110	10/05/2001	1249
CB			0.00387							10/05/2001	1253

QUALITY CONTROL RESULTS					
Job Number.: 610759			Report Date.: 10/19/2001		
CUSTOMER: Marathon Oil Company		PROJECT: BERTHA BARBER TANK		ATTN: Paul Peacock	
QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time

Test Method.....: EPA 8310	Units.....: ug/L	Analyst....: rm
Method Description.: Polynuclear Aromatic Hydrocarbons-HPLC	Batch.....: 82364	

LCS	Laboratory Control Sample	PNASPK				10/06/2001 0644
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	595.184		1000		59.5	% 10-92
Acenaphthylene	999.512		1000		100.0	% 11-127
Anthracene	576.970		1000		57.7	% 33-110
Benzo(b)fluoranthene	318.365		500		63.7	% 57-102
Benzo(k)fluoranthene	319.299		500		63.9	% 59-107
Benzo(a)anthracene	321.861		500		64.4	% 61-109
Benzo(a)pyrene	339.954		500		68.0	% 42-131
Benzo(ghi)perylene	318.686		500		63.7	% 55-119
Chrysene	357.398		500		71.5	% 59-103
Dibenzo(a,h)anthracene	342.148		500		68.4	% 63-108
Fluoranthene	334.380		500		66.9	% 40-122
Fluorene	579.772		1000		58.0	% 20-95
Indeno(1,2,3-cd)pyrene	441.476		500		88.3	% 57-104
Naphthalene	529.554		1000		53.0	% 10-82
Phenanthrene	361.513		500		72.3	% 37-102
Pyrene	325.144		500		65.0	% 59-111

MB	Method Blank					10/06/2001 0606
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	ND					
Acenaphthylene	ND					
Anthracene	ND					
Benzo(b)fluoranthene	ND					
Benzo(k)fluoranthene	ND					
Benzo(a)anthracene	ND					
Benzo(a)pyrene	ND					
Benzo(ghi)perylene	ND					
Chrysene	ND					
Dibenzo(a,h)anthracene	ND					
Fluoranthene	ND					
Fluorene	ND					
Indeno(1,2,3-cd)pyrene	ND					
Naphthalene	ND					
Phenanthrene	ND					
Pyrene	ND					

MS	Matrix Spike	PNASPK	610869-2			10/06/2001 0800
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	501.480		1000	ND	50.1	% 10-92
Acenaphthylene	252.612		1000	ND	25.3	% 11-127
Anthracene	565.779		1000	ND	56.6	% 33-110
Benzo(b)fluoranthene	252.745		500	ND	50.5	% 57-102
Benzo(k)fluoranthene	239.803		500	ND	48.0	% 59-107
Benzo(a)anthracene	283.159		500	ND	56.6	% 61-109

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
MS	Matrix Spike	PNASPK	610869-2		10/06/2001	0800

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzo(a)pyrene	276.601		500	ND	55.3	% 42-131
Benzo(ghi)perylene	212.198		500	ND	42.4	% 55-119
Chrysene	350.975		500	ND	70.2	% 59-103
Dibenzo(a,h)anthracene	220.068		500	ND	44.0	% 63-108
Fluoranthene	279.740		500	ND	55.9	% 40-122
Fluorene	487.043		1000	ND	48.7	% 20-95
Indeno(1,2,3-cd)pyrene	211.600		500	ND	42.3	% 57-104
Naphthalene	461.865		1000	ND	46.2	% 10-82
Phenanthrene	369.004		500	ND	73.8	% 37-102
Pyrene	315.023		500	ND	63.0	% 59-111

MSD	Matrix Spike Duplicate	PNASPK	610869-2		10/06/2001	0839
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	498.252	501.480	1000	ND	49.8	% 10-92
					0.6	R 30
Acenaphthylene	235.226	252.612	1000	ND	23.5	% 11-127
					7.1	R 30
Anthracene	566.577	565.779	1000	ND	56.7	% 33-110
					0.1	R 30
Benzo(b)fluoranthene	260.426	252.745	500	ND	52.1	% 57-102
					3.0	R 30
Benzo(k)fluoranthene	255.495	239.803	500	ND	51.1	% 59-107
					6.3	R 30
Benzo(a)anthracene	289.694	283.159	500	ND	57.9	% 61-109
					2.3	R 30
Benzo(a)pyrene	294.519	276.601	500	ND	58.9	% 42-131
					6.3	R 30
Benzo(ghi)perylene	217.405	212.198	500	ND	43.5	% 55-119
					2.4	R 30
Chrysene	311.765	350.975	500	ND	62.4	% 59-103
					11.8	R 30
Dibenzo(a,h)anthracene	224.656	220.068	500	ND	44.9	% 63-108
					2.1	R 30
Fluoranthene	276.217	279.740	500	ND	55.2	% 40-122
					1.3	R 30
Fluorene	463.200	487.043	1000	ND	46.3	% 20-95
					5.0	R 30
Indeno(1,2,3-cd)pyrene	203.901	211.600	500	ND	40.8	% 57-104
					3.7	R 30
Naphthalene	429.684	461.865	1000	ND	43.0	% 10-82
					7.2	R 30
Phenanthrene	354.432	369.004	500	ND	70.9	% 37-102
					4.0	R 30
Pyrene	328.464	315.023	500	ND	65.7	% 59-111
					4.2	R 30

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: EPA 8310

Units.....: ug/L

Analyst....: rm

Method Description.: Polynuclear Aromatic Hydrocarbons-HPLC

Batch.....: 82827

LCS	Laboratory Control Sample	PNASPK				10/18/2001 0616
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	511.67		1000		51.2	% 10-92
Acenaphthylene	381.306		1000		38.1	% 11-127
Anthracene	663.26		1000		66.3	% 33-110
Benzo(b)fluoranthene	367.23		500		73.4	% 57-102
Benzo(k)fluoranthene	365.56		500		73.1	% 59-107
Benzo(a)anthracene	353.95		500		70.8	% 61-109
Benzo(a)pyrene	325.87		500		65.2	% 42-131
Benzo(ghi)perylene	350.58		500		70.1	% 55-119
Chrysene	375.64		500		75.1	% 59-103
Dibenzo(a,h)anthracene	363.44		500		72.7	% 63-108
Fluoranthene	314.27		500		62.9	% 40-122
Fluorene	606.94		1000		60.7	% 20-95
Indeno(1,2,3-cd)pyrene	372.881		500		74.6	% 57-104
Naphthalene	574.23		1000		57.4	% 10-82
Phenanthrene	291.89		500		58.4	% 37-102
Pyrene	385.25		500		77.0	% 59-111

MB	Method Blank					10/18/2001 0536
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	ND					
Acenaphthylene	ND					
Anthracene	ND					
Benzo(b)fluoranthene	ND					
Benzo(k)fluoranthene	ND					
Benzo(a)anthracene	ND					
Benzo(a)pyrene	ND					
Benzo(ghi)perylene	ND					
Chrysene	ND					
Dibenzo(a,h)anthracene	ND					
Fluoranthene	ND					
Fluorene	ND					
Indeno(1,2,3-cd)pyrene	ND					
Naphthalene	ND					
Phenanthrene	ND					
Pyrene	ND					

MS	Matrix Spike	PNASPK	611271-1			10/18/2001 0735
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	479.45		1000	ND	47.9	% 10-92
Acenaphthylene	494.999		1000	ND	49.5	% 11-127
Anthracene	631.33		1000	ND	63.1	% 33-110
Benzo(b)fluoranthene	301.51		500	ND	60.3	% 57-102
Benzo(k)fluoranthene	298.60		500	ND	59.7	% 59-107
Benzo(a)anthracene	320.20		500	ND	64.0	% 61-109

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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MS	Matrix Spike	PNASPK	611271-1		10/18/2001	0735
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzo(a)pyrene	284.89		500	ND	57.0	% 42-131
Benzo(ghi)perylene	247.70		500	ND	49.5	% 55-119
Chrysene	344.56		500	ND	68.9	% 59-103
Dibenzo(a,h)anthracene	248.65		500	ND	49.7	% 63-108
Fluoranthene	303.84		500	ND	60.8	% 40-122
Fluorene	555.70		1000	ND	55.6	% 20-95
Indeno(1,2,3-cd)pyrene	286.351		500	ND	57.3	% 57-104
Naphthalene	513.49		1000	ND	51.3	% 10-82
Phenanthrene	294.70		500	ND	58.9	% 37-102
Pyrene	383.79		500	ND	76.8	% 59-111

MSD	Matrix Spike Duplicate	PNASPK	611271-1		10/18/2001	0815
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Acenaphthene	452.57	479.45	1000	ND	45.3	% 10-92
					5.8	R 30
Acenaphthylene	518.685	494.999	1000	ND	51.9	% 11-127
					4.7	R 30
Anthracene	603.94	631.33	1000	ND	60.4	% 33-110
					4.4	R 30
Benzo(b)fluoranthene	316.54	301.51	500	ND	63.3	% 57-102
					4.9	R 30
Benzo(k)fluoranthene	308.79	298.60	500	ND	61.8	% 59-107
					3.4	R 30
Benzo(a)anthracene	312.63	320.20	500	ND	62.5	% 61-109
					2.4	R 30
Benzo(a)pyrene	289.90	284.89	500	ND	58.0	% 42-131
					1.7	R 30
Benzo(ghi)perylene	267.05	247.70	500	ND	53.4	% 55-119
					7.5	R 30
Chrysene	338.96	344.56	500	ND	67.8	% 59-103
					1.6	R 30
Dibenzo(a,h)anthracene	262.63	248.65	500	ND	52.5	% 63-108
					5.5	R 30
Fluoranthene	294.30	303.84	500	ND	58.9	% 40-122
					3.2	R 30
Fluorene	523.06	555.70	1000	ND	52.3	% 20-95
					6.1	R 30
Indeno(1,2,3-cd)pyrene	280.204	286.351	500	ND	56.0	% 57-104
					2.2	R 30
Naphthalene	503.38	513.49	1000	ND	50.3	% 10-82
					2.0	R 30
Phenanthrene	260.57	294.70	500	ND	52.1	% 37-102
					12.3	R 30
Pyrene	352.91	383.79	500	ND	70.6	% 59-111
					8.4	R 30

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: EPA 8260B

Units.....: ug/L

Analyst....: wds

Method Description.: Volatile Organic Compounds

Batch.....: 82199

LCS	Laboratory Control Sample	CLPVOAMS3			10/05/2001	1100
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.41		50		94.8	% 67-130
Chlorobenzene	42.41		50		84.8	% 74-116
1,1-Dichloroethene	47.78		50		95.6	% 51-141
Toluene	44.79		50		89.6	% 75-114
Trichloroethene	45.22		50		90.4	% 72-114

MB	Method Blank				10/05/2001	1006
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
1,2,4-Trimethylbenzene	ND					
tert-Butyl methyl ether (MTBE)	ND					
1,1,1,2-Tetrachloroethane	ND					
2,3-Trichloropropane	ND					
Chlorobenzene	ND					
o-Xylene	ND					
Dibromomethane	ND					
Trichlorofluoromethane	ND					
2-Chloroethylvinyl ether	ND					
1,2,4-Trichlorobenzene	ND					
1,2-Dibromo-3-chloropropane	ND					
1,2-Dibromoethane (EDB)	ND					
1,2-Dichlorobenzene	ND					
1,3-Dichlorobenzene	ND					
1,4-Dichlorobenzene	ND					
Dichlorodifluoromethane	ND					
m&p-Xylenes	ND					
Acrolein	ND					
Acrylonitrile	ND					
Isopropylbenzene	ND					
Acetone	ND					
Benzene	ND					
Bromodichloromethane	ND					
Bromoform	ND					
Bromomethane	ND					
2-Butanone	ND					
Carbon disulfide	ND					
Carbon tetrachloride	ND					
Dibromochloromethane	ND					
Chlorobenzene	ND					
Chloroethane	ND					
Chloroform	ND					
Chloromethane	ND					
1,1-Dichloroethane	ND					
1,2-Dichloroethane	ND					
1,1-Dichloroethene	ND					
trans-1,2-Dichloroethene	ND					
cis-1,2-Dichloroethene	ND					
2-Dichloropropane	ND					

QUALITY CONTROL RESULTS					
Job Number.: 610759			Report Date.: 10/19/2001		
CUSTOMER: Marathon Oil Company		PROJECT: BERTHA BARBER TANK		ATTN: Paul Peacock	
QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time
MB	Method Blank				10/05/2001 1006

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
cis-1,3-Dichloropropene	ND					
trans-1,3-Dichloropropene	ND					
Ethylbenzene	ND					
2-Hexanone	ND					
Methylene chloride	1.12					
4-Methyl-2-pentanone (MIBK)	ND					
Styrene	ND					
1,1,2,2-Tetrachloroethane	ND					
Tetrachloroethene	ND					
Toluene	ND					
1,1,1-Trichloroethane	ND					
1,1,2-Trichloroethane	ND					
Trichloroethene	ND					
Vinyl acetate	ND					
Vinyl chloride	ND					
Xylenes (total)	ND					

MS	Matrix Spike	CLPVOAMS3	610743-1	10	10/05/2001 1159	
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	46.37		50	ND	92.7	% 67-130
Chlorobenzene	41.24		50	ND	82.5	% 74-116
1,1-Dichloroethene	48.61		50	ND	97.2	% 51-141
Toluene	45.07		50	ND	90.1	% 75-114
Trichloroethene	45.03		50	ND	90.1	% 72-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	610743-1	10	10/05/2001 1225	
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	47.20	46.37	50	ND	94.4 1.8	% 67-130 R 30
Chlorobenzene	41.20	41.24	50	ND	82.4 0.1	% 74-116 R 30
1,1-Dichloroethene	47.21	48.61	50	ND	94.4 2.9	% 51-141 R 30
Toluene	45.13	45.07	50	ND	90.3 0.1	% 75-114 R 30
Trichloroethene	44.55	45.03	50	ND	89.1 1.1	% 72-114 R 30

QUALITY CONTROL RESULTS

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: EPA 8260B

Units.....: ug/L

Analyst....: weh

Method Description.: Volatile Organic Compounds

Batch.....: 82317

LCS	Laboratory Control Sample	CLPVOAMS3			10/08/2001	1303
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	55.13		50		110.3	% 67-130
Chlorobenzene	50.44		50		100.9	% 74-116
1,1-Dichloroethene	58.37		50		116.7	% 51-141
Toluene	51.93		50		103.9	% 75-114
Trichloroethene	54.94		50		109.9	% 72-114

MB	Method Blank				10/08/2001	1230
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Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Bromobenzene	ND					
Dibromomethane	ND					
Dichlorodifluoromethane	ND					
1-Chloroethylvinyl ether	ND					
Isopropylbenzene	ND					
1,2,4-Trimethylbenzene	ND					
1,2,3-Trichloropropane	ND					
1,1,1,2-Tetrachloroethane	ND					
Acrylonitrile	ND					
tert-Butyl methyl ether (MTBE)	ND					
Acrolein	ND					
1,2,4-Trichlorobenzene	ND					
o-Xylene	ND					
m&p-Xylenes	ND					
Trichlorofluoromethane	ND					
1,3-Dichlorobenzene	ND					
1,2-Dibromo-3-chloropropane	ND					
1,2-Dichlorobenzene	ND					
1,4-Dichlorobenzene	ND					
1,2-Dibromoethane (EDB)	ND					
Acetone	ND					
Benzene	ND					
Bromodichloromethane	ND					
Bromoform	ND					
Bromomethane	ND					
2-Butanone	ND					
Carbon disulfide	ND					
Carbon tetrachloride	ND					
Dibromochloromethane	ND					
Chlorobenzene	ND					
Chloroethane	ND					
Chloroform	ND					
Chloromethane	ND					
1,1-Dichloroethane	ND					
1,2-Dichloroethane	ND					
1,1-Dichloroethene	ND					
trans-1,2-Dichloroethene	ND					
cis-1,2-Dichloroethene	ND					
2-Dichloropropane	ND					

QUALITY CONTROL RESULTS					
Job Number.: 610759			Report Date.: 10/19/2001		
CUSTOMER: Marathon Oil Company		PROJECT: BERTHA BARBER TANK		ATTN: Paul Peacock	
QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date Time
MB	Method Blank				10/08/2001 1230

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
cis-1,3-Dichloropropene	ND					
trans-1,3-Dichloropropene	ND					
Ethylbenzene	ND					
2-Hexanone	ND					
Methylene chloride	ND					
4-Methyl-2-pentanone (MIBK)	ND					
Styrene	ND					
1,1,2,2-Tetrachloroethane	ND					
Tetrachloroethene	ND					
Toluene	ND					
1,1,1-Trichloroethane	ND					
1,1,2-Trichloroethane	ND					
Trichloroethene	ND					
Vinyl acetate	ND					
Vinyl chloride	ND					
Xylenes (total)	ND					

MS	Matrix Spike	CLPVOAMS3	610759-1			10/08/2001 1409
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	53.32		50	ND	106.6	% 67-130
Chlorobenzene	48.47		50	ND	96.9	% 74-116
1,1-Dichloroethene	54.96		50	ND	109.9	% 51-141
Toluene	49.89		50	ND	99.8	% 75-114
Trichloroethene	53.22		50	ND	106.4	% 72-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	610759-1			10/08/2001 1437
Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	* Limits
Benzene	53.29	53.32	50	ND	106.6	% 67-130
					0.1	R 30
Chlorobenzene	48.28	48.47	50	ND	96.6	% 74-116
					0.4	R 30
1,1-Dichloroethene	60.66	54.96	50	ND	121.3	% 51-141
					9.9	R 30
Toluene	50.73	49.89	50	ND	101.5	% 75-114
					1.7	R 30
Trichloroethene	53.25	53.22	50	ND	106.5	% 72-114
					0.1	R 30

SURROGATE RECOVERIES REPORT

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Method.....: Volatile Organic Compounds

Batch.....: 82199

Method Code.....: 826TCL

Analyst.....: wds

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		50.56	50.00	101.1	76-116		10/05/2001	1006
		LCS		51.08	50.00	102.2	76-116		10/05/2001	1100
610743-1		MS	10	50.61	50.00	101.2	76-116		10/05/2001	1159
610743-1		MSD	10	50.81	50.00	101.6	76-116		10/05/2001	1225
610844-8				53.26	50.00	106.5	76-116		10/05/2001	1345
610844-10				53.26	50.00	106.5	76-116		10/05/2001	1411
610844-12				52.38	50.00	104.8	76-116		10/05/2001	1438
610844-9			20	50.19	50.00	100.4	76-116		10/05/2001	1531
610844-11			1000	51.63	50.00	103.3	76-116		10/05/2001	1557
610759-3				52.00	50.00	104.0	76-116		10/05/2001	1624
610759-7				53.96	50.00	107.9	76-116		10/05/2001	1650
610917-1				51.81	50.00	103.6	76-116		10/05/2001	1929

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		52.84	50.00	105.7	85-110		10/05/2001	1006
		LCS		53.31	50.00	106.6	85-110		10/05/2001	1100
610743-1		MS	10	52.17	50.00	104.3	85-110		10/05/2001	1159
610743-1		MSD	10	52.44	50.00	104.9	85-110		10/05/2001	1225
610844-8				51.38	50.00	102.8	85-110		10/05/2001	1345
610844-10				53.03	50.00	106.1	85-110		10/05/2001	1411
610844-12				52.97	50.00	105.9	85-110		10/05/2001	1438
610844-9			20	51.07	50.00	102.1	85-110		10/05/2001	1531
610844-11			1000	52.77	50.00	105.5	85-110		10/05/2001	1557
610759-3				53.35	50.00	106.7	85-110		10/05/2001	1624
610759-7				53.15	50.00	106.3	85-110		10/05/2001	1650
610917-1				51.98	50.00	104.0	85-110		10/05/2001	1929

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.72	50.00	101.4	85-112		10/05/2001	1006
		LCS		51.07	50.00	102.1	85-112		10/05/2001	1100
610743-1		MS	10	51.12	50.00	102.2	85-112		10/05/2001	1159
610743-1		MSD	10	51.36	50.00	102.7	85-112		10/05/2001	1225
610844-8				51.83	50.00	103.7	85-112		10/05/2001	1345
610844-10				52.86	50.00	105.7	85-112		10/05/2001	1411

SURROGATE RECOVERIES REPORT

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

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
610844-12				51.99	50.00	104.0	85-112		10/05/2001	1438
610844-9			20	51.53	50.00	103.1	85-112		10/05/2001	1531
610844-11			1000	51.36	50.00	102.7	85-112		10/05/2001	1557
610759-3				51.89	50.00	103.8	85-112		10/05/2001	1624
610759-7				52.18	50.00	104.4	85-112		10/05/2001	1650
610917-1				51.26	50.00	102.5	85-112		10/05/2001	1929

Method.....: Volatile Organic Compounds
Method Code.....: 826TCL

Batch.....: 82317
Analyst.....: weh

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		47.96	50.00	95.9	76-116		10/08/2001	1230
		LCS		45.47	50.00	90.9	76-116		10/08/2001	1303
610759-1				47.36	50.00	94.7	76-116		10/08/2001	1340
610759-1		MS		49.02	50.00	98.0	76-116		10/08/2001	1409
610759-1		MSD		47.79	50.00	95.6	76-116		10/08/2001	1437
610759-2				48.86	50.00	97.7	76-116		10/08/2001	1506
610759-4				48.27	50.00	96.5	76-116		10/08/2001	1534
610759-5				51.08	50.00	102.2	76-116		10/08/2001	1603
610759-6				49.89	50.00	99.8	76-116		10/08/2001	1631
611057-2				49.03	50.00	98.1	76-116		10/08/2001	1700
611057-3				44.34	50.00	88.7	76-116		10/08/2001	1729
611057-4				43.04	50.00	86.1	76-116		10/08/2001	1757
611057-6				40.84	50.00	81.7	76-116		10/08/2001	1826

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		49.86	50.00	99.7	85-110		10/08/2001	1230
		LCS		52.65	50.00	105.3	85-110		10/08/2001	1303
610759-1				50.15	50.00	100.3	85-110		10/08/2001	1340
610759-1		MS		52.27	50.00	104.5	85-110		10/08/2001	1409
610759-1		MSD		49.21	50.00	98.4	85-110		10/08/2001	1437
610759-2				49.63	50.00	99.3	85-110		10/08/2001	1506
610759-4				48.01	50.00	96.0	85-110		10/08/2001	1534
610759-5				49.30	50.00	98.6	85-110		10/08/2001	1603
610759-6				48.44	50.00	96.9	85-110		10/08/2001	1631
611057-2				47.09	50.00	94.2	85-110		10/08/2001	1700
611057-3				49.40	50.00	98.8	85-110		10/08/2001	1729

SURROGATE RECOVERIES REPORT

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
611057-4				50.03	50.00	100.1	85-110		10/08/2001	1757
611057-6				46.92	50.00	93.8	85-110		10/08/2001	1826

Surrogate	Units
Toluene-d8 (surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.16	50.00	100.3	85-112		10/08/2001	1230
		LCS		48.87	50.00	97.7	85-112		10/08/2001	1303
610759-1				49.67	50.00	99.3	85-112		10/08/2001	1340
610759-1		MS		50.23	50.00	100.5	85-112		10/08/2001	1409
610759-1		MSD		49.07	50.00	98.1	85-112		10/08/2001	1437
610759-2				50.01	50.00	100.0	85-112		10/08/2001	1506
610759-4				49.19	50.00	98.4	85-112		10/08/2001	1534
610759-5				49.12	50.00	98.2	85-112		10/08/2001	1603
610759-6				50.87	50.00	101.7	85-112		10/08/2001	1631
611057-2				53.13	50.00	106.3	85-112		10/08/2001	1700
611057-3				49.55	50.00	99.1	85-112		10/08/2001	1729
611057-4				50.58	50.00	101.2	85-112		10/08/2001	1757
611057-6				50.72	50.00	101.4	85-112		10/08/2001	1826

Method.....: Polynuclear Aromatic Hydrocarbons-HPLC
Method Code.....: 8310

Batch.....: 82364
Analyst.....: rm

Surrogate	Units
1-Fluoronaphthalene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		429.329	1000	42.9	10-74		10/06/2001	0606
		LCS		422.772	1000	42.3	10-74		10/06/2001	0644
610869-2				440.462	1000	44.0	10-74		10/06/2001	0722
610869-2		MS		332.045	1000	33.2	10-74		10/06/2001	0800
610869-2		MSD		293.664	1000	29.4	10-74		10/06/2001	0839
610814-1				290.723	1000	29.1	10-74		10/06/2001	0955
610814-2				368.263	1000	36.8	10-74		10/06/2001	1033
610824-1				158.14	1000	15.8	10-74		10/06/2001	1111
610943-1				283.578	1000	28.4	10-74		10/06/2001	1150
610759-1				434.031	1000	43.4	10-74		10/06/2001	1500
610759-2				424.258	1000	42.4	10-74		10/06/2001	1539
610759-4				424.916	1000	42.5	10-74		10/06/2001	1655
610759-5				435.930	1000	43.6	10-74		10/06/2001	1733
610759-6				444.797	1000	44.5	10-74		10/06/2001	1811
610759-7				489.889	1000	49.0	10-74		10/06/2001	1850

SURROGATE RECOVERIES REPORT

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Surrogate	Units
1-Fluoronaphthalene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
610819-2			2	307.857	1000	30.8	10-74		10/06/2001	2006
610942-1				453.258	1000	45.3	10-74		10/06/2001	2044
610947-2			2	302.083	1000	30.2	10-74		10/06/2001	2122
610947-1			4	249.801	1000	25.0	10-74		10/06/2001	2201
610942-2				415.230	1000	41.5	10-74		10/06/2001	2239

Surrogate	Units
Terphenyl-d14	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		797.611	1000	79.8	56-122		10/06/2001	0606
		LCS		678.808	1000	67.9	56-122		10/06/2001	0644
610869-2				473.569	1000	47.4	56-122	X	10/06/2001	0722
610869-2		MS		516.228	1000	51.6	56-122	X	10/06/2001	0800
610869-2		MSD		525.316	1000	52.5	56-122	X	10/06/2001	0839
610814-1				635.628	1000	63.6	56-122		10/06/2001	0955
610814-2				644.379	1000	64.4	56-122		10/06/2001	1033
610824-1				639.459	1000	63.9	56-122		10/06/2001	1111
610943-1				1179.869	1000	118.0	56-122		10/06/2001	1150
610759-1				614.918	1000	61.5	56-122		10/06/2001	1500
610759-2				569.697	1000	57.0	56-122		10/06/2001	1539
610759-4				617.803	1000	61.8	56-122		10/06/2001	1655
610759-5				582.120	1000	58.2	56-122		10/06/2001	1733
610759-6				687.413	1000	68.7	56-122		10/06/2001	1811
610759-7				670.669	1000	67.1	56-122		10/06/2001	1850
610819-2			2	632.673	1000	63.3	56-122		10/06/2001	2006
610942-1				717.952	1000	71.8	56-122		10/06/2001	2044
610947-2			2	652.974	1000	65.3	56-122		10/06/2001	2122
610947-1			4	693.449	1000	69.3	56-122		10/06/2001	2201
610942-2				635.077	1000	63.5	56-122		10/06/2001	2239

Method.....: Polynuclear Aromatic Hydrocarbons-HPLC
Method Code.....: 8310

Batch.....: 82827
Analyst.....: rm

Surrogate	Units
1-Fluoronaphthalene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
610521-1			4	306.30	1000	30.6	10-74		10/17/2001	2023
610521-2			2	333.17	1000	33.3	10-74		10/17/2001	2103
610659-1			4	353.86	1000	35.4	10-74		10/17/2001	2143
610659-2			2	476.21	1000	47.6	10-74		10/17/2001	2222
610759-3				412.95	1000	41.3	10-74		10/17/2001	2302

SURROGATE RECOVERIES REPORT

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Surrogate	Units
1-Fluoronaphthalene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
610819-1			4	531.93	1000	53.2	10-74		10/17/2001	2342
610041-1			40	ND	1000	0.0	10-74	D	10/18/2001	0020
610041-2			20	ND	1000	0.0	10-74	D	10/18/2001	0058
611111-1			4	290.02	1000	29.0	10-74		10/18/2001	0138
611111-2			2	359.57	1000	36.0	10-74		10/18/2001	0218
610235-1			4	298.39	1000	29.8	10-74		10/18/2001	0257
610235-2			2	272.06	1000	27.2	10-74		10/18/2001	0337
		MB		454.20	1000	45.4	10-74		10/18/2001	0536
		LCS		478.02	1000	47.8	10-74		10/18/2001	0616
611271-1				461.90	1000	46.2	10-74		10/18/2001	0655
611271-1		MS		442.10	1000	44.2	10-74		10/18/2001	0735
611271-1		MSD		436.59	1000	43.7	10-74		10/18/2001	0815
611271-2				474.29	1000	47.4	10-74		10/18/2001	0854
611106-1				392.12	1000	39.2	10-74		10/18/2001	0934
611106-2				346.18	1000	34.6	10-74		10/18/2001	1014
611231-1				356.69	1000	35.7	10-74		10/18/2001	1053
611231-2				354.92	1000	35.5	10-74		10/18/2001	1133
610707-1				651.59	1000	65.2	10-74		10/18/2001	1213
610869-1				408.37	1000	40.8	10-74		10/18/2001	1253
611232-1				236.19	1000	23.6	10-74		10/18/2001	1332
611107-1				320.44	1000	32.0	10-74		10/18/2001	1412

Surrogate	Units
Terphenyl-d14	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
610521-1			4	846.64	1000	84.7	56-122		10/17/2001	2023
610521-2			2	719.70	1000	72.0	56-122		10/17/2001	2103
610659-1			4	604.76	1000	60.5	56-122		10/17/2001	2143
610659-2			2	739.57	1000	74.0	56-122		10/17/2001	2222
610759-3				620.53	1000	62.1	56-122		10/17/2001	2302
610819-1			4	854.39	1000	85.4	56-122		10/17/2001	2342
610041-1			40	ND	1000	0.0	56-122	D	10/18/2001	0020
610041-2			20	ND	1000	0.0	56-122	D	10/18/2001	0058
611111-1			4	597.54	1000	59.8	56-122		10/18/2001	0138
611111-2			2	632.74	1000	63.3	56-122		10/18/2001	0218
610235-1			4	644.25	1000	64.4	56-122		10/18/2001	0257
610235-2			2	616.19	1000	61.6	56-122		10/18/2001	0337
		MB		651.42	1000	65.1	56-122		10/18/2001	0536
		LCS		717.60	1000	71.8	56-122		10/18/2001	0616
611271-1				623.02	1000	62.3	56-122		10/18/2001	0655
611271-1		MS		682.53	1000	68.3	56-122		10/18/2001	0735
611271-1		MSD		652.56	1000	65.3	56-122		10/18/2001	0815
611271-2				571.94	1000	57.2	56-122		10/18/2001	0854
611106-1				711.84	1000	71.2	56-122		10/18/2001	0934
611106-2				715.64	1000	71.6	56-122		10/18/2001	1014
611231-1				684.57	1000	68.5	56-122		10/18/2001	1053
611231-2				767.70	1000	76.8	56-122		10/18/2001	1133

SURROGATE RECOVERIES REPORT

Job Number.: 610759

Report Date.: 10/19/2001

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER TANK

ATTN: Paul Peacock

Surrogate	Units
Terphenyl-d14	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
610707-1				729.38	1000	72.9	56-122		10/18/2001	1213
610869-1				656.81	1000	65.7	56-122		10/18/2001	1253
611232-1				1265.00	1000	126.5	56-122	X	10/18/2001	1332
611107-1				963.08	1000	96.3	56-122		10/18/2001	1412

QUALITY ASSURANCE FOOTER

METHOD REFERENCES

STL Valparaiso

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

STL Valparaiso
2400 Cumberland Dr
Valparaiso, IN 46383

VPQ0140
Version 003
Effective 5/14/2001

pjsckl

Job Sample Receipt Checklist Report
09/30/2001

V2

Job Number.....: 510759 Location.: 57211 Customer Job ID.....:
Project Number.: 96000703 Project Description.: MOC - Bertha Barber
Customer.....: Marathon Oil Company Contact.: Paul Peacock

Job Check List Date.: 09/30/2001
Project Manager.....: arb

Questions ?

(Y/N) Comments

Chain-of-Custody Present?..... Y

Custody seal on shipping container?.....

...If "yes", custody seal intact?.....

Custody seals on sample containers?.....

...If "yes", custody seal intact?.....

Samples chilled?..... Y on ice

Temperature of cooler acceptable? (4 deg.C +/- 2). Y 5.0 deg c IR

Samples received intact (good condition)?..... Y

Volatile samples acceptable? (no headspace)..... Y

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..... *al*

**SEVERN
TRENT
SERVICES**

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

Report To:

Contact: SPARE
Company: SPARE
Address: AS
Phone:
Fax:
E-Mail:

Bill To:

Contact: Martens Oil Company
Company: Martens Oil Company
Address: 125 West Mission St
Midland TX 79707-0550
Phone:
Fax:
PO#:

Sampler Name: <u>Daniel Wadley</u>		Signature: <u>[Signature]</u>		Project Number: <u> </u>		Date Required: <u> </u>		Hard Copy: <u> </u>		Fax: <u> </u>	
Project Name: <u>Ferron</u>		Project Location: <u>Barber</u>		Lab PM: <u> </u>		Date: <u> </u>		Time: <u> </u>		Quote: <u> </u>	
Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Refrg #	# / Cont.	Volume	Preserv	Additional Analyses / Remarks
		BBMW-11	1:58		W	✓					
		BBMW-7	2:55		W	✓					
		BBMW-13	3:10		W	✓					
		LLW	3:30		W	✓					
		BBMW-12	4:19		W	✓					
		BBMW-3	5:20		W	✓					
		BBMW-6	6:15		W	✓					
Additional Analyses / Remarks											

RELINQUISHED BY: [Signature] COMPANY: STL Valparaiso DATE: 9-28-01 TIME: 8:30

RECEIVED BY: [Signature] COMPANY: STL Valparaiso DATE: 9-28-01 TIME: 8:30

Matrix Key WW = Wastewater W = Water S = Soil SL = Sludge MS = Miscellaneous OL = Oil A = Air		Container Key CP = Plastic VOA = Vial Sterile Plastic Amber Glass Widermouth Glass 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		TIME	

SEVERN TRENT SERVICES

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

Report To:

Contact: SAPE
Company: SAPE
Address: AS
Phone:
Fax:
E-Mail:

Bill To:

Contact:
Company: Marathon Oil Company
Address: 128 West Main St.
Middlefield TX 79707-0517
Phone:
Fax:
PO#:

Shaded Areas For Internal Use Only

Lab Lot#

Package Sealed Yes No	Samples Sealed Yes No
Received on Ice Yes No	Samples Intact Yes No
Temperature °C of Cooler	

Sampler Name:	Signature:	Project Name:	Project Number:	Date Required	Hard Copy:	Fax:	Client Sample ID	Sampling Date	Time	Matrix	Comp/Grab	Refr #	# / Cont.	Volume	Preserv	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	Additional Analyses / Remarks
Project Location:	Lab PM:	MS-MSD	Laboratory ID	BRMW-1	9-27-01	11:50	W															
				BRMW-8	9-27-01	2:55	W															
				BRMW-13	9-27-01	3:10	W															
				LLW	9-27-01	8:30	W															
				BRMW-12	9-27-01	4:19	W															
				BRMW-3	9-27-01	5:20	W															
				BRMW-4	9-27-01	6:15	W															

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
<u>[Signature]</u>	<u>SAPE</u>	<u>9-28-01</u>	<u>8:50</u>	<u>[Signature]</u>	<u>SAPE</u>	<u>9-28-01</u>	<u>12:00</u>

Matrix Key	Container Key	Preservative Key	COMMENTS
WW = Wastewater S = Soil SL = Sludge MS = Miscellaneous OL = Oil A = Air	1. Plastic 2. VOA Vial 3. Sterile Plastic 4. Amber Glass 5. Widemouth Glass 6. Other	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°	Date Received Courier: Bill of Lading Hand Delivered

ANALYTICAL REPORT

JOB NUMBER: 613910

Prepared For:

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

Attention: Paul Peacock

Date: 01/03/2002

Adrienne Byrnes
Signature

Name: Adrienne R. Byrnes

Title: Project Manager

E-Mail: arbyrnes@stl-inc.com

1/3/02
Date

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383

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

SAMPLE INFORMATION
Date: 01/03/2002

Job Number.: 613910
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
613910-1	MW #11	Water	12/26/2001	00:00	12/28/2001	14:00
613910-2	MW #8	Water	12/26/2001	00:00	12/28/2001	14:00
613910-3	MW #13	Water	12/26/2001	00:00	12/28/2001	14:00
613910-4	Livestock Water Well Offsite	Water	12/26/2001	00:00	12/28/2001	14:00
613910-5	MW #6	Water	12/26/2001	00:00	12/28/2001	14:00
613910-6	MW #12	Water	12/26/2001	00:00	12/28/2001	14:00
613910-7	MW #3	Water	12/26/2001	00:00	12/28/2001	14:00
613910-8	Trip Blank	Water	12/26/2001	00:00	12/28/2001	14:00

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: MW #11
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-1
Date Received.....: 12/28/2001
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	12/31/01	wds
	Ethylbenzene	ND	5	ug/L	12/31/01	wds
	Toluene	ND	5	ug/L	12/31/01	wds
	Xylenes (total)	ND	10	ug/L	12/31/01	wds

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: MW #8
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-2
Date Received.....: 12/28/2001
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	12/31/01	wds
	Ethylbenzene	ND	5	ug/L	12/31/01	wds
	Toluene	ND	5	ug/L	12/31/01	wds
	Xylenes (total)	ND	10	ug/L	12/31/01	wds

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: MW #13
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-3
Date Received.....: 12/28/2001
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	12/31/01	wds
	Ethylbenzene	ND	5	ug/L	12/31/01	wds
	Toluene	ND	5	ug/L	12/31/01	wds
	Xylenes (total)	ND	10	ug/L	12/31/01	wds

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: Livestock Water Well Offsite
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-4
Date Received.....: 12/28/2001
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds	ND	5	ug/L	12/31/01	ws
	Benzene	ND	5	ug/L	12/31/01	ws
	Ethylbenzene	ND	5	ug/L	12/31/01	ws
	Toluene	ND	10	ug/L	12/31/01	ws
	Xylenes (total)					

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: MW #6
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-5
Date Received.....: 12/28/2001
Time Received.....: 14:00

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 8260B	Volatile Organic Compounds	ND	5	ug/L	12/31/01	wds
	Benzene	ND	5	ug/L	12/31/01	wds
	Ethylbenzene	ND	5	ug/L	12/31/01	wds
	Toluene	ND	10	ug/L	12/31/01	wds
	Xylenes (total)	ND				

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: MW #12
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-6
Date Received.....: 12/28/2001
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	12/31/01	ws
	Ethylbenzene	ND	5	ug/L	12/31/01	ws
	Toluene	ND	5	ug/L	12/31/01	ws
	Xylenes (total)	ND	10	ug/L	12/31/01	ws

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: MW #3
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-7
Date Received.....: 12/28/2001
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	12/31/01	wds
	Ethylbenzene	ND	5	ug/L	12/31/01	wds
	Toluene	ND	5	ug/L	12/31/01	wds
	Xylenes (total)	ND	10	ug/L	12/31/01	wds

LABORATORY TEST RESULTS

Job Number: 613910

Date: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Customer Sample ID: Trip Blank
Date Sampled.....: 12/26/2001
Time Sampled.....: 00:00
Sample Matrix.....: Water

Laboratory Sample ID: 613910-8
Date Received.....: 12/28/2001
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	12/31/01	wds
	Ethylbenzene	ND	5	ug/L	12/31/01	wds
	Toluene	ND	5	ug/L	12/31/01	wds
	Xylenes (total)	ND	10	ug/L	12/31/01	wds

QUALITY CONTROL RESULTS					
Job Number.: 613910			Report Date.: 01/03/2002		
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	Units.....: ug/L	Analyst....: wds
Method Description.: Volatile Organic Compounds	Batch.....: 86301	

LCS	Laboratory Control Sample	CLPVOAMS3				12/31/2001 1406
Parameter/Test Description		QC Result	QC Result	True Value	Orig. Value	Calc. Result * Limits
Benzene		46.49		50		93.0 % 67-130
Toluene		48.32		50		96.6 % 75-114

MB	Method Blank					12/31/2001 1339
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	613885-1			12/31/2001 1556
Parameter/Test Description		QC Result	QC Result	True Value	Orig. Value	Calc. Result * Limits
Benzene		45.08		50	ND	90.2 % 67-130
Toluene		47.04		50	ND	94.1 % 75-114

MSD	Matrix Spike Duplicate	CLPVOAMS3	613885-1			12/31/2001 1622
Parameter/Test Description		QC Result	QC Result	True Value	Orig. Value	Calc. Result * Limits
Benzene		43.84	45.08	50	ND	87.7 % 67-130
						2.8 R 30
Toluene		45.63	47.04	50	ND	91.3 % 75-114
						3.0 R 30

SURROGATE RECOVERIES REPORT

Job Number.: 613910

Report Date.: 01/03/2002

CUSTOMER: Marathon Oil Company

PROJECT: BERTHA BARBER

ATTN: Paul Peacock

Method.....: Volatile Organic Compounds
Method Code.....: 8260V1

Batch.....: 86301
Analyst.....: wds

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		54.07	50.00	108.1	76-116		12/31/2001	1339
		LCS		51.16	50.00	102.3	76-116		12/31/2001	1406
613885-1				53.29	50.00	106.6	76-116		12/31/2001	1529
613885-1		MS		51.15	50.00	102.3	76-116		12/31/2001	1556
613885-1		MSD		52.17	50.00	104.3	76-116		12/31/2001	1622
613910-1				52.44	50.00	104.9	76-116		12/31/2001	1648
613910-2				53.99	50.00	108.0	76-116		12/31/2001	1715
613910-3				51.47	50.00	102.9	76-116		12/31/2001	1741
613910-4				50.66	50.00	101.3	76-116		12/31/2001	1807
613910-5				53.53	50.00	107.1	76-116		12/31/2001	1834
613910-6				52.73	50.00	105.5	76-116		12/31/2001	1900
613910-7				51.11	50.00	102.2	76-116		12/31/2001	1926
613910-8				51.62	50.00	103.2	76-116		12/31/2001	1953
613832-2			4000	50.77	50.00	101.5	76-116		12/31/2001	2138
613832-2			400	52.54	50.00	105.1	76-116		12/31/2001	2204

Surrogate	Units
BFB (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		43.36	50.00	86.7	85-110		12/31/2001	1339
		LCS		45.17	50.00	90.3	85-110		12/31/2001	1406
613885-1				43.82	50.00	87.6	85-110		12/31/2001	1529
613885-1		MS		44.06	50.00	88.1	85-110		12/31/2001	1556
613885-1		MSD		44.39	50.00	88.8	85-110		12/31/2001	1622
613910-1				45.30	50.00	90.6	85-110		12/31/2001	1648
613910-2				45.22	50.00	90.4	85-110		12/31/2001	1715
613910-3				45.68	50.00	91.4	85-110		12/31/2001	1741
613910-4				44.87	50.00	89.7	85-110		12/31/2001	1807
613910-5				44.72	50.00	89.4	85-110		12/31/2001	1834
613910-6				45.98	50.00	92.0	85-110		12/31/2001	1900
613910-7				45.36	50.00	90.7	85-110		12/31/2001	1926
613910-8				44.75	50.00	89.5	85-110		12/31/2001	1953
613832-2			4000	43.99	50.00	88.0	85-110		12/31/2001	2138
613832-2			400	42.76	50.00	85.5	85-110		12/31/2001	2204

SURROGATE RECOVERIES REPORT

Job Number.: 613910

Report Date.: 01/03/2002

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
		MB		50.72	50.00	101.4	85-112		12/31/2001	1339
		LCS		50.41	50.00	100.8	85-112		12/31/2001	1406
613885-1				50.69	50.00	101.4	85-112		12/31/2001	1529
613885-1		MS		50.07	50.00	100.1	85-112		12/31/2001	1556
613885-1		MSD		49.97	50.00	99.9	85-112		12/31/2001	1622
613910-1				50.19	50.00	100.4	85-112		12/31/2001	1648
613910-2				50.27	50.00	100.5	85-112		12/31/2001	1715
613910-3				48.92	50.00	97.8	85-112		12/31/2001	1741
613910-4				50.05	50.00	100.1	85-112		12/31/2001	1807
613910-5				50.36	50.00	100.7	85-112		12/31/2001	1834
613910-6				49.39	50.00	98.8	85-112		12/31/2001	1900
613910-7				49.78	50.00	99.6	85-112		12/31/2001	1926
613910-8				50.22	50.00	100.4	85-112		12/31/2001	1953
613832-2			4000	50.26	50.00	100.5	85-112		12/31/2001	2138
613832-2			400	51.35	50.00	102.7	85-112		12/31/2001	2204

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

rpjsckl

Job Sample Receipt Checklist Report
12/28/2001

V2

Job Number.....: 613910 Location.: 57211 Customer Job ID.....:
Project Number.: 96000651 Project Description.: Marathon Oil Co., Midland, Tx
Customer.....: Marathon Oil Company Contact.: Paul Peacock

Job Check List Date.: 12/28/2001
Project Manager.....: arb

Questions ?

(Y/N) Comments

Chain-of-Custody Present?..... Y

Custody seal on shipping container?.....

...If "yes", custody seal intact?.....

Custody seals on sample containers?.....

...If "yes", custody seal intact?.....

Samples chilled?..... Y on ice

Temperature of cooler acceptable? (4 deg C +/- 2). Y 4.0 deg C IR

Samples received intact (good condition)?..... Y

Volatile samples acceptable? (no headspace)..... Y

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 Trip blank not on COC

Additional.....

Comments.....

Sample Custodian Signature..... *cu*



Committed To Your Success

Valparaiso Laboratory

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

Report To:

Contact: SAPPT
Company: SAPPT
Address: as
Phone:
Fax:
E-Mail:

Bill To:

Contact: Marathon Oil Company
Company: 125 W. Missouri St
Address: Midland TX 79701-0012
Phone:
Fax:
PO#: Quote:

Shaded Areas For Internal Use Only / of /

Lab Lot

Package Sealed Yes No
Samples Sealed Yes No
Received on ice Yes No
Samples intact Yes No
Temperature °C of Cooler

Within Hold Time Yes No
Preserv. Indicated Yes No NA
pH Check ok Yes No NA
Res. Cl₂ Check ok Yes No NA
Sample Labels and COC Agree Yes No
COC not present

Additional Analyses / Remarks

Laboratory ID	MSD	Client Sample ID	Sampling Date	Time	Refr #	Matrix			Comp/Grab	Date Required									
						# Cont.	Volume	Preserv		Hard Copy: / /									
61310-1		M.W. # 11	12-26-01						W	BTEX									
61310-2		M.W. # 8	12-26-01						W										
61310-3		M.W. # 13	12-26-01						W										
61310-4		Live stock water	12-26-01						W										
61310-5		M.W. # 6	12-26-01						W										
61310-6		M.W. # 12	12-26-01						W										
61310-7		M.W. # 3	12-26-01						W										

REQUISITIONED BY Valparaiso Laboratory COMPANY Valparaiso Laboratory DATE 12-26-01 TIME 3:15
REQUISITIONED BY Marathon Oil Company COMPANY Marathon Oil Company DATE 12/28/01 TIME

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous
OL = Oil
A = Air

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 Acetate, Cool to 4°
6. Cool to 4°
7. None

COMMENTS:

Date Received 12/28/01
Courier:
Hand Delivered ☐
Bill of Lading: