GW - 21

PERMITS, RENEWALS, & MODS

New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division

MARCH 6, 2012

Mr. Sandy Ballard
Oxy USA
329 Marathon Road
Lakewood, NM 88254

Dear Mr. Ballard:

Based on your responses given in the "Oil & Gas Facilities Questionnaire for Determination of a WQCC Discharge Permit" and a file review, the Oil Conservation Division (OCD) has determined that one of your facilities with an expired or soon to be expired permit is not required to operate under a Water Quality Control Commission (WQCC) Discharge Permit. This means that the WQCC Discharge Permit for **GW-021** (Oxy Indian Basin GP) is hereby rescinded and you are not required to proceed with the renewal of this expired WQCC Discharge Permit. OCD will close this discharge permit in its database.

Previously, Oxy has conducted abatement of ground water contamination at this facility under the authority of its WQCC Discharge Permits, pursuant to 20.6.2.4000 NMAC (PREVENTION AND ABATEMENT OF WATER POLLUTION). OCD has determined that Oxy does not intentionally discharge at this facility; therefore, no WQCC Discharge Permit is required. However, because of existing ground water contamination at this facility, OCD is requiring Oxy to continue to abate pollution of ground water pursuant to 19.15.30 NMAC (REMEDIATION). The new Abatement Plan case number for the former GW-021 site is **AP-107**. Please use this Abatement Plan case number in all future correspondence. Please contact Edward J. Hansen at 505-476-3489 to discuss how Oxy may complete its abatement of the remaining ground water contamination at this facility.

Because this WQCC Discharge Permit will now longer be in effect, you may be required to obtain separate OCD permit(s) for other processes at your facility, such as: pits, ponds, impoundments, below-grade tanks; waste treatment, storage and disposal operations; and landfarms and landfills. OCD will determine if any of these existing processes may require a separate permit under OCD's Oil, Gas, and Geothermal regulations. If OCD determines that a separate permit(s) is required, then a letter will be sent to you indicating what type of permit is required.

Please keep in mind, if your facility has any discharges that would require a WQCC Discharge Permit now or in the future, then you will be required to renew or obtain a WQCC Discharge Permit.

If you have any questions regarding this matter, please contact Glenn von Gonten at 505-476-3488.

Thank you for your cooperation.

Jami Bailey
Director

JB/gvg

Lowe, Leonard, EMNRD

From: Lowe, Leonard, EMNRD
Sent: Tuesday, May 10, 2011 12:43 PM
To: 'Jon_Hamill@oxy.com'
Subject: RE: GW-021 Sump Retrofit & Current Permit Approval

Mr. Hamill,

NMOCD Santa Fe approves your submitted retrofits for GW-021.

Per our verbal conversation on Tuesday, May 10, 2011, OXY may proceed with updating their sumps.

llowe

Leonard Lowe
Environmental Engineer
Oil Conservation Division/EMNRD
1220 S. St. Francis Drive
Santa Fe, N.M. 87505
Office: 505-476-3492
Fax: 505-476-3462
E-mail: leonard.lowe@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/

-----Original Message-----
From: Jon_Hamill@oxy.com [mailto:Jon_Hamill@oxy.com]
Sent: Thursday, May 05, 2011 9:04 PM
To: Lowe, Leonard, EMNRD; VonGonten, Glenn, EMNRD
Cc: Thomas_Bernal@oxy.com; Sandy_Ballard@oxy.com; Mark_Andersen@oxy.com; Timothy.Reed@tetratech.com; John_Kirby@oxy.com
Subject: GW-021 Sump Retrofit & Current Permit Approval
Importance: High

Leonard:

Per our conversation on Friday (4/29), the Oxy Indian Basin Gas Plant (IBGP) is requesting NMOCD email approval on the following changes, until our GW Discharge Plan 5-year renewal is formally approved and permit conditions issued by the NMOCD:

1) continue to operate off our current permit; ✓

2) retrofit all single-containment sumps or replace with double-walled fiberglass sump w/ testing port (attached is our plans for the sump retrofits from page 14 in Oxy's GW-021 Discharge Plan) ✓

3) continue with proposed MIT schedule for all underground piping (attached is the revised, proposed schedule from pages 23-24 in Oxy's GW-021 Discharge Plan) ✓

Please let me know if you have any questions or comments. Thanks in advance for your consideration.

TYPICAL RETROFIT OF IBGP SUMPS

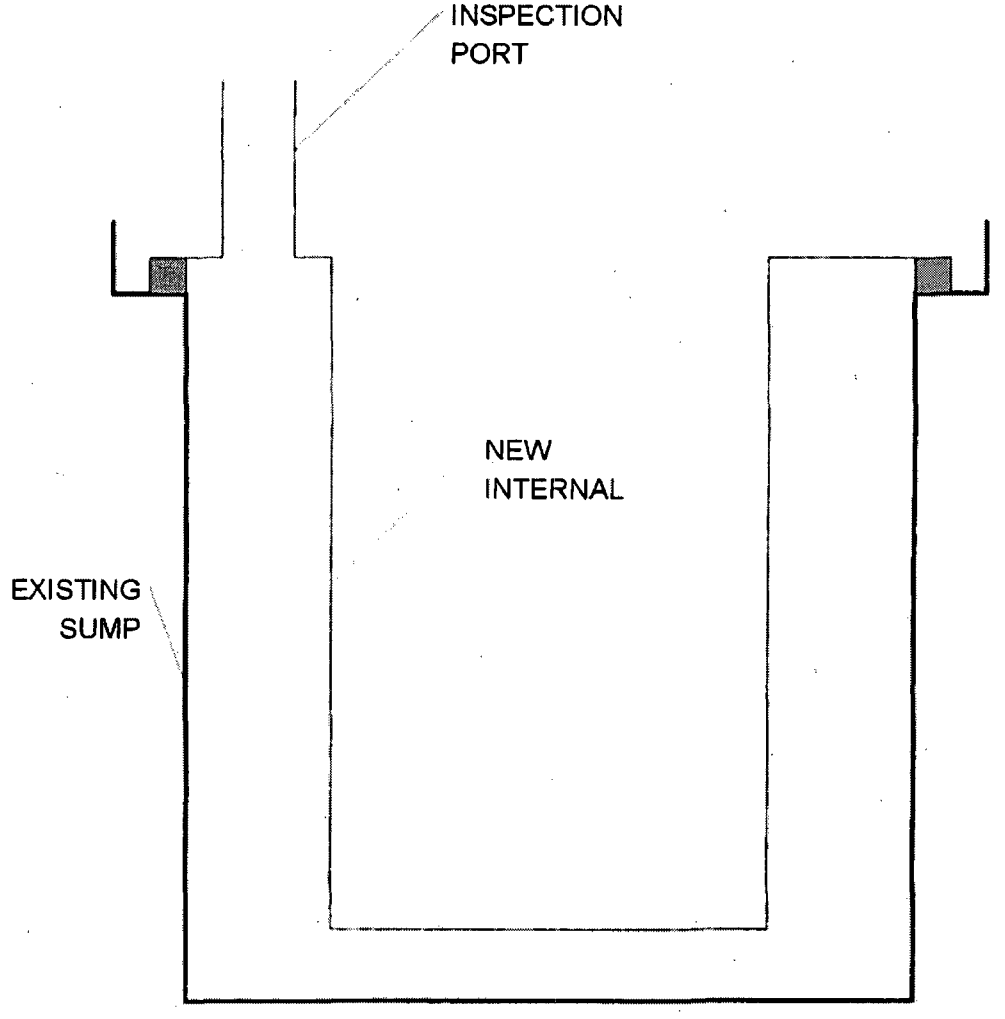

Table 5. Underground Piping

PL #	Piping Name	Pathway	Flow Rate (Bbls/day)	Pressure (psig)	Diameter (inch)	Piping Type	Baseline Integrity Test	Reoccurring (5yrs) Integrity Test
1	Produced Water Line	Inlet valve pit to skimmer basin gunbarrel	1500	15	6	Poly	Aug 2010	Jul-2015
2	Recompressor & Expander Lube Oil Makeup Line	From lube oil tank makeup pump to south of expander skid	<1	150	1	Steel	Aug 2010	Aug-2015
3	Stabilizer Compressor Dump	From Stab comp dumps to south of stab comp containment	15	30	1	Steel	Sep 2010	Sep-2015
4	Selexol Underground Pipeline	Selexol storage tank to Selexol unit	As needed	25	2	Steel	Oct 2010	Oct-2015
5	Waste Effluent Transfer Piping	Open drain collection sump to skimmer basin	80	30	4	IC Steel	Nov 2010	Nov-2015
6	LACT Sump Pump to Main Boiler Sump	LACT sump pump to main boiler sump	1	<35	2	Steel/Poly	Nov 2010	Nov-2015
7	Product Skimmer Recovery Line	Skimmer basin oil transfer pump to inlet condensate line	20	40	2	Steel	Dec 2010	Dec-2015
8	Open Drain System	Various plant units to open drain collection sump	15	No	3.2	IC Steel	Dec 2010	Dec-2015
9	Underground Amine Lines Tied to Valve "Octopus" From:							
10	Little Slop		1	5	2	Steel	Jan 2011	Jan-2016
11	Flash Tank		1	80	2	Steel	Jan 2011	Jan-2016
12	Bag Filters		<1	80	2	Steel	Jan 2011	Jan-2016
13	Charcoal Filters		<1	80	2	Steel	Jan 2011	Jan-2016
14	Reflux pumps		1	20	2	Steel	Jan 2011	Jan-2016
15	Amine Storage Tank 8		1	5	2	Steel	Jan 2011	Jan-2016
16	Amine Storage Tank 9		1	5	2	Steel	Jan 2011	Jan-2016
17	Condensate Delivery Sales	Condensate bullet storage tanks (1) to condensate loading area (LA)	300	<10	4	Poly	Mar 2011	Mar-2016
18	Glycol Storage Tank Discharge	Storage tank transfer pump to glycol flash tank	1	70	2	Poly	Apr 2011	Apr-2016
19	SWD pump discharge to 6" fiberglass	25-102 to 25-101	As needed	10	3	Steel	Apr 2011	Apr-2016
20	Condensate rerun line from lact unit to water tank	East of LACT, south to water truck unloading	As needed	0	2	Poly	Apr 2011	Apr-2016
21	Inlet Filter/Separator Closed Drain Connection	Inlet filter/separator to closed drain header	0	40	2	Steel	May 2011	May-2016
22	From Slugcatcher to Metering separator	00-100 to 31-100 to 31-101 to 31-102	150	200	2	Steel	Jun 2011	Jun-2016
23	Glycol Overhead Coalescer to Closed Drain	12-102 to 31-108	As needed	60	2	Steel	Jul 2011	Jul-2016
24	Acid gas suction line to skimmer basin	18-100 to 18-101	As needed	0	1	Steel	Jul 2011	Jul-2016
25	Gas Gathering Blowdown lines	20-106 through 109 to 20-110	As needed	1000	various	Steel	Aug 2011	Aug-2016
26	Hot sump pump discharge to east water tank	OD-104 to OD-105	80	0	2	Steel	Sep 2011	Sep-2016
27	Amine charcoal open drain sump pump discharge	OD-106 to OD-107	As needed	0	1	Steel	Oct 2011	Oct-2016
28	NGL proving station to flare scrubber	34-104 to 34-105	As needed	0	1 and 2	Steel	Nov 2011	Nov-2016
29	Flare scrubber pump discharge to stabilizer feed tank	34-106 to 34-103	50	75	2	Steel	Dec 2011	Dec-2016
30	Selexol Filter drains to still	17-107 through 17-109	As needed	75	2	Steel	Jan 2012	Jan-2017
31	Amine overhead coaleser to closed drain	31-109 to 31-110	As needed	60	1	Steel	Feb 2012	Feb-2017
32	GTU inlet filter coaleser and regen scrubber to closed drain	31-113 and 31-116 to 31-111	As needed	60	1	Steel	Feb 2012	Feb-2017
33	Condensate Rerun Line	Condensate bullet storage tanks to overhead pipe rack	10:100 max	<20	2	Steel	Mar 2012	Mar-2017
34	Selexol Reflux Water	Selexol unit to gunbarrel	1	20	2	Steel	Dec 2012	Dec-2017
35	Injection Line	Fiberglass saltwater tank to pump suction header	3000	30	10	Steel	Dec 2012	Dec-2017
36	Condensate Make Line	Stabilizer to condensate storage tanks	300	0	2	Steel	Dec 2012	Dec-2017
37	Softwater Regeneration	Water softner in water treatment building to fiberglass SWD tank	385	15	2	PVC	Dec 2012	Dec-2017
38	Inlet Condensate Line	Inlet valve pit to overhead pipe rack	350	<30	4	Steel	Dec 2012	Dec-2017
39	Co-Production Line to Skimmer Basin Gunbarrel	Co-production line outside plant to skimmer basin gunbarrel	2000	<10	6	Fiberglass	Dec 2012	Dec-2017
40	Dump Line	Stabilizer feed tank to skimmer basin	50	40	4	Poly	Dec 2012	Dec-2017
41	SWD pump discharge to A.G.I. #1 Well	25-109 to injection wellhead	3000	2000	6	Fiberglass	Dec 2012	Dec-2017
42	Closed Drain Scrubber Dump Line	Closed drain scrubber to skimmer basin gunbarrel	5	40	2	Poly	Dec 2012	Dec-2017
43	Blow Down Collection Header	Open drain collection sump area to boiler blow down bottle	80	40	2	Steel	Dec 2012	Dec-2017
44	Selexol Reflux Water to Reflux pump suction	17-110 to 17-106	170	8	3	Steel	Dec 2012	Dec-2017
45	Selexol condensate to Gunbarrell	17-113 to 17-114	10	0	1	Steel	Dec 2012	Dec-2017
46	Softwater, SWD bypass and RO reject to White tank	24-107 to 24-108	125	0	4	Steel	Dec 2012	Dec-2017
	LINES REMOVED FROM TABLE 5 UNDERGROUND PIPING MIT LIST						**COMMENTS**	
47	SRU Steam Condensate Return	From SRU to boiler feed tank	10	0	2	Stainless	Brought above ground	
48	Line 3 & 4 Metering Separator Oil Dump Line to Inlet Condensate Line	Line 3 & 4 metering separator oil dump line to inlet condensate line	200	40	3	Steel	Brought above ground	
49	Inlet Filter/Separator Dump Line	Inlet filter/separator to inlet condensate line	20	<10	2	Steel	Out Of Service (OOS)	
50	Open Drain Collection Sump Pump to Skimmer Basin Gunbarrel	Open drain collection sump pump to skimmer basin gunbarrel	80	100	4	IC Steel	Duplicate of Line #5	
51	Main Boiler Blowdown to Sump	Main boiler blowdown collection header	15	100	2	Steel	Brought above ground	
52	Reverse Osmosis Wastewater Piping (out of service due to permit)	RO unit in water treatment building to air stripper outlet to infiltration	200	60	2	Poly	Out Of Service (OOS)	
53	Untreated Groundwater Bypass Piping	Diversion valve at treatment compound to skimmer basin	2676	50	2	Poly	Out Of Service (OOS)	
54	Treated Groundwater Piping	Air stripper at treatment compound to skimmer basin SWD tank	125	20	6	Poly	Out Of Service (OOS)	
55	SRU Waste Heat Boiler & Large Condenser Blowdown Discharge Piping (OOS)	Waste heat boiler and large condenser to steel saltwater tank	10	70	2	Steel	Brought above ground	
56	Divert Line	Inlet valve pit to condensate bullet storage tanks	1	40	2	Poly	Out Of Service (OOS)	
57	Open Top Tank To Skimmer Basin Gunbarrel	Open top transfer pump to skimmer basin gunbarrel	50	10	2	Steel	Out Of Service (OOS)	
58	Cooling Tower Blowdown to Skimmer Basin	Cooling tower blowdown to skimmer basin SWD tank	200	<10	2	Poly	Fresh Water Line	

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	LINES REMOVED FROM TABLE 5 UNDERGROUND PIPING MIT LIST						COMMENTS
59	Morrow Gas Separator Dump Line	Morrow gas separator to closed drain	0	<5	2	Steel	Out Of Service (OOS)
60	Horizontal H.P. Inlet Scrubber Closed Drain	Removed from service	1	40	2	Steel	Out Of Service (OOS)
61	WHB Blowdown	WHB's to open drain collection sump area	65	100	2	Steel	Duplicate of Line #43
62	Inlet Condensate Divert Line to the Transfer Tank (OOS)	Inlet condensate divert line to the transfer tank	1	270	2	Steel	Out Of Service (OOS)
63	Inlet Compressor Suction Scrubber (H&V) Dump Lines to Inlet Metering Separator (O	Inlet comp. suction scrubber (H&V) dump lines to inlet metering system	3	30	2	Steel	Out Of Service (OOS)
64	Soft Water	From soft water pump discharge to boiler feed tanks	1	5	2	Steel	Soft Water Line
65	Acid Gas Compressor Suction Line	SRU to acid gas compressor	1 MMSCF/d	6	10	Steel	Natural Gas Line
66	Acid Gas Compressor Sweet Purge Gas	Pipe rack at glycol unit to acid gas compressor	As needed	50	2	Steel	Natural Gas Line
67	Acid Gas Compressor Instrument Air	Pipe rack at glycol unit to acid gas compressor	As needed	80	2	Steel	Dry Air System Line
68	Glycol Flash Gas to Closed Drain	Glycol flash tank to closed drain scrubber	1 MMSCF/d	100	2"	Steel	Natural Gas Line
69	Cyclone Dump to Closed Drain	Cyclone to closed drain scrubber	As needed	1000	2" / 3"	Steel	Out Of Service (OOS)

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New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Jon Goldstein
Cabinet Secretary

Jim Noel
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

June 29, 2010

Mr. David Edwards
5 Greenway Plaza
Suite 15.040
Houston TX 77046

Re: Renewal Discharge Permit, GW-021
Indian Basin Gas Plant
NE/4 Section 23, Township 21 South, Range 23 East, NMPM,
Eddy County, New Mexico

Dear Mr. Edwards:

Pursuant to Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - 20.6.2.3114 NMAC, the Oil Conservation Division (OCD) hereby approves the **Oxy USA WTP Limited Partnership's** discharge permit for the above referenced site contingent upon the conditions specified in the enclosed **Attachment to the Discharge Permit**. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within 30 days of receipt of this letter including permit fees.**

Please be advised that approval of this permit does not relieve the owner/operator of responsibility should operations result in pollution of surface water, ground water or the environment. Nor does approval of the permit relieve the owner/operator of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If you have any questions, please contact Leonard Lowe of my staff at (505-476-3492) or E-mail leonard.lowe@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Glenn von Gonten
Acting Environmental Bureau Chief

Attachments-1
xc: OCD District Office

ATTACHMENT

DISCHARGE PERMIT

APPROVAL CONDITIONS

1. **Payment of Discharge Plan Fees:** All discharge permits are subject to WQCC Regulations. Every billable facility that submits a discharge permit application will be assessed a filing fee of $100.00, plus a flat fee (*see* WQCC Regulation 20.6.2.3114 NMAC). The Oil Conservation Division ("OCD") has received the required $100.00 filing fee. The flat fee for a Gas Plant is $4000.00. Please submit this amount with a signed copy of the permit and return to the OCD **within 30 days**. Checks should be made out to the New Mexico Water Quality Management Fund.

2. **Permit Expiration, Renewal Conditions and Penalties:** Pursuant to WQCC Regulation 20.6.2.3109.H.4 NMAC, this permit is valid for a period of five years. **The permit will expire on November 26, 2014** and an application for renewal should be submitted no later than 120 days before that expiration date. Pursuant to WQCC Regulation 20.6.2.3106.F NMAC, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved. ***Expired permits are a violation of the Water Quality Act {Chapter 74, Article 6, NMSA 1978} and civil penalties may be assessed accordingly.***

3. **Permit Terms and Conditions:** Pursuant to WQCC Regulation 20.6.2.3104 NMAC, when a permit has been issued, the owner/operator must ensure that all discharges shall be consistent with the terms and conditions of the permit. In addition, all facilities shall abide by the applicable rules and regulations administered by the OCD pursuant to the Oil and Gas Act, NMSA 1978, Sections 70-2-1 through 70-2-38.

4. **Owner/Operator Commitments:** The owner/operator shall abide by all commitments submitted in its August 2009 discharge plan application, including attachments and subsequent amendments and these conditions for approval. Permit applications that reference previously approved plans on file with the division shall be incorporated in this permit and the owner/operator shall abide by all previous commitments of such plans and these conditions for approval.

5. **Modifications:** WQCC Regulation 20.6.2.3107.C and 20.6.2.3109 NMAC addresses possible future modifications of a permit. The owner/operator (discharger) shall notify the OCD of any facility expansion, production increase or process modification that would result in any significant modification in the discharge of water contaminants. The Division Director may require a permit modification if any water quality standard specified at 20.6.2.3103 NMAC is being or will be exceeded, or if a toxic pollutant as defined in WQCC Regulation 20.6.2.7 NMAC is present in ground water at any place of withdrawal for present or reasonably foreseeable future use, or that the Water Quality Standards for Interstate and Intrastate streams as specified in 20.6.4 NMAC are being or may be violated in surface water in New Mexico.

6. **Waste Disposal and Storage:** The owner/operator shall dispose of all wastes at an OCD-approved facility. Only oil field RCRA-exempt wastes may be disposed of by injection in a Class

II well. RCRA non-hazardous, non-exempt oil field wastes may be disposed of at an OCD-approved facility upon proper waste determination pursuant to 40 CFR Part 261. Any waste stream that is not listed in the discharge permit application must be approved by the OCD on a case-by-case basis.

A. **OCD Part 35 Waste:** Pursuant to OCD Part 35 (19.15.35.8 NMAC) disposal of certain non-domestic waste without notification to the OCD is allowed at NMED permitted solid waste facilities if the waste stream has been identified in the discharge permit and existing process knowledge of the waste stream does not change.

B. **Waste Storage:** The owner/operator shall store all waste in an impermeable bermed area, except waste generated during emergency response operations for up to 72 hours. All waste storage areas shall be identified in the discharge permit application. Any waste storage area not identified in the permit shall be approved on a case-by-case basis only. The owner/operator shall not store oil field waste on-site for more than 180 days unless approved by the OCD.

7. **Drum Storage:** The owner/operator must store all drums, including empty drums, containing materials other than fresh water on an impermeable pad with curbing. The owner/operator must store empty drums on their sides with the bungs in place and lined up on a horizontal plane. The owner/operator must store chemicals in other containers, such as tote tanks, sacks, or buckets on an impermeable pad with curbing.

8. **Process, Maintenance and Yard Areas:** The owner/operator shall either pave and curb or have some type of spill collection device incorporated into the design at all process, maintenance, and yard areas which show evidence that water contaminants from releases, leaks and spills have reached the ground surface.

9. **Above Ground Tanks:** The owner/operator shall ensure that all aboveground tanks have impermeable secondary containment (e.g., liners and berms), which will contain a volume of at least one-third greater than the total volume of the largest tank or all interconnected tanks. The owner/operator shall retrofit all existing tanks before discharge permit renewal. Tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt from this condition.

10. **Labeling:** The owner/operator shall clearly label all tanks, drums, and containers to identify their contents and other emergency notification information. The owner/operator may use a tank code numbering system, which is incorporated into their emergency response plans.

11. **Below-Grade Tanks/Sumps and Pits/Ponds.**

A. All below-grade tanks and sumps must be approved by the OCD prior to installation and must incorporate secondary containment with leak detection into the design. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal. All existing below-grade tanks and sumps without secondary containment and leak detection must be tested annually or as specified herein. Systems that have secondary containment with leak detection shall have a monthly inspection of the leak detection system to determine if the primary containment is leaking. Small sumps or depressions in

secondary containment systems used to facilitate fluid removal are exempt from these requirements if fluids are removed within 72 hours.

B. All pits and ponds, including modifications and retrofits, shall be designed by a certified registered professional engineer and approved by the OCD prior to installation. In general, all pits or ponds shall have approved hydrologic and geologic reports, location, foundation, liners, and secondary containment with leak detection, monitoring and closure plans. All pits or ponds shall be designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health, safety and the environment for the foreseeable future. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal.

C. The owner/operator shall ensure that all exposed pits, including lined pits and open top tanks (8 feet in diameter or larger) shall be fenced, screened, netted, or otherwise rendered non-hazardous to wildlife, including migratory birds.

D. The owner/operator shall maintain the results of tests and inspections at the facility covered by this discharge permit and available for OCD inspection. The owner/operator shall report the discovery of any system which is found to be leaking or has lost integrity to the OCD within 15 days. The owner/operator may propose various methods for testing such as pressure testing to 3 pounds per square inch greater than normal operating pressure and/or visual inspection of cleaned tanks and/or sumps, or other OCD-approved methods. The owner/operator shall notify the OCD at least 72 hours prior to all testing.

12. Underground Process/Wastewater Lines:

A. The owner/operator shall test all underground process/wastewater pipelines at least once every five (5) years to demonstrate their mechanical integrity, except lines containing fresh water or fluids that are gases at atmospheric temperature and pressure. Pressure rated pipe shall be tested by pressuring up to one and one-half times the normal operating pressure, if possible, or for atmospheric drain systems, to 3 pounds per square inch greater than normal operating pressure, and pressure held for a minimum of 30 minutes with no more than a 1% loss/gain in pressure. The owner/operator may use other methods for testing if approved by the OCD.

B. The owner/operator shall maintain underground process and wastewater pipeline schematic diagrams or plans showing all drains, vents, risers, valves, underground piping, pipe type, rating, size, and approximate location. All new underground piping must be approved by the OCD prior to installation. The owner/operator shall report any leaks or loss of integrity to the OCD within 15 days of discovery. The owner/operator shall maintain the results of all tests at the facility covered by this discharge permit and they shall be available for OCD inspection. The owner/operator shall notify the OCD at least 72 hours prior to all testing.

13. Class V Wells: The owner/operator shall close all Class V wells (e.g., septic systems, leach fields, dry wells, etc.) that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes unless it can be demonstrated that ground water will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD-regulated facilities that inject non-hazardous fluid into or above an underground source of drinking

water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only, must be permitted by the New Mexico Environment Department (NMED).

14. Housekeeping: The owner/operator shall inspect all systems designed for spill collection/prevention and leak detection at least monthly to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices shall be emptied of fluids within 72 hours of discovery. The owner/operator shall maintain all records at the facility and available for OCD inspection.

15. Spill Reporting: The owner/operator shall report all unauthorized discharges, spills, leaks and releases and conduct corrective action pursuant to WQCC Regulation 20.6.2.1203 NMAC and OCD Part 29 (19.15.29 NMAC). The owner/operator shall notify both the OCD District Office and the Santa Fe Office within 24 hours and file a written report within 15 days. The OCD does not consider covering contaminated areas a remediation of the spill/release.

16. OCD Inspections: The OCD will perform an inspection of this facility. The results of that inspection will be referenced in another letter.

17. Storm Water: The owner/operator shall implement and maintain run-on and runoff plans and controls. The owner/operator shall not discharge any water contaminant that exceeds the WQCC standards specified in 20.6.2.3101 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) including any oil sheen in any stormwater run-off. The owner/operator shall notify the OCD within 24 hours of discovery of any releases and shall take immediate corrective action(s) to stop the discharge.

18. Unauthorized Discharges: The owner/operator shall not allow or cause water pollution, discharge or release of any water contaminant that exceeds the WQCC standards listed in 20.6.2.3101 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) unless specifically listed in the permit application and approved herein. ***An unauthorized discharge is a violation of this permit.***

19. Vadose Zone and Water Pollution: The owner/operator shall address any contamination through the discharge permit process or pursuant to WQCC 20.6.2.4000-.4116 NMAC (Prevention and Abatement of Water Pollution). The OCD may require the owner/operator to modify its permit for investigation, remediation, abatement, and monitoring requirements for any vadose zone or water pollution. Failure to perform any required investigation, remediation, abatement and submit subsequent reports will be a violation of the permit.

20. Landfarm Operations: Owner/Operator shall verify that the land farm is considered closed by either;

21. Transfer of Discharge Permit (WQCC 20.6.2.3111) Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of a facility with a discharge permit, the transferor shall notify the transferee in writing of the existence of the discharge permit, and shall deliver or send by certified mail to the department a copy of such written

notification, together with a certification or other proof that such notification has in fact been received by the transferee.

Upon receipt of such notification, the transferee shall have the duty to inquire into all of the provisions and requirements contained in such discharge permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the department's file or files concerning such discharge permit. The transferee (new owner/operator) shall sign and return an original copy of these permit conditions and provide a written commitment to comply with the terms and conditions of the previously approved discharge permit.

22. Closure Plan and Financial Assurance: Pursuant to 20.6.2.3107 NMAC an owner/operator shall notify the OCD when any operations of the facility are to be discontinued for a period in excess of six months. Prior to closure, or as a condition of this permit, or request from the OCD, the operator will submit an approved closure plan, modified plan, and/or provide adequate financial assurance.

23. Certification: (Owner/Operator), by the officer whose signature appears below, accepts this permit and agrees to comply with all submitted commitments, including these terms and conditions contained here. **Owner/Operator** further acknowledges that the OCD may, for good cause shown, as necessary to protect fresh water, public health, safety, and the environment, change the conditions and requirements of this permit administratively

Conditions accepted by: "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment."

_____
Company Name-print name above

_____
Company Representative- print name

_____
Company Representative- Signature

Title_____

Date:_____

Lowe, Leonard, EMNRD

From: Lowe, Leonard, EMNRD
Sent: Wednesday, August 19, 2009 2:35 PM
To: 'Dennis_Newman@oxy.com'
Cc: 'David_Edwards@oxy.com'; 'Mark_Treesh@oxy.com'; 'Alonzo_Hernandez@oxy.com'
Subject: GW-021 - Indian Basin Gas Plant ADMIN. COMPLETE
Attachments: GW-021, Admin Complete Letter.pdf; GW-021, OCD PN.pdf; GW-021, Renewal Draft Permit.pdf

Mr. Newman,

The submitted renewal application for the GW-021 Indian Basin Gas Plant discharge permit has been deemed to be administratively complete.

Attached are documents stating so for your records.

On August 17, 2009 an e-mail was sent to your attention to edit your submitted public notice see e-mail below for details. Please resubmit your public notice for review.

llowe

Leonard Lowe
Environmental Engineer
Oil Conservation Division/EMNRD
1220 S. St. Francis Drive
Santa Fe, N.M. 87505
Office: 505-476-3492
Fax: 505-476-3462
E-mail: leonard.lowe@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/

From: Lowe, Leonard, EMNRD
Sent: Monday, August 17, 2009 2:37 PM
To: 'Dennis_Newman@oxy.com'
Cc: David_Edwards@oxy.com; Mark_Treesh@oxy.com; Alonzo_Hernandez@oxy.com
Subject: RE: Renewal - Groundwater Discharge Plan - GW-21 - Indian Basin Gas Plant
Importance: High

The OCD has reviewed your submitted public notice and has **denied** your submittal.

Please revise your public notice. You are missing:

"A brief description of the expected quality and volume of the discharge"

"The depth to and the total dissolved solids concentrations of the ground water most likely to be affected by the discharge"

Please submit ASAP.

I have provided the WQCC requirements for applicant public notice. Please refer to, not all fonts in red as they pertain to the renewal portion of this process.

Call me for questions.

llowe

Leonard Lowe
Environmental Engineer
Oil Conservation Division/EMNRD
1220 S. St. Francis Drive
Santa Fe, N.M. 87505
Office: 505-476-3492
Fax: 505-476-3462
E-mail: leonard.lowe@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/

Bill Richardson
Governor
Joanna Prukop
Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

August 19, 2009

Dear Mr. Edwards:

Re: Discharge Plan Renewal Permit GW-021
OXY USA WTP Limited Partnership
Indian Basin Gas Plant
Eddy County, New Mexico

The New Mexico Oil Conservation Division (NMOCD) has Oxy USA WTP Limited Partnership's request and initial fee, dated August 7, 2009, to renew GW-021 for Indian Basin Gas Plant located in the NE/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. The initial submittal provided the required information in order to deem the application "administratively" complete.

Therefore, the New Mexico Water Quality Control Commission regulations (WQCC) notice requirements of 20.6.2.3108 NMAC must be satisfied and demonstrated to the NMOCD. NMOCD will provide public notice pursuant to the WQCC notice requirements of 20.6.2.3108 NMAC to determine if there is any public interest.

If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3492 or leonard.lowe@state.nm.us. On behalf of the staff of the NMOCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Leonard Lowe
Environmental Engineer

LRL/lrl

xc: OCD District II Office, Artesia

Bill Richardson
Governor
Joanna Prukop
Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

August 19, 2009

Mr. David Edwards
5 Greenway Plaza
Suite 15.040
Houston TX 77046

Re: Renewal Discharge Permit, GW-021
Indian Basin Gas Plant
NE/4 Section 23, Township 21 South, Range 23 East, NMPM,
Eddy County, New Mexico

Dear Mr. Edwards:

Pursuant to Water Quality Control Commission (WQCC) Regulations 20.6.2.3104 - 20.6.2.3114 NMAC, the Oil Conservation Division (OCD) hereby approves the **Oxy USA WTP Limited Partnership's** discharge permit for the above referenced site contingent upon the conditions specified in the enclosed **Attachment to the Discharge Permit**. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within 30 days of receipt of this letter including permit fees.**

Please be advised that approval of this permit does not relieve the owner/operator of responsibility should operations result in pollution of surface water, ground water or the environment. Nor does approval of the permit relieve the owner/operator of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If you have any questions, please contact Leonard Lowe of my staff at (505-476-3492) or E-mail leonard.lowe@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Glenn von Gonten
Acting Environmental Bureau Chief

Attachments-1
xc: OCD District Office

ATTACHMENT

DISCHARGE PERMIT

APPROVAL CONDITIONS

1. **Payment of Discharge Plan Fees:** All discharge permits are subject to WQCC Regulations. Every billable facility that submits a discharge permit application will be assessed a filing fee of $100.00, plus a flat fee (*see* WQCC Regulation 20.6.2.3114 NMAC). The Oil Conservation Division ("OCD") has received the required $100.00 filing fee. The flat fee for a Gas Plant is $4000.00. Please submit this amount with a signed copy of the permit and return to the OCD within 30 days. Checks should be made out to the New Mexico Water Quality Management Fund.

2. **Permit Expiration, Renewal Conditions and Penalties:** Pursuant to WQCC Regulation 20.6.2.3109.H.4 NMAC, this permit is valid for a period of five years. **The permit will expire on November 26, 2014** and an application for renewal should be submitted no later than 120 days before that expiration date. Pursuant to WQCC Regulation 20.6.2.3106.F NMAC, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved. ***Expired permits are a violation of the Water Quality Act {Chapter 74, Article 6, NMSA 1978} and civil penalties may be assessed accordingly.***

3. **Permit Terms and Conditions:** Pursuant to WQCC Regulation 20.6.2.3104 NMAC, when a permit has been issued, the owner/operator must ensure that all discharges shall be consistent with the terms and conditions of the permit. In addition, all facilities shall abide by the applicable rules and regulations administered by the OCD pursuant to the Oil and Gas Act, NMSA 1978, Sections 70-2-1 through 70-2-38.

4. **Owner/Operator Commitments:** The owner/operator shall abide by all commitments submitted in its August 2009 discharge plan application, including attachments and subsequent amendments and these conditions for approval. Permit applications that reference previously approved plans on file with the division shall be incorporated in this permit and the owner/operator shall abide by all previous commitments of such plans and these conditions for approval.

5. **Modifications:** WQCC Regulation 20.6.2.3107.C and 20.6.2.3109 NMAC addresses possible future modifications of a permit. The owner/operator (discharger) shall notify the OCD of any facility expansion, production increase or process modification that would result in any significant modification in the discharge of water contaminants. The Division Director may require a permit modification if any water quality standard specified at 20.6.2.3103 NMAC is being or will be exceeded, or if a toxic pollutant as defined in WQCC Regulation 20.6.2.7 NMAC is present in ground water at any place of withdrawal for present or reasonably foreseeable future use, or that the Water Quality Standards for Interstate and Intrastate streams as specified in 20.6.4 NMAC are being or may be violated in surface water in New Mexico.

6. **Waste Disposal and Storage:** The owner/operator shall dispose of all wastes at an OCD-approved facility. Only oil field RCRA-exempt wastes may be disposed of by injection in a Class

II well. RCRA non-hazardous, non-exempt oil field wastes may be disposed of at an OCD-approved facility upon proper waste determination pursuant to 40 CFR Part 261. Any waste stream that is not listed in the discharge permit application must be approved by the OCD on a case-by-case basis.

A. **OCD Part 35 Waste:** Pursuant to OCD Part 35 (19.15.35.8 NMAC) disposal of certain non-domestic waste without notification to the OCD is allowed at NMED permitted solid waste facilities if the waste stream has been identified in the discharge permit and existing process knowledge of the waste stream does not change.

B. **Waste Storage:** The owner/operator shall store all waste in an impermeable bermed area, except waste generated during emergency response operations for up to 72 hours. All waste storage areas shall be identified in the discharge permit application. Any waste storage area not identified in the permit shall be approved on a case-by-case basis only. The owner/operator shall not store oil field waste on-site for more than 180 days unless approved by the OCD.

7. **Drum Storage:** The owner/operator must store all drums, including empty drums, containing materials other than fresh water on an impermeable pad with curbing. The owner/operator must store empty drums on their sides with the bungs in place and lined up on a horizontal plane. The owner/operator must store chemicals in other containers, such as tote tanks, sacks, or buckets on an impermeable pad with curbing.

8. **Process, Maintenance and Yard Areas:** The owner/operator shall either pave and curb or have some type of spill collection device incorporated into the design at all process, maintenance, and yard areas which show evidence that water contaminants from releases, leaks and spills have reached the ground surface.

9. **Above Ground Tanks:** The owner/operator shall ensure that all aboveground tanks have impermeable secondary containment (e.g., liners and berms), which will contain a volume of at least one-third greater than the total volume of the largest tank or all interconnected tanks. The owner/operator shall retrofit all existing tanks before discharge permit renewal. Tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt from this condition.

10. **Labeling:** The owner/operator shall clearly label all tanks, drums, and containers to identify their contents and other emergency notification information. The owner/operator may use a tank code numbering system, which is incorporated into their emergency response plans.

11. **Below-Grade Tanks/Sumps and Pits/Ponds.**

A. All below-grade tanks and sumps must be approved by the OCD prior to installation and must incorporate secondary containment with leak detection into the design. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal. All existing below-grade tanks and sumps without secondary containment and leak detection must be tested annually or as specified herein. Systems that have secondary containment with leak detection shall have a monthly inspection of the leak detection system to determine if the primary containment is leaking. Small sumps or depressions in

secondary containment systems used to facilitate fluid removal are exempt from these requirements if fluids are removed within 72 hours.

B. All pits and ponds, including modifications and retrofits, shall be designed by a certified registered professional engineer and approved by the OCD prior to installation. In general, all pits or ponds shall have approved hydrologic and geologic reports, location, foundation, liners, and secondary containment with leak detection, monitoring and closure plans. All pits or ponds shall be designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health, safety and the environment for the foreseeable future. The owner/operator shall retrofit all existing systems without secondary containment and leak detection before discharge permit renewal.

C. The owner/operator shall ensure that all exposed pits, including lined pits and open top tanks (8 feet in diameter or larger) shall be fenced, screened, netted, or otherwise rendered non-hazardous to wildlife, including migratory birds.

D. The owner/operator shall maintain the results of tests and inspections at the facility covered by this discharge permit and available for OCD inspection. The owner/operator shall report the discovery of any system which is found to be leaking or has lost integrity to the OCD within 15 days. The owner/operator may propose various methods for testing such as pressure testing to 3 pounds per square inch greater than normal operating pressure and/or visual inspection of cleaned tanks and/or sumps, or other OCD-approved methods. The owner/operator shall notify the OCD at least 72 hours prior to all testing.

12. Underground Process/Wastewater Lines:

A. The owner/operator shall test all underground process/wastewater pipelines at least once every five (5) years to demonstrate their mechanical integrity, except lines containing fresh water or fluids that are gases at atmospheric temperature and pressure. Pressure rated pipe shall be tested by pressuring up to one and one-half times the normal operating pressure, if possible, or for atmospheric drain systems, to 3 pounds per square inch greater than normal operating pressure, and pressure held for a minimum of 30 minutes with no more than a 1% loss/gain in pressure. The owner/operator may use other methods for testing if approved by the OCD.

B. The owner/operator shall maintain underground process and wastewater pipeline schematic diagrams or plans showing all drains, vents, risers, valves, underground piping, pipe type, rating, size, and approximate location. All new underground piping must be approved by the OCD prior to installation. The owner/operator shall report any leaks or loss of integrity to the OCD within 15 days of discovery. The owner/operator shall maintain the results of all tests at the facility covered by this discharge permit and they shall be available for OCD inspection. The owner/operator shall notify the OCD at least 72 hours prior to all testing.

13. Class V Wells: The owner/operator shall close all Class V wells (e.g., septic systems, leach fields, dry wells, etc.) that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes unless it can be demonstrated that ground water will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD-regulated facilities that inject non-hazardous fluid into or above an underground source of drinking

water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only, must be permitted by the New Mexico Environment Department (NMED).

14. Housekeeping: The owner/operator shall inspect all systems designed for spill collection/prevention and leak detection at least monthly to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices shall be emptied of fluids within 72 hours of discovery. The owner/operator shall maintain all records at the facility and available for OCD inspection.

15. Spill Reporting: The owner/operator shall report all unauthorized discharges, spills, leaks and releases and conduct corrective action pursuant to WQCC Regulation 20.6.2.1203 NMAC and OCD Part 29 (19.15.29 NMAC). The owner/operator shall notify both the OCD District Office and the Santa Fe Office within 24 hours and file a written report within 15 days. The OCD does not consider covering contaminated areas a remediation of the spill/release.

16. OCD Inspections: The OCD performed an inspection of this facility on month, day, year. Mr. Man witnessed the inspection. All photographs referenced below are located in the attachment of this permit. As a result of this, OCD inspection concluded the following:

1. **Photo 1:**

Owner/operator shall resolve these concerns and report within **by Month, Day, Year**. The report shall be submitted, with photographs, to the Environmental Bureau Oil Conservation Division identifying the resolutions to the concerns.

17. Storm Water: The owner/operator shall implement and maintain run-on and runoff plans and controls. The owner/operator shall not discharge any water contaminant that exceeds the WQCC standards specified in 20.6.2.3101 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) including any oil sheen in any stormwater run-off. The owner/operator shall notify the OCD within 24 hours of discovery of any releases and shall take immediate corrective action(s) to stop the discharge.

18. Unauthorized Discharges: The owner/operator shall not allow or cause water pollution, discharge or release of any water contaminant that exceeds the WQCC standards listed in 20.6.2.3101 NMAC or 20.6.4 NMAC (Water Quality Standards for Interstate and Intrastate Streams) unless specifically listed in the permit application and approved herein. ***An unauthorized discharge is a violation of this permit.***

19. Vadose Zone and Water Pollution: The owner/operator shall address any contamination through the discharge permit process or pursuant to WQCC 20.6.2.4000-.4116 NMAC (Prevention and Abatement of Water Pollution). The OCD may require the owner/operator to modify its permit for investigation, remediation, abatement, and monitoring requirements for any vadose zone or water pollution. Failure to perform any required investigation, remediation, abatement and submit subsequent reports will be a violation of the permit.

20. Additional Site Specific Conditions: The owner/operator shall ensure that all employees understand all permit conditions.

21. Transfer of Discharge Permit (WQCC 20.6.2.3111) Prior to any transfer of ownership, control, or possession (whether by lease, conveyance or otherwise) of a facility with a discharge permit, the transferor shall notify the transferee in writing of the existence of the discharge permit, and shall deliver or send by certified mail to the department a copy of such written notification, together with a certification or other proof that such notification has in fact been received by the transferee.

Upon receipt of such notification, the transferee shall have the duty to inquire into all of the provisions and requirements contained in such discharge permit, and the transferee shall be charged with notice of all such provisions and requirements as they appear of record in the department's file or files concerning such discharge permit. The transferee (new owner/operator) shall sign and return an original copy of these permit conditions and provide a written commitment to comply with the terms and conditions of the previously approved discharge permit.

22. Closure Plan and Financial Assurance: Pursuant to 20.6.2.3107 NMAC an owner/operator shall notify the OCD when any operations of the facility are to be discontinued for a period in excess of six months. Prior to closure, or as a condition of this permit, or request from the OCD, the operator will submit an approved closure plan, modified plan, and/or provide adequate financial assurance.

23. Certification: (Owner/Operator), by the officer whose signature appears below, accepts this permit and agrees to comply with all submitted commitments, including these terms and conditions contained here. **Owner/Operator** further acknowledges that the OCD may, for good cause shown, as necessary to protect fresh water, public health, safety, and the environment, change the conditions and requirements of this permit administratively

Conditions accepted by: "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment."

_____
Company Name-print name above

_____
Company Representative- print name

_____
Company Representative- Signature

Title_____

Date:_____

NOTICE OF PUBLICATION

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

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations (20.6.2.3106 NMAC), the following discharge permit application(s) has been submitted to the Director of the New Mexico Oil Conservation Division ("NMOCD"), 1220 S. Saint Francis Drive, Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

(GW-021) Oxy USA WTP Limited Partnership, 5 Greenway Plaza, Houston TX 77046 has submitted a renewal application for the previously approved discharge plan for their Indian Basin Gas Plant, 329 Marathon Road, County road 401, Lakewood, N.M. located in the NE/4 Section 23, Township 21 South, Range 23 East, NMPM, Eddy County. The facility processes natural gas. Oxy acquired this facility from Marathon Oil in July, 2009. Approximately 200 bbls/day of produced water, 195 bbls/day of process effluents and 50 bbls/day of waste water are generated and stored in onsite. Groundwater most likely to be affected by a spill, leak or accidental discharge is at a depth of approximately 15 - 25feet, with a total dissolved solids concentration of approximately 380 – 5900 mg/L. The discharge plan addresses how oilfield products and waste will be properly handled, stored, and disposed of, including how spills, leaks, and other accidental discharges to the surface will be managed in order to protect fresh water.

The NMOCD has determined that the application is administratively complete and has prepared a draft permit. The NMOCD will accept comments and statements of interest regarding this application and will create a facility-specific mailing list for persons who wish to receive future notices. Persons interested in obtaining further information, submitting comments or requesting to be on a facility-specific mailing list for future notices may contact the Environmental Bureau Chief of the Oil Conservation Division at the address given above. The administrative completeness determination and draft permit may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday through Friday, or may also be viewed at the NMOCD web site http://www.emnrd.state.nm.us/ocd/. Persons interested in obtaining a copy of the application and draft permit may contact the NMOCD at the address given above. Prior to ruling on any proposed discharge permit or major modification, the Director shall allow a period of at least thirty (30) days after the date of publication of this notice, during which interested persons may submit comments or request that NMOCD hold a public hearing. Requests for a public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines that there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed permit based on information available, including all comments received. If a public hearing is held, the director will approve or disapprove the proposed permit based on information in the permit application and information submitted at the hearing.

Para obtener más información sobre esta solicitud en español, sirvase comunicarse por favor: New Mexico Energy, Minerals and Natural Resources Department (Depto. Del Energia, Minerals y Recursos Naturales de Nuevo México), Oil Conservation Division (Depto. Conservacio´n Del Petróleo), 1220 South St. Francis Drive, Santa Fe, New México (Contacto: Dorothy Phillips, 505-476-3461)

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this **19** day of August 2009.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

S E A L

Mark Fesmire, Director

ACKNOWLEDGEMENT OF RECEIPT
OF CHECK/CASH

I hereby acknowledge receipt of check No. _____ dated 8/12/09

or cash received on _____ in the amount of $ 100.00

from Oxy USA Inc

for GW-21

Submitted by: Lawrence Rocio Date: 8/12/09

Submitted to ASD by: Maricar Garcia Date: 8/14/09

Received in ASD by: _____ Date: _____

Filing Fee ✓ New Facility _____ Renewal _____

Modification _____ Other _____

Organization Code 521.07 Applicable FY 2004

To be deposited in the Water Quality Management Fund.

Full Payment _____ or Annual Increment _____

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

RECEIVED
2009 AUG 13 AM 11 53

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised June 10, 2003

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES, GAS PLANTS, REFINERIES, COMPRESSOR, GEOTHERMAL FACILITIES AND CRUDE OIL PUMP STATIONS

(Refer to the OCD Guidelines for assistance in completing the application)

☐ New ☒ Renewal ☐ Modification

1. Type: GROUNDWATER DISCHARGE PLAN (GW-21)
2. Operator: OXY USA WTP LIMITED PARTNERSHIP

   Address: 5 GREENWAY PLAZA, MID-CONTINENT ASSETS, HOUSTON, TEXAS 77046-0521

   Contact Person: DAVID EDWARDS Phone: 713-366-5527

3. Location: NE/4 _____/4 Section 23 Township 21 Range 23
   Submit large scale topographic map showing exact location.
4. Attach the name, telephone number and address of the landowner of the facility site.
5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility.
6. Attach a description of all materials stored or used at the facility.
7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.
8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
10. Attach a routine inspection and maintenance plan to ensure permit compliance.
11. Attach a contingency plan for reporting and clean-up of spills or releases.
12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.
13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.
14. CERTIFICATIONI hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: DAVID EDWARDS Title: HES MANAGER

Signature: Dave R. Edwards Date: AUGUST 7, 2009

E-mail Address: david_edwards@oxy.com

OXY USA WTP LP
A subsidiary of Occidental Petroleum Corporation

5 Greenway Plaza, Suite 110, Houston, Texas 77046-0521
P.O. Box 27570, Houston, Texas 77227-7570
Phone 713.215.7000

August 10, 2009

CERTIFIED MAIL

Leonard Lowe
Environmental Engineer
New Mexico Oil Conservation Division/EMNRD
1220 S. Saint Francis Drive
Santa Fe, New Mexico 87505

Subject: Revised Discharge Plan and Application (GW-21)
Indian Basin Gas Plant, Lakewood, New Mexico

Dear Mr. Lowe:

Referencing your email dated June 18, 2009, please find enclosed two copies of the subject application and plan for GW-21. The $100.00 filing fee, to be made out to the New Mexico Water Quality Management Fund, is being sent separately (along with a copy of this letter).

If you have any questions concerning the subject application or plan, please contact David Edwards, HES Manager at 713-366-5527, or me at 713-366-5485.

Sincerely,

Dennis L. Newman, P.E.

cc w/enclosure:
NMOCD District II
1301 W. Grand Ave
Artesia, NM 88210

Mark Treesh – Oxy IBGP

cc: David Edwards
Alonzo Hernandez

Oxy USA Inc
P O Box 809050
Dallas, TX 75380

PAYMENT DOCUMENT

NEW MEXICO STATE
WATER QUALITY MANAGEMENT FUND
1220 S ST FRANCIS DR
SANTA FE, NM 87505-4225
United States

DATE	CHECK NO.
12-AUG-09	390363

5329

DATE	INVOICE CREDIT MEMO	DESCRIPTION	PO NUMBER	COMPANY CODE	DISCOUNT	GROSS
11-AUG-09	081109	ATTN: LEONARD LOWE; DISCHARGE PLAN APPLICATION FILING FEES FOR INDIAN BASIN GAS PLANT...FEPA				100.00
THE ATTACHED CHECK IS IN PAYMENT FOR ITEMS DESCRIBED ABOVE			**TOTAL >**			$100.00

OXY USA WTP LP
A subsidiary of Occidental Petroleum Corporation

5 Greenway Plaza, Suite 110, Houston, Texas 77046-0521
P.O. Box 27570, Houston, Texas 77227-7570
Phone 713.215.7000

August 10, 2009

CERTIFIED MAIL

Leonard Lowe
Environmental Engineer
New Mexico Oil Conservation Division/EMNRD
1220 S. Saint Francis Drive
Santa Fe, New Mexico 87505

Subject: Revised Discharge Plan and Application (GW-21)
Indian Basin Gas Plant, Lakewood, New Mexico

Dear Mr. Lowe:

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If you have any questions concerning the subject application or plan, please contact David Edwards, HES Manager at 713-366-5527, or me at 713-366-5485.

Sincerely,

Dennis L. Newman, P.E.

cc w/enclosure:
NMOCD District II
1301 W. Grand Ave
Artesia, NM 88210

Mark Treesh – Oxy IBGP

cc: David Edwards
Alonzo Hernandez

Groundwater Discharge Plan
GW-21
for
Indian Basin Gas Plant

329 Marathon Road
(Eddy County Road 401)
Lakewood, New Mexico

Prepared For:

OXY USA WTP Limited Partnership
5 Greenway Plaza
Houston, Texas 77046

Submitted to:

State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division

August 4, 2009

Groundwater Discharge Plan
for
Indian Basin Gas Plant

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APPENDICES

Groundwater Discharge Plan
for
Indian Basin Gas Plant

Per The Oil and Gas Act (Section 70-2-12.B(22)), the Water Quality Control Commission regulations (Sections 3104 and 3106), and NM Oil Conservation Division (NMOCD) guideline document titled "Guidelines For The Preparation Of Discharge Plans At Natural Gas Plants, Refineries, Compressor and Crude Oil Pump Stations" (Revised 12-95), this Groundwater Discharge Plan is being prepared for the Indian Basin Gas Plant ("Plant").

1.0 TYPE OF OPERATION

The purpose of the Plant is natural gas processing. OXY USA WTP Limited Partnership ("OXY") became the responsible operator of the Plant on June 1, 2009 through an acquisition from Marathon Oil Corporation ("Marathon").

2.0 OPERATOR/LEGALLY RESPONSIBLE PARTY & LOCAL REPRESENTATIVE

The name of the operator and legally responsible party is OXY. The primary office address is 5 Greenway Plaza, Suite 15.040, Houston, Texas 77046. The telephone number for Mr. David Edwards, HES and Regulatory Manager, Mid-Continent Assets is (713) 366-5527. All correspondence regarding this Ground Water Discharge Plan should be directed to Mr. Edwards.

The local OXY Representative at the Plant is Mr. Mark Treesh, Production Coordinator and his telephone number is (575) 628-4112. The physical address of the Plant is 329 Marathon Road (Eddy County Road 401), Lakewood, New Mexico ("NM"), 88254. The mailing address is P.O. Box 1988, Carlsbad, NM 88221. A copy of all correspondence regarding this Ground Water Discharge Plan should be sent to Mr. Treesh.

3.0 LOCATION OF PLANT

The Plant is located in Eddy County, NM, approximately 20 miles northwest of Carlsbad, NM and 28 miles southwest of Artesia, NM. Figure 1 is excerpted from the U.S.G.S. 7.5-minute topographic quadrangle, titled "Martha Creek", showing the location of the facility.

4.0 LANDOWNER

OXY is the landowner of record of a 160-acre site legally described as the Northeast 1/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, NM. The Plant is located on a portion of the 160-acre property.

5.0 FACILITY DESCRIPTION

The Plant includes an area approximately 1320 feet by 1320 feet within a 160 acres property owned by OXY. Figure 1 shows the Plant site, the boundary of the 160-acre property, and the adjacent property managed by the Bureau of Land Management ("BLM"). The Plant processes gas gathered from a producing natural gas field. Approximately one percent of the Plant is paved. In addition to the gas processing equipment, there is a closed land farm on the west side of the Plant and NORM storage areas on the west and south perimeter of the Plant. Offices, a warehouse and parking areas are located near the eastern part of the Plant.

The Plant waste water is disposed at the NMOCD-permitted injection well AGI#1 SWD well (API# 30-015-31294) ("Plant's injection well"). Waste water injection wells Marathon Federal SWD Well #1 and Marathon IB Gas Com Well #1 are no longer used (see Figure 1). A diagram (plot plan) of the Plant illustrating the facility lay-out and equipment is included as Figure 2.

6.0 MATERIALS STORED OR USED AT THE PLANT

A list of materials stored and used at the Plant is included in Tables 3 and 4. See Section 8.0 for more information.

7.0 SOURCES AND QUANTITIES OF EFFLUENTS & WASTE SOLIDS

Wastes that are generated at the Plant consist of commingled effluent (Section 7.1) and solid and liquid wastes (Section 7.2). The commingled effluent is gathered by the drain and sump system. Solid and liquid wastes are generated at the Plant but are not part of the commingled effluent.

7.1 Effluents

The commingled effluent consists of produced water and various other Plant effluents. The individual waste effluent streams in the commingled effluent are identified in Table 1. The waste effluent streams from the various processes are collected and conveyed by the open drain piping system, the closed drain piping system, and several underground pipelines. Effluent volumes at the Plant are variable and depend upon Plant and field operations. Commingled effluent is normally discharged into the Plant's injection well. In the unlikely event of an emergency, the commingled effluent may have to be trucked off-site to commercial disposal facilities.

Produced water; cooling tower blow down; and boiler and condenser blow downs consist of a combination of wastewater and chemical additives. The name and volume of additives in each effluent are listed on Table 1. The above-referenced effluents; effluents from cleaning operations; and miscellaneous process effluents are commingled via the open drain piping system, which drains to the skimmer basin before being pumped to the water disposal system.

The Selexol unit has two additional effluents. These effluents are outlined in Table 1. The Selexol effluent is drained via the open drain system, and is then sent to the Plant's injection

well. In the unlikely event of an emergency, it may have to be commingled with the Plant's disposal system. Reverse osmosis (RO) wastewater is disposed with the Plant's wastewater.

Domestic sewage is not commingled with other effluent and is therefore regulated by the NM Environment Department. Sewage is conveyed through an underground pipeline to one of two underground septic tanks, which are designed to drain to the sewage leachate field. According to records, one of the septic systems was installed prior to December 1972, the other in April 1997. Note that there will be a new underground septic tank installed in 2009 for the new office building.

7.2 Solid and Liquid Wastes

Solid and liquid wastes are generated at the Plant that are not part of the commingled effluent or conveyed by underground piping. The waste classification, treatment/disposal methods, treatment/disposal/recycle locations, and waste storage areas are described below and provided in Table 2.

Waste oil is collected from various Plant equipment and stored in a 500-gallon waste oil storage tank located on the west side of the Plant. The oil is stored in the tank until enough oil accumulates to warrant transport of the oil to a used oil recycling facility. Vehicle motor oil replacement is performed off-site and not at the Plant.

There are two Safety-Kleen parts cleaning units located in the pumper shack. One of the cleaning units is an open-top spray basin containing naptha solvent and the other unit is a self-contained cleaning unit that contains an aqueous solvent. Safety-Kleen services both units and recycles the solvent whenever the spent solvent is replaced. The naptha solvent is hazardous and the aqueous solvent is non-hazardous. The Environmental Protection Agency (EPA) small quantity generator number for hazardous waste generated at the Plant is NMD 982760183-1235. The EPA hazardous waste site identification is NMO-1406.

Laboratory wastes include a starch and iodine mix; silver nitrate; amine and selexol, solvents for testing; and water test reagents. These liquids are temporarily stored in a 5-gallon container in the laboratory and hand carried to a 55-gallon drum in the drum storage area on the west side of the Plant. Waste paint is stored in a 55-gallon drum in the drum storage area. Both streams are stored until enough waste has accumulated for disposal/recycle by Safety-Kleen. Documentation of the above-referenced waste streams is kept at the Plant.

7.3 Effluent and Solid Waste Quality Characteristics

7.3.1 Commingled Effluent

Grab samples of the commingled effluents have been collected from a valve between the saltwater tank pump and the pipeline to the Plant's injection well. Total dissolved solids (TDS), pH, general chemistry, chlorinated hydrocarbons, aromatic hydrocarbons, and Resource Conservation and Recovery Act (RCRA) metals analysis of the effluent sample was conducted by Severn Trent Laboratories (STL). Laboratory results indicated that all commingled effluent constituents are below the WQCC 3-103 standards for groundwater except for benzene, toluene, ethylbenzene, total xylenes, chloride, sulfate, and TDS. The concentrations of

benzene, toluene, ethylbenzene, and total xylenes were 4,300, 13,000, 700, and 7,000 µg/l, respectively. The laboratory results are included in Appendix A.

According to Plant records, testing for polychlorinated biphenols (PCBs) was not necessary because PCB-contaminated transformers were removed from service at the Plant before 1981. No other sources of PCB contamination have been identified to warrant testing for PCBs in the Plant effluent.

Table 1 lists produced water as an effluent that contain one or more constituents as defined by WQCC Section 1101.TT. The hazardous constituents that are likely contained in the effluent are benzene, toluene, ethylbenzene, meta-, para-, and ortho-xylenes, and naphthalene.

7.3.2 Wastewater Quality Characteristics

Commingled reverse osmosis (RO) wastewater and the treated groundwater were sampled on a monthly basis for benzene, toluene, ethylbenzene and xylenes (BTEX), and on a quarterly basis for major cations/anions and polyaromatic hydrocarbons (PAHs) analysis using EPA approved methods. RO wastewater is commingled with Plant waste water and disposed. The groundwater treatment system, which was used to treat condensate contaminated groundwater was shut-in January 2003 after receiving approval from the OCD. Hence, the above referenced monthly sampling of RO wastewater and treated groundwater has been discontinued.

Groundwater monitoring is being conducted on monitoring wells on a periodic basis. Current information regarding this monitoring activity is included in Appendix B.

7.3.3 Solid Waste Quality Characteristics

Most solid wastes generated at the Plant are not characterized by the definition in WQCC Section 1101.TT. Table 2 classifies each waste as either exempt, non-exempt (non-hazardous or potentially hazardous), or naturally occurring radioactive material (NORM). All non-exempt wastes will be characterized according to 40 CFR 261 to determine the appropriate method of disposal. After the waste stream has been characterized, the data will be kept on file at the Plant. Solid wastes will be stored and handled in accordance with all applicable federal and state laws.

8.0 TRANSFER AND STORAGE OF PROCESS FLUIDS AND EFFLUENTS

8.1 Onsite Collection and Storage Systems

The open drain and closed drain systems are used to manage some of the effluents at the Plant. Table 1 indicates which effluents are conveyed in the open drain system. These include two of the boiler and condenser blow downs, cleaning operation effluents, and miscellaneous process effluents. An open drain system is used to collect commingled effluents. The closed drain system is used to collect effluent from pressurized vessels.

8.1.1 Open Drain System

The open drain system collects effluent under atmospheric conditions. According to Plant records, the underground part of this system includes: four double-walled fiberglass sumps; one single-walled fiberglass sump at the air compressor building; two single-walled steel sumps (open-drain collection sump and LACT sump); steel collection pots; steel pipelines; and, polyethylene pipelines. The open drain system includes a total of seven underground sumps. The aboveground part of the system consists of concrete drainage and containment pads that collect and drain effluent into the underground part of the system for collection and disposal. All open drain sump pumps send their effluent to the open-drain collection sump where they are commingled. Commingled effluent collected in the open-drain collection sump is pumped to the skimmer basin gun barrel tank, located on the skimmer basin pad.

8.1.2 Description of Integrity Test of Open Drain System

Based on Plant records, seven (7) separate sections of underground piping were tested by filling the piping to volumetric capacity and visually observing any fluctuations in fluid levels at the sump and manway locations. The test was performed at atmospheric conditions for 5 hours. In order to reduce the effects of temperature fluctuations that occur during the day, the test was conducted in the early morning or late evening hours. All sources for active drainage were isolated to prevent accidental introduction of non-test fluids into the system. A successful test has been conducted when the initial fluid levels remain constant throughout the 5-hour test period. The double walled fiberglass sumps are integrity tested by filling the inner chamber to capacity and observing any leaking of fluid from the inner chamber to the outer chamber. A successful test of the double-walled sumps has occurred if fluid does not leak to the outer chamber from the inner chamber during the 5-hour test period.

Successful integrity tests were conducted on the entire system and records of all integrity tests are available at the Plant office.

8.1.3 Closed Drain System

Based on Plant records, the closed drain was constructed in 1980 and modified in 1984 and 1996 and is mainly aboveground. This system is used to collect effluent from pressurized vessels. The maximum operating pressure is 200 psig. The closed drain system is connected to process vessels: inlet filter coalescer, four expander/compressors, three amine contactors, glycol contactor, Selexol contactor, three amine scrubbers, glycol overhead filter coalescer, Selexol scrubber, two amine flash tanks, amine still, Selexol still, glycol inlet filter coalescer, Selexol 3-phase separator, product contactor, new fuel gas scrubber, old fuel gas scrubber, two regen scrubbers, vertical inlet separator, cyclone separator and horizontal inlet separator. Figure 3 is a schematic of the process flow of the Plant. Steel piping leads from the above-referenced process vessels to the closed drain scrubber, located near the generators. Collected liquids in the tank are sent to the skimmer basin gun barrel for recovery and then to disposal via the Plant's injection well.

8.2 Inventory of Tanks and Vessels

Tables 3 and 4 are lists of tanks and vessels, respectively, with a potential to discharge fluids.

Table 3 lists the tanks at the Plant. Table 4 lists all process vessels such as separators, boilers, exchangers, condensers and scrubbers.

8.3 Measures to Prevent Unintentional and Inadvertent Discharges

8.3.1 Secondary Containment for Tanks

All storage tanks, except those that contain uncontaminated freshwater, are bermed to contain 133% of the volume of the largest tank. If two or more tanks are connected within the same containment, the berm contains 133% of the total volume of the interconnected tanks. New or existing tanks that undergo a major modification, as determined by the NMOCD, will be placed within an impermeable enclosure.

8.3.2 Chemical and Drum Storage Area Containment

Drum storage areas are concrete paved and curbed to prevent a potential discharge to the ground of leaking or spilled drum contents. All tanks, drums, and containers will be clearly labeled to identify their contents and other emergency notification information.

8.3.3 New and Existing Sump Inspection

Construction plans for installing new sumps will be submitted to the NMOCD for approval prior to project commencement. New sumps will incorporate secondary containment and leak-detection into the design prior to installation. The only below-grade tank at the Plant is the sulfur underground storage tank.

8.3.4 Aboveground Tank Inspection

The glycol storage, 1200-barrel freshwater storage, and steel softwater tanks are on a concrete pad. All on-ground tanks are inspected every five years.

8.3.5 Process Areas

Process and maintenance areas which show evidence that leaks and spills may reach the ground surface will be either paved and curbed or have some type of spill collection device incorporated into the design.

8.3.6 Housekeeping

Systems designed for spill collection/prevention will be inspected weekly and after each storm event to ensure proper operation and to prevent overtopping or system failure. A record of inspections will be retained on site for a period of five years. In addition, Plant personnel are required to routinely look for leaks and/or hazardous conditions at the Plant on a daily basis as described in Section 10.1.

8.4 Underground Pipelines

Table 5 lists underground pipelines that convey either process or waste effluents within the

Plant. The name of the pipeline, where the fluids are transferred from and to (the pathway), year of construction or modification, flow rate, pressure, piping diameter, piping fabrication material, and the date of the last or next scheduled integrity test of each pipeline are indicated on Table 5. The procedures for mechanical integrity testing are on file at the Plant. The procedures are based upon the American Petroleum Institute document HP 1110 titled "Pressure Testing of Liquid Petroleum Pipelines."

8.5 Effluent Disposal

8.5.1 On-site Disposal

Surface impoundments or ponds, injection wells, leach fields (except for two septic tanks), drying beds, or other pits do not exist onsite. Onsite disposal of liquid and solid waste effluents is limited to the discharge of cooling tower effluent in the form of a mist onto the ground around the base of the cooling tower. Offspec solid sulfur may discharge onto the ground on the west side of the Plant during an upset condition; however, this solid sulfur will be collected and disposed of at an offsite commercial landfill. OXY never used the solid waste landfill onsite to dispose of exempt Plant wastes and office trash. The landfill was closed in 1995 by Marathon.

8.5.2 Onsite Treatment

8.5.2.1 Treatment of Soils

All waste soils generated at the Plant will be collected in a waste bin (roll-off box) supplied by a commercial landfill. Once the waste bin is full, the container will be shipped off to an OCD-approved landfill for disposal. Waste manifest and other documents related to offsite disposal will be kept onsite.

8.5.3 Off-Site Disposal

8.5.3.1 Injection Wells

All exempt Plant waste effluents are collected by the open-drain system, closed-drain system, or other underground piping, and commingled at the fiberglass tanks located on the west side of the Plant (Figure 2). The commingled effluent is conveyed by underground pipeline and discharged at Plant's injection well. This Class II injection well is located on adjacent BLM property, 2138 feet from the North line and 1060 feet from the West line (Unit E) of Section 23, T21S, R23E. The composition of the commingled effluent is identified in Table 1. Laboratory analysis of the commingled effluent is provided in Appendix A.

8.5.3.2 Commercial Disposal Facilities

All waste soils generated from the Plant will be transported to offsite OCD-approved landfills as described in Section 8.5.2.1. All waste streams are evaluated and classified before they are transported offsite. Office refuse and other inert wastes are transported to the local municipal landfill for disposal. All other wastes are handled according to Table 2.

9.0 PROPOSED MODIFICATIONS

OXY periodically reviews and evaluates the equipment, processes, inventory and integrity of the Plant equipment and processes. OXY may amend the Groundwater Discharge Plan, if necessary. This review will include updates to the figures and tables and any changes will be provided to the NM OCD.

10.0 INSPECTION, MAINTENANCE, AND REPORTING

OXY is actively involved in maintaining and improving spill and leak prevention and good housekeeping practices. These goals are achieved by encouraging Plant employees to be observant, to notify the appropriate persons of their observations, to correct problems quickly, and to prevent future spills and leaks by learning from problematic past practices.

10.1 Routine Inspection Procedures

Table 3 and 4 identify the aboveground storage tanks and process vessels (AST and APV; *i.e.*, those in-air tanks and vessels that allow 360 degree visual inspection) that are routinely inspected. The closed drain system is also routinely inspected. Plant employees routinely inspect Plant equipment (*i.e.,* tanks, piping, pumps, fittings, valves, etc.) for leaks and spills during their daily work tasks. Four Plant tours are conducted by Plant personnel during each of two, twelve-hour shifts. A primary objective of these tours is to detect equipment leaks and spills.

10.2 Routine Maintenance Procedures

Employees are encouraged to identify and report potential spill situations. All Plant employees have completed an 8-hour hazardous waste operations and emergency response (HAZWOPER) training session. In addition, all employees participate in an annual awareness training course which includes instruction on spill prevention and control measures.

10.3 Routine Reporting Procedures

Small leaks or spills are reported and remediated immediately. OXY requires employees to complete a spill report upon discovery of a spill or leak. Spills or leaks are reported to the NM OCD according to the requirements of NM OCD Rule 116 and WQCC Regulations Section 1-203. BLM is notified if a spill or leak occurs on BLM land. The National Response Center is notified in accordance with 40 CFR 110.10. Spill reports are kept on file at the Plant office.

10.4 Stormwater Runoff and Flood Protection

The potential for flooding of the Plant is very low. Normally, flooding due to significant rainfall events is limited to the braided stream channels of Rocky Arroyo. The stream bed of Rocky Arroyo is approximately 10 feet lower than the elevation at the southern Plant perimeter fence. The last time Rocky Arroyo overran its banks was in 1986, but the water did not reach the Plant.

Perimeter diversion berms consisting of dirt, piled two to three feet high, are located on the west and north sides of the Plant to prevent upgradient stormwater from running onto the Plant site.

These stormwater berms prevent stormwater from contacting hydrocarbons or flooding the open-drain system which is designed to manage normal process flow only.

11.0 SPILL/LEAK PREVENTION & REPORTING

The OCD notification threshold levels will be followed for discharges at the Plant as defined by WQCC Regulations Section 1203 and significant leaks or spills as defined by OCD Rule 116.

12.0 SITE CHARACTERISTICS

12.1 Geologic Description of Discharge Site

The typical stratigraphic sequence beneath the Plant is Queen Formation fractured sandstone, limestone, and dolomite bedrock at a depth of approximately 20 feet overlain by approximately 16 feet of silty, pebble to boulder gravel overlain by 4 feet of clayey silt and silt.

12.2 Hydrologic Features

Rocky Arroyo is a watercourse located approximately 600 feet south of the southern boundary of the site (Figure 1) that contains flowing water only during and for a period of time following heavy rainfall events. The main channel of Rocky Arroyo is 840 feet south of the Plant fenceline. South of the Plant site, the stream channel of Rocky Arroyo trends southeast.

The first groundwater encountered below the Plant site occurs within alluvium deposits. This shallow zone is perched above locally fractured, Permian sandstone, limestone, and dolomite of the Queen Formation. The presence of perched shallow groundwater is dependant on the amount of local rainfall. The flow direction of the perched shallow groundwater is generally southeast. A commercial supply well permitted by the State Engineer Office and completed in the shallow alluvial deposits is located approximately 2.5 miles east of the site boundary. The well is located where alluvial deposits are thick and downstream of the confluence of three major drainage channels in the southern Seven Rivers embayment. These are Rocky Arroyo, Martha Creek, and Dunnaway Draw.

A rancher well (Lee well) is located approximately 0.7 miles west of the western boundary of the 160-acre property and approximately 100 feet north of County Road 401 (Figure 1). This active well is permitted by the State Engineer Office as a stock supply well and is completed in the Lower Queen regional aquifer which is the next saturated zone below the shallow groundwater zone.

13.0 OTHER COMPLIANCE INFORMATION

A copy of the 2008 Groundwater Monitoring Report and recent correspondence regarding the groundwater remediation activities that were performed by Marathon is provided in Appendix B. OXY will continue to submit annual groundwater monitoring reports to NM OCD. This annual monitoring report includes plot plans, groundwater gradient and BTEX/TPH distribution maps, as well as analytical results and tables summarizing data.

TABLES

Table 1. Effluents and Estimated Volumes

Effluent	Pathway	Waste Effluent Constituents	Volume	(Section 1-191.ZZZ Constituents)
PRODUCED WATER	Inlet separators to skimmer basin to saltwater tanks	Condensate, saltwater, Calgon pretest 32-2 gal/day	2000 bbls/day	None
COOLING TOWER BLOWDOWN	Aboveground piping to fiberglass saltwater tank	Saftwater make-up	200 bbls/day	None
		Calgon conductor XLP-170	2.1 gal/day	None
		Van Waters Rogers sulfuric acid	5 bbls/mo	None
		Calgon Tower Brom 960 (solid)	100 lbs/mo	None
		Calgon H75	3 gal/wk	None
BOILER AND CONDENSER BLOWDOWNS		Caustic Soda - Unichem	1.5 gal/day	None
SRU Waste Heat Boiler Blowdown	Underground & aboveground steel pipeline to steel saltwater tank	Softwater make-up	95 bbls/day	None
SRU Large Condenser Blowdown	Underground & aboveground steel pipeline to steel saltwater tank	Calgon Ultra Amine 120	3.6 gal/day	None
SRU Small Condeneer Blowdown	Glycol sump of open drain to fiberglass saltwater tank	Calgon Burlook 2220	4.5 gal/day	None
Turbine Waste Heat Boilers (3) Blowdown	Open Drain System to steel saltwater tank	Calgon Conquer 3470	1.8 gal/day	None
Process (main) Steam Boiler Blowdown	Open Drain System to steel saltwater tank			
CLEANING OPERATIONS	Open Drain to Skimmer Basin to Saltwater Tank to injection	Water	50 bbls/day	None
Steam cleaning				
Turck, tank and drum washing				
PLANT PROCESS EFFLUENTS	Open Drain to Skimmer Basin to Saltwater Tank to injection		75 bbl/day	
Products sweetening		Huntsman diglycolamine (DGA)		None
Glycol		Triethylene glycol (TEG)		None
Reflux Water	Pumped from Selexol unit to gunbarrel	Water	50 gal/day	None
Selexol	Selexol unit ot open drain to injection	Dimethyl Ether of Polyethylene Glycol Mixture, Glycol Ethers	120 bbls	None
SOFTWATER REGEN	Softwater building to saltwater tank via underground piping	Saltwater	75 bbls/day	None
REVERSE OSMOSIS WASTEWATER	Primary: Water treatment to infiltration system via underground piping Secondary: Water treatment building to saltwater tank		300 bbls/day	None

Table 2. Wast Sources, Wast Classification, and Waste Treatment/Disposal Methods

Waste	Waste Classification	Treatment/Disposal Method	Disposal Location	Plant Storage Location
AEROSOL CANS (empty)	Non-exempt, Non-hazardous	Landfill	Southwest Disposal	Municiple waste stream
ANTIFREEZE (vehicle/glycol water bath)	Exempt & Non-exempt, Potentially hazardous	Disposal well	Safety Kleen	In original containers
BATTERIES, SPENT (generator, backup lighting, and etc.)	Non-exempt, Potentially hazardous	Recycle	Best-Buy	Drum storage area
CALCIUM SILICATE INSULATION	Non-exempt, Non-hazardous	Landfill	1) Southwest Disposal 2) Lea Land 3) Controlled Recovery, Inc.	Roll-off bin
CARBON, SPENT (Amine or Glycol System)	Exempt	1) Exempt waste disposal facility 2) Non-hazardous industrial landfill	1) Exempt waste disposal facility 2) Control Recovery, Inc. 3) Lea Land	Roll-off bin when needed
CONCRETE, UNCONTAMINATED	Non-exempt, Non-hazardous	1) Leave on site OR 2) Municiple landfill	1) On site 2) Municipal Landfill	NA
COOLING TOWER CLEANING WASTE SOLIDS	Non-exempt, Potentially hazardous	Injection: Off site Class II well	1) Control Recovery, Inc. 2) Lea Land	Frac tank until tesing complete
DEBRIS (Mercury Contaminated)	Non-exempt, Hazardous	Recycle	Safety Kleen	NA
DRUMS, SPENT	Non-exempt, Potentially hazardous	Recycle	U.S. Filter	Drum storage area
EFFLUENTS (Spent DGA and TEG, washwater, boiler, condenser blowdown fluids, waste saltwater, Selexol)	Exempt, Non-hazardous	Injection	AGI SWD Well	Saltwater Tank
ELECTRICAL MATERIALS (Conduit, Panels, Etc.)	Non-exempt, Non-hazardous	Recycle	U.S. Filter	Scrap metal recycling bin
FILTERS - AIR	Non-exempt, Non-hazardous	Landfill	Southwest Disposal/Roadrunner	Dumpster
FILTERS - NATURAL GAS FILTERS	Exempt	1) Recycle by incineration 2) Exempt waste disposal facility	1) Quell or U.S. Filter 2) Exempt waste disposal facility	Southeast of plant
FILTERS - STABILIZER COMPRESSOR/AIR COMPRESSOR LUBE OIL FILTERS	Non-exempt	Recycle by inceneration	Quell or U.S. Filter	West side of plant
FILTERS - TURBINE LUBE OIL FILTERS	Non-exempt	Recycle by incineration	Quell or U.S. Filter	Southeast of plant
FILTERS, GLYCOL & AMINE FILTERS & FILTER MEDIA (glycol sock filters, amine charcoal filters, amine bag filters)	Exempt	1) Recycle by incineration 2) Exempt waste disposal facility	1) Quell or U.S. Filter 2) Exempt waste disposal facility	Southeast of plant
FLUORESCENT LAMPS (Used)	Non-exempt, Hazardous	Recycle	Safety Kleen	NA
GLYCOL CERAMIC SADDLES, SPENT	Exempt	1) Exempt waste disposal facility 2) Non-hazardous industrial landfill	1) Exempt waste disposal facility 2) Control Recovery, Inc. 3) Lea Land	Roll-off bin or drums when needed
HYDROBLASTING & SANDBLASTING MEDIA	Non-exempt, Potentially hazardous	As dictated by sampling	As dictated by sampling	NA
LABORATORY WASTES (starch and iodine, silver nitrate, water test reagents)	Non-exempt, Potentially hazardous	Incinerated	Safety Kleen determines	Drum storage area
METAL, SCRAP (NORM contaminated)	Non-exempt, Potentially hazardous	NORM disposal	Newpark Environmental	NORM storage area
METAL, SCRAP (not NORM contaminated)	Non-exempt, Non-hazardous	Recycle	U.S. Filter - Arteisa Metals	Scrap metal recycling bin

Table 2. Wast Sources, Wast Classification, and Waste Treatment/Disposal Methods

Waste	Waste Classification	Treatment/Disposal Method	Disposal Location	Plant Storage Location
METHANOL	Non-exempt, Hazardous	Recycle	Safety Kleen	Methanol storage area
MOLECULAR SIEVE, SPENT	Exempt	1) Exempt waste disposal facility 2) Non-hazardous industrial landfill	1) Exempt waste disposal facility 2) Control Recovery, Inc. 3) Lea Land	West side of plant
NATURALLY OCCURRING RADIOACTIVE MATERIAL (NORM)	NORM waste	NORM disposal	Newpark Environmental	NORM storage area
OFFICE AND PLANT TRASH	Non-exempt, Non-hazardous	Dumpster	Southwest Disposal	West side of plant
OIL (vehicle motor, crankcase, chemical injection pumps, high pressure pumps, regen compressor, instrument air compressor, lube oil, stabilizer vapors compressor oil, turbine/expander compressor oil, inlet compressor oil	Non-exempt, Potentially hazardous	Recycle	U.S. Filter	Oil recycle storage area
PAINT, WASTE (non-empty cans, dried paints, waste paint)	Non-exempt, Potentially hazardous	Incinerated; Supplemental fuel	Safety Kleen determines	Drum storage area
POLY-PIPE (Scrp Polyethylene)	Non-exempt, Non-hazardous	Landfill	Southwest Disposal	West side of plant
RAGS, OILY	Exempt & Non-exempt	Recycle by incineration	Quell or U.S. Filter	Southeast of plant
RAIN WATER, TANK BATTERY	Exempt (contaminated) & Non-exempt (clean), Non-hazardous	Injection	AGI SWD Well	Bulk tank
RUBBER PRODUCTS (Belts, hoses, etc.)	Non-exempt, Non-hazardous	Landfill	Southwest Disposal	Roll-off bin
SOIL - AMINE CONTAMINATED (SPENT)	Exempt	Landfill	Offsite Landfill	Roll-off bin
SOIL - AMINE CONTAMINATED (VIRGIN)	Non-exempt	Landfill	Offsite Landfill	Roll-off bin
SOIL - GLYCOL CONTAMINATED (SPENT)	Exempt	Landfill	Offsite Landfill	Roll-off bin
SOIL - GLYCOL CONTAMINATED (VIRGIN)	Non-exempt	Landfill	Offsite Landfill	Roll-off bin
SOIL - HYDROCARBON CONTAMINATED (EXEMPT)	Exempt	Landfill	Offsite Landfill	Roll-off bin
SOIL - LUBE OIL CONTAMINATED (NON-EXEMPT)	Non-exempt	Landfill	Offsite Landfill	Roll-off bin
SOIL - PRODUCED WATER CONTAMINATED (EXEMPT)	Exempt	Bioremediation	In place	NA
SOIL - SULFUR CONTAMINATED	Exempt	Land discharge	1) Lea Land 2) Control Recovery, Inc.	West side of SRU, west of fence
SOLVENT, SPENT	Non-exempt, Potentially hazardous	Recycle	Safety Kleen	Naptha 105 - pumper shack; 55-gallon drum Aquaworks - NA
SULFUR RECOVERY UNIT USED CATALYST & SUPPORT BALLS	Exempt	1) Exempt waste disposal facility 2) Non-hazardous industrial landfill	1) Exempt waste disposal facility 2) Control Recovery, Inc. 3) Lea Land	Roll-off bin when needed
SULFUR, OFF-SPEC	Exempt, Non-hazardous	1) Land discharge 2) Non-hazardous industrial landfill	1) West side of SRU, W of fence 2) Control Recovery, Inc. 3) Lea Land	Sulfur storage yard west of Sulfer Recovery Unit (SRU)
SULFURIC ACID	Non-exempt, Hazardous	Neutralized and landfilled	Safety Kleen	NA
TIRES, VEHICLE USED	Non-exempt, Non-hazardous	Recycle	The Tire Co. - Carlsbad, NM	NA

Table 3. Inventory of Tanks

Name	Tank Volumes	Type	Containment	Storage Contents
Tank (Bullet)/SE Plant	1700 bbl	npASST	Earthen Dike	NA
[illegible]k (Bullet)/SE Plant Tank	1700 bbl	npASST	Earthen Dike	NGL
[illegible]k (Bullet)/SE Plant Tank	1700 bbl	npASST	Earthen Dike	NGL
Tank (Bullet)/SE Plant Tank	1700 bbl	npASST	Earthen Dike	NGL
Gun Barrel Storage Tank	750 bbl	npASST	Earthen Dike	Condensate and Produced Water
Condensate Storage Tank	1000 bbl	npASST	Earthen Dike	Stabilized Condensate
Condensate Storage Tank	1000 bbl	npASST	Earthen Dike	Stabilized Condensate
Water Storage Tank	500 bbl	npASST	Earthen Dike	Water
Lube Oil Tank/Recompressor	210 bbl	npASST	Earthen Dike	NA
Lube Oil Saddle Tank/Inlet Compressor	52 bbl	npASST	Concrete	NA
Saltwater Tank (Fiberglass)/SW Plant Area	500 bbl	npAST	Concrete	To injection
Lube Oil Saddle Tank/Stabilizer Compressor	11.9 bbl	npASST	Steel	NA
Diesel Tank/North Plant Area	10 bbl	npASST	Concrete	Diesel
SWD Pump Oil Tank/SW Plant Area	100 gal	npASST	Steel	Crank Case Oil
Waste Oil Tank/West Plant Area	500 gal	npASST	Concrete	Waste & Slop Oils
Condensate Tank/Treatment Compound	210 bbl	npAST	Earthen Dike	Cond. Contaminated Water
Condensate Tank/Treatment Compound	210 bbl	npAST	Earthen Dike	Cond. Contaminated Water
Freshwater Steel Tank/NE Plant Area	1200 bbl	npAST	No	Freshwater
Softwater Tank/SW Plant Area	125 bbl	npAST	?	RO Water
Reverse Osmosis Freshwater Tank/SW Plant	280	npAST	No	RO Water
Glycol Steel Tank/SW Plant Area	90 bbl	npAST	Concrete	TEG
Sulfer Tank/NW Plant Area	47,000 gal	npUST	No	Liquid Sulfur
Large DGA Slop Tank*	200 bbl	npASST	Earthen Dike	Used DGA; Royal Purple Oil
Small DGA Slop Tank*	70 bbl	npASST	Earthen Dike	Used DGA; Royal Purple Oil
Oxygen Scavenger Storage Tank	1000 gal	npASST	Earthen Dike	Unichem
UI 3270 Storage Tank	1000 gal	npASST	Earthen Dike	Unichem 3170
UI 3303 Storage Tank	1000 gal	npASST	Earthen Dike	Unichem 3270
[illegible]A Storage Tank #8	3000 gal	npASST	Earthen Dike	New DGA
DGA Storage Tank #9*	4200 gal	npASST	Earthen Dike	New DGA
Methanol Storage Tank	750 gal	npASST	Concrete	Methanol
Methanol Storage Tank	500 gal	npASST	Concrete	Methanol
Varsol Storage Tank	400 gal	npASST	Concrete	Varsol
Kerosene Storage Tank	400 gal	npASST	Concrete	Kerosene
Antifreeze Storage Tank	500 gal	npASST	Concrete	Ethylene Glycol Antifreeze
Selexol Storage Tank	210 bbl	npAST	Concrete	Selexol
Caustic Soda Tank	500 gal	npASST	Steel	Caustic Soda
Anit-Foam Tank	250 gal	npASST	Steel	Coastal Chem. 1017-F
Gun Barrel/Treatment Compound	500 bbl	npAST	Earthen Dike	Cond. Contaminated Water
Frac Tank	200 bbl	npAST	No	Fresh Water
Frac Tank	200 bbl	npAST	No	Fresh Water
Skimmer Oil Tank	210 bbl	npAST	Concrete	Oil/Water
Skimmer Gun Barrel	500 bbl	npAST	Concrete	Water/Oil
Saltwater Tank (East)	500 bbl	npAST	Concrete	Produced Water/Oil
Saltwater Tank (Middle)	500 bbl	npAST	Concrete	Produced Water/Oil
Saltwater Tank (West)	500 bbl	npAST	Concrete	Produced Water/Oil
Calgon Pre-tect 32	500 gal	npASST	Steel	Calgon Pre-tect 32
Gibraltar A-105 Tank (AGC)	500 gal		Steel	Oil

npASST = nonpressurized aboveground saddle storage tank (i.e. 360 degree inspection possible)

npAST = nonpressurized aboveground storage tank (i.e. 360 degree inspection possible)

npUST = nonpressurized underground storage tank

NA = not applicable

Table 4. Inventory of Process Vessels

Source Location	Volume (Bbls)	Vessel Type	Vessel Bottom Lined/ Ground Underneath Paved	Contents	Fluids Drained to
Water Exchanger/Gas Inlet	28	APV	In Air / No	Cooling Tower Water	Abandoned OD
Inlet Gas Separator #1/Gas Inlet	90	APV	In Air / No	Produced Water	CD
Inlet Gas Separator #2/Gas Inlet	32	APV	In Air / Yes, Conc. Foundation Pad	Produced Water	CD
Air Reciever/Gas Inlet	1	APV	In Air / Yes, Conc. Foundation Pad	Atmospheric Water	Bucket
Inlet Separator/Inlet Compressor	75	APV	In Air / No	Produced Water	OD
Suction Scrubber/Inlet Compressor	58	APV	In Air / Yes, Conc. Foundation Pad	Produced Water	OD
Air Reciever/Inlet Compressor	3	APV	In Air / Yes, Conc. Foundation Pad	Atmospheric Water	Bucket
Amine Contactor/Amine Sweetening	324	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Amine	CD
Amine Contactor Overhead Gas Scrubber/Amine Sweetening	8	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Amine	CD
Rich Amine Flash Tank/Amine Sweetening	76	APV	In Air / No	Produced Water, Amine	Amine Bag Filter
Amine Bag Filter/Amine Sweetening	2	APV	In Air / Yes	Produced Water, Amine	OD & Rich-Lean Amine Exchanger
Condensate Stabilizer Overhead Condensate/Amine Sweetening	2	APV	In Air / No	Produced Water	Aerial Cooler to Stabilizer Reflux Drum
Amine Still Condensate/Amine Sweetening	2	APV	In Air / No	Produced Water	Aerial Cooler to Reflux Accumulator
Lean Amine-Water Plate Exchanger/Amine Sweetening	2	APV	In Air / Yes	Produced Water, Amine	OD
Rich-Lean Amine Exchanger/Amine Sweetening	22	APV	In Air / No	Amine	Amine Still
Amine Still/Amine Sweetenting	300	APV	In Air / Yes, Conc. Foundation Pad	Reflux Water, Amine	CD
Amine Reflux Accumulator/Amine Sweetening	8	APV	In Air / Yes, Conc. Foundation Pad	Reflux Water, Amine	CD
Amine Still Reboiler/Amine Sweetening	19	APV	In Air / No	Reflux Water, Amine	Steam Condensate Surge Tank
Steam Condensate Surge Tank/Amine Sweetening	50	APV	In Air / No	Condensed Steam Water	CD
Amine Charcoal Filter/Amine Sweetening	60	APV	In Air / Yes, Conc. Pad	Amine	Slp Amine Tank
Glycol Water Exchangeer/Glycol Dehydration	2	APV	In Air / No	Produced Water, Glycol	
Glycol Contactor/Glycol Dehydration	205	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Glycol	CD
Glycol Contactor Overhead Scrubber/Glycol Dehydration	8	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Glycol	CD
Glycol Regenerator/Glycol Dehydration	73	APV	In Air / No	Produced Water, Glycol	Atmosphere
Rich-Lean Glycol Exchanger/Glycol Dehydration	59	APV	In Air / No	Glycol	Glycol Contactor
Glycol Surge Tank/Glycol Dehydration	16	APV	In Air / No	Produced Water, Glycol	OD
Water Collection Drum/Glycol Dehydration	3	APV	In Air / Yes	Steam, Glycol	OD
Inlet Water Separator/Inlet Condensate	291	APV	In Air / No	Produced Water, Cond	Abandoned OD
Stabilizer Feed Tank/Inlet Condensate	291	APV	In Air / No	Produced Water, Cond.	OD
Regeneration Gas Scrubber/Regeneration Gas	10	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Cond.	CD
Product Contactor/Product Treating	128	APV	In Air / Yes, Conc. Foundation Pad	Amine, KOH	Buckets
Product Solvent Separator/Product Treating	16	APV	In Air / Yes, Conc. Foundation Pad	Amine, KOH	Rich Amine Flash Tank
Acid Gas Scrubber #1/SRU	11	APV	In Air / No	Reflux Water	Amine Reflux Accumulator
Acid Gas Scrubber #2/SRU	11	APV	In Air / No	Reflux Water	Amine Reflux Accumulator
Small Condenser/SRU	20	APV	In Air / No	Cooling Tower Water	OD
Large condenser/SRU	59	APV	In Air / No	Cooling Tower Water	CD
Line 1, 3-Phase Separator/Inlet Pit	20	APV	In Air / No	Produced Water, Cond.	Skimmer Basin
Line 3, 3-Phase Separator/Inlet Pit	14	APV	In Air / No	Produced Water, Cond.	Skimmer Basin
Line 4, 3-Phase Separator/Inlet Pit	36	APV	In Air / No	Produced Water, Cond.	Skimmer Basin

Table 4. Inventory of Process Vessels

Source Location	Volume (Bbls)	Vessel Type	Vessel Bottom Lined/ Ground Underneath Paved	Contents	Fluids Drained to
Condensate Stabilizer Feed-Bottoms Exhanger/Cond. Stabilization	5	APV	On Ground / No	Condensate	Condensate Stabilizer Tower or Cooler
Condensate Stabilizer Reboiler/Condensate Stabilization	10	APV	In Air / No	Condensate / Steam	OD
Condensate Stabilizer/Condensate Stabilization	119	APV	On Ground / Yes, Concrete Pad	Condensate	OD
Stabilizer Reflux Drum/Condensate Stabilization	10	APV	On Ground / Yes, Concrete Pad	Cond. Reflux Water	OD
Stabilizer Bottoms Cooler/Condensate Stabilization	1	APV	In Air / No	Condensate	Condensate Stabilizer Tower or Cooler
Steam Waste Heat Boiler #1/Steam System	71.4	APV	In Air / No	Softwater with Additives	OD
Steam Waste Heat Boiler #2/Steam System	71.4	APV	In Air / No	Softwater with Additives	OD
Steam Waste Heat Boiler #3/Steam System	71.4	APV	In Air / No	Softwater with Additives	OD
Blowdown Drum/Steam System	11.9	APV		Softwater with Additives	OD
Main Boiler/Steam System	35.7	APV	In Air / No	Softwater with Additives	OD
Utility Flare Drum/Plant Flare System		APV	In Air / No	Gas	Flare
Inlet Gas Flare Drum/Plant Flare System	61	APV	In Air / No	Produced Water, Cond.	Condensate
Stabilizer Compressor Suction Scrubber	2	APV	In Air / Concrete Pad	Condensate	OD
Stabilizer Compressor Suction Scrubber		APV	Concrete Pad with Berm	Water / Lube Oil	OD
Inlet Compressor		Comp	Concrete Pad with Berm	Water / Lube Oil	OD
A-2 Amine Contactor	55	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Amine	CD
A-2 Amine Contactor Overhead Scrubber	8	APV	In Air / Yes, Conc. Foundation Pad	Produced Water, Amine	CD
A-2 Rich Amine Flash Tank	35	APV	In Air / Yes, Steel Skid	Amine / Produced Water	Bag Filter
A-2 Amine Pre-Bag Filter	3	APV	In Air / Yes, Steel Skid	Amine	Amine Charcoal Filter
A-2 Amine Charcoal Filter	12	APV	In Air / Yes, Steel Skid	Amine	Amine Post - Bag Filter
A-2 Amine Post-Bag Filter	3	APV	In Air / Yes, Steel Skid	Amine	High Pressure Pumps
A-2 Rich/Lean Amine Exchanger	10	APV	In Air / Yes, Steel Skid	Amine	Amine Still
A-2 Amine Reboiler/Surge Tank	46	APV	In Air / Yes, Steel Skid	Reflux Water / Amine	CD
A-2 Lean Amine/Water Heat Exchanger	8	APV	In Air / Yes, Steel Skid	Produced Water / Amine	Pre-Bag Filter
A-2 Lean Amine Cooler	2	APV	In Air / No	Amine	Lean Amine / Water Exchanger
A-2 Amine Condensor Fans	2	APV	In Air / No	Produced Water	Aerial Cooler to Reflux Accumulator
A-2 Amine Reflux Accumulator	9	APV	In Air / Yes, Conc. Foundation Pad	Reflux Water / Amine	CD
A-2 Amine Still	48	APV	In Air/ Yes, Conc. Foundation Pad	Reflux Water / Amine	CD
A-2 Rich Bag Filter	5	APV	In Air / Yes, Steel Skid	Amine / Produced Water	OD Rich/Lean Amine Exchanger
Field Fuel Gas Scrubber, South Side	7	APV	In Air / Yes, Conc. Foundation Pad	Fuel Gas	Closed Drain
Inlet Gas Filter Separator, South Side	29	APV	In Air / No	Produced Water, Cond.	Condensate System
Gas/Water Heat Exchanger, South Side	35	APV	In Air / No	Water / Gas	Cooling Tower
Selexol Contactor	27	APV	In Air / Yes, Conc. Foundation Pad	In Air / Yes, Conc. Foundation Pad	Selexol Flash Tank
Selexol Overhead Filter Coalescer	1	APV	In Air / Yes, Conc. Foundation Pad	In Air / Yes, Conc. Foundation Pad	Selexol Flash Tank
Selexol Flash Tank	22	APV	In Air / Yes, Steel Skid	R.O. Water / Selexol (95%)	Rich Selexol Filter
Selexol (Rich) Filter	3	APV	In Air / Yes, Steel Skid	R.O. Water / Selexol (95%)	L/R HEX / OD
Selexol Lean/Rich Heat Exchanger	94	APV	In Air/ Yes, Conc. Foundation Pad	R.O. Water / Selexol (95%)	Selexol Still Column
Selexol Still Column	34	APV	In Air / Yes, Conc. Foundation Pad	R.O. Water / Selexol (95%)	Selexol Surge Tank/Gun Barrel
Selexol Surge Tank	35	APV	In Air / Yes, Steel Skid	R.O. Water / Selexol (95%)	L/R HEX / OD

Table 4. Inventory of Process Vessels

Source Location	Volume (Bbls)	Vessel Type	Vessel Bottom Lined/ Ground Underneath Paved	Contents	Fluids Drained to
Selexol Cooler	5	APV	In Air / No	R.O. Water / Selexol (95%)	Charcoal Filter
Selexol Charcoal Filter	2	APV	In Air / Yes, Steel Skid	R.O. Water / Selexol (95%)	Lean Selexol Filter / OD
Selexol (Lean) Filter	3	APV	In Air / Yes, Steel Skid	R.O. Water / Selexol (95%)	OD
Selexol Reflux Cooler	1	APV	In Air / No	Process Water / Selexol (<1%)	Reflux Accumulator / OD
Selexol Reflux Accumulator	2	APV	In Air / Yes, Conc. Foundation Pad	Process Water / Selexol (<1%)	Selexol Still Column / OD
Selexol Anti-Foam Pot	0.05	APV	In Air / Yes, Steel Skid	Silicone Based Anti-Foam	Selexol Contactor / Still / OD

APV = aboveground process vessel (i.e. 360 degree inspection possible)
Comp = compressor
Cond = Condensate

OD = Open Drain
CD = Closed Drain

GW Discharge Plan

Table 5. Underground Piping

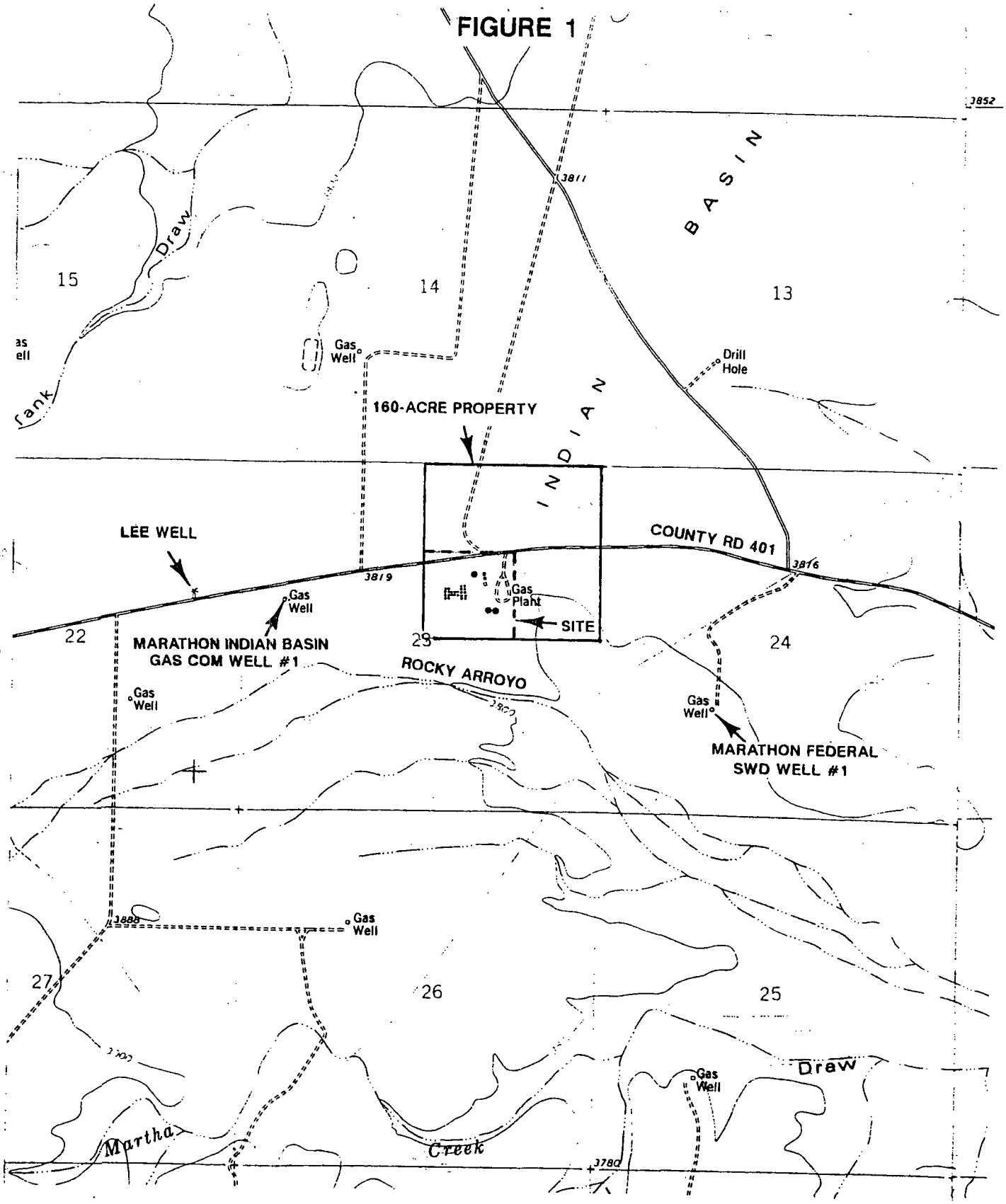
Piping Name	Pathway	Constructed or Modified	Flow Rate (Bbls/day)	Pressure (psig)	Diameter (inch)	Piping Type	Integrety Test
Open Drain System	Various plant units to open drain collection sump	2002	15	No	3.2	IC Steel	Sept 2019
Softwater Regeneration	Water softner in water treatment building to fiberglass SWD tank	Before 1990	385	15	2	PVC	Jan 2015
Reverse Osmosis Wastewater Piping (out of service due to permit)	RO unit in water treatment building to air stripper outlet to infiltration	1991	200	60	2	Poly	Jan 2016
Untreated Groundwater Bypass Piping	Diversion valve at treatment compound to skimmer basin	1995	2676	50	2	Poly	Jan 2016
Treated Groundwater Piping	Air stripper at treatment compound to skimmer basin SWD tank	1995	125	20	6	Poly	Jan 2020
Piping to A.G.I. #1 Well	Saltwater tank to injection well	2000	3000	2000	6	Fiberglass	Jan 2020
Waste Effluent Transfer Piping	Open drain collection sump to skimmer basin	1996	80		4	IC Steel	Jan 2011
Co-Production Line to Skimmer Basin Gunbarrel	Co-production line outside plant to skimmer basin gunbarrel	1996	2000	<10	6	Fiberglass	Jan 2016
Condensate Delivery Sales	Condensate bullet storage tanks (1) to condensate loading area (LA)	1993	300	<10	4	Poly	Mar 2018
SRU Waste Heat Boiler & Large Condenser Blowdown Discharge Piping (OOS)	Waste heat boiler and large condenser to steel saltwater tank	1985/1992	10	70	2	Steel	Jan 2017
Condensate Make Line	Stabilizer to condensate bullet storage tanks	1989	300		2	Steel	Jan 2014
Condensate Rerun Line	Condensate bullet storage tanks to overhead pipe rack	1989	10:100 max	<20	2	Steel	Jan 2014
LACT Sump Pump to Main Boiler Sump	LACT sump pump to main boiler sump	1966/1989	1	<35	2	Steel/Poly	Jan 2014
Inlet Condensate Line	Inlet valve pit to overhead pipe rack	1990	350	<30	4	Steel	Jan 2015
Divert Line	Inlet valve pit to condensate bullet storage tanks	1993	1	40	2	Poly	Jan 2018
Produced Water Line	Inlet valve pit to skimmer basin gunbarrel	1996	1500	15	6	Poly	Jan 2018
Product Skimmer Recovery Line	Skimmer basin oil transfer pump to inlet condensate line	1996	20	40	2	Steel	Jan 2011
Dump Line	Stabilizer feed tank to skimmer basin	1996	50	40	4	Poly	Jan 2017
Injection Line	Fiberglass saltwater tank to pump suction header	1996	3000	30	10	Steel	Jan 2013
Open Top Tank To Skimmer Basin Gunbarrel	Open top transfer pump to skimmer basin gunbarrel	1996	50	10	2	Steel	Jan 2021
Cooling Tower Blowdown to Skimmer Basin	Cooling tower blowdown to skimmer basin SWD tank	1999	200	<10	2	Poly	Jan 2024
Morrow Gas Separator Dump Line	Morrow gas separator to closed drain	1996	0	<5	2	Steel	Jan 2021
Closed Drain Scrubber Dump Line	Closed drain scrubber to skimmer basin gunbarrel	1996	5	40	2	Poly	Jan 2021
Inlet Filter/Separator Dump Line	Inlet filter/separator to inlet condensate line	1998	20	<10	2	Steel	Jan 2023
Inlet Filter/Separator Closed Drain Connection	Inlet filter/separator to closed drain header	1998	0	40	2	Steel	Jan 2023
Blow Down Collection Header	Open drain collection sump area to boiler blow down bottle	1996	80	40	2	Steel	Jan 2021
SRU Steam Condensate Return		2001	10	0	2	Stainless	Jan 2009
Horizontal H.P. Inlet Scrubber Closed Drain		1994	1	40	2	Steel	Dec 2019
WHB Blowdown	WHB's to open drain collection sump area	1991	65	100	2	Steel	Jan 2016
Main Boiler Blowdown to Sump	Main boiler blowdown collection header	1996	15	100	2	Steel	Jan 2015
Open Drain Collection Sump Pump to Skimmer Basin Gunbarrel	Open drain collection sump pump to skimmer basin gunbarrel	1980	80	100	4	IC Steel	Jan 2005
Stabilizer Compressor Dump		1982	15	30	1	Steel	Jan 2007
Inlet Condensate Divert Line to the Transfer Tank (OOS)	Inlet condensate divert line to the transfer tank	1986	1	270	2	Steel	Jan 2011
Line 3 & 4 Metering Separator Oil Dump Line to Inlet Condensate Line	Line 3 & 4 metering separator oil dump line to inlet condensate line	1996	200	40	3	Steel	Jan 2018
Inlet Compressor Suction Scrubber (H&V) Dump Lines to Inlet Metering Separator	Inlet comp. suction scrubber (H&V) dump lines to inlet metering system	1989	3	30	2	Steel	Jan 2014
Recompressor & Expander Lube Oil Makeup Line		1980	<1	150	1	Steel	Jan 2005
Underground Amine Lines Tied to Valve "Octopus" From:							
Little Slop		1988	1	5	2	Steel	Jan 2013
Flash Tank		1988	1	80	2	Steel	Jan 2013
Bag Filters		1988	<1	80	2	Steel	Jan 2013
Charcoal Filters		1988	<1	80	2	Steel	Jan 2013
Reflux pumps		1988	1	20	2	Steel	Jan 2013
Amine Storage Tank 8		1988	1	5	2	Steel	Jan 2013
Amine Storeage Tank 9							
Soft Water		1988	1	5	2	Steel	Jan 2013
Glycol Storage Tank Discharge	Storage tank transfer pump to glycol flash tank	1999	1	70	2	Poly	Dec 2019
Acid Gas Compressor Suction Line	SRU to acid gas compressor	1996	1 MMSCF/d	6	10	Steel	Jan 2021
Acid Gas Compressor Sweet Purge Gas	Pipe rack at glycol unit to acid gas compressor	1996		50	2	Steel	Jan 2021
Acid Gas Compressor Instrument Air	Pipe rack at glycol unit to acid gas compressor	1996		80	2	Steel	Jan 2021
Selexol Reflux Water	Selexol unit to gunbarrel	2002	1	20	2	Steel	None scheduled
Selexol Underground Pipeline	Selexol storage tank to Selexol unit	2002	As needed	25	2	Steel	None scheduled
Glycol Flash Gas to Closed Drain	Glycol flash tank to closed drain scrubber	2003	I MMSCF/d	100	2"	Steel	-
Cyclone Dump to Closed Drain	Cyclone to closed drain scrubber	2003		1000	2" / 3"	Steel	-

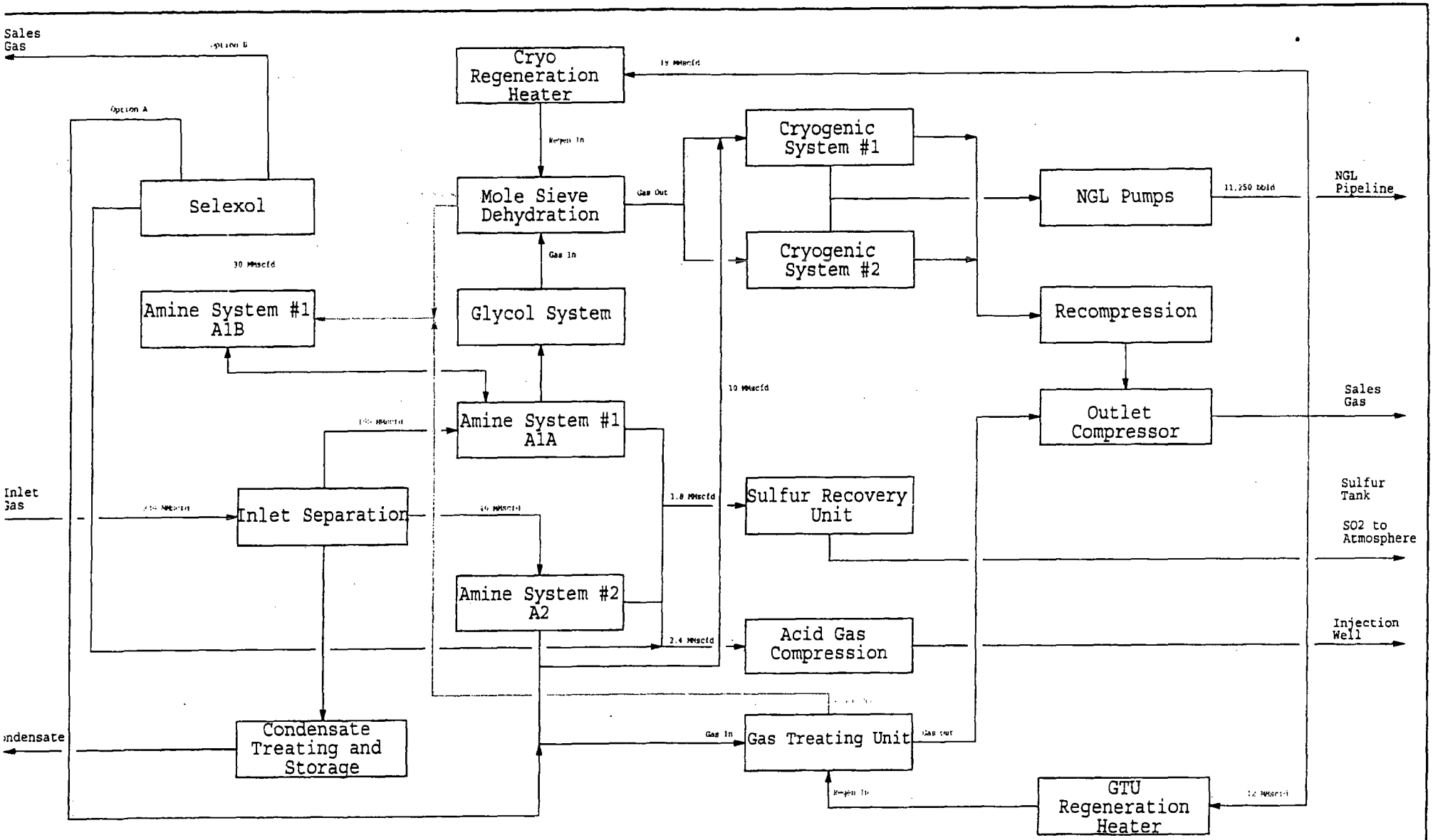
Table 6. Soil Treatment Cleanup Standards

Use of Treated Soil	Cleanup Standards (mg/kg)		
	TRPH (EPA 418.1)	Total BTEX	Benzene
Reburied	100	50	10
Stormwater Control Dikes	1000	50	10
Secondary Containment Berms in the Gas Plant	3000	50	10
Roadspread or Patching Lease Roads	3000	50	10
Pad Dirt on Production Locations	3000	50	10

FIGURES

FIGURE 1


3852
3811
BASIN
INDIAN
Draw
15
14
13
Gas Well
Drill Hole
160-ACRE PROPERTY
LEE WELL
COUNTY RD 401
3816
3819
Gas Well
Gas Plant
SITE
22
23
24
MARATHON INDIAN BASIN GAS COM WELL #1
ROCKY ARROYO
Gas Well
MARATHON FEDERAL SWD WELL #1
3888
27
26
25
Martha Creek
3780
Draw


Sales Gas
Option B
Option A
Cryo Regeneration Heater
Regen In
Cryogenic System #1
Cryogenic System #2
Mole Sieve Dehydration
Gas Out
Gas In
Selexol
30 MMscfd
Amine System #1 A1B
Glycol System
Amine System #1 A1A
10 MMscfd
NGL Pumps
11,250 bbld
NGL Pipeline
Recompression
Outlet Compressor
Sales Gas
Inlet Gas
Inlet Separation
1.8 MMscfd
Sulfur Recovery Unit
Sulfur Tank
SO2 to Atmosphere
Amine System #2 A2
2.4 MMscfd
Acid Gas Compression
Injection Well
Condensate Treating and Storage
Gas In
Gas Treating Unit
Gas Out
Regen In
GTU Regeneration Heater
12 MMscfd
SOUR GAS
SWEET GAS
ACID GAS
RESIDUE GAS
NGL
GAS TO SELEXOL
SULFUR
REGEN GAS
LEAN / RICH AMINE
Marathon Oil Company
SOUTHERN BUSINESS UNIT
FIGURE 3
INDIAN BASIN GAS PLANT
PROCESS BLOCK FLOW DIAGRAM
IBGP PF DIAGRAM
NONE
IBGP
000
00
0001
1/1
0

APPENDIX A

APPENDIX A

LABORATORY RESULTS OF COMMINGLED DISCHARGE FLUID

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Committed To *Your* Success

NOV 22 1999

ANALYTICAL REPORT

JOB NUMBER: 912816

Prepared For:

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

Attention: Mr. Paul Peacock

Date: 11/16/99

Les Arnold
Signature

11/16/99
Date

Name: Les Arnold

Title: Laboratory Manager

Severn Trent Laboratories
2400 Cumberland Drive
Valparaiso, IN 46383

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

STL
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SAMPLE INFORMATION
Date: 11/16/99

Job Number.: 912816
Customer...: Marathon Oil Company
Attn.....: Mr. Paul Peacock

Project Number.....: 96000651
Customer Project ID....: INDIAN BASIN GAS PLT
Project Description....: Marathon Oil Co., Midland, Tx

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
912816-1	COMINGLED GAS PLT WASTE EFFLUENT	Aqueous	11/08/1999	10:00	11/09/1999	15:25

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LABORATORY TEST RESULTS

Job Number: 912816

Date: 11/16/99

CUSTOMER: Marathon Oil Company | PROJECT: INDIAN BASIN GAS PLT | ATTN: Mr. Paul Pencock

Customer Sample ID: COMINGLED GAS PLT WASTE EFFLUENT
Date Sampled.....: 11/08/1999
Time Sampled.....: 10:00
Sample Matrix.....: Aqueous

Laboratory Sample ID: 912816-1
Date Received.....: 11/09/1999
Time Received.....: 15:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
EPA 160.1	Solids, Total Dissolved (TDS)	21000	10	mg/L	11/10/99	lam
EPA 300.0	Chloride	6600	1000	mg/L	11/10/99	kso
EPA 300.0	Fluoride (F)	<50	50	mg/L	11/10/99	kso
EPA 300.0	Nitrogen, Nitrate as N (NO3-N)	<1.0	1.0	mg/L	11/10/99	kso
EPA 300.0	Sulfate (SO4)	1460	100	mg/L	11/10/99	kso
EPA 420.2	Phenol, Total Recoverable	0.18	0.05	mg/L	11/11/99	dmw
SM 4500 CN	Cyanide, Total	0.08	0.05	mg/L	11/15/99	jdb
EPA 3010	Acid Digestion, Metals (ICP)	Complete			11/10/99	amw
EPA 7470	Mercury (Hg)	<0.001	0.001	mg/L	11/11/99	pal
EPA 3510	Separatory Funnel Liq/Liq Extraction	Complete			11/12/99	bjl
EPA 6010B	Metals Analysis (ICAP)					
	Aluminum (Al)	<0.1	0.1	mg/L	11/11/99	pal
	Arsenic (As)	<0.02	0.02	mg/L	11/10/99	amw
	Barium (Ba)	0.06	0.01	mg/L	11/10/99	chh
	Boron (B)	1.67	0.05	mg/L	11/11/99	pal
	Cadmium (Cd)	<0.005	0.005	mg/L	11/10/99	chh
	Chromium (Cr)	0.01	0.01	mg/L	11/10/99	chh
	Cobalt (Co)	<0.03	0.03	mg/L	11/10/99	chh
	Copper (Cu)	0.02	0.01	mg/L	11/10/99	chh
	Iron (Fe)	6.83	0.05	mg/L	11/10/99	chh
	Lead (Pb)	<0.05	0.05	mg/L	11/10/99	chh
	Manganese (Mn)	0.23	0.01	mg/L	11/10/99	chh
	Molybdenum (Mo)	<0.05	0.05	mg/L	11/10/99	chh
	Nickel (Ni)	0.03	0.01	mg/L	11/10/99	chh
	Selenium (Se)	<0.02	0.02	mg/L	11/10/99	amw
	Silver (Ag)	<0.01	0.01	mg/L	11/10/99	amw
	Zinc (Zn)	0.21	0.01	mg/L	11/10/99	chh
EPA 8310	Polynuclear Aromatic Hydrocarbons-HPLC					
	Acenaphthene	ND	5.0	ug/L	11/16/99	rm
	Acenaphthylene	ND	5.0	ug/L	11/16/99	rm
	Anthracene	ND	1.0	ug/L	11/16/99	rm
	Benzo(b)fluoranthene	ND	0.10	ug/L	11/16/99	rm
	Benzo(k)fluoranthene	ND	0.10	ug/L	11/16/99	rm
	Benzo(a)anthracene	ND	0.10	ug/L	11/16/99	rm
	Benzo(a)pyrene	ND	0.10	ug/L	11/16/99	rm
	Benzo(ghi)perylene	ND	0.10	ug/L	11/16/99	rm
	Chrysene	ND	1.0	ug/L	11/16/99	rm

STL
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LABORATORY TEST RESULTS

Job Number: 912816

Date: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: INDIAN BASIN GAS PLT ATTN: Mr. Paul Peacock

Customer Sample ID: COMINGLED GAS PLT WASTE EFFLUENT
Date Sampled.....: 11/08/1999
Time Sampled.....: 10:00
Sample Matrix.....: Aqueous

Laboratory Sample ID: 912816-1
Date Received.....: 11/09/1999
Time Received.....: 15:25

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	REPORTING LIMIT	UNITS	DATE	TECH
	Dibenzo(a,h)anthracene	ND	0.10	ug/L	11/16/99	rm
	Fluoranthene	ND	1.0	ug/L	11/16/99	rm
	Fluorene	ND	1.0	ug/L	11/16/99	rm
	Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	11/16/99	rm
	Naphthalene	<5.0	5.0	ug/L	11/16/99	rm
	Phenanthrene	ND	1.0	ug/L	11/16/99	rm
	Pyrene	ND	1.0	ug/L	11/16/99	rm
EPA 8260B	Volatile Organic Compounds					
	Vinyl chloride	ND	500	ug/L	11/15/99	weh
	1,1-Dichloroethene	ND	200	ug/L	11/15/99	weh
	Methylene chloride	ND	200	ug/L	11/15/99	weh
	Benzene	4300	200	ug/L	11/15/99	weh
	Carbon tetrachloride	ND	200	ug/L	11/15/99	weh
	Chloroform	ND	200	ug/L	11/15/99	weh
	1,2-Dibromoethane (EDB)	ND	200	ug/L	11/15/99	weh
	1,1-Dichloroethane	ND	200	ug/L	11/15/99	weh
	1,2-Dichloroethane	ND	200	ug/L	11/15/99	weh
	Ethylbenzene	700	200	ug/L	11/15/99	weh
	1,1,2,2-Tetrachloroethane	ND	200	ug/L	11/15/99	weh
	Tetrachloroethene	ND	200	ug/L	11/15/99	weh
	Toluene	13000	200	ug/L	11/15/99	weh
	1,1,1-Trichloroethane	ND	200	ug/L	11/15/99	weh
	1,1,2-Trichloroethane	ND	200	ug/L	11/15/99	weh
	Trichloroethene	ND	200	ug/L	11/15/99	weh
	Xylenes (total)	7000	500	ug/L	11/15/99	weh

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 300.0
Method Description.: Ion Chromatography Analysis
Parameter.....: Chloride
Batch.....: 49213
Units.....: mg/L
Analyst...: kso
Test Code.: CHL

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V199269C	9.197		10		92.0	%	85-115	11/10/1999	1149
ICB			0.274							11/10/1999	1202
CCV		V199269C	9.602		10		96.0	%	85-115	11/10/1999	1253
CCB			0.277							11/10/1999	1306
CCV		V199269C	9.760		10		97.6	%	85-115	11/10/1999	1358
CCB			0.317							11/10/1999	1411
MD	912816-1		6.777.269			6.645604	2.0	R	20	11/10/1999	1436
MS	912816-1	V1992698	17.954		10.000000	6.645604	113.1	%	75-125	11/10/1999	1449
CCV		V199269C	9.837		10		98.4	%	85-115	11/10/1999	1502
CCB			0.320							11/10/1999	1515

Test Method.....: SM 4500 CN
Method Description.: Cyanide
Parameter.....: Cyanide, Total
Batch.....: 49471
Units.....: mg/L
Analyst...: jda
Test Code.: CNT

	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
			0.000461							11/15/1999	1857
		V199237D	0.100252		0.1		100.3	%	85-115	11/15/1999	1857
MB			-0.000704							11/15/1999	1858
LCS		V199237C	0.081533		0.080000		101.9	%	80-120	11/15/1999	1859
MD	912698-4		0.006644			0.001112	0.005532	A	0.005000	11/15/1999	1901
MS	912698-4	V199237C	0.217930		0.200000	0.001112	108.4	%	75-125	11/15/1999	1901
CCV		V199237D	0.103436		0.1		103.4	%	85-115	11/15/1999	1906
CCB			0.000040							11/15/1999	1907
CCV		V199237D	0.098843		0.1		98.8	%	85-115	11/15/1999	1916
CCB			0.001002							11/15/1999	1917
CCV		V199237D	0.096158		0.1		96.2	%	85-115	11/15/1999	1927
CCB			0.001337							11/15/1999	1929
CCV		V199237D	0.098777		0.1		98.8	%	85-115	11/15/1999	1931
CCB			0.001160							11/15/1999	1932

Test Method.....: EPA 300.0
Method Description.: Ion Chromatography Analysis
Parameter.....: Fluoride (F)
Batch.....: 49213
Units.....: mg/L
Analyst...: kso
Test Code.: FL

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V199269C	1.063		1		106.3	%	85-115	11/10/1999	1149
ICB			0.0000							11/10/1999	1202
CCV		V199269C	1.071		1		107.1	%	85-115	11/10/1999	1253
CCB			0.000							11/10/1999	1306
MD	912816-1		0.00			0.00	0.00	A	0.50	11/10/1999	1332
MS	912816-1	V1992698	0.952		1.000000	0.00	95.2	%	75-125	11/10/1999	1345
CCV		V199269C	0.965		1		96.5	%	85-115	11/10/1999	1358
CCB			0.000							11/10/1999	1411
CCV		V199269C	0.973		1		97.3	%	85-115	11/10/1999	1502
CCB			0.000							11/10/1999	1515

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 300.0
Method Description.: Ion Chromatography Analysis
Parameter.....: Nitrogen, Nitrate as N (NO3-N)

Batch.....: 49213
Units.....: mg/L

Analyst...: kso
Test Code.: NO3

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V199269C	0.944		1		94.4	%	85-115	11/10/1999	1149
ICB			0.010							11/10/1999	1202
MD	912816-1		0.0158			0.000	0.0158	A	0.1000	11/10/1999	1228
MS	912816-1	V199269B	0.890		1.000000	0.000	89.0	%	75-125	11/10/1999	1241
CCV		V199269C	0.986		1		98.6	%	85-115	11/10/1999	1253
CCB			0.010							11/10/1999	1306
CCV		V199269C	1.007		1		100.7	%	85-115	11/10/1999	1358
CCV		V199269C	0.999		1		99.9	%	85-115	11/10/1999	1502
CCB			0.011							11/10/1999	1515

Test Method.....: EPA 420.2
Method Description.: Phenolics, Total Recoverable (Auto.)
Parameter.....: Phenol, Total Recoverable

Batch.....: 49279
Units.....: mg/L

Analyst...: dmw
Test Code.: PHENTR

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
		V199270G	0.198905		0.2000		99.5	%	85-115	11/11/1999	1451
			-0.002587							11/11/1999	1452
		V199268C	0.089323		0.100000		89.3	%	80-120	11/11/1999	1453
			-0.003807							11/11/1999	1453
MS	912777-2	V199268C	0.095418		0.100000	-0.005935	101.4	%	75-125	11/11/1999	1455
MD	912777-2		-0.004557			-0.005935	0.001378	A	0.005000	11/11/1999	1455
CCV		V199270G	0.198366		0.2000		99.2	%	85-115	11/11/1999	1502
CCB			-0.002379							11/11/1999	1503
CCV		V199270G	0.200532		0.2000		100.3	%	85-115	11/11/1999	1510
CCB			-0.003195							11/11/1999	1511
CCV		V199270G	0.199045		0.2000		99.5	%	85-115	11/11/1999	1514
CCB			-0.003235							11/11/1999	1514

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

Batch.....: 49210
Units.....: mg/L

Analyst...: lam
Test Code.: TDS

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MB			0.0							11/10/1999	1410
LCS		V199269D	9503.0		10000		95.0	%	80-120	11/10/1999	1420
MD	912804-1		1782.0			1774.0	0.4	R	20	11/10/1999	1450
MS	912804-1	V199269D	2326.0		500.000000	1774.0	110.4	%	75-125	11/10/1999	1500

Test Method.....: EPA 300.0
Method Description.: Ion Chromatography Analysis
Parameter.....: Sulfate (SO4)

Batch.....: 49213
Units.....: mg/L

Analyst...: kso
Test Code.: SO4

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V199269C	20.217		20		101.1	%	85-115	11/10/1999	1149
ICB			0.506							11/10/1999	1202
		V199269C	20.660		20		103.3	%	85-115	11/10/1999	1253
			0.506							11/10/1999	1306

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 300.0
Method Description.: Ion Chromatography Analysis
Parameter.....: Sulfate (SO4)

Batch.....: 49213
Units.....: mg/L

Analyst...: kso
Test Code.: SO4

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MD	912816-1		14.51647			14.61164	0.7	R	20	11/10/1999	1332
MS	912816-1	V199269B	35.568		20.000000	14.61164	104.8	%	75-125	11/10/1999	1345
CCV		V199269C	21.063		20		105.3	%	85-115	11/10/1999	1358
CCB			0.485							11/10/1999	1411
CCV		V199269C	21.054		20		105.3	%	85-115	11/10/1999	1502
CCB			0.503							11/10/1999	1515

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Aluminum (Al)

Batch.....: 49281
Units.....: mg/L

Analyst...: pal
Test Code.: AL

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00630		0.00					11/11/1999	1003
CAL		ICPCALSTD	2.17210		10.0					11/11/1999	1008
CCV		V211204A	2.03914		2.00		102.0	%	90-110	11/11/1999	1026
CCB			-0.01382							11/11/1999	1030
ICS		V211206A	488.59609		500.0		97.7	%	80-120	11/11/1999	1035
LCS	1110-2		0.01572							11/11/1999	1046
LCS	1110-2	ICPSPK99B	1.02274		1.000		102.3	%	80-120	11/11/1999	1051
MD	912804-1		0.01623			0.04165	0.02542	A	0.10000	11/11/1999	1100
MS	912804-1	ICPSPK99B	1.16268		1.000	0.04165	112.1	%	75-125	11/11/1999	1104
ISB		V211206A	473.41082		500.0		94.7	%	80-120	11/11/1999	1132
CCV		V211204A	1.97128		2.00		98.6	%	90-110	11/11/1999	1143
CCB			-0.01565							11/11/1999	1148

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Arsenic (As)

Batch.....: 49229
Units.....: mg/L

Analyst...: BMW
Test Code.: AS

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V211205B	4.11327		4.00		102.8	%	90-110	11/10/1999	2109
ICB			0.00220							11/10/1999	2115
PB	1103-3		0.00598							11/10/1999	2144
LCS	1103-3	ICPSPK99B	0.53014		0.5000		106.0	%	80-120	11/10/1999	2150
MD	912510-1		0.02004			0.03000	0.00996	A	0.02000	11/10/1999	2202
MS	912510-1	ICPSPK99B	0.58903		0.5000	0.03000	111.8	%	75-125	11/10/1999	2207
PB	1110-2		0.00174							11/10/1999	2228
LCS	1110-2	ICPSPK99B	0.51947		0.5000		103.9	%	80-120	11/10/1999	2234
CCV		V211205B	4.09142		4.00		102.3	%	90-110	11/10/1999	2240
CCB			0.00120							11/10/1999	2246
MD	912804-1		0.02857			0.03230	0.00373	A	0.02000	11/10/1999	2257
MS	912804-1	ICPSPK99B	0.51995		0.5000	0.03230	97.5	%	75-125	11/10/1999	2303
PB	1108-1		0.00689							11/10/1999	2315
LCS	1108-1	V16008711	0.50299		0.516906		97.3	%	80-120	11/10/1999	2323
MS	912685-1	V16008208	1.72295		2.000000	0.00515	85.9	%	75-125	11/10/1999	2336
MSD	912685-1	V16008208	1.78756	1.72295	2.000000	0.00515	89.1	%	75-125	11/10/1999	2342
		V211205B	3.61105		4.00		3.7	R	20		
			-0.00010				90.3	%	90-110	11/11/1999	0006
										11/11/1999	0012

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

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QUALITY CONTROL RESULTS

Job Number.: 912816 Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: ahh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: BA
Parameter.....: Barium (Ba)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	-0.00120		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.99510		1.00					11/10/1999	1439
ICV		V211204A	2.07557		2.00		103.8	%	95-105	11/10/1999	1501
ICB			0.00050							11/10/1999	1506
ISB		V211204E	0.50175		0.50		100.3	%	80-120	11/10/1999	1510
CCV		V211204A	2.02930		2.00		101.5	%	95-105	11/10/1999	1602
CCB			0.00100							11/10/1999	1607
PB	1110-2		0.00100							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.50697		0.5000		101.4	%	80-120	11/10/1999	1634
MD	912804-1		0.45277			0.45106	0.4	R	20	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.97761		0.5000	0.45106	105.3	%	75-125	11/10/1999	1646
CCV		V211204A	2.09976		2.00		105.0	%	95-105	11/10/1999	1713
CCB			0.00130							11/10/1999	1717
PB	1108-5		0.00010							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.52072		0.5000		104.1	%	80-120	11/10/1999	1755
CCV		V211204A	2.07467		2.00		103.7	%	95-105	11/10/1999	1803
CCB			0.00010							11/10/1999	1807
		V211204A	1.97571		2.00		98.8	%	95-105	11/10/1999	1947
			0.00115							11/10/1999	1953
		V211204E	0.48981		0.50		98.0	%	80-120	11/10/1999	1956
MD	912691-2		0.06832			0.06634	2.9	R	20	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.54399		0.5000	0.06634	95.5	%	75-125	11/10/1999	2009
ISB		V211204E	0.48180		0.50		96.4	%	80-120	11/10/1999	2022
CCV		V211204A	1.96174		2.00		98.1	%	95-105	11/10/1999	2032
CCB			0.00097							11/10/1999	2036

Test Method.....: EPA 6010B Batch.....: 49281 Analyst...: pal
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: B
Parameter.....: Boron (B)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.01799							11/11/1999	1003
CAL		ICPCALSTD	1.17519		2.00					11/11/1999	1020
ICV		V211204A	1.90770		2.00		95.4	%	90-110	11/11/1999	1026
ICB			0.00034							11/11/1999	1030
PB	1110-2		0.00674							11/11/1999	1046
LCS	1110-2	ICPSPK99B	0.48306		0.5000		96.6	%	80-120	11/11/1999	1051
MD	912804-1		0.34013			0.31991	6.1	R	20	11/11/1999	1100
MS	912804-1	ICPSPK99B	0.88627		0.5000	0.31991	113.3	%	75-125	11/11/1999	1104
CCV		V211204A	1.82682		2.00		91.3	%	90-110	11/11/1999	1143
CCB			-0.00276							11/11/1999	1148

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Cadmium (Cd)

Batch.....: 49224
Units.....: mg/L

Analyst...: chh
Test Code.: CD

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00179		0.00					11/10/1999	1432
CAL		ICPCALSTD	3.98740		3.00					11/10/1999	1443
ICV		V211204A	2.04204		2.00		102.1	%	95-105	11/10/1999	1501
ICB			-0.00090							11/10/1999	1506
ISB		V211204E	0.89071		1.00		89.1	%	80-120	11/10/1999	1510
CCV		V211204A	1.99431		2.00		99.7	%	95-105	11/10/1999	1602
CCB			0.00067							11/10/1999	1607
PB	1110-2		-0.00173							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.04821		0.05000		96.4	%	80-120	11/10/1999	1634
MD	912804-1		0.00075			-0.00233	0.00308	A	0.00500	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.04670		0.05000	-0.00233	98.1	%	75-125	11/10/1999	1646
CCV		V211204A	2.02239		2.00		101.1	%	95-105	11/10/1999	1713
CCB			0.00037							11/10/1999	1717
PB	1108-5		-0.00331							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.05024		0.05000		100.5	%	80-120	11/10/1999	1755
CCV		V211204A	2.00440		2.00		100.2	%	95-105	11/10/1999	1803
CCB			-0.00007							11/10/1999	1807
		V211204A	2.02085		2.00		101.0	%	95-105	11/10/1999	1947
			0.00349							11/10/1999	1953
		V211204E	0.90071		1.00		90.1	%	80-120	11/10/1999	1956
	912691-2		-0.00065			-0.00092	0.00027	A	0.00500	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.05126		0.05000	-0.00092	104.4	%	75-125	11/10/1999	2009
ISB		V211204E	0.91419		1.00		91.4	%	80-120	11/10/1999	2022
CCV		V211204A	2.07255		2.00		103.6	%	95-105	11/10/1999	2032
CCB			0.00026							11/10/1999	2036

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Chromium (Cr)

Batch.....: 49224
Units.....: mg/L

Analyst...: chh
Test Code.: CR

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00069		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.48109		1.0					11/10/1999	1436
ICV		V211204A	1.98753		2.00		99.4	%	95-105	11/10/1999	1501
ICB			0.00228							11/10/1999	1506
ISB		V211204E	0.44476		0.50		89.0	%	80-120	11/10/1999	1510
CCV		V211204A	1.94411		2.00		97.2	%	95-105	11/10/1999	1602
CCB			0.00061							11/10/1999	1607
PB	1110-2		-0.00291							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.19136		0.2000		95.7	%	80-120	11/10/1999	1634
MD	912804-1		-0.00145			-0.00104	0.00041	A	0.01000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.18719		0.2000	-0.00104	94.1	%	75-125	11/10/1999	1646
CCV		V211204A	1.97649		2.00		98.8	%	95-105	11/10/1999	1713
CCB			0.00353							11/10/1999	1717
PB	1108-5		-0.00187							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.19530		0.2000		97.7	%	80-120	11/10/1999	1755
CCV		V211204A	1.94762		2.00		97.4	%	95-105	11/10/1999	1803
CCB			0.00291							11/10/1999	1807
CCV		V211204A	1.97503		2.00		98.8	%	95-105	11/10/1999	1947
			0.00570							11/10/1999	1953
		V211204E	0.45111		0.50		90.2	%	80-120	11/10/1999	1956

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

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QUALITY CONTROL RESULTS

Job Number.: 912816 Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CR
Parameter.....: Chromium (Cr)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MD	912691-2		0.09901			0.09012	9.4	R	20	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.28722		0.2000	0.09012	98.5	%	75-125	11/10/1999	2009
ISB		V211204E	0.44951		0.50		89.9	%	80-120	11/10/1999	2022
CCV		V211204A	1.99441		2.00		99.7	%	95-105	11/10/1999	2032
CCB			0.00889							11/10/1999	2036

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CO
Parameter.....: Cobalt (Co)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00009		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.66299		1.00					11/10/1999	1439
ICV		V211204A	2.07074		2.00		103.5	%	95-105	11/10/1999	1501
ICB			-0.00150							11/10/1999	1506
		V211204E	0.43837		0.50		87.7	%	80-120	11/10/1999	1510
		V211204A	2.02262		2.00		101.1	%	95-105	11/10/1999	1602
			0.00015							11/10/1999	1607
PB	1110-2		-0.00030							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.50339		0.5000		100.7	%	80-120	11/10/1999	1634
MD	912804-1		-0.00090			0.00045	0.00135	A	0.02000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.49766		0.5000	0.00045	99.4	%	75-125	11/10/1999	1646
CCV		V211204A	2.05672		2.00		102.8	%	95-105	11/10/1999	1713
CCB			0.00075							11/10/1999	1717
PB	1108-5		-0.00316							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.51802		0.5000		103.6	%	80-120	11/10/1999	1755
CCV		V211204A	2.03333		2.00		101.7	%	95-105	11/10/1999	1803
CCB			-0.00075							11/10/1999	1807
CCV		V211204A	1.97970		2.00		99.0	%	95-105	11/10/1999	1947
CCB			-0.00080							11/10/1999	1953
ISB		V211204E	0.43766		0.50		87.5	%	80-120	11/10/1999	1956
MD	912691-2		0.00531			0.00211	0.00320	A	0.02000	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.50418		0.5000	0.00211	100.4	%	75-125	11/10/1999	2009
ISB		V211204E	0.43685		0.50		87.4	%	80-120	11/10/1999	2022
CCV		V211204A	2.01401		2.00		100.7	%	95-105	11/10/1999	2032
CCB			-0.00241							11/10/1999	2036

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: CU
Parameter.....: Copper (Cu)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	-0.00010		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.23160		1.00					11/10/1999	1439
ICV		V211204A	2.05607		2.00		102.8	%	95-105	11/10/1999	1501
ICB			0.00646							11/10/1999	1506
ISB		V211204E	0.44436		0.50		88.9	%	80-120	11/10/1999	1510
	912648-4		0.01120			0.00861	0.00259	A	0.01000	11/10/1999	1554
	912648-4	V16008208	0.27411		0.250000	0.00861	106.2	%	75-125	11/10/1999	1558

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Copper (Cu)
Batch.....: 49224
Units.....: mg/L
Analyst...: chh
Test Code.: CU

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCV		V211204A	2.01206		2.00		100.6	%	95-105	11/10/1999	1602
CCB			0.00388							11/10/1999	1607
PB	1110-2		0.00129							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.24774		0.2500		99.1	%	80-120	11/10/1999	1634
MD	912804-1		0.00086			0.00129	0.00043	A	0.01000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.24558		0.2500	0.00129	97.7	%	75-125	11/10/1999	1646
CCV		V211204A	2.05779		2.00		102.9	%	95-105	11/10/1999	1713
CCB			0.00474							11/10/1999	1717
PB	1108-5		-0.00172							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.25292		0.2500		101.2	%	80-120	11/10/1999	1755
CCV		V211204A	2.03578		2.00		101.8	%	95-105	11/10/1999	1803
CCB			-0.00000							11/10/1999	1807
CCV		V211204A	1.98334		2.00		99.2	%	95-105	11/10/1999	1947
CCB			0.00040							11/10/1999	1953
ISB		V211204E	0.45043		0.50		90.1	%	80-120	11/10/1999	1956
MD	912691-2		0.06876			0.05000	0.01876	A	0.01000	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.29549		0.2500	0.05000	98.2	%	75-125	11/10/1999	2009
		V211204E	0.44395		0.50		88.8	%	80-120	11/10/1999	2022
		V211204A	1.97769		2.00		98.9	%	95-105	11/10/1999	2032
			-0.00000							11/10/1999	2036

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Iron (Fe)
Batch.....: 49224
Units.....: mg/L
Analyst...: chh
Test Code.: FE

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00960		0.00					11/10/1999	1432
CAL		ICPCALSTD	83.38069		100.00					11/10/1999	1439
ICV		V211204A	2.06757		2.00		103.4	%	95-105	11/10/1999	1501
ICB			-0.00263							11/10/1999	1506
ISB		V211204E	184.46746		200.0		92.2	%	80-120	11/10/1999	1510
CCV		V211204A	2.03659		2.00		101.8	%	95-105	11/10/1999	1602
CCB			0.00647							11/10/1999	1607
PB	1110-2		0.01391							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.50448		0.5000		100.9	%	80-120	11/10/1999	1634
MD	912804-1		0.03982			0.01907	0.02075	A	0.05000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.52440		0.5000	0.01907	101.1	%	75-125	11/10/1999	1646
CCV		V211204A	2.07416		2.00		103.7	%	95-105	11/10/1999	1713
CCB			0.00035							11/10/1999	1717
PB	1108-5		0.00000							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.53003		0.5000		106.0	%	80-120	11/10/1999	1755
CCV		V211204A	2.05836		2.00		102.9	%	95-105	11/10/1999	1803
CCB			-0.00120							11/10/1999	1807
CCV		V211204A	1.98853		2.00		99.4	%	95-105	11/10/1999	1947
CCB			0.01584							11/10/1999	1953
ISB		V211204E	180.25849		200.0		90.1	%	80-120	11/10/1999	1956
MD	912691-2		0.41103			0.35765	13.9	R	20	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.85928		0.5000	0.35765	100.3	%	75-125	11/10/1999	2009
		V211204E	179.55508		200.0		89.8	%	80-120	11/10/1999	2022
		V211204A	2.01156		2.00		100.6	%	95-105	11/10/1999	2032
			0.01956							11/10/1999	2036

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Lead (Pb)
Batch.....: 49224
Units.....: mg/L
Analyst...: chh
Test Code.: PB

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	-0.02160		0.00					11/10/1999	1432
CAL		ICPCALSTD	5.03679		10.0					11/10/1999	1443
ICV		V211204A	2.08801		2.00		104.4	%	95-105	11/10/1999	1501
ICB			0.04962							11/10/1999	1506
ISB		V211204E	1.06901		1.00		106.9	%	80-120	11/10/1999	1510
CCV		V211204A	2.01665		2.00		100.8	%	95-105	11/10/1999	1602
CCB			0.02570							11/10/1999	1607
PB	1110-2		0.04796							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.51828		0.5000		103.7	%	80-120	11/10/1999	1634
MD	912804-1		0.02968			0.00260	0.02708	A	0.05000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.49773		0.5000	0.00260	99.0	%	75-125	11/10/1999	1646
CCV		V211204A	1.98915		2.00		99.5	%	95-105	11/10/1999	1713
CCB			0.05239							11/10/1999	1717
PB	1108-5		0.03366							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.53097		0.5000		106.2	%	80-120	11/10/1999	1755
CCV		V211204A	2.01825		2.00		100.9	%	95-105	11/10/1999	1803
CCB			0.06504							11/10/1999	1807
		V211204A	2.02497		2.00		101.2	%	95-105	11/10/1999	1947
			0.01537							11/10/1999	1953
		V211204E	0.95396		1.00		95.4	%	80-120	11/10/1999	1956
MD	912691-2		-0.00452			0.04172	0.04624	A	0.05000	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.50937		0.5000	0.04172	93.5	%	75-125	11/10/1999	2009
ISB		V211204E	0.94240		1.00		94.2	%	80-120	11/10/1999	2022
CCV		V211204A	2.03451		2.00		101.7	%	95-105	11/10/1999	2032
CCB			-0.01311							11/10/1999	2036

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Manganese (Mn)
Batch.....: 49224
Units.....: mg/L
Analyst...: chh
Test Code.: MN

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.01740		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.92269		2.00					11/10/1999	1443
ICV		V211204A	2.03519		2.00		101.8	%	95-105	11/10/1999	1501
ICB			-0.00132							11/10/1999	1506
ISB		V211204E	0.44561		0.50		89.1	%	80-120	11/10/1999	1510
CCV		V211204A	1.99253		2.00		99.6	%	95-105	11/10/1999	1602
CCB			0.00044							11/10/1999	1607
PB	1110-2		-0.00088							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.48168		0.5000		96.3	%	80-120	11/10/1999	1634
MD	912804-1		-0.00131			-0.00153	0.00022	A	0.01000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.47856		0.5000	-0.00153	96.0	%	75-125	11/10/1999	1646
CCV		V211204A	2.04535		2.00		102.3	%	95-105	11/10/1999	1713
CCB			-0.00220							11/10/1999	1717
PB	1108-5		-0.00287							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.49507		0.5000		99.0	%	80-120	11/10/1999	1755
CCV		V211204A	2.03253		2.00		101.6	%	95-105	11/10/1999	1803
CCB			-0.00309							11/10/1999	1807
		V211204A	2.01995		2.00		101.0	%	95-105	11/10/1999	1947
			0.00137							11/10/1999	1953
		V211204E	0.45609		0.50		91.2	%	80-120	11/10/1999	1956

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

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QUALITY CONTROL RESULTS

Job Number.: 912816 Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: MN
Parameter.....: Manganese (Mn)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
MD	912691-2		0.00869			0.00598	0.00271	A	0.01000	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.50038		0.5000	0.00598	98.9	%	75-125	11/10/1999	2009
ISB		V211204E	0.45571		0.50		91.1	%	80-120	11/10/1999	2022
CCV		V211204A	2.04127		2.00		102.1	%	95-105	11/10/1999	2032
CCB			0.00206							11/10/1999	2036

Test Method.....: EPA 7470 Batch.....: 49327 Analyst...: pal
Method Description.: Mercury, Total Units.....: mg/L Test Code.: HG
Parameter.....: Mercury (Hg)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		HGCALBLK	26277		0.000					11/11/1999	1520
CAL		V211205C	33050		0.000050					11/11/1999	1523
CAL		V211205C	48244		0.000200					11/11/1999	1526
CAL		V211205C	131319		0.001000					11/11/1999	1529
		V211205C	602098		0.005000					11/11/1999	1532
		V211205C	1094966		0.010000					11/11/1999	1535
		V211205D	0.00547		0.005000		109.4	%	90-110	11/11/1999	1538
ICB			-0.000003							11/11/1999	1541
PB			-0.000131							11/11/1999	1544
LCS		V211205D	0.00543		0.005000		108.6	%	80-120	11/11/1999	1547
MD	912809-2		-0.000142			-0.000167	0.000025	A	0.001000	11/11/1999	1552
MS	912809-2	V211205D	0.00501		0.005000	-0.000167	103.5	%	75-125	11/11/1999	1555
CCV		V211205C	0.00471		0.005000		94.2	%	90-110	11/11/1999	1613
CCB			-0.000008							11/11/1999	1616
CCV		V211205C	0.00490		0.005000		98.0	%	90-110	11/11/1999	1649
CCB			-0.000013							11/11/1999	1652
CCV		V211205C	0.00467		0.005000		93.4	%	90-110	11/11/1999	1724
CCB			-0.000032							11/11/1999	1727

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: MO
Parameter.....: Molybdenum (Mo)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00130							11/10/1999	1432
CAL		ICPCALSTD	0.20409		2.00					11/10/1999	1453
ICV		V211204A	2.10563		2.00		105.3	%	95-105	11/10/1999	1501
ICB			0.04635							11/10/1999	1506
CCV		V211204A	1.96660		2.00		98.3	%	95-105	11/10/1999	1602
CCB			0.07593							11/10/1999	1607
PB	1110-2		0.00098							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.48404		0.5000		96.8	%	80-120	11/10/1999	1634
MD	912804-1		0.02957			0.05818	0.02861	A	0.10000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.53729		0.5000	0.05818	95.8	%	75-125	11/10/1999	1646
CCV		V211204A	2.01293		2.00		100.6	%	95-105	11/10/1999	1713
CCB			0.06804							11/10/1999	1717
		V211204A	2.02379		2.00		101.2	%	95-105	11/10/1999	1803
			0.04832							11/10/1999	1807

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

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QUALITY CONTROL RESULTS

Job Number.: 912816 Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: NI
Parameter.....: Nickel (Ni)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	-0.00160		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.64550		1.0					11/10/1999	1436
ICV		V211204A	2.03516		2.00		101.8	%	95-105	11/10/1999	1501
ICB			-0.00030							11/10/1999	1506
ISB		V211204E	0.83814		1.00		83.8	%	80-120	11/10/1999	1510
CCV		V211204A	1.97738		2.00		98.9	%	95-105	11/10/1999	1602
CCB			0.00139							11/10/1999	1607
PB	1110-2		-0.00448							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.47202		0.500		94.4	%	80-120	11/10/1999	1634
MD	912804-1		-0.00139			-0.00680	0.00541	A	0.01000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.45625		0.500	-0.00680	92.6	%	75-125	11/10/1999	1646
CCV		V211204A	2.01105		2.00		100.6	%	95-105	11/10/1999	1713
CCB			0.00324							11/10/1999	1717
PB	1108-5		-0.00231							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.47619		0.500		95.2	%	80-120	11/10/1999	1755
CCV		V211204A	1.99174		2.00		99.6	%	95-105	11/10/1999	1803
CCB			0.00834							11/10/1999	1807
		V211204A	1.98981		2.00		99.5	%	95-105	11/10/1999	1947
			0.00189							11/10/1999	1953
		V211204E	0.86134		1.00		86.1	%	80-120	11/10/1999	1956
MD	912691-2		0.05968			0.05142	14.9	R	20	11/10/1999	2005
MS	912691-2	ICPSPK99B	0.53017		0.500	0.05142	95.8	%	75-125	11/10/1999	2009
ISB		V211204E	0.86280		1.00		86.3	%	80-120	11/10/1999	2022
CCV		V211204A	2.02778		2.00		101.4	%	95-105	11/10/1999	2032
CCB			0.00206							11/10/1999	2036

Test Method.....: EPA 6010B Batch.....: 49229 Analyst...: amw
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: SE
Parameter.....: Selenium (Se)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ICV		V211205B	4.13607		4.00		103.4	%	90-110	11/10/1999	2109
ICB			0.00716							11/10/1999	2115
PB	1103-3		-0.00774							11/10/1999	2144
LCS	1103-3	ICPSPK99B	0.52583		0.5000		105.2	%	80-120	11/10/1999	2150
MD	912510-1		0.04239			0.05221	0.00982	A	0.02000	11/10/1999	2202
MS	912510-1	ICPSPK99B	0.60952		0.5000	0.05221	111.5	%	75-125	11/10/1999	2207
PB	1110-2		0.00754							11/10/1999	2228
LCS	1110-2	ICPSPK99B	0.51176		0.5000		102.4	%	80-120	11/10/1999	2234
CCV		V211205B	4.11920		4.00		103.0	%	90-110	11/10/1999	2240
CCB			-0.00049							11/10/1999	2246
MD	912804-1		0.06091			0.06711	0.00620	A	0.02000	11/10/1999	2257
MS	912804-1	ICPSPK99B	0.53834		0.5000	0.06711	94.2	%	75-125	11/10/1999	2303
PB	1108-1		-0.00048							11/10/1999	2315
LCS	1108-1	V16008711	1.26703		1.389429		91.2	%	80-120	11/10/1999	2323
MS	912685-1	V16008208	1.66516		2.000000	-0.00141	83.3	%	75-125	11/10/1999	2336
MSD	912685-1	V16008208	1.73536	1.66516	2.000000	-0.00141	86.8	%	75-125	11/10/1999	2342
							4.1	R	20		
CV		V211205B	3.61532		4.00		90.4	%	90-110	11/11/1999	0006
			0.00502							11/11/1999	0012

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

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QUALITY CONTROL RESULTS

Job Number.: 912816 Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B Batch.....: 49229 Analyst...: amw
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: AG
Parameter.....: Silver (Ag)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
ISB		V21122A	1.01911		1.00		101.9	%	80-120	11/10/1999	2059
ICV		V211205B	0.82532		0.80		103.2	%	90-110	11/10/1999	2109
ICB			0.00639							11/10/1999	2115
PB	1103-3		0.00602							11/10/1999	2144
LCS	1103-3	ICPSPK99B	0.21922		0.2000		109.6	%	80-120	11/10/1999	2150
MD	912510-1		-0.00134			0.00301	0.00435	A	0.01000	11/10/1999	2202
MS	912510-1	ICPSPK99B	0.23286		0.2000	0.00301	114.9	%	75-125	11/10/1999	2207
PB	1110-2		0.00387							11/10/1999	2228
LCS	1110-2	ICPSPK99B	0.20008		0.2000		100.0	%	80-120	11/10/1999	2234
CCV		V211205B	0.81442		0.80		101.8	%	90-110	11/10/1999	2240
CCB			0.00538							11/10/1999	2246
MD	912804-1		-0.00299			0.00267	0.00566	A	0.01000	11/10/1999	2257
MS	912804-1	ICPSPK99B	0.18444		0.2000	0.00267	90.9	%	75-125	11/10/1999	2303
PB	1108-1		0.00394							11/10/1999	2315
LCS	1108-1	V16008711	0.98418		1.039642		94.7	%	80-120	11/10/1999	2323
MS	912685-1	V16008208	0.42520		0.400000	0.09302	83.0	%	75-125	11/10/1999	2336
[illegible]	912685-1	V16008208	0.44731	0.42520	0.400000	0.09302	88.6	%	75-125	11/10/1999	2342
							5.1	R	20		
		V21122A	0.92430		1.00		92.4	%	80-120	11/10/1999	2356
		V211205B	0.72690		0.80		90.9	%	90-110	11/11/1999	0006
CCB			0.00329							11/11/1999	0012

Test Method.....: EPA 6010B Batch.....: 49224 Analyst...: chh
Method Description.: Metals Analysis (ICAP) Units.....: mg/L Test Code.: ZN
Parameter.....: Zinc (Zn)

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CAL		ICPCALBLK	0.00100		0.00					11/10/1999	1432
CAL		ICPCALSTD	0.74320		3.00					11/10/1999	1443
ICV		V211204A	2.05861		2.00		102.9	%	95-105	11/10/1999	1501
ICB			0.00000							11/10/1999	1506
ISB		V211204E	0.94520		1.00		94.5	%	80-120	11/10/1999	1510
CCV		V211204A	2.01376		2.00		100.7	%	95-105	11/10/1999	1602
CCB			-0.00241							11/10/1999	1607
PB	1110-2		-0.00399							11/10/1999	1629
LCS	1110-2	ICPSPK99B	0.49158		0.5000		98.3	%	80-120	11/10/1999	1634
MD	912804-1		0.02308			0.01626	0.00682	A	0.01000	11/10/1999	1642
MS	912804-1	ICPSPK99B	0.51147		0.5000	0.01626	99.0	%	75-125	11/10/1999	1646
CCV		V211204A	2.06765		2.00		103.4	%	95-105	11/10/1999	1713
CCB			-0.00283							11/10/1999	1717
PB	1108-5		-0.00442							11/10/1999	1750
LCS	1108-5	ICPSPK99B	0.49473		0.5000		98.9	%	80-120	11/10/1999	1755
CCV		V211204A	2.04205		2.00		102.1	%	95-105	11/10/1999	1803
CCB			-0.00407							11/10/1999	1807
CCV		V211204A	2.04812		2.00		102.4	%	95-105	11/10/1999	1947
CCB			-0.00179							11/10/1999	1953
ISB		V211204E	0.95902		1.00		95.9	%	80-120	11/10/1999	1956
MD	912691-2		0.42511			0.40387	5.1	R	20	11/10/1999	2005
	912691-2	ICPSPK99B	0.92205		0.5000	0.40387	103.6	%	75-125	11/10/1999	2009
		V211204E	0.96117		1.00		96.1	%	80-120	11/10/1999	2022
		V211204A	2.06797		2.00		103.4	%	95-105	11/10/1999	2032

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

Test Method.....: EPA 6010B
Method Description.: Metals Analysis (ICAP)
Parameter.....: Zinc (Zn)

Batch.....: 49224
Units.....: mg/L

Analyst...: chh
Test Code.: ZN

QC	Lab ID	Reagent	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits	Date	Time
CCB			-0.00401							11/10/1999	2036

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

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QUALITY CONTROL RESULTS

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

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

Test Method.....: EPA 8310
Method Description.: Polynuclear Aromatic Hydrocarbons-HPLC
Batch.....: 49504
Units.....: ug/L
Analyst...: rm

MB | Method Blank | | | | 11/16/1999 0111

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						

LCS | Laboratory Control Sample | V173725B | | | 11/16/1999 0154

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Acenaphthene	651.7		1000.000000		65.2	%	10-92
Acenaphthylene	735.6		1000.000000		73.6	%	11-127
Anthracene	632.7		1002.000000		63.1	%	13-110
Benzo(b)fluoranthene	348.2		500.000000		69.6	%	57-102
Benzo(k)fluoranthene	360.5		500.000000		72.1	%	59-107
Benzo(a)anthracene	346.8		500.000000		69.4	%	61-109
Benzo(a)pyrene	328.3		500.000000		65.7	%	42-131
Benzo(ghi)perylene	427.2		500.000000		85.4	%	55-119
Chrysene	364.7		500.000000		72.9	%	59-103
Dibenzo(a,h)anthracene	323.0		500.000000		64.6	%	63-108
Fluoranthene	350.5		500.000000		70.1	%	40-122
Fluorene	735.3		1000.000000		73.5	%	20-95
Indeno(1,2,3-cd)pyrene	358.8		500.000000		71.8	%	57-104
Naphthalene	483.3		1000.000000		48.3	%	10-82
Phenanthrene	380.7		502.500000		75.8	%	37-102
Pyrene	382.8		500.000000		76.6	%	59-111

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

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QUALITY CONTROL RESULTS

Job Number.: 912816 Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

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

Test Method.....: EPA 8260B Batch.....: 49489 Analyst...: weh
Method Description.: Volatile Organic Compounds Units.....: ug/L

MB | Method Blank | 11/15/1999 1439

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
Vinyl chloride	ND						
1,1-Dichloroethene	ND						
Methylene chloride	ND						
Benzene	ND						
Carbon tetrachloride	ND						
Chloroform	ND						
1,2-Dibromoethane (EDB)	ND						
1,1-Dichloroethane	ND						
1,2-Dichloroethane	ND						
Ethylbenzene	ND						
1,1,2,2-Tetrachloroethane	ND						
Tetrachloroethene	ND						
Toluene	ND						
1-Trichloroethane	ND						
-Trichloroethane	ND						
loroethene	ND						
es (total)	ND						

LCS | Laboratory Control Sample | CLPVOAMS2 | 11/15/1999 1510

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
1,1-Dichloroethene	50.90		50		101.8	%	51-141
Benzene	50.28		50		100.6	%	67-130
Toluene	50.26		50		100.5	%	75-114
Trichloroethene	49.80		50		99.6	%	72-114

MS | Matrix Spike | CLPVOAMS2 | 913032-1 | 11/15/1999 1611

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
1,1-Dichloroethene	50.80		50	ND	101.6	%	51-141
Benzene	50.91		50	1.12	99.6	%	67-130
Toluene	50.52		50	ND	101.0	%	75-114
Trichloroethene	49.66		50	ND	99.3	%	72-114

MSD | Matrix Spike Duplicate | CLPVOAMS2 | 913032-1 | 11/15/1999 1642

Parameter/Test Description	QC Result	QC Result	True Value	Orig. Value	Calc. Result	*	Limits
1,1-Dichloroethene	51.40	50.80	50	ND	102.8	%	51-141
					1.2	R	30
Benzene	50.41	50.91	50	1.12	98.6	%	67-130
					1.0	R	30
ene	50.59	50.52	50	ND	101.2	%	75-114
					0.1	R	30
loroethene	48.32	49.66	50	ND	96.6	%	72-114
					2.7	R	30

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

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SURROGATE RECOVERIES REPORT

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

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

Batch.....: 49489
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		51.26	50.00	102.5	76-120		11/15/1999	1439
		LCS		50.76	50.00	101.5	76-120		11/15/1999	1510
913032-1				51.66	50.00	103.3	76-120		11/15/1999	1540
913032-1		MS		50.97	50.00	101.9	76-120		11/15/1999	1611
913032-1		MSD		50.92	50.00	101.8	76-120		11/15/1999	1642
913032-3				50.89	50.00	101.8	76-120		11/15/1999	1712
913032-2				51.00	50.00	102.0	76-120		11/15/1999	1743
912816-1			50	47.02	50.00	94.0	76-120		11/15/1999	2036
912767-15				52.17	50.00	104.3	76-120		11/15/1999	2107
912767-16				51.00	50.00	102.0	76-120		11/15/1999	2137

Surrogate	Units
[illegible] (Surrogate)	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		51.80	50.00	103.6	85-115		11/15/1999	1439
		LCS		51.23	50.00	102.5	85-115		11/15/1999	1510
913032-1				52.45	50.00	104.9	85-115		11/15/1999	1540
913032-1		MS		53.36	50.00	106.7	85-115		11/15/1999	1611
913032-1		MSD		52.32	50.00	104.6	85-115		11/15/1999	1642
913032-3				52.36	50.00	104.7	85-115		11/15/1999	1712
913032-2				52.46	50.00	104.9	85-115		11/15/1999	1743
912816-1			50	48.12	50.00	96.2	85-115		11/15/1999	2036
912767-15				50.96	50.00	101.9	85-115		11/15/1999	2107
912767-16				50.19	50.00	100.4	85-115		11/15/1999	2137

Surrogate	Units
Toluene-d8	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		50.11	50.00	100.2	85-112		11/15/1999	1439
		LCS		49.94	50.00	99.9	85-112		11/15/1999	1510
913032-1				49.91	50.00	99.8	85-112		11/15/1999	1540
913032-1		MS		50.52	50.00	101.0	85-112		11/15/1999	1611
913032-1		MSD		51.24	50.00	102.5	85-112		11/15/1999	1642
913032-3				51.57	50.00	103.1	85-112		11/15/1999	1712
913032-2				50.89	50.00	101.8	85-112		11/15/1999	1743
[illegible]816-1			50	50.44	50.00	100.9	85-112		11/15/1999	2036
[illegible]67-15				51.31	50.00	102.6	85-112		11/15/1999	2107
[illegible]67-16				54.32	50.00	108.6	85-112		11/15/1999	2137

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SURROGATE RECOVERIES REPORT

Job Number.: 912816

Report Date.: 11/16/99

CUSTOMER: Marathon Oil Company PROJECT: Marathon Oil Co., Midland, Tx ATTN: Mr. Paul Peacock

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

Batch.....: 49504
Analyst.....: rm

Surrogate	Units
1-Fluoronaphthalene	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		371.7	1000	37.2	10-74		11/16/1999	0111
		LCS		555.3	1000	55.5	10-74		11/16/1999	0154
912816-1				720.4	1000	72.0	10-74		11/16/1999	0236

Surrogate	Units
Terphenyl-d14	ug/L

Lab ID	Matrix	QC Type	Dilution	Result	True Value	Percent Recovery	Limits	Flag	Date	Time
		MB		749.9	1000	75.0	56-122		11/16/1999	0111
		LCS		936.4	1000	93.6	56-122		11/16/1999	0154
912816-1				776.2	1000	77.6	56-122		11/16/1999	0236

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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

ckl | Job Sample Receipt Checklist Report 11/09/99 | V2

Job Number.....: 912816 Location.: 57211 Customer Job ID.....: Job Check List Date.: 11/09/99
Project Number.: 96000746 Project Description.: INDIAN BASIN REMEDIATION STRIPPER Project Manager.....: lpa
Customer.....: Marathon Oil Company Contact.: Mr. Paul Peacock

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	
Temperature of cooler acceptable? (4 deg C +/- 2).		RECEIVED ON ICE
Samples received intact (good condition)?	Y	
Vile 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		

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CHAIN OF CUSTODY RECORD

Customer Information		Project Information				Analysis/Method	No. 57211-10411
PO		PROJECT NAME	INDIAN BASIN GAS PLT		A	6010	
WO		LAB NUMBER	912816	BOTTLE ORDER 96000813	B	4500CN	20 NMAC 6.2 TABLE 3103
COMPANY	Marathon Oil Company	BILL TO	Marathon Oil Company		C	7470	STL PROJECT ID 96000651-
SEND REPORT TO	Mr. Paul Peacock	INVOICE ATTN	Mr. Paul Peacock		D	420.2	group 4
ADDRESS	Midland, Tx	ADDRESS	125 West Missouri Street		E	300.0	
			P.O. Box 552		F	160.1	
	Bottles to: Mr. Jack Brown				G	8310	
CITY/STATE/ZIP	Lakewood, New Mexico	CITY/STATE/ZIP	Midland, TX 79702-0552		H	8260V1	
PHONE		PHONE	915-687-8312		I		
FAX		FAX	915-687-8305		J K L M N O P Q R S		

SAMP NO.	SAMPLE DESCRIPTION	PRESERV.	F	SAMPLE MATRIX	SAMPLE DATE	SAMPLE TIME	#CONTAINR	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
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		H_2SO_4					2 1-L Glass				X															
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		NONE					6 3-1 L Glass							X												
		HCl					8 4-40 mL VOA								X											

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1. Relinquished By: J Brown	Date 11/8/99	2. Relinquished By:	Date	3. Relinquished By:	Date
Company Name: MARATHON	Time 11:30	Company Name:	Time	Company Name:	Time
1. Received By: Bill	Date 11/9/99	2. Received By:	Date	3. Received By:	Date
Company Name: STL	Time 1000	Company Name:	Time	Company Name:	Time

APPENDIX B

ARCADIS

Infrastructure, environment, facilities

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Marathon Oil Company

Evaluation of Natural Attenuation

Indian Basin Remediation Project

Eddy County, New Mexico

May 12, 2008

North American Production Operations

P. O. Box 3128
Houston, TX 77253-3128

5555 San Felipe Road
Houston, TX 77056-2799

Telephone: (713) 296-3510
FAX: (713) 499-8595

Marathon Oil Company

HAND DELIVERED

May 15, 2008

Mr. Wayne Price
Environment Bureau - Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87504

RE: Evaluation of Natural Attenuation
Indian Basin Remediation Project/GW-21,
Eddy County, NM

Dear Mr. Price:

Please find enclosed the Evaluation of Natural Attenuation Report for Indian Basin Remediation Project. The report, which was prepared by ARCADIS G&M, Inc., summarizes the groundwater monitoring and remediation activities associated with the Indian Basin Remediation Project. Based on the the information reviewed and presented in this report, ARCADIS believes that closure of the Indian Basin Remediation Project is warranted.

If you have any questions or need any additional information, please contact me at (713) 296-3510 or at TCPersaud@MarathonOil.com.

Sincerely,

Terry Persaud, P.E.
Senior HES Professional

NM-IBRP-2504

VKK\TCP\
Enclosures

cc: Gail Chenoweth, Oil Asset Team Manager - w\o Encls
Mark Treesh, Plant Superintendent - w\ Encls
Paul Peacock, NAPO - HES Manager - w\o Encls

ARCADIS

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

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Evaluation of Natural Attenuation

Indian Basin Remediation Project

Prepared for:
Marathon Oil Company

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Our Ref.:
MT001010.0001

Date:
May 12, 2008

Appendices

Executive Summary

ARCADIS U.S., Inc., on behalf of Marathon Oil Company conducted a review of site biogeochemistry to evaluate the on-going natural attenuation processes at the Indian Basin Remediation Project (IBRP) Site located at the Indian Basin Gas Plant, Eddy County, New Mexico (Site) for the purpose of determining if closure of the IBRP is warranted. Based on the review and evaluation, several conclusions were reached.

Using data from wells monitored, it appears that the natural attenuation rates in the Shallow Zone under the influence of Rocky Arroyo (Shallow Zone 1) have been sufficient to degrade the mass of petroleum hydrocarbons that impacted this vertical zone and area in the past. The average benzene half life in this zone is on the order of 6.5 months. In Shallow Zone 2 (Shallow Zone area outside the influence of Rocky Arroyo) and in the Lower Queen there is a sufficient source of sulfate in the dissolved phase or available as gypsum in the mineral matrix to provide a natural attenuation capacity, with a calculated average half-life on the order of 2.5 to 3 months. Using these half-life values, and considering the hydraulic gradient, effective porosity and hydraulic conductivity, the average dissolved phase hydrocarbon transport distances range from approximately 241 feet in the Lower Queen to approximately 1,283 feet in Shallow Zone 1. Even in the worst case scenario, with the longest half life in an area with the greatest hydraulic conductivity, the potential transport distance as a dissolved phase is still less than 1 mile. In zones where free-phase hydrocarbons have been successfully removed these attenuation processes have been sufficient to completely degrade remaining dissolved-phase hydrocarbons. The transport of liquid hydrocarbons in areas of concern are ultimately limited by absorption processes within the mineral matrix. Migration of dissolved-phase benzene, toluene, ethyl benzene and xylenes (BTEX) constituents originating from these bound up free phase hydrocarbons is controlled by the significant natural attenuation processes described in this report. Even with detectable hydrocarbons present in source areas, the migration distances are tightly constrained.

In the core zone of hydrocarbon impact, within the free phase hydrocarbon source area of the Lower Queen, there are continued sources of dissolved phase BTEX hydrocarbons. The presence of sulfate in the mineral matrix in the form of gypsum continues to provide for significant and undiminished degradation capacity of dissolved phase hydrocarbons due to sulfate-driven natural attenuation. The sulfate-driven attenuation capacity of the Lower Queen is also present in zones outside of and peripheral to the free phase hydrocarbon source area. The capacity to degrade dissolved-phase hydrocarbons as they migrate from source areas is sufficient to

adequately control and confine the migration of dissolved-phase BTEX hydrocarbons over very long (literally geologic) time frames.

Significant hydrocarbon mass has been removed by the on-going remediation program. The relatively small volume of residual free-phase hydrocarbon (compared to the volume of impacted geologic matrix and adjacent mineral matrix) is effectively absorbed by fracture surfaces in the bedrock subsurface. Biogeochemical attenuation processes are then adequate to degrade dissolved-phase hydrocarbons that may elute into groundwater in contact with the absorbed free-phase liquids.

Based on the information reviewed and presented in this report, ARCADIS believes that closure of the Indian Basin Remediation Project is warranted. Upon concurrence by the NMOCD, a plan for formally closing the project (including well plugging and abandonment, and equipment decommissioning) will be prepared and submitted for approval.

Introduction and Background

A review of the site biogeochemistry was performed to evaluate the on-going natural attenuation processes at the Indian Basin Remediation Project (IBRP) site located at the Indian Basin Gas Plant, Eddy County, New Mexico (Site). Figure 1 shows the location of the site. A long term monitoring program has been on-going at the site. That data has been used as part of this review and is available in other historical and recent documentation associated with the monitoring and operation of the environmental programs at the site. A report prepared by IT Corporation (IT Corporation, 1998) presented the results of a detailed inorganic biogeochemical screening of monitor wells at the site. Source data and figures from the IT Corporation 1998 report and a report by ARCADIS in 2007 that was used for this evaluation are included in Appendix A.

There are two dominant groundwater systems at the Site, an upper groundwater zone (Figure 4, ARCADIS, 2007), and a lower groundwater zone (Figure 7, ARCADIS, 2007 and Figure 2-7, IT, 1998). The upper is termed the Shallow Zone, and the deeper is termed the Lower Queen. The Shallow Zone can be classified into two sub-zones based on inorganic chemistry. One sub-zone (Shallow Zone 1, Figure 2) is low in sulfate and is associated with Rocky Arroyo. The low sulfate zone is likely dominated by surface water runoff that infiltrates when there is surface water discharge in the Rocky Arroyo. The second Shallow Zone sub-zone (Shallow Zone 2, Figure 2) is high in sulfate and is associated with areas that are more distant, and largely north of the Rocky Arroyo. Based on groundwater flow direction, the high sulfate zone groundwater has a history of long term horizontal migration through alluvial sediments and shallow bedrock outcrops upgradient of the site. Figure 2-6 from the 1998 IT Corporation report and Figure 4 from the ARCADIS 2007 report illustrate the configuration of the groundwater table in the shallow-water bearing unit. Figure 3-14 of the IT report illustrates the relationship of sulfate to the groundwater table (and its inferred flow direction) with Rock Arroyo. The Lower Queen is similar to Shallow Zone 2 with regard to its biogeochemical dynamics (Figure 3).

In April, 1991 a subsurface release along a pipeline where it crosses Rocky Arroyo was detected 0.2 miles south of the plant. Based on production records it was estimated that the leak began in November, 1990 and that an estimated 35,000 barrels of condensate were reportedly released. At the point of the release the pipeline was located five feet below the Rocky Arroyo channel bed. Since that time assessment and remediation has been performed at the site. Remediation records dating back to April 1991 show that approximately 24,600 barrels of condensate has been removed

as free product, as vapor phase, through stimulated aerobic biodegradation. Additionally, substantial degradation from natural anaerobic bio-oxidation by sulfate or iron-reducing microbial activity has occurred, but the volume has not been quantified.

An important issue is how free product was able to migrate from the release point into the Lower Queen. The location of the pipeline five feet below the bottom of Rocky Arroyo may have been a contributing factor. Others include:

- There is a USGS gauging station located on Rocky Arroyo where it meets the Pecos River. In the 47 years the station has been active there has been at least one measurable discharge per year for 39 of those years. Prior to the release in November, 1990 there had been no measurable discharge in Rocky Arroyo between November, 1988 and September, 1990. The event in September, 1990 was a very small one with a flow of 2.21 cubic feet per minute (The maximum recorded flow was 615.5 cubic feet per minute in August, 1966 and the mean discharge for August and September respectively is 19 and 17 cubic feet per second.) Another measurable discharge did not take place for another eight months. This could have attenuated the water levels in the shallow water bearing unit, especially in Rocky Arroyo, allowing for direct conduits of the released condensate to the deeper Lower Queen water bearing unit.

- In addition, given those dry conditions the contour of the upper bedrock surface (Figure 2-1, IT, 1998) would direct fluids at the soil bed rock interface first north towards the plant, then East and Southeast into the area where the impact of condensate has been observed.

As the remediation program has been implemented at the Site the dissolved and free-phase light non-aqueous phase liquids (LNAPL) impacts have declined over time. Following is a brief summary of those changes for the Shallow Zone and the Lower Queen.

Shallow Zone

History

- Over the history of the Site, a total of 29 Shallow Zone wells that have been sampled had at least one sample with BTEX above regulatory limits.

- A total of seven wells out of 81 wells with historical gauging data had at least one gauging event with condensate recorded.

- Past VES remediation in the Shallow Zone had limited hydrocarbon recovery and effectiveness.

- A new sampling program was established in 2000 that limited the number of Shallow Zone wells that were sampled. Wells included in sampling program were selected based on their location and whether they contained BTEX compounds. A number of "clean" wells along the perimeter of the impacted area were selected in order to provide a line of compliance monitoring.

- With NMOCD approval, in March 2003, 39 Shallow Zone wells were plugged and abandoned because they were dry and/or were not necessary to continue monitoring the Shallow Zone.

Today / Recent History

- A total of four Shallow Zone wells (MW-14, MW-46, MW-49 and MW-55) in the current monitoring program contain dissolved benzene above regulatory limits.

- Only one Shallow Zone well (MW-126) has contained measurable condensate over the last three years.

- The benzene trend indicates that MW-14 is fairly stable; MW-46 and MW-49 are up slightly in the last year; and MW-55 is generally declining as a result of natural attenuation processes discussed in this report.

- Between 2000 and 2004, active remediation of some shallow zone wells was performed using a soil vapor extraction system (VES). There has been no active remediation required in the shallow zone during the past three years.

Lower Queen

History

- A total of 32 Lower Queen wells that have been monitored had at least one sample with benzene above the regulatory limit (10 parts per billion (ppb)) over the entire monitoring history. Many of the wells had only one sample that exceeded the regulatory limit, and those exceedences were generally just above the regulatory limit.

- A total of 38 wells out of 72 wells with historical gauging data had at least one gauging event with condensate recorded.

- Active remediation using VES has been ongoing since 2000. Over time, volatilization has declined, but biological degradation is still significant.

- A new sampling program was established in 2000 that limited the number of Lower Queen wells that were sampled. Wells included in sampling program were selected based on their location and whether they contained BTEX compounds. A number of "clean" wells along the perimeter of the impacted area were selected in order to provide a line of compliance monitoring.

Today / Recent History

- No Lower Queen wells in the current sampling program have contained dissolved benzene above regulatory limits since 2005. In 2005, only one well (MW-74) contained benzene, but it was just above the regulatory limit at 11 ppb.

- A total of five wells contained measurable condensate in 2007. Over the last three years, a total of 13 wells have had condensate reported at least once. By year, there were 12 wells with condensate in 2005, eight wells with condensate in 2006 and five wells with condensate in 2007.

- Biological degradation of hydrocarbons via the VES system is still removing significant hydrocarbons. However, volatilization has decreased from a high of approximately 416 barrels in 2003 to approximately 150 barrels in 2007. Over the last three years, the volatilization fraction is generally showing an asymptotic trend.

Review of Important Site Specific Natural Attenuation Processes

Natural attenuation of petroleum hydrocarbons via biodegradation requires the stimulation of indigenous microbial populations with requisite electron acceptors. The setting of the site appears to provide for three dominant electron acceptor systems and degradation pathways:

- Aerobic supported by oxygen supplied by the atmosphere.

- Sulfate reduction supported by sulfate available in most of the groundwater at the site, and from gypsum present in the mineral matrix of the water bearing units at the site.

- Iron reduction supported by bio-available iron minerals present in the mineral matrix of the water-bearing units at the site.

Natural aerobic biodegradation is supported by dissolved oxygen present in groundwater at the site. In the case of the Shallow Zone, hydraulic influence from surface water infiltrating from Rocky Arroyo is a point of recharge for oxygen-rich water. Potential hydraulic interaction of those shallow aerated waters via potential-fracture pathways may provide a means of introducing oxygenated water into the deeper Lower Queen water-bearing unit as well. The aerobic degradation pathway is well demonstrated at the site and is exploited as an integral part of the on-going remediation program using soil vapor extraction, bio-venting, and limited air sparging. The demonstrated domination of hydrocarbon removal by the remediation system in the form of carbon dioxide (the degradation product of the aerobic biodegradation of petroleum hydrocarbons) clearly illustrates the robust nature of the indigenous-aerobic microbial populations.

However, while the stimulation of the mass transport of air and oxygen in the unsaturated zone is very effective, the relatively low solubility of oxygen in water (approximately 8 mg/L) limits the stoichiometric efficiency of aerobic biodegradation within the groundwater system in bulk. In the groundwater system the data indicates that the dominant natural attenuation pathway is sulfate reduction. Sulfate reduction is an effective degrader of petroleum (Kleikemper, 2003) and BTEX hydrocarbons (Lovley et al, 1995; and Weiner et al, 1998). Compared to oxygen the solubility limits of sulfate in water are higher by several orders of magnitude. At the Site, the ultimate source of sulfate in the groundwater systems resides with gypsum present in the mineral matrix. A detailed discussion concerning the volume of gypsum in the mineral matrix of the bedrock in the area is presented in Ball et al (1985) based on field work done near Indian Basin, several miles east of the Site. Cox (1967), Sarg (1988) and Weiss (1997) also discuss the presence gypsum within the Queen formation in the area of the site.

Sulfate is consumed and converted to sulfide when petroleum hydrocarbons are degraded by sulfate reducing micro-organisms. The hydrogen sulfide may be removed from the system as gas or it may react with available iron to form pyrite. Limited amounts of the sulfide may be reconverted to sulfate through reaction with available oxygen.

The biodegradation of petroleum hydrocarbons by iron-reducing bacteria is also well understood. The overall process dynamic is keyed into the mineral matrix, the required ferric iron is insoluble in water. But the mineral matrix has the potential to contain substantial amounts of mineralized ferric iron. Sandstones with red coloration are likely to have more abundant ferric iron mineralization than carbonates. But carbonates may

also contain some mineralized ferric oxides as well as siderite (iron carbonate). However, for utilization the iron in the minerals must be bioavailable, in circumstances where iron reduction is the dominant available metabolic pathway (when sulfate or oxygen are not available) microbes will excrete extracellular siderophores (biological iron chelators) to aid in the solubilization of iron from the mineral matrix. Lastly, the stoichiometry of hydrocarbon degradation via the iron reduction pathway is about four to five times less efficient than the oxygen or sulfate pathways. The presence of dissolved iron in groundwater is the key indicator that some degree of hydrocarbon degradation via the ferric iron reduction pathway is taking place. Biodegradation through iron reduction is taking place at the site, but it is not a dominant pathway. The ready availability of sulfate from gypsum in the mineral matrix allows indigenous sulfate-reducing microbial populations to dominate the in situ microbial ecology in the presence of petroleum hydrocarbons. In rare instances where sulfate is not available, biodegradation by iron-reducing microbial consortia does take place as well.

Aside from evaluation of the biogeochemical dynamics of oxygen, sulfate and iron at the site, there is a second largely empirical basis to evaluate natural attenuation processes. Monitoring of dissolved phase BTEX hydrocarbon concentrations in monitor wells at the Site over time allows for the observation and quantification of the decay rate of BTEX hydrocarbons. As previously discussed, there are two major types of hydrocarbon impact at the Site. One type is dominated by the presence of dissolved-phase BTEX hydrocarbons; it is not directly associated with the presence of free-phase hydrocarbons and tends to attenuate without any rebound of BTEX concentrations. The second type is also a dissolved-phase impact, but is associated with the presence of free-phase hydrocarbons. In that case attenuation takes place as well, but due to the presence of free-phase hydrocarbons to act as a continuing source there is a greater likelihood for the rebound of dissolved-BTEX concentrations.

Observed Site Specific Natural Attenuation

In some cases there have been measured impacts of dissolved-phase BTEX hydrocarbons that subsequently attenuated with no history of return. In other cases, likely more closely associated with the presence of free-phase hydrocarbons, there are instances of hydrocarbon decay then rebound or instances of relatively continued presence of dissolved-phase hydrocarbons likely coming from the continuous dissolution of BTEX from proximal sources of liquid hydrocarbons. The BTEX hydrocarbon history at each of the appropriate monitor wells at the Site has been evaluated to make an estimate of BTEX decay rate in terms of half-life. Half-life is simply the time it takes for half of an initially-observed concentration to be removed by

attenuation processes. A short half-life means more rapid degradation, a longer half-life slower degradation. In most instances the decay rate follows near first order kinetics. First order kinetics is associated with a wide variety of natural processes such as radioactive decay and microbial processing. In essence the degradation processes are associated purely with the material that is being decayed. Other physical processes such as adsorption or volatilization do not play a role. The absolute concentration of the decaying material does not affect the kinetic rate or half-life either. Concentration only effects the total time it will take a series of half-life intervals to cause a concentration decline from an initial to a lower targeted concentration. In the case of 1st order kinetics the half-life is the time required for half of the material to decay. Once half has decayed it will take another half-life for the remaining half to decay and so on at ever decreasing absolute concentrations. The half-life value and rate will be valid over the entire course of the attenuation process.

The history and setting of this Site is complex because of the bedrock geology and interactions of surface water from Rocky Arroyo with the groundwater systems. This has resulted in a large number of wells being installed and sampled over a period of a decade or more. The historical database associated with the on-going site-wide monitoring program was used to evaluate BTEX hydrocarbon half-lives. In most instances the half life was based on the half-life of benzene, which is typically the longest of the BTEX hydrocarbons. In a few cases the data was limited and the half-life was calculated using concentrations of total xylenes. The graphs from which the half-lives were calculated are included in Appendix B. Much of the inorganic biogeochemical data evaluated came from the IT report prepared in 1998 and is included in Appendix A. Specifically:

- Sulfate data was presented for the Shallow Zone in Figure 3-14 and for the Lower Queen in Figure 3-19.
- Dissolved iron data was presented for the Shallow Zone in Figure 3-20 and for the Lower Queen in Figure 3-23.
- Detailed tabulations of the data used to prepare the referenced figures are also included in the IT report. This includes:
    - Table 3-5 for Sulfate in the Shallow Zone.
    - Table 3-7 for Dissolved Iron in the Shallow Zone.
    - Table 3-6 for Sulfate in the Lower Queen.
    - Table 3-8 for Dissolved Iron in the Lower Queen.

The 22 wells used for the purposes of this evaluation had both inorganic data reported in the 1998 IT report and a history of detectable BTEX hydrocarbons. There were 52 wells not used for this evaluation, largely because of limited sampling history. There are 24 wells with no history of hydrocarbon impact that also are not discussed.

The results of the natural attenuation review are summarized as follows:

Shallow Zone

For Shallow Zone 1, groundwater influenced by Rocky Arroyo (MW-14, 69, 78, and 79) the benzene half-life ranged from 90 to 390 days with an average of 194 days. No sulfate was detected in these wells, but dissolved iron concentrations averaged 3.1 mg/L. This information is summarized in Table 1.

The natural attenuation processes in the Rock Arroyo portion of the Shallow Zone appear to not be governed by sulfate reduction. In the absence of sulfate and low levels of oxygen, iron reduction does appear to be taking place. It is likely that physical flushing by periodic flow in Rocky Arroyo may be playing a role in the attenuation process as well as temporary aerobic degradation following such events. The degradation half-lives are the longest at the Site. However, due to the removal of hydrocarbon source zones the wells monitored in this area have all been clean for a number of years. The natural attenuation capacity due to anaerobic bio-oxidation is limited in this area. However, bio-attenuation via aerobic pathways and limited amount of hydrocarbon impact in this area create a condition where attenuation processes have been sufficient to remove hydrocarbon to levels below concern.

For Shallow Zone 2, groundwater outside of the influence of Rocky Arroyo (MW-43, 46, 49, 54, 55, 61 and 90) the benzene half-life ranges from 25 days to 210 days with an average of 81 days. The average sulfate concentration is 562 mg/L and average dissolved iron 0.7 mg/L. This information is summarized in Table 1.

Due to the availability of sulfate, the benzene half-life in this area is much shorter than in the adjacent Shallow Zone 1. There are a limited number of wells that appear to have permanently attenuated dissolved-phase BTEX impacts (MW-60, 61A, and 67). The remaining wells in this zone have a history of the presence of free-phase hydrocarbons on a periodic basis. When BTEX is present the natural attenuation capacity represented by the available sulfate and highly-viable sulfate reducing microbial populations rapidly attenuate the residual dissolved-phase hydrocarbon mass. In many instances this has only been required once, in others where periodic

dissolved-phase impacts due to the effects of residual free-phase hydrocarbons causes a reoccurrence, the attenuation process is always sufficient to rapidly degrade the BTEX constituents to levels below concern.

Lower Queen

For the Lower Queen (MW-57, 59, 60, 61A, 62, 63, 64, 67, 70, 73, 74, and 98) had a minimum benzene half-life of 20 days, a maximum of 140 days, and an average half-life of 69 days. The average sulfate concentration was 527 mg/L and the average dissolved-iron concentration 0.25 mg/L. This information is summarized in Table 2.

The Lower Queen also appears to be dominated by sulfate-driven natural attenuation processes. Of interest is that a limited number of wells (MW-63, 64, and 74) had sulfate measured at 20 mg/L or less. But the average benzene half-life (83 Days) in those wells is not significantly different than the benzene half-life (63 Days) in wells with more elevated levels of dissolved sulfate. Groundwater in which the only available sulfate is in the dissolved phase will not support sulfate reduction if the initial-dissolved sulfate concentration is 20 mg/L or lower. This is an indication of the ability of the indigenous microbial population of sulfate reducers to exploit sulfate that is present in the mineral matrix. With available carbon and high microbial populations, the sulfate that is provided to the dissolved phase by the gypsum reservoir is rapidly utilized to support hydrocarbon degradation, producing the short-observed benzene half-lives.

Natural Attenuation and Groundwater Flow Dynamics

The empirically derived half life for benzene can in turn be used to calculate a theoretical transport distance from a source area. With a half-life, a groundwater velocity and an initial source area concentration, the distance that a dissolved plume can theoretically travel can be calculated. The shallow groundwater-bearing unit has flow through shallow alluvium on top of bedrock and through shallow bedrock. Flow in the Lower Queen is all in bedrock. Groundwater flow in alluvium is via intergranular transport through soil matrix.

Groundwater flow responsible for significant transport is dominated by fractures in the Lower Queen and bedrock portions of the shallow zone. Some intergranular flow does occur through the walls of fractures into the mineral matrix of the Lower Queen. However, that flow does not dominate transport; it has effect on long term releases of free and dissolved-phase hydrocarbons in the source areas into the fracture flow pathways. In general fracture flow responsible for transport must have two critical

components. Fractures must exist with some open aperture, and since all fractures have finite length they must be of sufficient length and fracture density must be high enough to allow individual fractures to connect and support transport over significant distance. The flow in a fracture increases in a ratio that increases with the cube of the fracture aperture. The overall effect of physical distribution and connectivity of fractures with the effects of fracture aperture creates a very high degree of heterogeneity in flow conditions. This effect is seen in all fractured bed rock sites, including Indian Basin.

To calculate the groundwater velocity, three parameters are required: the hydraulic conductivity, the gradient of the water table, and the effective porosity of the respective water bearing unit. Values for groundwater velocity, hydraulic conductivity, gradient and effective porosity are summarized in Table 2.

- Values of hydraulic conductivity for both water bearing zones were reported in the 1998 IT report.
    - For the Shallow Zone, the hydraulic conductivity was 9.8 feet/day.
    - For the Lower Queen, the average hydraulic conductivity is 97 feet/day. This is based on a range of hydraulic conductivity values.

- The dimensionless gradients of the groundwater tables are based on groundwater gauging data collected in October 2006 and are approximately 0.015 ft/ft for the Shallow water bearing unit and approximately 0.0002 ft/ft in the Lower Queen.

- Porosity data is not available; however experience with other sites in similar settings can be used to make reasonable estimates.

    - In the Shallow Zone effective porosity in the alluvial sediments is likely to be in the range of 20% with a possible low of 10% and a high of 30%. For the purpose of this evaluation a value of 20% porosity will be used.
    - In the Lower Queen the dominant transport hydraulic flow regime is fracture flow. It is anticipated that the effective porosity in the Lower Queen will range between approximately 2% and 10%. For the purposes of this evaluation a porosity value of 5% is used (Clark, 1966).

The maximum observed benzene concentration since 1991 was in MW-33 in September, 1991 at 6,300 ppb. Using 6,300 ppb, a transport evaluation was completed with a targeted goal of reducing benzene to less than the regulatory limit of 10 ppb. For the purposes of this evaluation the average and maximum half-life in each

of the three dynamic natural attenuation zones are used to calculate a potential range of transport distance. Details of this evaluation are presented in Table 2, but the following is a summary of the range of potential transport distances that result from using the above range of hydrodynamic and biogeochemical values:

- For the Shallow Zone influenced by Rocky Arroyo (Shallow Zone 1)
  - The average travel distance is 1,283 feet in 1,746 days.
  - The maximum travel distance is 5,159 feet in 3,510 days.
- For the Shallow Zone away from Rocky Arroyo (Shallow Zone 2)
  - The average travel distance is 534 feet in 729 days.
  - The maximum travel distance is 2,778 feet in 1,890 days.
- For the Lower Queen
  - The average travel distance ranges from 241 feet in 621 days.
  - The maximum travel distance is 3,465 feet in 1,260 days.

In each of the above cases the distance at which the complete attenuation of the maximum dissolved phase benzene concentration would be attenuated is proximal to the site and the existing monitor well network.

The transport of free-phase hydrocarbons presents a different issue than the transport of the dissolved-phase in an attenuating matrix. As dissolved constituents migrate out of the free-phase hydrocarbons they immediately enter into the attenuation pathway. Dissolution of the free-phase liquid is a physical attenuation pathway as well. Additional physical attenuation processes include the effects of hydrocarbon wetting on mineral surfaces and the effects of other interfacial forces between the liquid hydrocarbon, mineral surfaces, groundwater and air that tend to physically retard the transport of liquid-phase hydrocarbons and bind them to mineral surfaces. The degree of interconnectivity driven by fracture length and density also play a role.

The specific physical character of the fracture-system migration pathways in the Lower Queen are to a large degree unknown, and without an assessment program requiring another significant level of effort over and above the extensive assessment done to date at the Site, this will likely remain unknown. Empirically, the limited extent of free phase and dissolved-phase hydrocarbon migration between the time of the release and the implementation of the full-scale remediation program in the late 1990's indicates that the potential of significant migration of free-phase hydrocarbons from the source area is limited.

One further purely physical example of a site conceptual model may be of value to illustrate the lack of migration potential of the free phase hydrocarbons:

- Conservatively assume that 10,000 barrels of the original 35,000 barrels of released condensate remains.
- As the condensate migrates along fracture pathways, due to physical wetting of the hydrocarbon on to mineral surfaces as it interacts with the walls of the fractures, further assume that an irreducible coating of hydrocarbon that is 0.05 inches thick is formed.
- The volume of 10,000 barrels of oil is 56,150 cubic feet. Within a fracture the total-liquid hydrocarbon thickness would be 0.1 inch (with 0.05 inches on each side along the walls of the fracture).
    - The 56,100 cubic feet of liquid hydrocarbon spread out in a layer 0.1 inch thick would occupy would an area of approximately 2,600 square feet.
    - A rough estimate of the size of the historical free-product source area is 1,800 feet by 3600 feet, or approximately 6,500,000 square feet.
    - If fractures are spaced 10 feet apart and present a vertical interval of 1 foot for the support of advective flow containing hydrocarbons that presents approximately 650,000 square feet of surface area within the fracture matrix an area that is 250 times greater than the potential spreading surface.

The history of the site has shown that limited amounts of free-phase hydrocarbons do appear in a limited number of wells. However, those wells are distributed over a relatively wide area. In recent years the on-going VES program has likely accentuated the mobilization of free-phase hydrocarbon by the generation of bio-surfactants. Cessation of the operations of the VES system would stop aerobic microbial activity and the bulk of the production of biosurfactants likely limiting the capacity to mobilize absorbed hydrocarbon from the surfaces of the mineral matrix within the hydrocarbon impacted area.

The site conceptual transport model likely includes multiple zones of volumetrically limited fractures with relatively wide apertures that may preferentially contain volumes of hydrocarbon. These isolated storage pockets have limited connectivity via fracture pathways of much less connectivity and with limited aperture width. Another absorption mechanism at work but not accounted for in the above conceptual assessment is the absorption into the walls of zones in which fractures transect granular or semi-granular bedrock, further enhancing physical immobility under flow conditions.

The empirical history of the Site and the geometric analysis of the Site above indicate that the residual volumes of hydrocarbon that reside within the geologic matrix of the source area are relatively widely distributed within the source area, localized, and immobilized by physical interaction with surfaces in that matrix. Isolated measurable levels of hydrocarbon are occasionally detected in monitor wells, but that is not indicative of the physical state of the liquid hydrocarbons in the bulk matrix. The bioventing program is ideal to remove this residual hydrocarbon mass, but that mass does not present a significant potential for long distance migration as a free-phase hydrocarbon fluid.

Conclusions

In summary, based on wells monitored, it appears that the natural attenuation rates in the Shallow Zone under the influence of Rocky Arroyo (Shallow Zone 1) have been sufficient to degrade the mass of petroleum hydrocarbons that impacted this vertical zone and area in the past. The average benzene half-life in this zone is on the order of 6.5 months. In Shallow Zone 2 (Shallow Zone area outside the influence of Rocky Arroyo) and in the Lower Queen there is a sufficient source of sulfate in the dissolved phase or available as gypsum in the mineral matrix to provide a natural attenuation capacity, with an average half-life on the order of 2.5 to 3 months. Using these half-life values, and considering the hydraulic gradient, effective porosity and hydraulic conductivity, the average dissolved-phase hydrocarbon transport distances range from approximately 241 feet in the Lower Queen to approximately 1,283 feet in Shallow Zone 1. Even in the worst case scenario, with the longest half-life in an area with the greatest hydraulic conductivity, the potential transport distance as a dissolved phase is still less than one mile. In zones where free-phase hydrocarbons have been successfully removed these attenuation processes have been sufficient to completely degrade remaining dissolved-phase hydrocarbons. The transport of liquid hydrocarbons in areas of concern are ultimately limited by absorption processes within the mineral matrix. Migration of dissolved-phase BTEX constituents originating from these bound up free-phase hydrocarbons is controlled by the significant natural attenuation processes described in this report. Even with detectable hydrocarbons present in source areas, the migration distances are tightly constrained.

In the core zone of hydrocarbon impact, within the free-phase hydrocarbon source area of the Lower Queen, there are continued sources of dissolved-phase BTEX hydrocarbons. The presence of sulfate in the mineral matrix in the form of gypsum continues to provide for significant and undiminished degradation capacity of dissolved-phase hydrocarbons due to sulfate-driven natural attenuation. The sulfate-driven attenuation capacity of the Lower Queen is also present in zones outside of and peripheral to the free-phase hydrocarbon source area. The capacity to degrade dissolved-phase hydrocarbons as they migrate from source areas is sufficient to adequately control and confine the migration of dissolved-phase BTEX hydrocarbons over very long (literally geologic) time frames.

Significant hydrocarbon mass has been removed by the on-going remediation program. The relatively small volume of residual free-phase hydrocarbon (compared to the volume of impacted geologic matrix and adjacent mineral matrix) is effectively absorbed by fracture surfaces in the bedrock subsurface. Biogeochemical attenuation

processes are then adequate to degrade dissolved-phase hydrocarbons that may elute into groundwater in contact with the absorbed free-phase liquids.

Based on the information reviewed and presented in this report, ARCADIS believes that closure of the Indian Basin Remediation Project is warranted. Upon concurrence by the NMOCD, a plan for formally closing the project (including well plugging and abandonment, and equipment decommissioning) will be prepared and submitted for approval.

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Table 1. Key Natural Attenuation Parameters
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

Benzene Half-Life in Days

Groundwater Unit	Minimum Value and Well in Which it was Detected	Maximum Value and Well in Which it was Detected	Average Value and the Number of Wells Used for Calculation
Shallow Zone 1	90 in MW-78	390 in MW-69	194 in 4 Wells
Shallow Zone 2	25 in MW-90	210 in MW-55	81 in 7 Wells
Lower Queen	20 in MW-63	140 in MW-98	69 in 12 Wells

Sulfate Concentration in mg/L

Groundwater Unit	Minimum Value and Well in Which it was Detected	Maximum Value and Well in Which it was Detected	Average Value and the Number of Wells Used for Calculation
Shallow Zone 1	< 5 in all evaluated wells	< 5 in all evaluated wells	< 5 in all evaluated wells
Shallow Zone 2	22 in MW-46	1,600 in MW-61	562 in 7 Wells
Lower Queen	< 5 in MW-64	2,800 in MW-73	527 in 12 Wells

Dissolved Iron Concentration in mg/L

Groundwater Unit	Minimum Value and Well in Which it was Detected	Maximum Value and Well in Which it was Detected	Average Value and the Number of Wells Used for Calculation
Shallow Zone 1	1.6 in MW-78	4.7 in MW-14	3.1 in 4 Wells
Shallow Zone 2	<0.013 in MW-54, 90	2.6 in MW-43	0.7 in 7 Wells
Lower Queen	<0.013 MW-60, 63, 70	1.3 in MW-74	0.25 in 12 Wells

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Table 2. Hydrogeologic Parameters, Groundwater Flow Velocity, and Potential Transport Distance Versus Benzene[a] Half-Life Decay Rate
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico

		Hydraulic Conductivty (K)			Effective Porosity (% of Total Volume)			Benzene Half-Life Decay Rate			Groundwater Velocity			Benzene Transport Distance and Time		
Groundwater Unit	Gradient (ft/ft)	Maximum Value for K (feet/day)	Minimum Value for K (feet/day)	Average Value for K (feet/day)	Porosity High Value (%)	Porosity Low Value (%)	Porosity Used for Calculation (%)	Maximum Half-Life (days)	Minimum Half-Life (days)	Average Half-Life (days)	Maximum Groundwater Velocity (feet/day)	Minimum Groundwater Velocity (feet/day)	Average Groundwater Velocity (feet/day)	Maximum Transport Distance and Time	Minimum Transport Distance and Time	Average Transport Distance and Time
Shallow Zone 1	0.015			9.8	30%	10%	20%	390	90	194	537	179	268	5,159 Feet in 3,510 Days	397 Feet in 810 Days	1,283 Feet in 1,746 Days
Shallow Zone 2	0.015			9.8	30%	10%	20%	210	25	81	537	179	268	2,778 Feet in 1,890 Days	110 Feet in 225 Days	534 Feet in 729 Days
Lower Queen	0.0002	275	0.8	97	10%	2%	5%	140	20	69	1004	0.6	142	3,465 Feet in 1,260 Days	0.29 Feet in 180 Days	241 Feet in 621 Days

Notes:

(a) For the determination of the number of half lives required for natural attenuation to degrade benzene to less than 0.01 mg/L. An initial benzene concentration of 6.3 mg/L (6,300 ppb) is used (The highest observed historical benzene concentration in MW-33 in September 1991).

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Appendix A

Source Data from 1998 IT Corporation and 2007 ARCADIS Reports

TABLE 3-5

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chloride (mg/l)	Cyanide (mg/l)	Fluoride (mg/l)	NITRITE NITROGEN (mg/l)	Nitrate/Nitrite (mg/l)	NITRATE NITROGEN (mg/l)	pH (mg/l)	Phenols, total (mg/l)
LYMAN	06/29/98	13	<0.005	0.6	<0.1	0.6	0.6	7.4	<0.005
MW-013	06/21/98	230	<0.005	0.3	<0.1	0.1	0.1	7.0	0.023
MW-014	06/22/98	330	<0.005	0.4	<0.1	0.1	0.1	7.0	0.008
MW-041	06/19/98	120	<0.005	1.5	<0.1	<0.1	<0.1	7.5	0.024
MW-043	06/22/98	210	<0.005	0.8	<0.1	<0.1	<0.1	7.3	0.007
MW-044	06/22/98	260	<0.005	0.8	<0.1	<0.1	<0.1	7.2	0.040
MW-046	06/21/98	140	<0.005	1.1	<0.1	<0.1	<0.1	7.2	0.034
MW-049	06/21/98	630	0.050	1.3	<0.1	<0.1	<0.1	7.0	0.012
MW-050	06/19/98	340	<0.005	1.2	<0.1	0.5	0.5	8.2	<0.005
MW-054	06/25/98	110	<0.005	1.8	<0.1	<0.1	<0.1	7.1	<0.005
MW-055	06/25/98	300	<0.005	1.5	<0.1	0.1	0.1	7.0	0.016
MW-061	06/18/98	480	<0.005	2.2	<0.1	<0.1	<0.1	6.9	<0.005
MW-069	06/29/98	120	<0.005	0.3	<0.1	<0.1	<0.1	6.9	0.015
MW-078	06/19/98	47	<0.005	<0.2	<0.1	<0.1	<0.1	7.1	<0.005
MW-090	06/17/98	35	<0.005	0.5	<0.1	7.1	7.1	7.5	<0.005
MW-106	06/18/98	4	<0.005	0.3	<0.1	1.9	1.9	7.3	<0.005
UIHS_ARROYO	06/26/98	13	<0.005	0.7	<0.1	<0.1	<0.1	7.2	0.006

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

For RCL INORGANICS

TABLE 3-5

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL INORGANICS

TABLE 3-6

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Chloride (mg/l)	Cyanide (mg/l)	Fluoride (mg/l)	NITRITE NITROGEN (mg/l)	Nitrate/Nitrite (mg/l)	NITRATE NITROGEN (mg/l)	pH (mg/l)	Phenols, total (mg/l)
MW-057	06/25/98	50	<0.005	0.5	<0.1	<0.1	<0.1	7.3	0.006
MW-058	06/22/98	42	<0.005	0.9	<0.1	<0.1	<0.1	7.4	<0.005
MW-059	06/24/98	560	<0.005	0.6	<0.1	0.1	0.1	7.5	0.022
MW-060	06/21/98	12	<0.005	1.4	<0.1	0.3	0.3	7.3	<0.005
MW-061A	06/18/98	4	0.025	0.8	<0.1	<0.1	<0.1	7.3	<0.005
MW-062	06/26/98	91	<0.005	0.8	<0.1	<0.1	<0.1	7.1	<0.005
MW-063	06/25/98	10	<0.005	0.4	<0.1	7.1	7.1	7.4	0.005
MW-064	06/23/98	15	<0.005	0.7	<0.1	0.7	0.7	7.3	<0.005
MW-065A	06/25/98	24	<0.005	0.7	<0.1	<0.1	<0.1	7.2	0.005
MW-066	06/17/98	13	0.761	0.8	<0.1	0.3	0.3	7.2	<0.005
MW-067	06/24/98	11	<0.005	0.7	<0.1	<0.1	<0.1	7.3	0.005
MW-068	06/26/98	29	<0.005	0.6	<0.1	1.7	1.7	7.3	0.025
MW-070	06/16/98	12	<0.005	0.6	<0.1	2.7	2.7	7.5	<0.005
MW-071	06/19/98	4	<0.005	2.2	<0.1	<0.1	<0.1	7.2	<0.005
MW-072	06/30/98	49	<0.005	0.8	<0.1	<0.1	<0.1	6.9	0.015
MW-073	06/30/98	320	<0.005	1.3	<0.1	<0.1	<0.1	6.9	<0.005
MW-074	06/24/98	340	<0.005	1.1	<0.1	<0.1	<0.1	7.0	0.025
MW-075	06/30/98	54	<0.005	1.2	<0.1	0.1	0.1	7.3	0.077
MW-076	06/29/98	23	<0.005	0.5	<0.1	1.3	1.3	7.3	0.008
MW-081	06/29/98	16	<0.005	0.7	<0.1	<0.1	<0.1	7.4	<0.005
MW-082	06/25/98	72	<0.005	0.7	<0.1	0.14	0.14	7.1	0.006
MW-083	06/25/98	49	<0.005	0.7	<0.1	<0.1	<0.1	7.2	<0.005
MW-084	06/23/98	7	<0.005	0.5	<0.1	<0.1	<0.1	7.5	0.008
MW-085	06/23/98	120	<0.005	1.3	<0.1	0.1	0.1	7.5	0.034
MW-086	06/26/98	330	<0.005	1.1	<0.1	0.1	0.1	7.0	0.068
MW-087	06/19/98	13	<0.005	0.9	<0.1	0.8	0.8	7.4	<0.005
MW-087A	06/19/98	160	<0.005	2.4	<0.1	<0.1	<0.1	7.7	<0.005

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

For RCL INORGANICS

TABLE 3-6

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Sulfate (mg/l)	Total dissolved solids (TDS) (mg/l)
MW-057	06/25/98	110	490
MW-058	06/22/98	<5	760
MW-059	06/24/98	2300	4100
MW-060	06/21/98	390	720
MW-061A	06/18/98	300	690
MW-062	06/26/98	140	650
MW-063	06/25/98	39	370
MW-064	06/23/98	<5	600
MW-065A	06/25/98	250	550
MW-066	06/17/98	430	760
MW-067	06/24/98	140	480
MW-068	06/26/98	100	480
MW-070	06/16/98	80	370
MW-071	06/19/98	650	1100
MW-072	06/30/98	530	890
MW-073	06/30/98	2800	3700
MW-074	06/24/98	13	1500
MW-075	06/30/98	390	870
MW-076	06/29/98	51	400
MW-081	06/29/98	450	800
MW-082	06/25/98	390	730
MW-083	06/25/98	270	640
MW-084	06/23/98	<5	370
MW-085	06/23/98	<5	1100
MW-086	06/26/98	29	1500
MW-087	06/19/98	360	710
MW-087A	06/19/98	2200	3100

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

For RCL INORGANICS

TABLE 3-6

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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For RCL INORGANICS

TABLE 3-6

DISSOLVED-PHASE INORGANIC COMPOUNDS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL INORGANICS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Aluminum (mg/l)	Dissolved Arsenic (mg/l)	Dissolved Barium (mg/l)	Dissolved Boron (mg/l)	Dissolved Cadmium (mg/l)	Dissolved Chromium (mg/l)	Dissolved Cobalt (mg/l)	Dissolved Copper (mg/l)
LYMAN	06/29/98	<0.026	<0.0018	0.018	0.090	0.0003	<0.0008	<0.0003	<0.0018
MW-013	06/21/98	<0.026	0.015	0.52	0.22	0.0004	<0.0008	0.0005	<0.0018
MW-014	06/22/98	<0.026	0.0062	0.56	0.31	0.0005	0.0009	<0.0003	<0.0018
MW-041	06/19/98	0.030	0.011	0.36	0.27	<0.0002	0.0038	0.0026	<0.0018
MW-043	06/22/98	<0.026	0.0052	0.28	0.30	0.0003	<0.0008	0.0082	<0.0018
MW-044	06/22/98	<0.026	<0.0018	0.23	0.33	<0.0002	<0.0008	<0.0003	<0.0018
MW-046	06/21/98	<0.026	0.0033	0.32	0.20	<0.0002	0.0016	<0.0003	<0.0018
MW-049	06/21/98	<0.026	<0.0018	0.048	0.054	<0.0002	0.0038	<0.0003	<0.0018
MW-050	06/19/98	<0.026	0.0052	0.028	0.48	<0.0002	0.0009	<0.0003	<0.0018
MW-054	06/25/98	<0.026	<0.0018	0.015	0.29	<0.0002	0.0008	0.0003	<0.0018
MW-055	06/25/98	<0.026	0.0094	0.40	0.34	0.0004	0.0013	0.0012	<0.0018
MW-061	06/18/98	0.090	0.0024	0.025	0.068	<0.0002	<0.0008	<0.0003	<0.0018
MW-069	06/29/98	<0.026	0.0062	1.2	0.16	0.0005	0.0010	0.0005	<0.0018
MW-078	06/19/98	<0.026	0.0097	0.93	0.10	0.0003	0.0031	0.0013	<0.0018
MW-090	06/17/98	<0.026	0.0044	0.14	0.11	<0.0002	0.0010	<0.0003	<0.0018
MW-108	06/18/98	<0.026	0.0035	0.22	0.074	<0.0002	<0.0008	<0.0003	0.0033
UIHS_ARROYO	06/26/98	<0.026	<0.0018	0.044	0.078	<0.0002	<0.0008	0.0004	<0.0018

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

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Iron (mg/l)	Dissolved Manganese (mg/l)	Dissolved Mercury (mg/l)	Dissolved Molybdenum (mg/l)	Dissolved Nickel (mg/l)	Dissolved Lead (mg/l)	Dissolved Selenium (mg/l)	Dissolved Silicon (mg/l)
LYMAN	06/29/98	0.035	<0.0002	<0.0001	0.0034	<0.0009	<0.0022	<0.0023	---
MW-013	06/21/98	3.4	0.22	<0.0001	0.0031	0.014	<0.0022	<0.0023	---
MW-014	06/22/98	4.7	0.24	<0.0001	0.0039	0.0025	<0.0022	<0.0023	---
MW-041	06/19/98	0.93	0.20	<0.0001	0.0090	0.0054	<0.0022	<0.0023	---
MW-043	06/22/98	2.6	0.20	<0.0001	0.054	0.039	<0.0022	<0.0023	---
MW-044	06/22/98	<0.013	0.043	<0.0001	0.0007	<0.0009	<0.0022	<0.0023	---
MW-046	06/21/98	0.014	0.090	<0.0001	0.0007	0.0036	<0.0022	<0.0023	---
MW-049	06/21/98	0.055	0.079	<0.0001	0.0050	<0.0009	<0.0022	<0.0023	---
MW-050	06/19/98	<0.013	0.035	<0.0001	0.0055	0.0053	<0.0022	0.0037	---
MW-054	06/25/98	<0.013	0.0050	<0.0001	0.0026	<0.0009	<0.0022	<0.005	---
MW-055	06/25/98	2.2	0.12	<0.0001	0.0031	<0.0009	<0.0022	<0.005	---
MW-061	06/18/98	0.032	0.0010	0.0010	0.0011	<0.0009	<0.0022	<0.0023	---
MW-069	06/29/98	2.7	0.59	<0.0001	0.0033	<0.0009	<0.0022	<0.005	---
MW-078	06/19/98	1.6	0.82	<0.0001	0.0034	0.0065	<0.0022	0.0035	---
MW-090	06/17/98	<0.013	<0.0002	<0.0001	0.0025	0.0021	<0.0022	<0.0023	---
MW-106	06/18/98	<0.013	0.0066	0.0005	0.0019	<0.0009	<0.0022	<0.0023	---
UIHS_ARROYO	06/26/98	0.015	0.012	<0.0001	0.0021	<0.0009	<0.0022	<0.005	---

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

For RCL METALS

TABLE 3-7

DISSOLVED-PHASE METALS (JUNE 1998)
SHALLOW ZONE

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Iron (mg/l)	Dissolved Manganese (mg/l)	Dissolved Mercury (mg/l)	Dissolved Molybdenum (mg/l)	Dissolved Nickel (mg/l)	Dissolved Lead (mg/l)	Dissolved Selenium (mg/l)	Dissolved Silicon (mg/l)
MW-057	06/25/98	1.0	0.20	<0.0001	0.0017	<0.0009	<0.0022	<0.005	---
MW-058	06/22/98	0.29	0.28	<0.0001	0.0057	0.0015	<0.0022	<0.0023	---
MW-059	06/24/98	0.053	1.5	<0.0001	0.0074	0.074	<0.0022	<0.0023	---
MW-060	06/21/98	<0.013	0.0004	0.0003	0.0024	<0.0009	<0.0022	<0.0023	---
MW-061A	06/18/98	0.061	0.11	<0.0001	0.0013	0.0048	<0.0022	<0.0023	---
MW-062	06/26/98	0.25	0.39	0.0001	0.0040	<0.0009	<0.0022	<0.005	---
MW-063	06/25/98	<0.013	0.0015	<0.0001	0.0008	<0.0009	<0.0022	<0.005	---
MW-064	06/23/98	0.021	0.026	<0.0001	0.036	0.0028	<0.0022	<0.0023	---
MW-065A	06/25/98	0.59	0.44	<0.0001	0.0049	0.024	<0.0022	<0.005	---
MW-066	06/17/98	<0.013	0.0008	0.0005	0.0040	<0.0009	<0.0022	<0.0023	---
MW-067	06/24/98	0.017	0.82	<0.0001	0.0093	0.090	<0.0022	<0.0023	---
MW-068	06/26/98	0.080	0.10	0.0002	0.0046	<0.0009	<0.0022	<0.005	---
MW-070	06/16/98	<0.013	0.0026	0.0003	0.0023	<0.0009	<0.0022	<0.0023	---
MW-071	06/19/98	<0.013	0.0027	<0.0001	0.0005	<0.0009	<0.0022	<0.0023	---
MW-072	06/30/98	0.89	0.65	<0.0001	0.0035	0.0014	<0.0022	<0.0023	---
MW-073	06/30/98	0.26	0.065	<0.0001	0.0028	0.0015	<0.0022	<0.0023	---
MW-074	06/24/98	1.3	0.33	<0.0001	0.0033	0.0037	<0.0022	<0.0023	---
MW-075	06/30/98	0.18	0.26	<0.0001	0.0023	0.0039	<0.0022	<0.0023	---
MW-076	06/29/98	0.031	0.15	0.0003	0.0042	<0.0009	<0.0022	<0.005	---
MW-081	06/29/98	0.99	0.20	<0.0001	<0.0003	<0.0009	<0.0022	<0.005	---
MW-082	06/25/98	0.44	0.18	<0.0001	0.0040	0.0027	<0.0022	<0.005	---
MW-083	06/25/98	0.81	0.54	<0.0001	0.0045	0.0047	<0.0022	<0.005	---
MW-084	06/23/98	0.86	0.25	<0.0001	0.0043	0.0020	<0.0022	<0.0023	---
MW-085	06/23/98	1.0	0.19	<0.0001	0.0020	0.0020	<0.0022	<0.0023	---
MW-086	06/26/98	0.53	0.17	0.0001	0.0012	<0.0009	<0.0022	<0.005	---
MW-087	06/19/98	<0.013	0.0012	<0.0001	0.0025	<0.0009	<0.0022	<0.0023	---
MW-087A	06/19/98	0.24	0.012	<0.0001	0.0053	0.0099	<0.0022	0.0025	---

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Aluminum (mg/l)	Arsenic (mg/l)	Barium (mg/l)	Boron (mg/l)	Cadmium (mg/l)	Calcium (mg/l)	Chromium (mg/l)	Cobalt (mg/l)
MW-088	06/18/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	---	---	---	---	---	---	---	---
MW-094	06/26/98	---	---	---	---	---	---	---	---
MW-095	06/22/98	---	---	---	---	---	---	---	---
MW-096	06/21/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	---	---	---	---	---	---	---	---
MW-104	06/21/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	---	---	---	---	---	---	---	---
MW-110	06/30/98	---	---	---	---	---	---	---	---
MW-111	06/29/98	---	---	---	---	---	---	---	---
SW-01	06/30/98	---	---	---	---	---	---	---	---
SW-02	06/24/98	---	---	---	---	---	---	---	---
SW-03	06/24/98	---	---	---	---	---	---	---	---

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Copper (mg/l)	Iron (mg/l)	Lead (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Mercury (mg/l)	Molybdenum (mg/l)	Nickel (mg/l)
MW-088	06/18/98	---	---	---	---	---	---	---	---
MW-089	06/17/98	---	---	---	---	---	---	---	---
MW-094	06/26/98	---	---	---	---	---	---	---	---
MW-095	06/22/98	---	---	---	---	---	---	---	---
MW-096	06/21/98	---	---	---	---	---	---	---	---
MW-097	06/21/98	---	---	---	---	---	---	---	---
MW-098	06/29/98	---	---	---	---	---	---	---	---
MW-104	06/21/98	---	---	---	---	---	---	---	---
MW-108	06/22/98	---	---	---	---	---	---	---	---
MW-110	06/30/98	---	---	---	---	---	---	---	---
MW-111	06/29/98	---	---	---	---	---	---	---	---
SW-01	06/30/98	---	---	---	---	---	---	---	---
SW-02	06/24/98	---	---	---	---	---	---	---	---
SW-03	06/24/98	---	---	---	---	---	---	---	---

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

SITE	DATE	Dissolved Iron (mg/l)	Dissolved Manganese (mg/l)	Dissolved Mercury (mg/l)	Dissolved Molybdenum (mg/l)	Dissolved Nickel (mg/l)	Dissolved Lead (mg/l)	Dissolved Selenium (mg/l)	Dissolved Silicon (mg/l)
MW-088	06/18/98	0.064	0.0062	<0.0001	0.0041	<0.0009	<0.0022	<0.0023	---
MW-089	06/17/98	0.014	0.046	0.0003	0.0033	0.0040	<0.0022	<0.0023	---
MW-094	06/26/98	<0.013	0.0023	0.0001	0.0023	<0.0009	<0.0022	<0.005	---
MW-095	06/22/98	<0.013	0.019	<0.0001	0.0025	<0.0009	<0.0022	<0.0023	---
MW-096	06/21/98	<0.013	0.0071	0.0003	0.0026	<0.0009	<0.0022	<0.0023	---
MW-097	06/21/98	<0.013	<0.0002	<0.0001	0.0021	0.0009	<0.0022	0.0026	---
MW-098	06/29/98	0.034	<0.0002	<0.0001	0.0034	<0.0009	<0.0022	<0.005	---
MW-104	06/21/98	<0.013	<0.0002	<0.0001	0.0034	<0.0009	<0.0022	<0.0023	---
MW-108	06/22/98	<0.013	0.0004	<0.0001	0.0028	<0.0009	<0.0022	<0.0023	---
MW-110	06/30/98	0.043	0.065	<0.0001	0.0038	<0.0009	<0.0022	<0.0023	---
MW-111	06/29/98	0.092	0.22	<0.0001	0.0044	<0.0009	<0.0022	<0.005	---
SW-01	06/30/98	0.060	0.0032	<0.0001	0.0019	<0.0009	0.0031	<0.0023	---
SW-02	06/24/98	<0.013	0.060	<0.0001	0.0020	<0.0009	0.018	<0.0023	---
SW-03	06/24/98	0.015	0.0015	<0.0001	0.0024	<0.0009	<0.0022	<0.005	---

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

For RCL METALS

TABLE 3-8

DISSOLVED-PHASE METALS (JUNE 1998)
LOWER QUEEN

Indian Basin Remediation Project
Eddy County, NM

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

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

For RCL METALS

ARCADIS
Infrastructure, environment, buildings

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2009 JUN 15 PM 1 20

ARCADIS
1004 North Big Spring Street
Suite 300
Midland
Texas 79701
Tel 432.687.5400
Fax 432.687.5401
www.arcadis-us.com

Mr. Terry Persaud, P.E.
Marathon Oil Company
P.O. Box 3487
Mail Stop 32:07
Houston, Texas 77253-3487

ENVIRONMENTAL

Subject:
Indian Basin Remediation Project Monitoring Well Plugging Report
Indian Basin Gas Plant
Eddy County, New Mexico

Date:
June 11, 2009

Contact:
Alan Reed

Phone:
432.687.5400

Email:
alan.reed@arcadis-us.com

Our ref:
MT001010.0002.00001

Dear Mr. Persaud:

The purpose of this letter is to document the field activities associated with the plugging and abandonment of 95 wells that were part of the Indian Basin Remediation Project (IBRP) located at the Indian Basin Gas Plant in Eddy County, New Mexico. The well abandonment program was approved through correspondence received from the New Mexico Oil Conservation Division (OCD) dated February 20, 2009 (Attachment A). It is important to note that the original list of wells proposed for plugging and abandonment and submitted to the OCD included three water supply wells at the site. The OCD approved the plugging and abandonment of 98 wells, which included the three water supply wells. However, Marathon Oil Company (MOC) did not plug the three water wells at this time since they are needed to supply water for site operations.

Plugging and abandonment field activities were initiated on March 23, 2009. All site work was completed on April 24, 2009. In accordance with requirements specified in the February 20, 2009 OCD correspondence, the 95 wells were grouted in-place using a cement grout consisting of approximately three percent bentonite. The cement was delivered to the bottom of the well by means of a grout pump and tremie pipe. The well surface completions were removed and, attempts were made to remove the monitoring well casings. If the well casing could not be removed, it was cut off below existing grade. All surface completions, removed casing, and empty cement and bentonite sacks were placed in roll-off boxes and disposed at the Lea Land Landfill. All plugging and abandonment work was performed by a New Mexico licensed drilling contractor. Attachment B contains well plugging and abandonment documentation provided by the drilling contractor.

The 95 wells that were plugged and abandoned included 32 monitoring wells and 2 sumps that were used to monitor the shallow zone groundwater and a total of 61 wells used to monitor the Lower Queen groundwater. The Lower Queen wells included 49 monitoring wells, 2 infiltration wells and 10 vapor extraction wells. A summary list of the plugged and abandoned wells is included in the attached Table 1. Based on the February 20, 2009 OCD correspondence, the OCD has conditionally approved the discontinuance of active remediation at the IBRP. The OCD is requiring at least annual groundwater monitoring for benzene, toluene, ethylbenzene

and xylenes (BTEX), total dissolved solids (TDS) and chloride, and at least semi-annual gauging of depth to groundwater and non-aqueous phase liquid thickness at the 15 groundwater monitoring wells at the site listed in the attached Table 2. In addition, OCD is requiring submittal of an annual groundwater monitoring report.

At this time, the next annual groundwater monitoring event is scheduled to be completed in May 2009. Subsequently, the annual groundwater monitoring report will be prepared and submitted to the OCD in June 2009. Finally, the Indian Basin Gas Plant groundwater monitoring plan will be updated to document the transfer of the remaining 15 wells in the IBRP to the plan. The plan will be updated by the end of July 2009 and will conclude the active remediation work on the IBRP.

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

Very truly yours,

ARCADIS

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

Steven P. Tischer
Associate Vice President/SER Department Manager

Attachments:
Attachment A – New Mexico OCD Correspondence dated February 20, 2009
Attachment B – Well Plugging Documentation
Table 1 – Wells Plugged and Abandoned
Table 2 – Wells Retained for Groundwater Monitoring

ARCADIS

Infrastructure, environment, building

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2009 JUN 15 PM 1 20

ARCADIS
1004 North Big Spring Street
Suite 300
Midland
Texas 79701
Tel 432.687.5400
Fax 432.687.5401

Transmittal Letter

To:
Ed Hansen
New Mexico Oil Conservation Division
1220 So. Saint Francis Drive
Santa Fe, New Mexico 87505

Copies:
3 – Terry Persaud, Marathon Oil Co
1 – File Copy

From:
Alan J. Reed, Jr.

Date:
June 11, 2009

Subject:
Indian Basin Remediation Project Monitoring Well Plugging Report
Indian Basin Gas Plant
Eddy County, New Mexico

ARCADIS Project No.:
MT001010.0002.00001

We are sending you:

☒ **Attached** ☐ **Under Separate Cover Via _____ the Following Items:**

☐ Shop Drawings ☐ Plans ☐ Specifications ☐ Change Order
☐ Prints ☐ Samples ☐ Copy of Letter ☐ Reports
☐ Other:

Copies	Date	Drawing No.	Rev.	Description	Action*
1				Indian Basin Remediation Project Monitoring Well Plugging Report	FA

Action*

☐ A Approved ☐ CR Correct and Resubmit ☐ Resubmit _____ Copies
☐ AN Approved As Noted ☐ F File ☐ Return _____ Copies
☐ AS As Requested ☒ FA For Approval ☐ Review and Comment
☐ Other:

Mailing Method

☒ U.S. Postal Service 1st Class ☐ Courier/Hand Delivery ☐ FedEx Priority Overnight ☐ FedEx 2-Day Delivery
☐ Certified/Registered Mail ☐ United Parcel Service (UPS) ☐ FedEx Standard Overnight ☐ FedEx Economy
☐ Other:

ARCADIS

ATTACHMENT A

New Mexico OCD
Correspondence dated
February 20, 2009

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Joanna Prukop
Cabinet Secretary
Reese Fullerton
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

February 20, 2009

M. Paul Peacock
Marathon Oil Company
P.O. Box 3128
Houston, TX 77253-3128

RE: Indian Basin Remediation Project Report and Proposed Well Plugging Request for the Marathon's Indian Basin Gas Plant (GW-21)
Eddy County, New Mexico

Dear Mr. Peacock:

The New Mexico Oil Conservation Division (OCD) has reviewed Marathon's report, Evaluation of Natural Attenuation, Indian Basin Remediation Project [IBRP], Eddy County, New Mexico, dated May 12, 2008, and Proposed IBRP Well Plugging Program [Request], dated February 5, 2009. The report and request are substantially acceptable to the OCD. Therefore, the OCD hereby conditionally approves the discontinuance of active remediation at the above-referenced site.

However, at least annual groundwater monitoring for BTEX, TDS and chloride at the 13 proposed wells as specified in the Well Plugging Request plus at an additional two groundwater monitoring wells, MW-81 and MW-113, for a total of 15 wells must continue unless otherwise approved by the OCD. Also, at least semi-annually gauging of depth to groundwater and non-aqueous phase liquid thickness at these 15 wells must continue unless otherwise approved by the OCD. Marathon must continue to submit an annual groundwater monitoring report to the OCD unless otherwise approved by the OCD.

In addition, the material used to plug the 98 (the 100 proposed minus the 2 rejected) groundwater monitoring wells as specified in the Request must be a cement grout with 1% to 3% bentonite. Please submit to the OCD a final plugging report within 180 days of receipt of this letter.

Please be advised that OCD approval of this report and request does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Edward Hansen of my staff at 505-476-3489 or edwardj.hansen@state.nm.us.

Sincerely,

Wayne Price
Environmental Bureau Chief

WP:EJH:ejh

cc: OCD; Artesia District Office
Terry Persaud, P.E., Marathon Oil Company, P.O. Box 3128, Houston, TX 77253-3128

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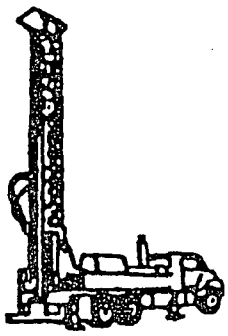
ATTACHMENT B

Well Plugging
Documentation



White Drilling Company, Inc.

• Environment • Geotechnical
• Water Wells • Rock Coring
1113 S. Access Road West
P.O. Box 906 • Clyde, Texas 79510
(325) 893-2950 • (325) 893-4099

May 12, 2009

ARCADIS U.S., Inc.
Allen Reed
1004 N. Big Spring St., Suite 300
Midland, Texas 79701

Mr. Reed,

This letter is to inform you that the State of New Mexico State Engineer's Office does not have a State Plugging Report at this time. After contacting the State Engineer's Office, they instructed me to fill out 1 State Well Record with basic information then attach an excel spread sheet with all the well information for the plugging of the 95 Monitor Wells in the Indian Basin Gas Plant. If you have any questions or concerns please call at (325) 893-2950.

Sincerely,

John W. White, President
White Drilling Company, Inc.

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

POD NUMBER (WELL NUMBER): See Attached/95 wells	OSE FILE NUMBER(S):
WELL OWNER NAME(S): Marathon Oil Company/Terry Persaud, P.E.	PHONE (OPTIONAL): 713-296-3510
WELL OWNER MAILING ADDRESS: P.O. Box 3487/Mail Stop 32:07	CITY: Houston STATE: TX ZIP: 77253-3487

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	27	39.90	N
LONGITUDE	104	33	38.20	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS: Indian Basin Gas Plant/Eddy County, NM

2. OPTIONAL

(2.5 ACRE)	(10 ACRE)	(40 ACRE)	(160 ACRE)	SECTION	TOWNSHIP	RANGE
¼	¼	¼	¼		21 ☐ NORTH ☒ SOUTH	23 ☒ EAST ☐ WEST

SUBDIVISION NAME	LOT NUMBER	BLOCK NUMBER	UNIT/TRACT

HYDROGRAPHIC SURVEY	MAP NUMBER	TRACT NUMBER

3. DRILLING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-1456	John W. White	White Drilling Company, Inc.

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
3/24/09	4/17/09			

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☐ SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT):

DRILLING FLUID: ☐ AIR ☐ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☐ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

DEPTH (FT) FROM	DEPTH (FT) TO	BORE HOLE DIA. (IN)	CASING MATERIAL	CONNECTION TYPE (CASING)	INSIDE DIA. CASING (IN)	CASING WALL THICKNESS (IN)	SLOT SIZE (IN)

4. WATER BEARING STRATA

DEPTH (FT) FROM	DEPTH (FT) TO	THICKNESS (FT)	FORMATION DESCRIPTION OF PRINCIPAL WATER-BEARING STRATA (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	YIELD (GPM)

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA	TOTAL ESTIMATED WELL YIELD (GPM)

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 1 OF 2

5. SEAL AND PUMP

TYPE OF PUMP: ☐ SUBMERSIBLE ☐ JET ☐ NO PUMP – WELL NOT EQUIPPED
☐ TURBINE ☐ CYLINDER ☐ OTHER – SPECIFY:

ANNULAR SEAL AND GRAVEL PACK	DEPTH (FT) FROM	DEPTH (FT) TO	BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHOD OF PLACEMENT

6. GEOLOGIC LOG OF WELL

DEPTH (FT) FROM	DEPTH (FT) TO	THICKNESS (FT)	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	WATER BEARING?
				☐ YES ☐ NO
				☐ YES ☐ NO
				☐ YES ☐ NO
				☐ YES ☐ NO
				☐ YES ☐ NO
				☐ YES ☐ NO
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				☐ YES ☐ NO
				☐ YES ☐ NO

ATTACH ADDITIONAL PAGES AS NEEDED TO FULLY DESCRIBE THE GEOLOGIC LOG OF THE WELL

7. TEST & ADDITIONAL INFO

WELL TEST — METHOD: ☐ BAILER ☐ PUMP ☐ AIR LIFT ☐ OTHER – SPECIFY:

TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

ADDITIONAL STATEMENTS OR EXPLANATIONS:

This is a plugging event only. New Mexico currently does not have a individual plugging report available. I contacted the NM State Engineer's Office and they approved 1-Log along with a spread sheet with all the information on the plugging. Please see attached list and information for all wells that were plugged. Attached is a copy of approval to plug all 95-wells by the OCD.

8. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

SIGNATURE OF DRILLER — DATE: 5/14/09

FOR OSE INTERNAL USE — WELL RECORD & LOG (Version 6/9/08)

FILE NUMBER	POD NUMBER	TRN NUMBER
LOCATION		PAGE 2 OF 2

Ma[illegible]on Oil Company

Indian Basin Gas Plant, Eddy County, NM

Well Number	Well Diameter (in)	Northing NAD 27 Con	Easting hddd,mm',ss.s"	Section, Township & Range	Date Plugged	Depth (ft) FROM	Depth (ft) TO	Material Type and Size	Amount (cubic feet)	Method of Placement
MW-4	2	32 27 39.9	104 33 38.2	S24,T21S,R23E	4/7/09	17.30	0.00	Type 2 Portland w/3% gel	0.37	pump mix w/tremmie pipe
MW-12	2	32 27 44.0	104 34 08.0	S23,T21S,R23E	3/25/09	23.00	0.00	Type 2 Portland w/3% gel	0.50	pump mix w/tremmie pipe
MW-13	2	32 27 42.4	104 34 01.1	S23,T21S,R23E	3/25/09	19.90	0.00	Type 2 Portland w/3% gel	0.44	pump mix w/tremmie pipe
MW-17	2	32 27 44.2	104 33 56.2	S23,T21S,R23E	3/24/09	18.00	0.00	Type 2 Portland w/3% gel	0.39	pump mix w/tremmie pipe
MW-19	2	32 27 45.5	104 33 54.0	S23,T21S,R23E	3/24/09	19.00	0.00	Type 2 Portland w/3% gel	0.41	pump mix w/tremmie pipe
MW-22	2	32 27 39.8	104 33 54.1	S23,T21S,R23E	3/25/09	16.00	0.00	Type 2 Portland w/3% gel	0.35	pump mix w/tremmie pipe
MW-24	2	32 27 44.6	104 33049.5	S24,T21S,R23E	3/25/09	11.00	0.00	Type 2 Portland w/3% gel	0.24	pump mix w/tremmie pipe
MW-26	2	32 27 41.8	104 33 48.1	S24,T21S,R23E	4/7/09	19.30	0.00	Type 2 Portland w/3% gel	0.44	pump mix w/tremmie pipe
MW-32	2	32 27 38.7	104 33 53.0	S23,T21S,R23E	3/25/09	14.00	0.00	Type 2 Portland w/3% gel	0.31	pump mix w/tremmie pipe
MW-47	2	32 27 52.6	104 34 05.6	S23,T21S,R23E	3/24/09	19.00	0.00	Type 2 Portland w/3% gel	0.41	pump mix w/tremmie pipe
MW-48	2	32 27 48.6	104 34 05.7	S23,T21S,R23E	3/25/09	17.85	0.00	Type 2 Portland w/3% gel	0.39	pump mix w/tremmie pipe
MW-50	2	32 28 00.4	104 34 03.4	S23,T21S,R23E	3/25/09	35.00	0.00	Type 2 Portland w/3% gel	0.76	pump mix w/tremmie pipe
MW-51	2	32 28 02.6	104 34 12.7	S23,T21S,R23E	3/25/09	18.00	0.00	Type 2 Portland w/3% gel	0.39	pump mix w/tremmie pipe
MW-112	1	32 27 32.9	104 33 29.1	S24,T21S,R23E	4/8/09	213.00	0.00	Type 2 Portland w/3% gel	2.34	pump mix w/tremmie pipe
MW-10	4	32 27 43.1	104 33 44.7	S24,T21S,R23E	4/7/09	18.00	0.00	Type 2 Portland w/3% gel	1.57	pump mix w/tremmie pipe
MW-11	4	32 27 43.1	104 34 08.1	S23,T21S,R23E	3/25/09	23.00	0.00	Type 2 Portland w/3% gel	0.5	pump mix w/tremmie pipe
MW-16	4	32 27 41.7	104 33 56.2	S23,T21S,R23E	3/25/09	20.00	0.00	Type 2 Portland w/3% gel	1.75	pump mix w/tremmie pipe
MW-41	4	32 27 52.5	104 33 54.0	S23,T21S,R23E	3/25/09	24.04	0.00	Type 2 Portland w/3% gel	2.1	pump mix w/tremmie pipe
MW-43	4	32 27 52.5	104 33 59.9	S23,T21S,R23E	3/24/09	22.00	0.00	Type 2 Portland w/3% gel	1.92	pump mix w/tremmie pipe
MW-54	4	32 27 56.7	104 33 44.6	S24,T21S,R23E	3/25/09	76.00	0.00	Type 2 Portland w/3% gel	6.63	pump mix w/tremmie pipe
MW-55	4	32 27 46.7	104 33 37.6	S24,T21S,R23E	4/7/09	63.40	0.00	Type 2 Portland w/3% gel	5.59	pump mix w/tremmie pipe
MW-56	4	32 27 37.1	104 33 32.9	S24,T21S,R23E	4/7/09	44.00	0.00	Type 2 Portland w/3% gel	3.84	pump mix w/tremmie pipe
MW-61	4	32 28 08.5	104 33 10.8	S24,T21S,R23E	4/2/09	57.00	0.00	Type 2 Portland w/3% gel	4.98	pump mix w/tremmie pipe
MW-65	4	32 27 18.7	104 33 14.2	S25,T21S,R23E	4/15/09	56.00	0.00	Type 2 Portland w/3% gel	4.89	pump mix w/tremmie pipe
MW-69	4	32 27 31.9	104 34 05.8	S23,T21S,R23E	4/2/09	51.00	0.00	Type 2 Portland w/3% gel	4.45	pump mix w/tremmie pipe
MW-90	4	32 27 19.1	104 33 42.5	S25,T21S,R23E	4/1/09	63.50	0.00	Type 2 Portland w/3% gel	5.59	pump mix w/tremmie pipe
MW-91	4	32 27 24.4	104 33 43.2	S24,T21S,R23E	4/1/09	72.37	0.00	Type 2 Portland w/3% gel	6.37	pump mix w/tremmie pipe
MW-100	4	32 27 14.1	104 33 31.2	S25,T21S,R23E	4/1/09	72.50	0.00	Type 2 Portland w/3% gel	6.37	pump mix w/tremmie pipe
MW-105	4	32 27 02.6	104 32 49.5	S25,T21S,R23E	4/15/09	74.20	0.00	Type 2 Portland w/3% gel	6.46	pump mix w/tremmie pipe
MW-109	4	32 27 53.0	104 34 15.9	S23,T21S,R23E	3/24/09	18.90	0.00	Type 2 Portland w/3% gel	1.66	pump mix w/tremmie pipe
MW-117	4	32 46 61.4	104 56 15.6	S23,T21S,R23E	3/24/09	44.85	0.00	Type 2 Portland w/3% gel	3.93	pump mix w/tremmie pipe
MW-57	4	32 27 29.9	104 33 40.1	S24,T21S,R23E	4/7/09	175.50	0.00	Type 2 Portland w/3% gel	53.78	pump mix w/tremmie pipe

Mission Oil Company

Indian Basin Gas Plant, Eddy County, NM

Well Number	Well Diameter (in)	Northing NAD 27 Con	Easting hddd,mm',ss.s"	Section, Township & Range	Date Plugged	Depth (ft) FROM	Depth (ft) TO	Material Type and Size	Amount (cubic feet)	Method of Placement
MW-59	4	32 27 48.2	104 33 20.7	S24,T21S,R23E	4/9/09	206.00	0.00	Type 2 Portland w/3% gel	53.95	pump mix w/tremmie pipe
MW-60	4	32 27 47.9	104 33 02.6	S24,T21S,R23E	4/6/09	223.18	0.00	Type 2 Portland w/3% gel	58.4	pump mix w/tremmie pipe
MW-61A	4	32 28 08.5	104 33 10.6	S24,T21S,R23E	4/2/09	217.00	0.00	Type 2 Portland w/3% gel	56.83	pump mix w/tremmie pipe
MW-62	4	32 27 32.5	104 33 18.3	S24,T21S,R23E	4/16/09	223.00	0.00	Type 2 Portland w/3% gel	58.4	pump mix w/tremmie pipe
MW-63	4	32 27 46.7	104 34 31.6	S23,T21S,R23E	3/31/09	222.00	0.00	Type 2 Portland w/3% gel	58.4	pump mix w/tremmie pipe
MW-64	4	32 27 31.0	104 32 56.8	S24,T21S,R23E	4/15/09	200.00	0.00	Type 2 Portland w/3% gel	52.38	pump mix w/tremmie pipe
MW-65A	4	32 27 18.8	104 33 14.2	S25,T21S,R23E	4/14/09	166.00	0.00	Type 2 Portland w/3% gel	43.48	pump mix w/tremmie pipe
MW-67	4	32 27 11.2	104 32 53.4	S25,T21S,R23E	4/15/09	163.00	0.00	Type 2 Portland w/3% gel	42.69	pump mix w/tremmie pipe
MW-68	4	32 27 42.2	104 34 51.7	S23,T21S,R23E	4/1/09	203.00	0.00	Type 2 Portland w/3% gel	53.17	pump mix w/tremmie pipe
MW-71	4	32 28 09.1	104 32 32.9	S19,T21S,R24E	4/2/09	234.00	0.00	Type 2 Portland w/3% gel	61.28	pump mix w/tremmie pipe
MW-87	4	32 27 40.6	104 32 38.1	S19,T21S,R24E	4/6/09	168.00	0.00	Type 2 Portland w/3% gel	44	pump mix w/tremmie pipe
MW-89	4	32 28 20.2	104 33 48.2	S13,T21S,R24E	3/31/09	234.00	0.00	Type 2 Portland w/3% gel	61.28	pump mix w/tremmie pipe
MW-95	4	32 27 00.3	104 32 56.7	S25,T21S,R23E	4/1/09	147.20	0.00	Type 2 Portland w/3% gel	38.5	pump mix w/tremmie pipe
MW-96	4	32 27 24.1	104 32 36.8	S30,T21S,R24E	4/15/09	126.00	0.00	Type 2 Portland w/3% gel	33	pump mix w/tremmie pipe
MW-97	4	32 27 06.8	104 32 34.6	S30,T21S,R24E	4/15/09	137.00	0.00	Type 2 Portland w/3% gel	35.88	pump mix w/tremmie pipe
MW-98	4	32 27 06.0	104 33 19.6	S25,T21S,R23E	4/14/09	165.30	0.00	Type 2 Portland w/3% gel	43.21	pump mix w/tremmie pipe
MW-108	4	32 27 04.9	104 32 54.0	S25,T21S,R23E	4/15/09	170.00	0.00	Type 2 Portland w/3% gel	29.68	pump mix w/tremmie pipe
MW-116	4	32 27 44.3	104 33 3.8	S24,T21S,R23E	4/8/09	221.50	0.00	Type 2 Portland w/3% gel	58.14	pump mix w/tremmie pipe
MW-118	4	32 27 12.1	104 33 16.0	S25,T21S,R23E	4/14/09	200.00	0.00	Type 2 Portland w/3% gel	52.38	pump mix w/tremmie pipe
MW-120	4	32 28 00.9	104 33 25.0	S24,T21S,R23E	4/9/09	236.00	0.00	Type 2 Portland w/3% gel	61.81	pump mix w/tremmie pipe
MW-121	4	32 27 50.5	104 33 27.4	S24,T21S,R23E	4/8/09	224.60	0.00	Type 2 Portland w/3% gel	58.67	pump mix w/tremmie pipe
MW-123	4	32 27 18.4	104 33 22.7	S25,T21S,R23E	4/14/09	215.00	0.00	Type 2 Portland w/3% gel	56.31	pump mix w/tremmie pipe
MW-130	4	32 27 26.5	104 33 23.7	S24,T21S,R23E	4/8/09	225.00	0.00	Type 2 Portland w/3% gel	58.93	pump mix w/tremmie pipe
MW-131	4	32 27 37.1	104 33 36.5	S24,T21S,R23E	4/8/09	240.00	0.00	Type 2 Portland w/3% gel	62.86	pump mix w/tremmie pipe
MW-83	6	32 27 25.7	104 33 15.9	S24,T21S,R23E	4/15/09	200.00	0.00	Type 2 Portland w/3% gel	117.78	pump mix w/tremmie pipe
MW-84	6	32 27 10.8	104 33 11.5	S25,T21S,R23E	4/14/09	169.00	0.00	Type 2 Portland w/3% gel	99.52	pump mix w/tremmie pipe
MW-104	6	32 27 26.5	104 32 55.6	S24,T21S,R23E	4/15/09	239.50	0.00	Type 2 Portland w/3% gel	141.34	pump mix w/tremmie pipe
MW-110	6	32 28 00.9	104 34 06.4	S23,T21S,R23E	4/9/09	233.00	0.00	Type 2 Portland w/3% gel	137.21	pump mix w/tremmie pipe
VE-19	6	32 27 19.1	104 33 16.8	S25,T21S,R23E	4/16/09	149.00	0.00	Type 2 Portland w/3% gel	87.75	pump mix w/tremmie pipe
MW-122	6.5	32 27 56.8	104 33 33.6	S24,T21S,R23E	3/31/09	227.00	0.00	Type 2 Portland w/3% gel	182.03	pump mix w/tremmie pipe
MW-125	6.5	32 27 39.7	104 33 45.0	S24,T21S,R23E	4/7/09	227.00	0.00	Type 2 Portland w/3% gel	182.03	pump mix w/tremmie pipe

Ma[illegible]n Oil Company

Indian Basin Gas Plant, Eddy County, NM

Well Number	Well Diameter (in)	Northing NAD 27 Con	Easting hddd,mm',ss.s"	Section, Township & Range	Date Plugged	Depth (ft) FROM	Depth (ft) TO	Material Type and Size	Amount (cubic feet)	Method of Placement
MW-128	6.5	32 27 39.3	104 33 27.5	S24,T21S,R23E	4/8/09	223.00	0.00	Type 2 Portland w/3% gel	178.82	pump mix w/tremmie pipe
MW-129	6.875	32 27 44.4	104 33 58.0	S23,T21S,R23E	3/26/09	245.00	0.00	Type 2 Portland w/3% gel	196.47	pump mix w/tremmie pipe
MW-117A	7	32 27 57.9	104 34 08.6	S23,T21S,R23E	3/31/09	225.00	0.00	Type 2 Portland w/3% gel	234.6	pump mix w/tremmie pipe
MW-124	7	32 27 23.0	104 33 30.3	S25,T21S,R23E	4/7/09	191.00	0.00	Type 2 Portland w/3% gel	153.16	pump mix w/tremmie pipe
MW-78	7 875	32 27 25.5	104 33 32.2	S24,T21S,R23E	4/7/09	81.50	0.00	Type 2 Portland w/3% gel	42.94	pump mix w/tremmie pipe
MW-79	7.875	32 27 24.0	104 33 53.0	S26,T21S,R23E	4/1/09	82.04	0.00	Type 2 Portland w/3% gel	42.94	pump mix w/tremmie pipe
MW-76	7.875	32 27 34.S	104 33 48.7	S24,T21S,R23E	4/7/09	221.00	0.00	Type 2 Portland w/3% gel	232	pump mix w/tremmie pipe
VE-1	7.875	32 28 15.2	104 33 30.3	S24,T21S,R23E	3/31/09	224.00	0.00	Type 2 Portland w/3% gel	234.6	pump mix w/tremmie pipe
VE-2	7.875	32 28 15.2	104 33 28.5	S24,T21S,R23E	3/31/09	211.00	0.00	Type 2 Portland w/3% gel	231.45	pump mix w/tremmie pipe
VE-3	7.875	32 28 16.5	104 33 19.9	S13,T21S,R24E	4/2/09	203.00	0.00	Type 2 Portland w/3% gel	212.6	pump mix w/tremmie pipe
VE-4	7.875	32 28 14.2	104 33 00.8	S24,T21S,R23E	4/2/09	185.00	0.00	Type 2 Portland w/3% gel	193.75	pump mix w/tremmie pipe
VE-5	7.875	32 28 06.4	104 32 57.8	S24,T21S,R23E	4/2/09	169.00	0.00	Type 2 Portland w/3% gel	176.99	pump mix w/tremmie pipe
MW-72	8	32 27 56.5	104 33 24.3	S24,T21S,R23E	4/9/09	227.00	0.00	Type 2 Portland w/3% gel	316.98	pump mix w/tremmie pipe
MW-73	8	32 27 55.6	104 33 25.2	S24,T21S,R23E	4/9/09	216.00	0.00	Type 2 Portland w/3% gel	217.02	pump mix w/tremmie pipe
MW-74	8	32 27 55.1	104 33 27.6	S24,T21S,R23E	4/9/09	217.00	0.00	Type 2 Portland w/3% gel	217	pump mix w/tremmie pipe
MW-75	8	32 27 52.9	104 33 21.8	S24,T21S,R23E	4/9/09	221.50	0.00	Type 2 Portland w/3% gel	232.5	pump mix w/tremmie pipe
MW-82	8	32 27 40.1	104 33 19.7	S24,T21S,R23E	4/16/09	247.00	0.00	Type 2 Portland w/3% gel	258.69	pump mix w/tremmie pipe
MW-85	8	32 28 02.6	104 33 36.8	S24,T21S,R23E	4/9/09	240.00	0.00	Type 2 Portland w/3% gel	251.35	pump mix w/tremmie pipe
MW-86	8	32 28 00.6	104 33 51.4	S23,T21S,R23E	3/30/09	225.00	0.00	Type 2 Portland w/3% gel	235.64	pump mix w/tremmie pipe
MW-87A	8	32 27 40.7	104 32 37.8	S19,T21S,R24E	4/6/09	131.00	0.00	Type 2 Portland w/3% gel	137.2	pump mix w/tremmie pipe
MW-94	8	32 27 53.6	104 33 46.0	S24,T21S,R23E	3/31/09	232.00	0.00	Type 2 Portland w/3% gel	242.97	pump mix w/tremmie pipe
MW-114	8	32 27 32.8	104 34 08.0	S23,T21S,R23E	4/2/09	219.00	0.00	Type 2 Portland w/3% gel	229.36	pump mix w/tremmie pipe
MW-115	8	32 27 49.9	104 34 03.0	S23,T21S,R23E	3/30/09	224.00	0.00	Type 2 Portland w/3% gel	234.6	pump mix w/tremmie pipe
MW-119	8	32 28 00.9	104 33 44.0	S24,T21S,R23E	3/31/09	245.00	0.00	Type 2 Portland w/3% gel	256.59	pump mix w/tremmie pipe
VE-16	8	32 27 11.2	104 33 02.0	S25,T21S,R23E	4/16/09	149.00	0.00	Type 2 Portland w/3% gel	156.05	pump mix w/tremmie pipe
VE-17	8	32 27 13.0	104 33 05.7	S25,T21S,R23E	4/16/09	129.00	0.00	Type 2 Portland w/3% gel	135.1	pump mix w/tremmie pipe
VE-18	8	32 27 16.4	104 33 11.2	S25,T21S,R23E	4/16/09	153.00	0.00	Type 2 Portland w/3% gel	160.24	pump mix w/tremmie pipe
VE-20	8	32 27 20.7	104 33 20.1	S25,T21S,R23E	4/16/09	144.58	0.00	Type 2 Portland w/3% gel	166.52	pump mix w/tremmie pipe
IW-1	12	32 27 20.3	104 33 52.2	S26,T21S,R23E	4/14/09	260.00	0.00	Type 2 Portland w/3% gel	612.61	pump mix w/tremmie pipe
IW-2	12	32 45 04.4	104 56 46.9	S26,T21S,R23E	4/14/09	279.00	0.00	Type 2 Portland w/3% gel	657.38	pump mix w/tremmie pipe
Sump A10	24	32 27 44.2	104 34 13.7	S23,T21S,R23E	4/1/09	13.40	0.00	Type 2 Portland w/3% gel	62.84	pump mix w/tremmie pipe
Sump 16A	24	32 27 37.5	104 33 52.2	S23,T21S,R23E	4/1/09	17.40	0.00	Type 2 Portland w/3% gel	66.77	pump mix w/tremmie pipe

TABLE 1

Wells Plugged
and Abandoned

Table 1. Wells Plugged and Abandoned
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Monitoring Zone	Well ID	Well Type
Shallow Zone	MW-4	monitoring
Shallow Zone	MW-10	monitoring
Shallow Zone	MW-11	monitoring
Shallow Zone	MW-12	monitoring
Shallow Zone	MW-13	monitoring
Shallow Zone	MW-16	monitoring
Shallow Zone	MW-17	monitoring
Shallow Zone	MW-19	monitoring
Shallow Zone	MW-22	monitoring
Shallow Zone	MW-24	monitoring
Shallow Zone	MW-26	monitoring
Shallow Zone	MW-32	monitoring
Shallow Zone	MW-41	monitoring
Shallow Zone	MW-43	monitoring
Shallow Zone	MW-47	monitoring
Shallow Zone	MW-48	monitoring
Shallow Zone	MW-50	monitoring
Shallow Zone	MW-51	infiltration
Shallow Zone	MW-54	monitoring
Shallow Zone	MW-55	monitoring
Shallow Zone	MW-56	monitoring
Shallow Zone	MW-61	monitoring
Shallow Zone	MW-65	monitoring
Shallow Zone	MW-69	recovery
Shallow Zone	MW-78	monitoring
Shallow Zone	MW-79	monitoring
Shallow Zone	MW-90	monitoring
Shallow Zone	MW-91	monitoring
Shallow Zone	MW-100	monitoring
Shallow Zone	MW-105	monitoring
Shallow Zone	MW-109	monitoring
Shallow Zone	MW-117	phase II infill
Shallow Zone	Sump A10	monitoring
Shallow Zone	Sump 16A	monitoring

ARCADIS

Table 1. Wells Plugged and Abandoned
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Monitoring Zone	Well ID	Well Type
Lower Queen	MW-57	monitoring
Lower Queen	MW-59	monitoring
Lower Queen	MW-60	monitoring
Lower Queen	MW-61A	monitoring
Lower Queen	MW-62	monitoring
Lower Queen	MW-63	monitoring
Lower Queen	MW-64	monitoring
Lower Queen	MW-65A	recovery
Lower Queen	MW-67	monitoring
Lower Queen	MW-68	recovery
Lower Queen	MW-71	monitoring
Lower Queen	MW-72	dual recovery
Lower Queen	MW-73	monitoring
Lower Queen	MW-74	monitoring
Lower Queen	MW-75	dual recovery
Lower Queen	MW-76	recovery
Lower Queen	MW-82	recovery
Lower Queen	MW-83	recovery
Lower Queen	MW-84	recovery
Lower Queen	MW-85	dual recovery
Lower Queen	MW-86	recovery
Lower Queen	MW-87	monitoring
Lower Queen	MW-87A	monitoring
Lower Queen	MW-89	monitoring
Lower Queen	MW-94	recovery
Lower Queen	MW-95	monitoring
Lower Queen	MW-96	monitoring
Lower Queen	MW-97	monitoring
Lower Queen	MW-98	monitoring
Lower Queen	MW-104	monitoring
Lower Queen	MW-108	monitoring
Lower Queen	MW-110	recovery
Lower Queen	MW-112	phase I infill
Lower Queen	MW-114	phase I infill
Lower Queen	MW-115	phase I infill
Lower Queen	MW-116	phase I infill
Lower Queen	MW-117A	phase II infill
Lower Queen	MW-118	phase II infill
Lower Queen	MW-119	phase II infill
Lower Queen	MW-120	phase II infill
Lower Queen	MW-121	phase II infill
Lower Queen	MW-122	phase II infill
Lower Queen	MW-123	phase II infill
Lower Queen	MW-124	phase II infill
Lower Queen	MW-125	phase II infill
Lower Queen	MW-128	phase II infill
Lower Queen	MW-129	phase II infill
Lower Queen	MW-130	phase II infill
Lower Queen	MW-131	phase II infill
Lower Queen	IW-1	infiltration

Table 1. Wells Plugged and Abandoned
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Monitoring Zone	Well ID	Well Type
Lower Queen	IW-2	infiltration
Lower Queen	VE-1	vapor extraction
Lower Queen	VE-2	vapor extraction
Lower Queen	VE-3	vapor extraction
Lower Queen	VE-4	vapor extraction
Lower Queen	VE-5	vapor extraction
Lower Queen	VE-16	vapor extraction
Lower Queen	VE-17	vapor extraction
Lower Queen	VE-18	vapor extraction
Lower Queen	VE-19	vapor extraction
Lower Queen	VE-20	vapor extraction

TABLE 2

Wells Retained for
Groundwater Monitoring

ARCADIS

Table 2. Wells Retained for Groundwater Monitoring
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Monitoring Zone	Well ID	Well Type	Measuring Point Elevation (feet amsl)	Total Depth (feet btoc)	Top of Screen/ OpenHole Interval (feet btoc)	Screen/Open Hole Depth (feet)	Casing Diameter (inches)
Shallow Zone	MW-14	monitoring	3803.61	22.00	12.00	10.00	4
Shallow Zone	MW-45	monitoring	3808.68	24.00	9.50	14.50	2
Shallow Zone	MW-46	monitoring	3805.54	18.00	8.00	10.00	4
Shallow Zone	MW-49	monitoring	3805.61	24.00	14.00	10.00	2
Shallow Zone	MW-77	monitoring	3775.48	80.00	17.50	62.50	8
Shallow Zone	MW-106	monitoring	3721.97	92.00	12.50	79.5	4
Shallow Zone	MW-126	phase II infill	3795.58	70.00	30.00	40.00	7
Lower Queen	MW-58	recovery	3824.07	216.00	191.00	25.00	4
Lower Queen	MW-66	monitoring	3828.98	232.50	182.00	50.50	4
Lower Queen	MW-70	monitoring	3822.57	222.00	172.00	50.00	4
Lower Queen	MW-81	dual recovery	3817.03	225.00	71.00	154.00	8
Lower Queen	MW-88	monitoring	3789.7	175.00	142.50	32.50	8
Lower Queen	MW-111	monitoring	3824.44	230.00	190.00	40.00	4
Lower Queen	MW-113	phase I infill	3772.67	200.00	125.00	75.00	6
Lower Queen	MW-127	phase II infill	3825.17	245.00	195.00	50.00	4

Notes:
feet amsl Feet above mean sea level
feet btoc Feet below top of casing

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

January 21, 2005

CERTIFIED MAIL
RETURN RECEIPT NO. 7923 4429

Mr. Vijay K. Kurki, P.E.
Marathon Oil Company
P.O. Box 3487
Houston, Texas 77253-3487

Re: Discharge Permit GW-021 Renewal
Indian Basin Gas Plant

Dear Mr. Kurki:

The groundwater discharge permit renewal for the Marathon Oil Company Indian Basin Gas Permit GW-021 operated by Marathon Oil Company located in the NE/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within 30 working days of receipt of this letter.**

The original discharge permit application was submitted on November 10, 1981 and approved on November 26, 1984 with an expiration date of November 26, 1989. The discharge permit renewal application dated September 17, 2004 and supplemental information submitted pursuant to Section 3106 of the New Mexico Water Quality Control Commission (WQCC) Regulations also includes all earlier applications and all conditions later placed on those approvals.

The discharge permit is renewed pursuant to Section 3109.C. Please note Section 3109.G., which provides for possible future amendment of the permit. Please be advised that approval of this permit does not relieve Marathon Oil Company of liability should operations result in pollution of surface or ground waters, or the environment. Please be advised that all exposed pits, including lined pits and open top tanks (exceeding 16 feet in diameter) shall be screened, netted, or otherwise rendered non-hazardous to wildlife including migratory birds.

Please note that Section 3104. of the regulations requires that "when a permit has been approved, discharges must be consistent with the terms and conditions of the permit." Pursuant to Section

3107.C., Marathon Oil Company is required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3109.H.4., this approval is for a period of five years. **This approval will expire November 26, 2009** and an application for renewal should be submitted in ample time before that date. Pursuant to Section 3106.F. of the regulations, if a discharger submits a discharge permit renewal application at least 120 days before the discharge permit expires and is in compliance with the approved permit, then the existing discharge permit will not expire until the application for renewal has been approved or disapproved.

The discharge permit application for the Marathon Oil Company, Indian Basin Gas Plant is subject to the WQCC Regulation 3114. Every billable facility submitting a discharge permit will be assessed a fee equal to the filing fee of $100 plus a renewal flat fee of $4000.00 for a Gas Plant.

Please make all checks payable to: Water Quality Management Fund
C/o: Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505.

If you have any questions, please contact Wayne Price of my staff at (505-476-3487) or E-mail WPRICE@state.nm.us. On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge permit review.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief
RCA/lwp
Attachment-1
Xc: OCD Hobbs Office

ATTACHMENT TO THE DISCHARGE PERMIT GW-021 APPROVAL
Marathon Oil Company, Indian Basin Gas Plant
DISCHARGE PERMIT APPROVAL CONDITIONS
January 21, 2005

1. Payment of Discharge Permit Fees: The $100.00 filing fee has been received by the OCD. There is a required flat fee of $4000.00 for Gas Processing Plants.

2. Commitments: Marathon Oil Company will abide by all commitments submitted in the discharge permit renewal application dated September 17, 2004 and supplemental information submitted December 02, 2004 including attachments, and these conditions for approval.

3. Drum Storage: All drums containing materials other than fresh water must be stored on an impermeable pad with curbing. All empty drums should be stored on their sides with the bungs in place and lined up on a horizontal plane. Chemicals in other containers such as sacks or buckets must also be stored on an impermeable pad with curbing.

4. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device incorporated into the design.

5. Above Ground Tanks: All above ground tanks which contain fluids other than fresh water must be bermed to contain a volume of one-third more than the total volume of the largest tank or of all interconnected tanks. All new facilities or modifications to existing facilities must place the tank on an impermeable type pad within the berm.

6. Above Ground Saddle Tanks: Above ground saddle tanks must have impermeable pad and curb type containment unless they contain fresh water or fluids that are gases at atmospheric temperature and pressure.

7. Labeling: All tanks, drums, and other containers should be clearly labeled to identify their contents and other emergency information necessary if the tank were to rupture, spill, or ignite.

8. Below Grade Tanks/Sumps: All below grade tanks, sumps, and pits must be approved by the OCD prior to installation or upon modification and must incorporate secondary containment and leak-detection into the design. All below grade tanks, sumps and pits must be tested annually, except systems that have secondary containment with leak detection. These systems with leak detection

shall have a monthly inspection of the leak detection to determine if the primary containment is leaking. Results of tests and inspections shall be maintained at the facility covered by this discharge permit and available for NMOCD inspection. Any system found to be leaking shall be reported pursuant to Item # 12. Permit holders may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure and/or visual inspection of cleaned out tanks and/or sumps, or other OCD approved methods. The OCD will be notified at least 72 hours prior to all testing.

9. Underground Process/Wastewater Lines: All underground process/wastewater pipelines. must be approved by the OCD prior to installation and must be tested to demonstrate their mechanical integrity every five (5) years. Results of such tests shall be maintained at the facility covered by this discharge permit and available for NMOCD inspection. Permit holders may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. The OCD will be notified at least 72 hours prior to all testing. The wastewater disposal lines from the plant to the disposal wells shall be included in the Underground Process/Wastewater Lines testing program.

10. Class V Wells: No Class V wells that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes will be approved for construction and/or operation unless it can be demonstrated that groundwater will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD regulated facilities which inject non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only must be permitted by the New Mexico Environment Department.

11. Housekeeping: All systems designed for spill collection/prevention, and leak detection will be inspected daily to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices will be emptied of fluids within 48 hours of discovery. A record of inspections will be retained on site for a period of five years.

12. Spill Reporting: All spills/releases shall be reported pursuant to OCD Rule 116. and WQCC 1203. to the OCD Artesia District Office.

13. Waste Disposal: All wastes will be disposed of at an OCD approved facility. Only oilfield exempt wastes shall be disposed of down Class II injection wells. Non-exempt oilfield wastes that are non-hazardous may be disposed of at an OCD approved facility upon proper waste determination per 40 CFR Part 261. Any waste stream that is not listed in the discharge permit will be approved by OCD on a case-by-case basis.

Rule 712 Waste: Pursuant to Rule 712 disposal of certain non-domestic waste is allowed at solid waste facilities permitted by the New Mexico Environment Department as long as the waste stream is identified in the discharge permit, and existing process knowledge of the waste stream does not change without notification to the Oil Conservation Division.

14. Gas Plant Class II Disposal Well: Shall be operated and maintained pursuant to OCD division orders, rules and regulations.

15. OCD Inspections: Additional requirements may be placed on the facility based upon results from OCD inspections.

16. Storm Water Permit: Stormwater runoff controls shall be maintained. As a result of operations, if any water contaminant that exceeds the WQCC standards listed in 20 NMAC 6.2.3101 is discharged in any stormwater run-off, then immediate actions shall be taken to mitigate the effects of the run-off, notify the OCD within 24 hours, and modify the discharge permit to include a formal stormwater run-off containment permit and submit for OCD approval within 15 days.

17. Landfarm/Landfill Operations: Marathon shall submit a closure permit for the on-site Landfarm and old covered non-active landfill at time of the next discharge permit renewal.

18. Vadose Zone and Water Pollution: The previously submitted investigation and remediation permits were submitted pursuant to the discharge permit and all future discoveries of contamination will be addressed through the discharge permit process. Marathon shall abide by all of the commitments as described in the Amended December 02, 2004 Discharge permit application. In addition, Marathon shall provide the following:

    a. Continue to submit the comprehensive annual groundwater report with detail findings, conclusions and recommendations.

    b. Notify the OCD Santa Fe and local district office at least 2 weeks in advance of all scheduled activities such that the OCD has the opportunity to witness the events and split samples.

    c. Submit an investigation and remediation permit for OCD approval within 15 days of the discovery of the exceedance of a WQCC standard in any down gradient monitor well or fresh water well where contaminant concentrations did not exceed WQCC standards during the preceding monitoring event.

19. Transfer of Discharge Permit: The OCD will be notified prior to any transfer of ownership, control, or possession of a facility with an approved discharge permit. A written commitment to comply with the terms and conditions of the previously approved discharge permit must be submitted by the purchaser and approved by the OCD prior to transfer.

20. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure permit will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

21. Certification: **Marathon Oil Company** by the officer whose signature appears below, accepts this permit and agrees to comply with all terms and conditions contained herein. **Marathon Oil Company** further acknowledges that these conditions and requirements of this permit may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Conditions accepted by: **Marathon Oil Company**

KEN TATARZYN

Company Representative- print name

Date 2-23-05

Company Representative- Sign

Title Manager, Permian Asset Team

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

January 21, 2005

CERTIFIED MAIL
RETURN RECEIPT NO. 7923 4429

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Marathon Oil Company
P.O. Box 3487
Houston, Texas 77253-3487

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Indian Basin Gas Plant

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Environmental Bureau Chief
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Xc: OCD Hobbs Office

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    b. Notify the OCD Santa Fe and local district office at least 2 weeks in advance of all scheduled activities such that the OCD has the opportunity to witness the events and split samples.

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21. Certification: **Marathon Oil Company** by the officer whose signature appears below, accepts this permit and agrees to comply with all terms and conditions contained herein. **Marathon Oil Company** further acknowledges that these conditions and requirements of this permit may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Conditions accepted by: **Marathon Oil Company**

_____
Company Representative- print name

_____Date_____
Company Representative- Sign

Title_____

Table 1. Groundwater Monitoring Plan (revised October 2004)
Marathon Oil Company, Indian Basin Remediation Project, Eddy County, New Mexico.

Shallow Zone

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

Lower Queen

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

Notes:
OCD approved annual sampling plan with a semi-annual groundwater gauging in 2004.
Sampling will be performed in the month of April annually.
SVOC and WQCC metals analysis will fall on even years (i.e., 2002, 2004, etc.)

SVOCs	Semi-Volatile Organic Compounds via Method 8310
WQCC metals	New Mexico Water Quality Control Commission metals (dissolved only for arsenic, lead, selenium, aluminum, barium, boron, cadmium, chromium, cobalt, copper, iron, manganese, moybdenum, nickel, silver, and zinc)
TDS	Total Dissolved Solids
e/o year	Every other year

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

July 20, 2000

Lori Wrotenbery
Director
Oil Conservation Division

CERTIFIED MAIL
RETURN RECEIPT NO. 5051 5253

RECEIVED
SEP 14 2000
Environmental Bureau
Oil Conservation Division

MCR
2 5 2000
Environmental & Safety

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

Re: Discharge Plan GW-021 Renewal
Indian Basin Gas Plant

Dear Mr. Peacock:

The groundwater discharge plan renewal for the Marathon Oil Company Indian Basin Gas Plant GW-021 operated by Marathon Oil Company located in the NE/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within ten working days of receipt of this letter.**

The original discharge plan application was submitted on November 10, 1981 and approved on November 26, 1984 with an expiration date of November 26, 1989. The discharge plan renewal application dated July 21, 1999 including attachments, and supplemental information submitted on February 25, 2000, March 13, 2000 and July 18, 2000 submitted pursuant to Section 3106 of the New Mexico Water Quality Control Commission (WQCC) Regulations also includes all earlier applications and all conditions later placed on those approvals.

The discharge plan is renewed pursuant to Section 3109.C. Please note Section 3109.G., which provides for possible future amendment of the plan. Please be advised that approval of this plan does not relieve Marathon Oil Company of liability should operations result in pollution of surface or ground waters, or the environment. Please be advised that all exposed pits, including lined pits and open top tanks (exceeding 16 feet in diameter) shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3104. of the regulations requires that "when a plan has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3107.C., Marathon Oil Company is required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

Pursuant to Section 3109.H.4., this approval is for a period of five years. **This approval will expire November 26, 2004** and an application for renewal should be submitted in ample time before that date. Pursuant to Section 3106.F. of the regulations, if a discharger submits a discharge plan renewal application at least 120 days before the discharge plan expires and is in compliance with the approved plan, then the existing discharge plan will not expire until the application for renewal has been approved or disapproved. It should be noted that all discharge plan facilities will be required to submit plans for, or the results of, an underground drainage testing program as a requirement for discharge plan renewal.

The discharge plan application for the Marathon Oil Company, Indian Basin Gas Plant is subject to the WQCC Regulation 3114. Every billable facility submitting a discharge plan will be assessed a fee equal to the filing fee of $50 plus a renewal flat fee of $1667.50 for a Gas Plant. The OCD has received the $50 filing and $1667.50 flat fee.

If you have any questions, please contact Wayne Price of my staff at (505-827-7155). On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

RCA/lwp
Attachment-2
xc: OCD Artesia Office

ATTACHMENT TO THE DISCHARGE PLAN GW-021 APPROVAL
Marathon Oil Company, Indian Basin Gas Plant
DISCHARGE PLAN APPROVAL CONDITIONS
July 20, 2000

1. Payment of Discharge Plan Fees: The $50.00 filing fee and the $1667.50 flat fee has been received by OCD.

2. Commitments: Marathon Oil Company will abide by all commitments submitted in the discharge plan renewal application dated July 21, 1999 including attachments, and supplemental information submitted on February 25, 2000, March 13, 2000, July 18, 2000 and these conditions for approval.

3. Drum Storage: All drums containing materials other than fresh water must be stored on an impermeable pad with curbing. All empty drums should be stored on their sides with the bungs in place and lined up on a horizontal plane. Chemicals in other containers such as sacks or buckets must also be stored on an impermeable pad with curbing.

4. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device incorporated into the design.

5. Above Ground Tanks: All above ground tanks which contain fluids other than fresh water must be bermed to contain a volume of one-third more than the total volume of the largest tank or of all interconnected tanks. All new facilities or modifications to existing facilities must place the tank on an impermeable type pad within the berm.

6. Above Ground Saddle Tanks: Above ground saddle tanks must have impermeable pad and curb type containment unless they contain fresh water or fluids that are gases at atmospheric temperature and pressure.

7. Labeling: All tanks, drums, and other containers should be clearly labeled to identify their contents and other emergency information necessary if the tank were to rupture, spill, or ignite.

8. Below Grade Tanks/Sumps: All below grade tanks, sumps, and pits must be approved by the OCD prior to installation or upon modification and must incorporate secondary containment and leak-detection into the design. All pre-existing sumps and below-grade tanks must be tested to demonstrate their mechanical integrity no later than November 26, 1999 and every year from tested date, thereafter. Permittees may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure and/or visual inspection of cleaned out tanks and/or sumps, or other OCD approved methods. The OCD will be notified at least 72 hours prior to all testing. The test results will be submitted to OCD with the annual groundwater report.

From: "Price, Wayne" <WPrice@state.nm.us>
To: 'Troy R Johnson' <TRJohnson@MarathonOil.com>
Date: 8/10/00 2:04pm
Subject: RE: Indian Basin Gas Plant Discharge Plan

Please note all sumps with secondary containment and leak detection will not require annual testing. Please consider this as an approved amendment to the discharge plan conditions #8. Please attach to the original and sign the discharge plan approval conditions and return to this office within 10 days.

> ---------
> From: Troy R Johnson[SMTP:TRJohnson@MarathonOil.com]
> Sent: Friday, August 04, 2000 8:21 AM
> To: Price, Wayne
> Cc: MPPeacock@MarathonOil.com; TRJohnson@MarathonOil.com
> Subject: Indian Basin Gas Plant Discharge Plan
>
>
>
>
> Wayne,
>
> I am writing in response to our conversation yesterday regarding the
> "standard" approval conditions for the Indian Basin Gas Plant Discharge
> Plan (GW-021). As we discussed, condition #8 was not clear that below
> grade sumps with secondary containment and/or leak detection were not
> required to annually test for mechanical integrity of the system. Of
> course, the sumps still must be tested every 5 years to insure integrity
> for the plan renewal.
>
> We really appreciate the indefinite extension you verbally gave us so we
> can resolve this issue and thanks again for taking the time to review the
> language in the approval conditions.
>
> Sincerely,
>
> Troy Johnson
> Marathon Oil Company
> (915) 687-8302
>

9. Underground Process/Wastewater Lines: All underground process/wastewater pipelines must be tested to demonstrate their mechanical integrity no later than November 26, 1999 and every 5 years, from tested date, thereafter. Permittees may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. The OCD will be notified at least 72 hours prior to all testing. The test results will be submitted to OCD with the annual groundwater report.

10. Class V Wells: No Class V wells that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes will be approved for construction and/or operation unless it can be demonstrated that groundwater will not be impacted in the reasonably foreseeable future. Leach fields and other wastewater disposal systems at OCD regulated facilities which inject non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. Class V wells that inject domestic waste only must be permitted by the New Mexico Environment Department.

11. Housekeeping: All systems designed for spill collection/prevention, and leak detection will be inspected daily to ensure proper operation and to prevent over topping or system failure. All spill collection and/or secondary containment devices will be emptied of fluids within 48 hours of discovery.

12. Spill Reporting: All spills/releases shall be reported pursuant to OCD Rule 116. and WQCC 1203. to the OCD Artesia District Office.

13. Waste Disposal: All wastes will be disposed of at an OCD approved facility. Only oilfield exempt wastes shall be disposed of down Class II injection wells. Non-exempt oilfield wastes that are non-hazardous may be disposed of at an OCD approved facility upon proper waste determination per 40 CFR Part 261. Any waste stream that is not listed in the discharge plan will be approved by OCD on a case-by-case basis.

14. Gas Plant Class II Disposal Wells: Shall be operated and maintained pursuant to OCD division orders SWD-55 and SWD-416 as amended April 12, 2000.

15. OCD Inspections: Additional requirements may be placed on the facility based upon results from OCD inspections. As a result of NMOCD's recent inspection of the facility conducted on March 08, 2000 (copy enclosed) the following additional condition(s) will be required:

    A. The wastewater disposal lines from the plant to the disposal wells shall be included in the Underground Process/Wastewater Lines testing program condition number 9. of these conditions.

16. Storm Water Plan: Marathon Oil Company shall abide by the storm water run-off plan dated March 12, 1998, revised on June 01, 1998 submitted as part of the discharge plan application dated February 25, 2000.

17. Landfarm/Landfill Operations: The on-site landfarm shall be maintained and operated as proposed in the discharge plan application and only receive hydrocarbon contaminated soils generated from plant operations that are non-hazardous as defined by EPA CFR 40 part 261. Remediated soils from the landfarm may be used for soil replacement of plant clean-up areas, storm water control dikes, secondary containment berms in the gas plant if ; the Total Petroleum Hydrocarbon (TPH) levels are 1000 ppm or less, total BTEX levels are 50 ppm or less and benzene levels are 1 ppm or less. Records shall be maintained for all soils placed into and removed from the landfarm. The off-site use of any remediated soils from the landfarm area shall be approved by the OCD on a case-by-case basis.

    Marathon shall address the closure of the old covered non-active landfill at time of discharge plan closure.

18. Vadose Zone and Water Pollution: The previously submitted investigation and remediation plans were submitted pursuant to the discharge plan and all future discoveries of contamination will be addressed through the discharge plan process.

    A. Treatment System Monitoring: Marathon will sample and analyze the treatment system effluent on a monthly basis for benzene, toluene, ethylbenzene and xylenes (BTEX) and on a quarterly basis for major cations/anions and polynuclear aromatic hydrocarbons using EPA approved methods. The results of these sampling events will be included in the annual ground water remediation monitoring reports for the facility.

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19. Transfer of Discharge Plan: The OCD will be notified prior to any transfer of ownership, control, or possession of a facility with an approved discharge plan. A written commitment to comply with the terms and conditions of the previously approved discharge plan must be submitted by the purchaser and approved by the OCD prior to transfer.

20. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure plan will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

21. Certification: **Marathon Oil Company** by the officer whose signature appears below, accepts this permit and agrees to comply with all terms and conditions contained herein. **Marathon Oil Company** further acknowledges that these conditions and requirements of this permit may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Conditions accepted by: **Marathon Oil Company**

Steven B. Hinchman
Company Representative- print name

Steven B. Hinchman Date 9-5-00
Company Representative- Sign

Title Region Production Manager

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

July 20, 2000

Lori Wrotenbery
Director
Oil Conservation Division

CERTIFIED MAIL
RETURN RECEIPT NO. 5051 5253

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

Re: Discharge Plan GW-021 Renewal
Indian Basin Gas Plant

Dear Mr. Peacock:

The groundwater discharge plan renewal for the Marathon Oil Company Indian Basin Gas Plant GW-021 operated by Marathon Oil Company located in the NE/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico, **is hereby approved** under the conditions contained in the enclosed attachment. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within ten working days of receipt of this letter.**

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If you have any questions, please contact Wayne Price of my staff at (505-827-7155). On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge plan review.

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Environmental Bureau Chief

RCA/lwp
Attachment-2
xc: OCD Artesia Office

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Marathon Oil Company, Indian Basin Gas Plant
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21. Certification: **Marathon Oil Company** by the officer whose signature appears below, accepts this permit and agrees to comply with all terms and conditions contained herein. **Marathon Oil Company** further acknowledges that these conditions and requirements of this permit may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Conditions accepted by: **Marathon Oil Company**

_____
Company Representative- print name

_____Date_____
Company Representative- Sign

Title_____

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

EEE 0000564

OFFICIAL RECEIPT

Date: 10-1-04

Received From: Marathon Oil

* E E E 0 0 0 0 5 6 4 *

_____ Dollars

Center Code	Revenue Code	Amount	Work Order No.
1240		100	

Center Code	Revenue Code	Amount	Work Order No.

State Treasurer Deposit Number _____

Total $ 100-

Description: _____

Signed: _____

ASD-White Copy / Customer-Yellow Copy / Retained in Book-Pink Copy

EEE 0000565

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OFFICIAL RECEIPT

Date: 10-1-04

Received From: Plains Pipeline

EEE0000565

_____ Dollars

Center Code	Revenue Code	Amount	Work Order No.
0740		1,250.00	

Center Code	Revenue Code	Amount	Work Order No.

State Treasurer Deposit Number _____

Total $ 1,250.00

Description: _____

Signed: _____

ASD-White Copy / Customer-Yellow Copy / Retained in Book-Pink Copy

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 9/17/04,

or cash received on _____ in the amount of $ 100.00

from Marathon Oil

for Indian Basin GP (Facility Name) GW-021 (DP No.)

Submitted by: _____ Date: 10-1-04

Submitted to ASD by: _____ Date: _____

Received in ASD by: _____ Date: _____

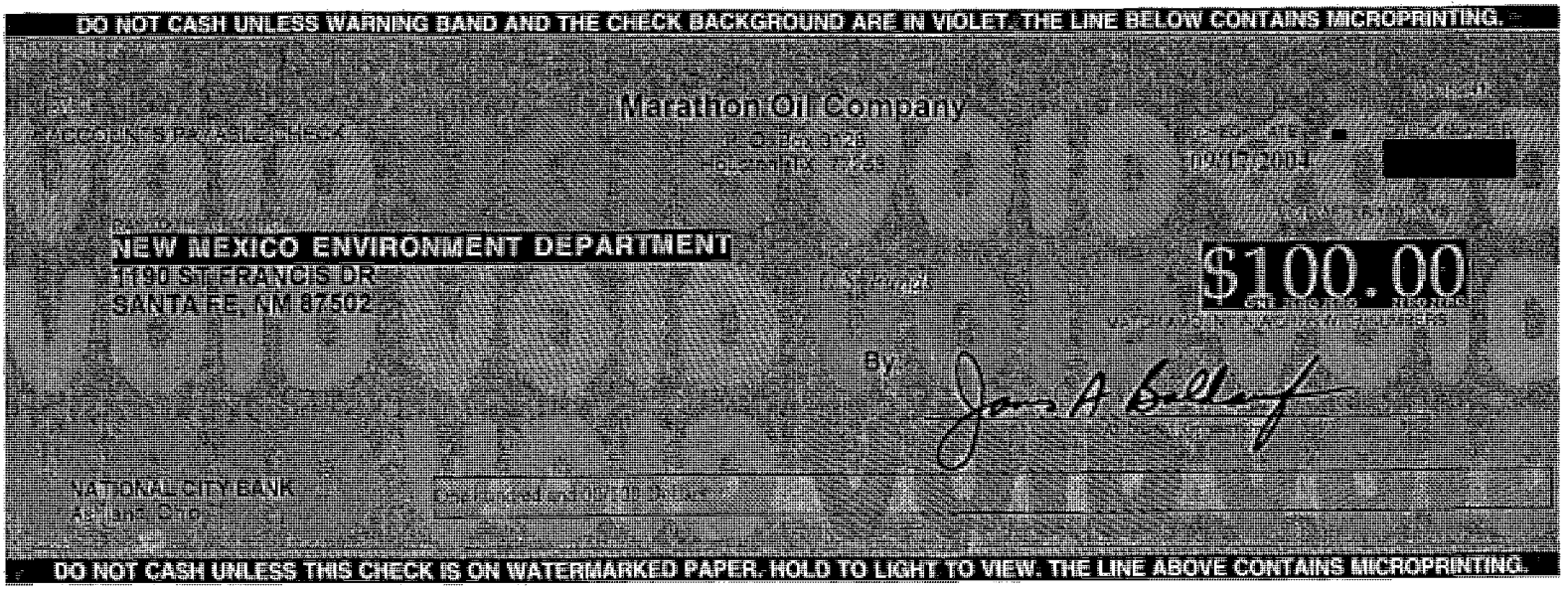
Filing Fee ✓ New Facility ___ Renewal ✓

Modification ___ Other _____ (specify)

Organization Code 521.07 Applicable FY 2001

To be deposited in the Water Quality Management Fund.

Full Payment ✓ or Annual Increment ___



[redacted]

Marathon Oil Company

P.O. Box 3487
Houston, TX 77253-3487
Telephone 713/629-6600

September 17, 2004

Mr. Wayne Price
Environmental Bureau
New Mexico Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

RE: Groundwater Discharge Plan GW-21 Renewal
Indian Basin Gas Plant

Dear Mr. Price,

Marathon Oil Company operates the Indian Basin Gas Plant located in Eddy County, New Mexico. The plant is currently operating under the Groundwater Discharge Plan GW-21 approved in 1989. This approved plan expires on November 26, 2004.

Please find attached discharge plan renewal application along with a check for application fee of $100.00. This plan was renewed in July 2000. There have been no significant changes at the plant since last renewal. However, an updated plant plot and equipment list attachments of the plan will be submitted to the OCD by September 30, 2004.

If you have any questions regarding this application, please contact me at (713) 296-2213.

Sincerely,

Vijay Kurki

Vijay K. Kurki, P.E.
Senior HES Professional

xc: NMOCD District I, Hobbs, NM
Mr. Tom Breninger, Plant Superintendent, IBGP

File: NM-IBGP-E405-038

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Revised June 10, 2003

Submit Original
Plus 1 Copy
to Santa Fe
1 Copy to Appropriate
District Office

DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES,GAS PLANTS, REFINERIES, COMPRESSOR, GEOTHERMAL FACILITES AND CRUDE OIL PUMP STATIONS

(Refer to the OCD Guidelines for assistance in completing the application)

☐ New ☒ Renewal ☐ Modification GW-021

1. Type: Gas Plant (Indian Basin Gas Plant)
2. Operator: Marathon Oil Company

   Address: 329 Marathon Road, Lakewood, NM 88254

   Contact Person: Tom Breninger 505-457-2621 Phone: 713-296-2213 (V. KURKI) Ext 104
3. Location: -- /4 NE /4 Section 23 Township 21 S Range 23 E

   Submit large scale topographic map showing exact location.
4. Attach the name, telephone number and address of the landowner of the facility site.
5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility.
6. Attach a description of all materials stored or used at the facility.
7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.
8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
10. Attach a routine inspection and maintenance plan to ensure permit compliance.
11. Attach a contingency plan for reporting and clean-up of spills or releases.
12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.
13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.

14. CERTIFICATIONI hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Vijay K. Kurki Title: Senior HES Professional

Signature: Vi Jay Kurki Date: 9/17/04

E-mail Address: VKKURKI@MARATHONOIL.COM

Check No	Check Date	Bank	Bank No	Vendor No
[redacted]	09/17/2004	NCBAS	7780	5001115

Marathon Oil Company
P. O. Box 3128
Houston, TX 77253

Direct Inquiries to:
ACCOUNTS PAYABLE DEPARTMENT
Accts Payable Contact Center
Phone: 918-925-6097

Hndlg
HS

Invoice Number	Invoice Date	Document No	Remit Comment	Gross Amount	Discount	Invoice/Pay Amount
NE100.00	09/15/2004	1900026271		100.00		100.00
			TOTAL:	100.00		100.00

Indian Basin Gas Plant
Discharge Plan Renewal Application Fee
Permit No: GW-021

(FOLD ON PERFORATION BELOW AND DETACH CHECK STUB BEFORE DEPOSITING)

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 2/23/2000,

or cash received on _____ in the amount of $ 1,667.50

from MARATHON OIL COMPANY

for INDIAN BASIN GAS PLANT GW-21

Submitted by: (Family Name) WAYNE PRICE (DP No.) Date: 2/28/00

Submitted to ASD by: [signature] Date: "

Received in ASD by: _____ Date: _____

Filing Fee ___ New Facility ___ Renewal ✓

Modification ___ Other _____ (specify)

Organization Code 521.07 Applicable FY 2000

To be deposited in the Water Quality Management Fund.

Full Payment ✓ or Annual Increment ___

THIS CHECK IS VOID IF BROWN COLORED BACKGROUND IS ABSENT

FORM 2501 REV. 5-95

60-162/433

ACCOUNTS PAYABLE CHECK

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

CHECK DATE 02/23/2000 CHECK NUMBER [redacted]

PAY TO THE ORDER OF:

NEW MEXICO OIL CONSERVATION
DIVISION
2040 PACHECO STREET
SANTA FE NM 87501

MATCH AMOUNT IN WORDS WITH NUMBERS

U.S. Funds ******$1,667.50

VOID AFTER 180 DAYS

One Thousand Six Hundred Sixty-Seven and 50/100 U.S. Dollars

Marathon Oil Company

PNC BANK,
NATIONAL ASSOCIATION,
JEANETTE, PA

GW-21

By: [signature]
Authorized Representative

THE BACK OF THIS DOCUMENT CONTAINS AN ARTIFICIAL WATERMARK. HOLD AT AN ANGLE TO VIEW.

[redacted]

Check No	Check Date	Bank No	Vendor No
[redacted]	02/23/00	3723	N03075

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

Direct Inquiries to:
ACCOUNTS PAYABLE DEPARTMENT
Midland, Texas
PHONE: 915-682-1626

Loc	Mo	Vou	Sub	P.O. Number	Invoice Number	Invoice Date	Remit Comment	Discount	Invoice/Pay Amt
0574	02	P04	15103026		E&S003	02/22/00	IB GW DISCHARGE PLAN RENEWAL	0.00	1,667.50
0000	00						Total remittance: U.S. Dollars		1,667.50

(FOLD ON PERFORATION BELOW AND DETACH CHECK STUB BEFORE DEPOSITING)

Mid-Continent Region
Production United States

Marathon Oil Company

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

July 23, 1999

JUL 26

Mr. Roger Anderson
Environment Bureau
Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

Certified Return Request Z 445-057-131

RE: Groundwater Discharge Plan GW-21
Indian Basin Gas Plant
Marathon Oil Company

Dear Mr. Anderson:

I have enclosed a check in the amount of $50.00 and the renewal application for the Groundwater Discharge Plan GW-21 at the Indian Basin Gas Plant. The renewal application is being submitted 120 days prior to the November 26, 1999 expiration date of the existing plan. The existing plan will be updated and submitted to your office on or by November 26, 1999.

If you have any questions or comments, then please call me at (915) 687-8312.

Sincerely,

M. Paul Peacock
Advanced Environmental & Safety Engineer

Attachments
MPP\OCD IBGP Disch Plan Renewal.doc

ec: T. A. Deines w/attachments
T. R. Johnson w/attachments
F. D. Searle w/attachments
C. M. Schweser w/attachments

File: 524-03

District I - (505) 393-6161
P. O. Box 1980
Hobbs, NM 88241-1980
District II - (505) 748-1283
811 S. First
Artesia, NM 88210
District III - (505) 334-6178
1000 Rio Brazos Road
Aztec, NM 87410
District IV - (505) 827-7131

New Mexico
Energy Minerals and Natural Resources Department
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

Revised 12/1/95

Submit Original
Plus 1 Copies
to Santa Fe
1 Copy to appropriate
District Office

DISCHARGE PLAN APPLICATION FOR SERVICE COMPANIES, GAS PLANTS, REFINERIES, COMPRESSOR, AND CRUDE OIL PUMP STATIONS

(Refer to the OCD Guidelines for assistance in completing the application)

☐ New ☒ Renewal ☐ Modification

1. Type: Natural Gas Plant
2. Operator: Marathon Oil Company - Ground water Discharge Plan GW-21
   Address: 329 Marathon Rd. , Lakewood, N.M. 88254
   Contact Person: Mike Schweser Phone: 505 457-2621 ext 104
3. Location: _____/4 NE /4 Section 23 Township 21 South Range 23 East
   Submit large scale topographic map showing exact location.
4. Attach the name, telephone number and address of the landowner of the facility site.
5. Attach the description of the facility with a diagram indicating location of fences, pits, dikes and tanks on the facility.
6. Attach a description of all materials stored or used at the facility.
7. Attach a description of present sources of effluent and waste solids. Average quality and daily volume of waste water must be included.
8. Attach a description of current liquid and solid waste collection/treatment/disposal procedures.
9. Attach a description of proposed modifications to existing collection/treatment/disposal systems.
10. Attach a routine inspection and maintenance plan to ensure permit compliance.
11. Attach a contingency plan for reporting and clean-up of spills or releases.
12. Attach geological/hydrological information for the facility. Depth to and quality of ground water must be included.
13. Attach a facility closure plan, and other information as is necessary to demonstrate compliance with any other OCD rules, regulations and/or orders.
14. CERTIFICATION

I herby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Timothy A. Deines Title: Operations Superintendent

Signature: Timothy A. Deines Date: 7/21/99

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 7/23/99,

or cash received on _____ in the amount of $ 50.00

from MARATHON OIL COMPANY

for INDIAN BASIN GAS PLANT GW-21
(Facility Name)

Submitted by: WAYNE PRICE Date: 8/3/99
(DP No.)

Submitted to ASD by: _____ Date: _____

Received in ASD by: _____ Date: _____

Filing Fee ✓ New Facility ___ Renewal ___

Modification ___ Other _____
(specify)

Organization Code 521.07 Applicable FY ~~99~~ 2000

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

THIS CHECK IS VOID IF BROWN COLORED BACKGROUND IS ABSENT

FORM 2501 REV. 5-95

ACCOUNTS PAYABLE CHECK

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

60-162/433

CHECK DATE 07/23/99

CHECK NUMBER [redacted]

PAY TO THE ORDER OF:

NEW MEXICO OIL CONSERVATION
DIVISION
2040 PACHECO STREET
SANTA FE NM 87501

MATCH AMOUNT IN WORDS WITH NUMBERS

U.S. Funds ********$50.00

VOID AFTER 180 DAYS

Fifty and 00/100 U.S. Dollars

Marathon Oil Company

PNC BANK,
NATIONAL ASSOCIATION,
JEANETTE, PA

GW-21

By: D. C. Pasquini
Authorized Representative

THE BACK OF THIS DOCUMENT CONTAINS AN ARTIFICIAL WATERMARK - HOLD AT AN ANGLE TO VIEW

[redacted]

Check No	Check Date	Bank No	Vendor No
	07/23/99	3723	N03075

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

Direct Inquiries to:
ACCOUNTS PAYABLE DEPARTMENT
Midland, Texas
PHONE: 915-682-1626

Loc	Mo	Vou	Sub	P.O. Number	Invoice Number	Invoice Date	Remit Comment	Discount	Invoice/Pay Amt
0574	07	P04	15103032		315085	07/23/99	IB GROUNDWATER DISCHARGE PLAN	0.00	50.00
0000	00						Total remittance: U.S. Dollars		50.00

GW-21

(FOLD ON PERFORATION BELOW AND DETACH CHECK STUB BEFORE DEPOSITING)

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

May 14, 1998

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-067

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

Re: Discharge Plan GW-21 Minor Modification
Indian Basin Gas Plant/Remediation Project
Infiltration of Exempt Reverse Osmosis Reject Water into the Lower Queen Aquifer
Eddy County, New Mexico

Dear Mr. Peacock:

The modified groundwater discharge plan GW-21 for the Marathon Oil Company (Marathon) Indian Basin Gas Plant located in the NE/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico **is hereby approved** under the conditions contained in the enclosed attachment. The application consists of the discharge plan modification dated August 27, 1997, and additional information dated April 1, 1998. Enclosed are two copies of the conditions of approval. **Please sign and return one copy to the New Mexico Oil Conservation Division (OCD) Santa Fe Office within 10 working days of receipt of this letter.**

The discharge plan modification application was submitted pursuant to Section 3106 of the New Mexico Water Quality Control Commission (WQCC) Regulations. It is approved pursuant to Section 3109.A. Please note Sections 3109.E and 3109.F., which provide for possible future amendments or modifications of the plan. Please be advised that approval of this plan does not relieve Marathon of liability should operations result in pollution of surface water, ground water, or the environment.

Please be advised that all exposed pits, including lined pits and open tanks (tanks exceeding 16 feet in diameter), shall be screened, netted, or otherwise rendered nonhazardous to wildlife including migratory birds.

Please note that Section 3104 of the regulations provides: "When a facility has been approved, discharges must be consistent with the terms and conditions of the plan." Pursuant to Section 3107.C., Marathon is required to notify the Director of any facility expansion, production increase, or process modification that would result in any change in the discharge of water quality or volume.

The discharge plan modification application for the Marathon Oil Company Indian Basin Gas Plant is subject to WQCC Regulation 3114. Every billable facility submitting a modification will be assessed a fee equal to the filing fee of $50. The OCD received the filing fee.

On behalf of the staff of the OCD, I wish to thank you and your staff for your cooperation during this discharge plan review.

Sincerely,

Lori Wrotenbery

Lori Wrotenbery
Director

LW/mwa
Attachment

xc: OCD Artesia Office

ATTACHMENT TO THE DISCHARGE PLAN MODIFICATION GW-21 APPROVAL
MARATHON OIL COMPANY
INDIAN BASIN GAS PLANT
DISCHARGE PLAN MODIFICATION APPROVAL CONDITIONS
(May 14, 1998)

1. Marathon Commitments: Marathon will abide by all commitments submitted in the discharge plan modification dated August 27, 1997, and the additional information dated April 1, 1998.

2. Waste Disposal: All wastes shall be disposed of at an OCD approved facility. Only oilfield exempt wastes shall be disposed of down Class II injection wells. Non-exempt oilfield wastes that are non-hazardous may be disposed of at an OCD approved facility upon proper waste characterization per 40 CFR Part 261.

3. Drum Storage: All drums containing materials other than fresh water must be stored on an impermeable pad with curbing. All empty drums will be stored on their sides with the bungs in and lined up on a horizontal plane. Chemicals in other containers such as sacks or buckets will also be stored on an impermeable pad and curb type containment.

4. Process Areas: All process and maintenance areas which show evidence that leaks and spills are reaching the ground surface must be either paved and curbed or have some type of spill collection device incorporated into the design.

5. Above Ground Tanks: All above ground tanks which contain fluids other than fresh water must be bermed to contain a volume of one-third more than the total volume of the largest tank or of all interconnected tanks. All new tanks or existing tanks that undergo a major modification, as determined by the Division, must be placed within an impermeable bermed enclosure.

6. Above Ground Saddle Tanks: Above ground saddle tanks must have impermeable pad and curb type containment unless they contain fresh water or fluids that are gases at atmospheric temperature and pressure.

7. Labeling: All tanks, drums and containers should be clearly labeled to identify their contents and other emergency notification information.

8. Below Grade Tanks/Sumps: All below grade tanks, sumps, and pits must be approved by the OCD prior to installation or upon modification and must incorporate secondary containment and leak-detection into the design. All pre-existing sumps and below-grade tanks must demonstrate integrity on an annual basis. Integrity tests include pressure testing to 3 pounds per square inch above normal operating pressure and/or visual

inspection of cleaned out tanks and/or sumps, or other OCD approved methods. The OCD will be notified at least 72 hours prior to all testing.

9. Underground Process/Wastewater Lines: All underground process/wastewater pipelines must be tested to demonstrate their mechanical integrity at present and then every 5 years thereafter, or prior to discharge plan renewal. Permittees may propose various methods for testing such as pressure testing to 3 pounds per square inch above normal operating pressure or other means acceptable to the OCD. The OCD will be notified at least 72 hours prior to all testing.

10. Class V Wells: Leach fields and other wastewater disposal systems at OCD regulated facilities which inject non-hazardous fluid into or above an underground source of drinking water are considered Class V injection wells under the EPA UIC program. All Class V wells that inject non-hazardous industrial wastes or a mixture of industrial wastes and domestic wastes will be closed unless it can be demonstrated that groundwater will not be impacted in the reasonably foreseeable future. Closure of Class V wells must be in accordance with a plan approved by the Division's Santa Fe Office. The OCD allows industry to submit closure plans which are protective of human health, the environment and groundwater as defined by the WQCC, and are cost effective. Class V wells that inject domestic waste only must be permitted by the New Mexico Environment Department.

11. Housekeeping: All systems designed for spill collection/prevention will be inspected weekly and after each storm event to ensure proper operation and to prevent overtopping or system failure. A record of inspections will be retained on site for a period of five years.

12. Spill Reporting: All spills/releases shall be reported pursuant to OCD Rule 116 and WQCC 1203 to the OCD Artesia District Office.

13. Transfer of Discharge Plan: The OCD will be notified prior to any transfer of ownership, control, or possession of a facility with an approved discharge plan. A written commitment to comply with the terms and conditions of the previously approved discharge plan must be submitted by the purchaser and approved by the OCD prior to transfer.

14. Closure: The OCD will be notified when operations of the facility are discontinued for a period in excess of six months. Prior to closure of the facility a closure plan will be submitted for approval by the Director. Closure and waste disposal will be in accordance with the statutes, rules and regulations in effect at the time of closure.

15. Treatment System Monitoring: Marathon will sample and analyze the treatment system effluent on a monthly basis for benzene, toluene, ethylbenzene and xylenes (BTEX) and on a quarterly basis for major cations/anions and polynuclear aromatic hydrocarbons

using EPA approved methods. The results of these sampling events will be included in the quarterly ground water remediation monitoring reports for the facility.

16. Reverse Osmosis (RO) Reject and Commingled Water: Marathon will sample and analyze the RO reject and commingled water on a quarterly basis for major cations/anions using EPA approved methods. The concentrations present in the water to be infiltrated will not exceed the WQCC limits as listed in WQCC Regulation 3101. The results of these sampling events will be included in the quarterly ground water remediation monitoring reports for the facility.

17. Certification: Marathon, by the officer whose signature appears below, accepts this permit and agrees to comply with all terms and conditions contained herein. Marathon further acknowledges that these conditions and requirements of this permit may be changed administratively by the Division for good cause shown as necessary to protect fresh water, human health and the environment.

Accepted:

MARATHON OIL COMPANY

by_____
Title

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 8/28/97,

or cash received on _____ in the amount of $ 50.00

from Marathon

for Indian Basin Remediation GW-21
(Facility Name) (OP No.)

Submitted by: _____ Date: _____

Submitted to ASD by: R. Chavez Date: 10/24/97

Received in ASD by: _____ Date: _____

Filing Fee X New Facility ___ Renewal ___

Modification ___ Other _____
(specify)

Organization Code 521.07 Applicable FY 98

To be deposited in the Water Quality Management Fund.

Full Payment ___ or Annual Increment ___

THIS CHECK IS VOID IF BROWN COLORED BACKGROUND IS ABSENT

FORM 2501 REV. 5-95

ACCOUNTS PAYABLE CHECK

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

60-162/433

CHECK DATE 08/28/97

CHECK NUMBER [redacted]

PAY TO THE ORDER OF:

NEW MEXICO OIL CONSERVATION
DIVISION
2040 PACHECO STREET
SANTA FE NM 87501

MATCH AMOUNT IN WORDS WITH NUMBERS

PAY: **********$50.00

VOID AFTER 180 DAYS

Fifty and 00/100 Dollars

Marathon Oil Company

PNC BANK,
NATIONAL ASSOCIATION,
JEANETTE, PA

By: D. C. Pasquini
Authorized Representative

THE BACK OF THIS DOCUMENT CONTAINS AN ARTIFICIAL WATERMARK HOLD AT AN ANGLE TO VIEW

[redacted]

ACKNOWLEDGEMENT OF RECEIPT OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 5/15/96

or cash received on _____ in the amount of $ 1667.50

from Marathon Oil

for Indian Basin G.P. (Facility Name) GW-021 (OCP No.)

Submitted by: _____ Date: _____

Submitted to ASD by: [signature] Date: 5/31/96

Received in ASD by: Diane Salazar Date: 5-31-96

Filing Fee ___ New Facility ___ Renewal X

Modification ___ Other _____ (specify)

Organization Code 521.07 Applicable FY 96

To be deposited in the Water Quality Management Fund.

Full Payment X or Annual Increment ___

THIS CHECK IS VOID IF BROWN COLORED BACKGROUND IS ABSENT

FORM 2501 REV. 5-95

ACCOUNTS PAYABLE CHECK

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

60-162/433

CHECK DATE 05/15/96

CHECK NUM [redacted]

MATCH AMOUNT IN WORDS WITH NUMBERS

******$1,667.50

VOID AFTER 180 DAYS

PAY TO THE ORDER OF:

OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG
P O BOX 2088
SANTA FE NM 87504-2088

PAY:

One Thousand Six Hundred Sixty-Seven and 50/100 Dollars

Marathon Oil Company

By: [signature]

Authorized Representative

PNC BANK,
NATIONAL ASSOCIATION
JEANETTE, PA

THE BACK OF THIS DOCUMENT CONTAINS AN ARTIFICIAL WATERMARK. HOLD AT AN ANGLE TO VIEW.

[redacted]

Check No	Check Date	Bank No	Vendor No
[redacted]	05/15/96	3723	001324

Marathon Oil Company
539 South Main Street
Findlay, Ohio 45840

Direct Inquiries to:
ACCOUNTS PAYABLE DEPARTMENT
Midland, Texas
PHONE: 915-682-1626

Loc	Mo	Vou	Sub	P.O. Number	Invoice Number	Invoice Date	Remit Comment	Discount Amt	Invoice/Pay Amt
0574	05	P01	15203013		262616	05/15/96	FLAT FEE FOR IBGP DISCH PLAN	0.00	1,667.50
							TOTAL REMITTANCE:		1,667.50

GW-21

(FOLD ON PERFORATION BELOW AND DETACH CHECK STUB BEFORE DEPOSITING)