

2R - 22

REPORTS

DATE:

MARCH 3, 1995

1995 APR 12 PM 8 52



**Marathon
Oil Company**

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

April 10, 1995

Mr. William C. Olson
Hydrogeologist
Oil Conservation Division
2040 Pacheco St.
Santa Fe, New Mexico 87501

RE: Indian Basin Remediation Project
Transmittal of Vapor Extraction Pilot Test Report

Dear Mr. Olson:

Enclosed is the final report for vapor extraction field activities conducted at the Indian Basin remediation project site in December 1994 and January 1995. The report prepared by Groundwater Technology, Inc. in Albuquerque, New Mexico is being submitted to your office per Marathon's proposed workplan dated November 22, 1994 which was approved by the Oil Conservation Division (OCD) in your letter dated November 22, 1994.

Please call if you have any questions regarding the report or project.

Sincerely,

A handwritten signature in cursive script that reads "Robert J. Menzie, Jr.".

Robert J. Menzie, Jr.
Production Environmental Representative

Attachment

c: C. K. Curlee

OIL CONSERVATION DIVISION
RECEIVED



Marathon
Oil Company

APR 13 PM 8 52

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

March 31, 1995

Mr. William C. Olson
Hydrogeologist
Oil Conservation Division
2040 Pacheco St.
Santa Fe, New Mexico 87501

RE: Indian Basin Remediation Project
Transmittal of Drilling Investigation Report

Dear Mr. Olson:

Enclosed is the final report for field activities conducted at the Indian Basin remediation project site between November 28, 1994 and December 15, 1994. The letter report prepared by Groundwater Technology, Inc. in Albuquerque, New Mexico is being submitted to your office per Marathon's proposed workplan dated November 22, 1994 which was approved by the Oil Conservation Division (OCD) in your letter dated November 22, 1994.

Thank you again for the OCD's immediate approval of our workplan. If you have any questions regarding this transmittal, please call me.

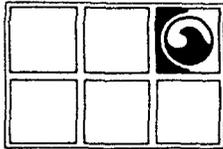
Sincerely,

A handwritten signature in cursive script that reads "Robert J. Menzie, Jr.".

Robert J. Menzie, Jr.
Production Environmental Representative

Attachment

c: C. K. Curlee



GROUNDWATER TECHNOLOGY®

Groundwater Technology, Inc.

2501 Yale Boulevard, SE, Suite 204, Albuquerque, NM 87106 USA
Tel: (505) 242-3113 Fax: (505) 242-1103

March 3, 1995

RECEIVED

Project No. 023350052

Mr. Robert J. Menzie, Jr.
Marathon Oil Company
P.O. Box 552
Midland, TX 79702-5233

APR 03 1995

Environmental Bureau
Oil Conservation Division

RE: Transmittal of Drilling Logs for Monitor Wells MW-73 through MW-80, Marathon Oil Company (MOC) Indian Basin Gas Plant (IBGP), Indian Basin, Carlsbad, New Mexico.

Dear Mr. Menzie:

Please find the enclosed drilling logs for monitor wells MW-73 through MW-80 installed by Groundwater Technology, Inc. (Groundwater Technology) at the above-referenced site from November 29 through December 15, 1994. A site plan illustrating well locations is also enclosed.

All drilling activities were performed using a Failing 1500 air rotary drill rig. During drilling activities air monitoring was performed by Groundwater Technology personnel using a photoionization detector (PID) for organic vapors, and a Tri-Level meter for percent oxygen and presence of hydrogen sulfide in and around the breathing zone. PID readings ranged from 0 to 18.5 parts per million (ppm) in the breathing zone and 0 to 354 ppm at the boring opening. Percent oxygen (%O₂) readings ranged from 19.9 to 21.4% at the boring opening and drill rig floor. In addition to vapor monitoring by Groundwater Technology personnel, field personnel were outfitted with Hydrogen Sulfide monitors during drilling activities. Hydrogen sulfide was not detected during drilling activities.

Monitor wells MW-73 through MW-76 were drilled to approximately 220 feet below grade, into the Lower Queen aquifer. Monitor wells MW-77 through MW-80 were completed in the shallow aquifer, to total depths ranging from approximately 80 to 90 feet below grade. Upon completion of the borehole, the top portion of the borehole (minimum of 5 feet below grade) was reamed to 12 1/4-inches in diameter and a 8 5/8-inch steel surface casing (CSG) was installed in each monitor well from approximately 3 feet above-grade to a minimum of 5 feet into competent bedrock (depths ranging from 5.5 to 16.8 feet below grade). From the bottom of the CSG (5.5 to 16.8 feet below grade) each borehole remains open to the total depth (TD) of the well (80-90 feet below grade in the shallow aquifer wells, and approximately 220 feet below grade in the deep aquifer wells).

Monitor wells MW-73 through MW-76 were developed by pumping for approximately 8 hours per well. Monitor wells MW-77 through MW-80 were dry upon completion, and therefore no development was performed.

MAR 15 1995
Environmental Bureau

Robert J. Menzie, Jr.
March 3, 1995

Page 2 of 2

If you have any questions regarding this transmittal, or require any additional information or services, please do not hesitate to contact me at (505) 242-3113.

Sincerely,

Groundwater Technology, Inc.

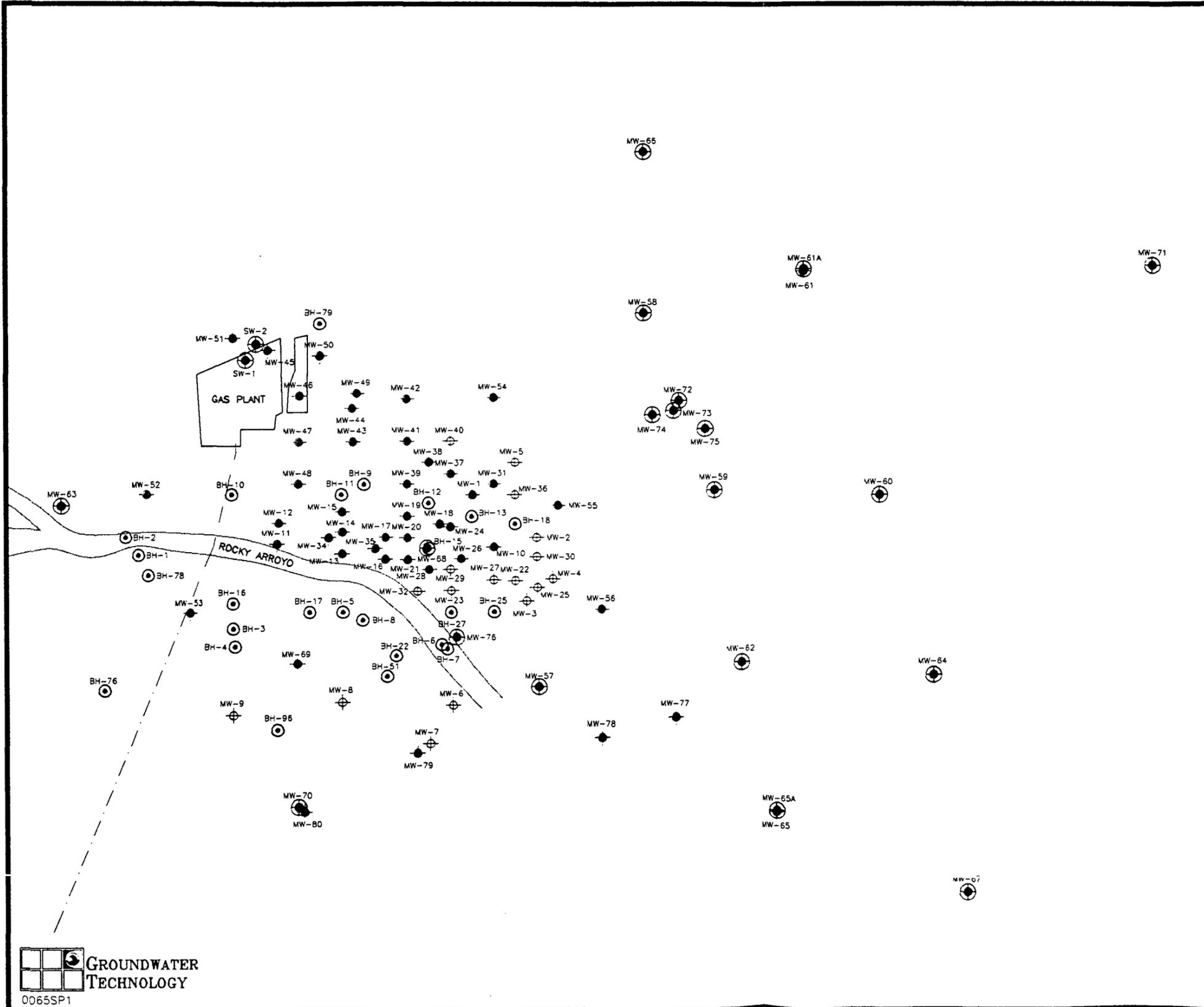


Sara C. Brothers
Project Manager
Operations Manager, New Mexico

c: Project File

EXPLANATION

- ◆ UPPER AQUIFER MONITOR WELL
- ⊕ LOWER AQUIFER MONITOR WELL
- ⊕ MONITOR WELL (DRY)
- ⊙ BOREHOLE
- - - CONDENSATE LINE



MARATHON OIL COMPANY

INDIAN BASIN GAS PLANT SITE

INDIAN BASIN, NEW MEXICO

023350065

DRAWN BY: S. BROTHERS DATE: 03-01-95
 DRAFTED BY: DEN HOLMES DATE: 03-01-95
 CHECKED BY: _____ DATE: _____

SITE PLAN

GROUNDWATER TECHNOLOGY

0065SP1

Site plan of Marathon Oil Company's Indian Basin Gas Plant, Indian Basin, New Mexico.



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TECHNOLOGY

Drilling Log

Monitoring Well **MW-73**

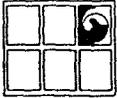
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad NM Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 205 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 10 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Dave Gang Log By Bob Davis Date 11/29-30/94 Permit # _____
 Checked By Wku. Maramilla License No. _____

See Site Map
For Boring Location

COMMENTS:

Well located 100 feet S of MW-72. Set 10 feet 8 5/8" surface CSG to 7 feet below grade after reaming hole to 12 1/4" to a depth of 7 feet. From 7 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-3							SPUD 0800 11/29/94 About 1 ft. alluvium before encountering bedrock. Rate of penetration about 30 ft/hr.
0							0-10 ft: DOLOMITE, medium light gray (N8), hard, interbedded with calcareous, SANDSTONE, pale olive (5 yr 5/2), soft, friable. Rate of penetration about 30 ft/hr (0'-20')
2							
4							
6							
8							
10		0					10-20 ft: Dolomitic SANDSTONE, light gray (N7), moderately soft, moderate friable, dry, slightly calcareous interbedded with DOLOMITE, gray (10 yr 6/1), very hard, conchoidal fractures. Rate of penetration = 30 ft/hr.
12							
14							
16							
18							
20		0					20-30 ft: Dolomitic SANDSTONE, fine grained, light gray (N7), moderately soft, friable, dry, slightly calcareous interbedded with occasional DOLOMITE, medium light gra. (N5), hard, conchoidal fractures. Rate of penetration = 30 ft/hr.
22							
24							



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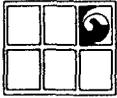
Drilling Log

Monitoring Well **MW-73**

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

Owner Marathon Oil Company
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							0905-0930 = 25 minutes to change Subs, bit & connect next 30' stand. Continue drilling at 0930, depth 30 feet.
26							
28							
30		0					30-40 ft: SANDSTONE, fine grained, very light gray (N8), soft, friable, slightly calcareous, dry, interbedded with minor DOLOMITE, yellowish gray (5 yr 7/2), hard, conchoidal fractures.
32							
34							
36							Rate of penetration = 30 ft/hr.
38							
40		0					40-50 ft: Sandy DOLOMITE, very light gray (N8), moderately hard, dry, non-calcareous.
42							
44							Rate of penetration about 30 ft/hr.
46							
48							
50		0					50-80 ft: SANDSTONE, light gray (N7), fine grained, moderately soft, friable, non-calcareous interbedded with sandy DOLOMITE, very light gray (N8), moderately hard, dry, non-calcareous.
52							
54							Rate of penetration about 20 ft/hr.
56							



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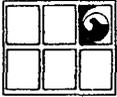
Drilling Log

Monitoring Well **MW-73**

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

Owner Marathon Oil Company
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					60-70 ft: Dolomitic SANDSTONE, light gray (N7), fine grained, moderately hard, dry noncalcareous interbedded with sandy DOLOMITE, medium light gray (N5), hard, crystalline.
62							Rate of penetration about 38 ft/hr.
64							
66							
68							
70		0					70-80 ft: Sandy DOLOMITE as above interbedded with dolomite, light gray, (N7), hard, brittle, conchoidal fractures, dry.
72							Rate of penetration about 30 ft/hr.
74							
76							
78							
80		0					80-90 ft: DOLOMITE, light brownish gray (5 yr 6/1) very hard, crystalline, conchoidal fractures.
82							Rate of penetration about 18 ft/hr.
84							
86							
88							



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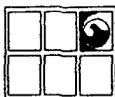
Drilling Log

Monitoring Well **MW-73**

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

Owner Marathon Oil Company
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88							
90		0					90-100 ft: Sandy DOLOMITE, light gray (N7), moderately hard, crystalline, minor fine grained sand, conchoidal fractures, dry. Note: Cuttings are predominately powder (98%).
92							
94							Drilled 45 minutes with only 8 feet penetration.
96							
98							
100		0					100-110 ft: DOLOMITE, light brownish gray (5 yr 6/!) very hard, conchoidal fractures, interbedded sandy dolomite, light gray (N7), moderately hard, moderately hydrocarbon odor (PID = 0.0 ppm).
102							
104							
106							1345-1430 Rig down - replaced JAWS gripping KB worn out. Downtime of 45 minutes. 1430 resumed drilling.
108							Rate of penetration about 13 ft/hr.
110		0					110-120 ft: Sandy DOLOMITE, as above.
112							
114							Rate of penetration about 20 ft/hr.
116							
118							
120		0					



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-73**

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		0					120-130 ft: Sandy DOLOMITE, as above, interbedded with light brownish gray (5 yr 6/l), very hard, conchoidal fractures, moderate hydrocarbon odor, cuttings predominately "rock flour."
122							
124							Rate of penetration about 15 ft/hr.
126							
128							
130		16.4					130-140 ft: Sandy DOLOMITE, interbedded with dolomite, as above.
132							
134							Rate of penetration 15 ft/hr.
136							
138							
140		0					140-150 ft: DOLOMITE, as above.
142							Rate of penetration 40 ft/hr.
144							Rig shutdown for the day at 1700 hours.
146							11/30/94 Began setting up at 0645 hours, drilling at 0655. Found water in the hole.
148							0710 - Water in fuel filter - trying to fix problem - shutdown - had to go to town for new filters. <u>Rig down for 2 hours 5 minutes.</u>
150		0					0915 - Resume drilling. Rate of penetration 40 ft/hr.
152							150-180 ft: Dolomitic SANDSTONE, very light gray (N8), fine grained, moderately hard, non-calcareous, no hydrocarbon odor.



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Drilling Log

Monitoring Well **MW-73**

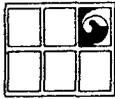
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152							Rate of penetration 17 ft/hr.
154							
156							
158							
160		0					180-170 ft: Dolomitic SANDSTONE as above, with occasional sandy DOLOMITE, light gray (N7) moderately hard, non-calcareous, no hydrocarbon odor.
162							Rate of penetration about 9 ft/hr.
164							
166							
168							
170		0					170-180 ft: Lithology, as above, with minor dolomite, light brownish gray (5 yr 6/1), hard, brittle, conchoidal fractures, no hydrocarbon odor.
172							
174							
176							
178							
180		0					180-180 ft: DOLOMITE, light brownish gray (5 yr 6/1), very hard, microcrystalline, conchoidal fractures, no hydrocarbon odor, slightly calcareous (effervescent with 10% HCL).
182							
184							



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Drilling Log

Monitoring Well **MW-73**

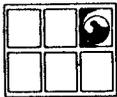
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184							Rate of penetration about 11 ft/hr.
186							
188							
190		0					190-200 ft: DOLOMITE, as above, moderate-strong hydrocarbon odor.
192							
194							
196		354					Rate of penetration about 40 ft/hr.
198							
200		6					200-210 ft: DOLOMITE, as above, moderate-strong hydrocarbon odor, saturated, interbedded with dolomitic Limestone, light gray (N7) chalky.
202							
204							Water at 205 feet.
206							
208							Rate of penetration about 27 ft/hr.
210		0					210-220 ft: Dolomitic Limestone, light gray (N7), chalky, saturated moderate hydrocarbon odor.
212							
214							
216							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-73**

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad NM

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216-							
-218-							
-220-		0					Reached TD (220 ft) at 1415 hours. Reamed hole to 7' with 12 1/2" bit. Set 8 5/8" CSG to 7 feet with 3 feet above surface. Set CSG with 1 sack bentonite and 4 sacks ready mix cement. Moved Rig to MW-74 location at 1550 hours.
-222-							
-224-							
-226-							
-228-							
-230-							
-232-							
-234-							
-236-							
-238-							
-240-							
-242-							
-244-							
-246-							
-248-							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-74**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 115 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 9.5 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Dave Gann Log By Bob Davis Date 11/30-12/06/94 Permit # _____
 Checked By Julie Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

MW-74 located approximately 200 ft SW of MW-73. 8 5/8" surface casing set to 7 ft below ground. From 7 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ * Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-3							SPUD 1600 hours 11/30/94 Rate of penetration about 40 ft/hr.
0							0-0.5 ft: Approximately 4-6" alluvium before bedrock.
2							0.5-10 ft: LIMESTONE, pinkish gray (5 yr 8/1), very hard, high effervescence with 10% HCL, dry, interbedded with DOLOMITE, light brown (5 yr 6/4), hard, brittle, conchoidal fractures, no hydrocarbon odor and SANDSTONE, pale yellowish brown (10 yr 6/2); fine grained, soft, friable, noncalcareous, dry.
4							Rate of penetration about 40 ft/hr.
6							
8							
10		0					10-20 ft: SANDSTONE/LIMESTONE/DOLOMITE, as above.
12							
14							
16							
18							Shutdown Rig at 1700 hours 11/30/94. Resume drilling at 0645 12/01/94. 0715-0830 Rig shutdown - change out jaws - downtime 1.25 hours.
20		0					20-30 ft: Dolomitic SANDSTONE, yellowish gray (5 yr 8/1); fine grained, hard, non-calcareous.
22							
24							



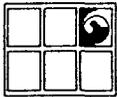
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							
26							
28							Change bit at 30 feet, resume drilling at 0935. Repack Kelley swivel, change filters and pull down. 0.75 hours down. Rate of penetration 60 ft/hr.
30		0					30-40 ft: Dolomitic SANDSTONE, as above, interbedded with sandstone, yellowish gray (5 yr 8/1), fine grained, moderately hard, non-calcareous, dry.
32							
34							Rate of penetration about 24 ft/hr.
36							
38							
40		0					40-50 ft: SANDSTONE, yellowish gray (5 yr 8/1), very fine grained, moderately soft, moderately friable, dry interbedded with sandy sandy dolomite, very light gray (N8), moderately hard, microcrystalline, conchoidal fractures.
42							
44						Rate of penetration 20 ft/hr.	
46							
48							
50		0				50-60 ft: SANDSTONE, as above.	
52						Rate of penetration about 30 ft/hr.	
54							
56							



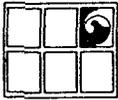
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-74**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58						
60		0				60-70 ft: Sandy DOLOMITE, very light gray (N8), moderately hard to hard, microcrystalline, interbedded with minor SANDSTONE, yellowish gray (5 yr 8/1), moderately soft, moderately friable, dry, non-calcareous, no hydrocarbon odor.
62						
64						
66						Rate of penetration about 24 ft/hr.
68						
70		0				70-80 ft: Sandy DOLOMITE, very light gray (N8), hard, brittle, microcrystalline, dry, no hydrocarbon odor.
72						
74						Rate of penetration about 17 ft/hr.
76						
78						
80		0				80-90 ft: DOLOMITE, light brownish gray (5 yr 6/1), hard, brittle microcrystalline, conchoidal fractures, dry, no hydrocarbon odor.
82						
84						Rate of penetration about 17 ft/hr.
86						
88						



GROUNDWATER
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Drilling Log

Monitoring Well **MW-74**

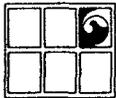
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88							
90		0					90-100 ft: DOLOMITE interbedded with sandy dolomite, very light gray (N8), hard, brittle, dry, no hydrocarbon odor.
92							
94							
96							
98							
100		0					100-110 ft: DOLOMITE, light brownish gray (5 yr 6/1) to very light gray (N8), hard, microcrystalline, conchoidal fractures, d y, faint hydrocarbon odor.
102							
104							Rate of penetration about 30 ft/hr.
106							
108							
110		0					110-120 ft: DOLOMITE, as above, with minor sandy dolomite, light gray (N7), moderately hard, microcrystalline, saturated, no hydrocarbon odor.
112							
114							
116		0					Water at 115 feet with moderate-strong hydrocarbon odor; PID=0.0 ppm.
118							Rate of penetration about 12 ft/hr.
120		0					



GROUNDWATER
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Drilling Log

Monitoring Well **MW-74**

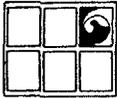
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
120		0				120-130 ft: DOLOMITE and sandy dolomite, as above.	
122							
124							Rate of penetration about 30 ft/hr.
126							
128							
130		0				130-140 ft: DOLOMITE, light brownish gray (5 yr 6/1) to very light gray (N8), hard, microcrystalline, conchoidal fractures, no hydrocarbon odor.	
132							At 132 feet driller had to add water to system to remove cuttings. Abundant sand, fine grained, quartz, non-calcareous.
134							Rate of penetration about 15 ft/hr.
136							
138							
140		0				140-150 ft: DOLOMITE/SAND, as above, no hydrocarbon odor.	
142							
144							Rate of penetration about 30 ft/hr.
146							
148							
150		0				150-160 ft: Abundant SAND with minor DOLOMITE.	
152							



GROUNDWATER
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Drilling Log

Monitoring Well **MW-74**

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
152								
154								
156								
158								
160		0						160-170 ft: SANDSTONE, yellowish gray (5 yr 7/2), fine grained, quartz grains, noncalcareous, interbedded with DOLOMITE, pale yellowish brown (10 yr 6/2), hard, cherty, conchoidal fractures, no hydrocarbon odor.
162								
164								
166								
168								At 1605 hours pulled out of hole to run surface CSG, ream top hole to 7 feet with 12.25" bit. Set 10 feet of 8 5/8" CSG to 7 feet below grade. Resume drilling 12/05/94 at 1215 hours.
170		0						170-180 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) hard, cherty, microcrystalline, conchoidal fractures, no hydrocarbon odor.
172								
174								
176								Rate of penetration about 15 ft/hr.
178								
180		0						180-180 ft: DOLOMITE, as above.
182								
184								



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-74**

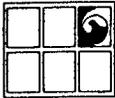
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184							Rate of penetration 15 ft/hr.
186							
188							
190		0					190-200 ft: DOLOMITE, as above.
192							1400 hours at 192 feet, hydraulic pump failed. Rig down until pump can be replaced. Resumed drilling at 1615 hours on 12/06/94.
194							
196							Rate of penetration about 20 ft/hr.
198							
200		0					200-210 ft: DOLOMITE, as above, interbedded with LIMESTONE, light gray (N7), hard, crystalline, high effervescence with 10% HCL, no hydrocarbon odor.
202							
204							Rate of penetration about 30 ft/hr.
206							
208							
210		0					210-220 ft: SANDSTONE, yellowish gray (5 yr 7/2), fine grained, moderately hard, brittle, calcareous, quartz grains, no hydrocarbon odor, interbedded with DOLOMITE, as above.
212							
214							Rate of penetration about 40 ft/hr.
216							



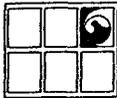
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-74**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216							
-218							
-220		0					Total depth at 1800 hours on 12/06/94. TD = 220 feet.
-222							
-224							
-226							
-228							
-230							
-232							
-234							
-236							
-238							
-240							
-242							
-244							
-246							
-248							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-75**

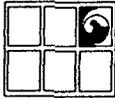
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 85 ft. Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 10 ft. Type Steel
 Fill Material _____ Rig/Core Falling 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 12/02-08/94 Permit # _____
 Checked By Luke Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

400 ft Southwest of MW-73. 8 5/8" surface CSG set to 10 feet below grade. Surface CSG is 27" above grade. From 10 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PTD (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.25							SPUD 12/02/94 0935 hours
0							0-4 ft: Alluvium, silty SAND, pale yellowish brown, (10 yr 6/2), fine grained, soft, friable, dry.
2							Rate of penetration about 40 ft/hr.
4							4-10 ft: Silty SAND, pale yellowish brown (10 yr 6/2), fine grained, soft, friable, dry. LIMESTONE, very pale orange (10 yr 8/2) hard, (high effervescence with 10% HCL) dry. DOLOMITE, light brownish gray (5 yr 6/1), very hard, crystalline, conchoidal fractures, dry.
6							
8							
10		0					10-20 ft: Sandy DOLOMITE, light gray (N7), fine to medium quartz grains, hard, conchoidal fractures, dry.
12							
14							
16							Rate of penetration about 30 ft/hr.
18							
20		0					20-30 ft: SANDSTONE, yellowish gray (5 yr 8/1) to light brownish gray (5 yr 6/1), fine grained quartz sand, moderately hard to hard, non-calcerous, dry with minor sandy DOLOMITE, light gray (N7), fine grained quartz sand, hard, brittle, conchoidal fractures, dry, no hydrocarbon odor.
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-75**

Project MOC/Indian Basin Gas Plant
Location Indian Basin, Carlsbad, New Mexico

Owner Marathon Oil Company
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							Rate of penetration about 24 ft/hr.
26							
28							
30		0					30-40 ft: SANDSTONE, light gray (N7) to light brownish gray (5 yr 6/1), fine grained, moderately hard to soft, friable, dry, noncalcareous, with minor sandy DOLOMITE, as above.
32							
34							
36							Rate of penetration about 30 ft/hr.
38							
40		0					40-50 ft: SANDSTONE/sandy DOLOMITE, as above.
42							Change jaws on Kelly. Down 55 minutes (1130-1225).
44							
46							
48							
50		0					50-60 ft: SANDSTONE, pale yellowish brown (10 yr 6/2) to light gray (N7), very fine grained, soft, friable, dry, noncalcareous, no hydrocarbon odor.
52							
54							Rate of penetration about 30 ft/hr.
56							



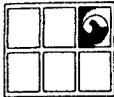
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-75**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					60-70 ft: With sandy DOLOMITE, light gray (N7) fine grained quartz, very hard, conchoidal fractures, dry, no hydrocarbon odor.
62							
64							
66							Rate of penetration about 30 ft/hr.
68							
70		0					70-80 ft: SANDSTONE, as above.
72							
74							Rate of penetration about 24 ft/hr.
76							
78							
80		0					80-90 ft: SANDSTONE interbedded with DOLOMITE, light brownish gray (5 yr 6/1), very hard, microcrystalline, conchoidal fractures, and sandy DOLOMITE, light gray (N7) fine grained quartz, very hard conchoidal fractures, saturated, no hydrocarbon odor.
82							
84							
86							Water at 85 feet, no hydrocarbon odor. Add water to air system to bring up cuttings. Distinct "oily" sheen on water from the borehole.
88							



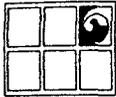
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88							
90		0					90-100 ft: DOLOMITE/sandy dolomite (as above) with minor SANDSTONE.
92							
94							Rate of penetration about 30 ft/hr.
96							
98							
100							100-110 ft: DOLOMITE, grayish orange (10 yr 7/4), hard, crystalline (many rhombohedral crystals visable with hand lens), conchoidal fractures, saturated, no hydrocarbon odor.
102							
104							
106							
108							Pulled out of hole to set surface CSG - 8 5/8" CSG to 10 feet BG. Grout with 1 sack bentonite, 7 sacks reedy mix cement. Rig down at 1630 hours 12/06/94. Resume drilling at 1320 hours 12/07/94.
110		0					110-120 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), very hard, microcrystalline, occasionally cherty, conchoidal fractures, saturated, no hydrocarbon odor.
112							
114							Rate of penetration about 12 ft/hr.
116		0					
118							
120		0					



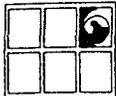
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		0					<p>120-130 ft: DOLOMITE, as above, interbedded with SANDSTONE, pale yellowish brown (10 yr 6/2), very fine grained quartz, occasionally silty, soft, friable, saturated, non-calcareous.</p> <p>Black liquid (hydrocarbons ?) observed mixed with water, hydrocarbon odor but no PID readings.</p> <p>Rate of penetration about 15 ft/hr.</p>
122							
124							
126							
128							
130		0					<p>130-140 ft: DOLOMITE as above.</p>
132							
134							
136							
138							
140		0					<p>Black sheen on water, moderate hydrocarbon odor, PID = 0.0 ppm.</p> <p>140-150 ft: DOLOMITE, light brownish gray (5 yr 6/1), hard, microcrystalline, occasionally cherty, conchoidal fractures, saturated, no hydrocarbon odor.</p> <p>Rate of penetration about 15 ft/hr.</p>
142							
144							
146							
148							
150		0					<p>150-160 ft: DOLOMITE, as above, interbedded with SANDSTONE, pale yellowish brown (10 yr 6/2), moderately hard, moderately friable, very fine grained, non-calcareous, saturated, no hydrocarbon odor.</p>
152							



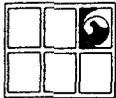
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-75**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152							
154							
156							
158							
160		0					160-170 ft: DOLOMITE with minor sandstone, as above, no hydrocarbon odor.
162							Rate of penetration about 11 ft/hr.
164							
166							
168							
170		0					170-180 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, interbedded with dolomitic SANDSTONE, fine quartz grains, very hard, non-calcareous, saturated, no hydrocarbon odor.
172						Rate of penetration about 10 ft/hr.	
174							
176							
178							
180		0				180-190 ft: DOLOMITE, as above, no hydrocarbon odor.	
182							
184							



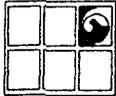
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184						Rate of penetration about 11 ft/hr.
186						
188						
190		0				190-200 ft: DOLOMITE, as above, moderately strong hydrocarbon odor.
192						
194						Rate of penetration about 11 ft/hr.
196						
198						
200		75.1				200-210 ft: DOLOMITE, as above, strong hydrocarbon odor.
202						
204						
206						
208						Rate of penetration about 30 ft/hr.
210		709				210-220 ft: SANDSTONE, pale yellowish brown, (10 yr 6/2), fine quartz grains, moderately soft, moderately friable, occasional vugs of secondary euhedral quartz crystals, calcareous cement, saturated, moderate hydrocarbon odor, minor DOLOMITE, as above, LIMESTONE, light gray (N7), hard, microcrystalline, massive.
212						
214						Drill break at 211 feet and approximately 8 inches, possible small sandstone stringer.
216						



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-216						
-218						
-220		3.2				Well TD at 220 ft. at 1100 hours 12/08/94.
-222						
-224						
-226						
-228						
-230						
-232						
-234						
-236						
-238						
-240						
-242						
-244						
-246						
-248						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 220 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial 35 ft. Static _____
 Screen: Dia NA in. Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 9 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 12/07-12/94 Permit # _____
 Checked By Duke Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

Replacement well for MW-68 set 8 5/8" surface CSG to 6 ft. below grade on 12/7/94. From 6 feet to 220 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-3							SPUD well for surface CSG at 0700 hours 12/07/94.
0							0-6 ft: Encountered bedrock about 0.5 ft below grade, DOLOMITE, light brownish gray (5 yr 6/1), hard, microcrystalline, cherty, conchoidal fractures, dry.
2							Drilled to 6 feet. Resume drilling at 0625 hours on 12/09/94.
4							6-10 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), to light gray (N7), hard, microcrystalline, occasionally cherty, conchoidal fractures, dry, no hydrocarbon odor.
6							10-20 ft: DOLOMITE, as above.
8							Rate of penetration about 7.5 ft/hr.
10		0					20-30 ft: DOLOMITE, light gray (N7) to medium light gray (N6), very hard, microcrystalline, dry, no hydrocarbon odor.
12							
14							
16							
18							
20		0					
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

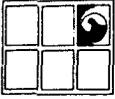
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

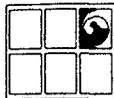
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ x Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							Rate of penetration about 6 ft/hr.
26							
28							
30		0					30-40 ft: DOLOMITE, as above, with thin stringers of silty SANDSTONE/SILTSTONE, medium dark gray (N4). Fine grained, moderate- hard, noncalcareous, dry, moderate hydrocarbon odor.
32							
34							
36							35 ft: Strong hydrocarbon odor at 35 feet with some moisture possible. Top of shallow zone aquifer.
38							Rate of penetration about 24 ft/hr.
40		0					40-50 ft: SANDSTONE, light brownish gray (5 yr 6/1), silty, fine grained, moderate hard, noncalcareous, damp, interbedded with DOLOMITE (as above) and LIMESTONE, light gray (N7), hard, crystalline, effervescence with 10% HCL. No hydrocarbon odor.
42							
44							
46							Rate of penetration about 15 ft/hr.
48							
50							50-80 ft: SANDSTONE, DOLOMITE, LIMESTONE, as above, with moderate hydrocarbon odor, moist.
52							
54							
56							



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							
58							
60		0					Water noted at 60 foot connection (probably from 35 ft.). 61-64 ft: Drilling break - SANDSTONE, pale yellowish orange (10 yr 8/6), fine grained, hard, calcareous cement, damp. Faint hydrocarbon odor. Rate of penetration about 30 ft/hr (60-70 interval).
62							
64							64-70 ft: GYPSUM, pale olive. (10 yr 6/2) very soft, friable, platy, moist, interbedded with minor SANDSTONE and DOLOMITE, as above. No hydrocarbon odor. Rate of penetration about 20 ft/hr.
66							
68							
70		0					70-80 ft: LIMESTONE, very light gray (N8), moderately soft to hard, chalky, interbedded with DOLOMITE, as above. Moist, fair hydrocarbon odor.
72							
74							
76							
78							
80		0					80-80 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, moderately brittle, noncalcareous, saturated, interbedded with minor DOLOMITE and LIMESTONE, as above. No hydrocarbon odor.
82							
84							
86							
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

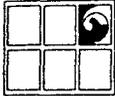
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90		0				90-100 ft: Interbedded SANDSTONE and DOLOMITE, as above, no hydrocarbon odor. Occasional hematite stain and sandstone cuttings.
92						
94						Rate of penetration about 15 ft/hr.
96						
98						
100		0				100-110 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to brownish gray (5 yr 6/1), hard, microcrystalline, cherty, conchoidal fractures, no hydrocarbon odor, interbedded with SANDSTONE, as above (see 90 ft.).
102						
104						
106						
108						
110		0				110-120 ft: LIMESTONE, grayish orange (10 yr 7/4), to grayish orange pink (5 yr 7/2), moderately soft, crystalline, chalky, powdery in cutting. Minor DOLOMITE, no hydrocarbon odor.
112						
114						
116						
118						
120		0				



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

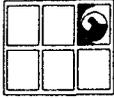
Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
120		0				120-130 ft: LIMESTONE/DOLOMITE, as above. Down for routine maintenance (tighten clutch, etc.).
122						
124						
126						
128						130-140 ft: LIMESTONE/DOLOMITE, as above, no hydrocarbon odor. Rate of penetration about 40 ft/hr.
130		0				
132						
134						
136						140-150 ft: SANDSTONE, grayish orange (10 yr 7/4), very fine grained, moderately hard, noncalcareous. Limey SANDSTONE, very pale orange (10 yr 8/2), very fine grained, well rounded, moderately hard, strong effervescence w/10% HCL, no hydrocarbon odor. Minor DOLOMITE. Rate of penetration 60 ft/hr.
138						
140		0				
142						
144						150-160 ft: SANDSTONE, Limey SANDSTONE, minor DOLOMITE, as above, no hydrocarbon odor.
146						
148						
150		0				
152						



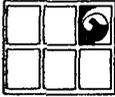
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
152						
154						Rate of penetration about 40 ft/hr.
156						
158						
160		0				160-170 ft: SANDSTONE, grayish orange (10 yr 7/4), very fine quartz grains, moderately hard, well cemented, non-calcareous, no hydrocarbon odor.
162						Rate of penetration about 40 ft/hr.
164						
166						
168						
170		0				170-180 ft: Dolomitic SANDSTONE, grayish orange (10 yr 7/4), fine grained, 95% loose grains in cuttings, calcareous cement, minor LIMESTONE.
172						Rate of penetration about 80 ft/hr.
174						
176						
178						
180		0				180-190 ft: DOLOMITE, paly yellowish brown (10 yr 6/2) very hard, microcrystalline, interbedded with LIMESTONE, pale yellowish brown (10 yr 6/2), moderately hard, microcrystalline. Effervescence with 10% HCL, no hydrocarbon odor.
182						
184						



Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
184							Rate of penetration about 80 ft/hr.
186							
188							
190		0					180-200 ft: LIMESTONE, as above, with DOLOMITE, fractures in dolomite filled with calcareous cement, no hydrocarbon odor.
192							Soap added to water to bring up cuttings.
194							
196							
198							
200		0					200-210 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, calcareous, no hydrocarbon odor.
202							
204							
206							
208							
210		0					210-212 ft: SANDSTONE, grayish red (5yr 4/2), very fine grained, moderately hard, noncalcareous, no hydrocarbon odor.
212							
214							213-220 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, very calcareous, no hydrocarbon odor.
216							



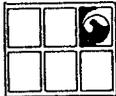
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-76**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
216							
218							
220		0					Well TD at 1335 hrs. 12/12/94.
222							
224							
226							
228							
230							
232							
234							
236							
238							
240							
242							
244							
246							
248							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-77**

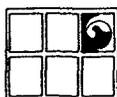
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 80 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia NA in. Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 17.5 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Ronny Keith Log By Bob Davis Date 12/07-13/94 Permit # _____
 Checked By Duke Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

8.625 inches surface casing set to 15 feet on 12/07/94. Well completed on 12/13/94. Located 400 feet SE of MW-73. From 15 feet to 80 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.5							Spud for surface casing at 0815 on 12/07/94.
0							Well spud in silty alluvium. Alluvium to a depth of 10 feet. 0-10 ft: SILTSTONE, moderate yellowish brown (10 yr 4/2), very soft, friable, dry.
2							
4							
6							
8							
10		0					10-11 ft: LIMESTONE, light gray (N7), hard, crystalline, dry with subangular dolomitic gravel (1/2 inch to 3 inches), occasional SANDSTONE, light gray (N7), fine grained quartz, moderately soft, moderately friable, dry.
12							
14							
16							15-20 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish brown (10 yr 4/2), hard, cherty, microcrystalline, conchoidal fractures, dry, with minor LIMESTONE, light gray (N7), hard crystalline, dry.
18							
20		2.2					20-25 ft: DOLOMITE, as above, no hydrocarbon odor, minor LIMESTONE. Rate of penetration about 15 ft/hr.
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-77**

Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							
26		0					<p>25-30 ft: DOLOMITE and minor LIMESTONE with minor SILTSTONE, sandy, pale yellowish brown (10 yr 6/2), moderately hard, dry.</p> <p>**Change filters in air system - downtime 20 minutes**</p> <p>Rate of penetration 15 ft/hr.</p>
30		0					<p>30-35 ft: DOLOMITE, as above, with occasional SILTSTONE, dark yellowish orange (10 yr 6/6), (hematite stained), sandy, slightly calcareous, dry, no hydrocarbon odor.</p> <p>Rate of penetration 20 ft/hr.</p>
36		0					<p>35-40 ft: DOLOMITE, dry, moderate hydrocarbon odor.</p> <p>Rate of penetration about 15 ft/hr.</p>
42		14.8					<p>40-45 ft: DOLOMITE, as above, interbedded with sandstone, medium dark gray (N4), fine-medium quartz grains-round to subrounded, poorly sorted, very hard, non-calcareous, dry, no hydrocarbon odor.</p>
48		0					<p>45-50 ft: Dolomite, interbedded with minor SANDSTONE, dry, no hydrocarbon odor.</p> <p>Rate of penetration about 15 ft/hr.</p>
52		4.6					<p>50-55 ft: As above, dry, no hydrocarbon odor.</p>
56		23.0					<p>55-60 ft: DOLOMITE, as above, with minor SILTSTONE, dark yellowish orange (10 yr 6/6), hematite stained,</p>



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-77**

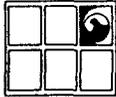
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						moderately soft, non-calcareous, dry, faint hydrocarbon odor.
58						Rate of penetration about 15 ft/hr.
60		8.1				60-65 ft: DOLOMITE, as above, with SANDSTONE, dark yellowish orange (10 yr 6/6), very fine quartz grains, well rounded, hard, noncalcareous, well cemented, dry, no hydrocarbon odor.
62						Rate of penetration about 12 ft/hr.
64		0				65-70 ft: DOLOMITE and SANDSTONE, as above, dry, no hydrocarbon odor.
66						Rate of penetration about 30 ft/hr.
68						70-75 ft: DOLOMITE and SANDSTONE, as above, dry, no hydrocarbon odor.
70		0				Rate of penetration about 20 ft/hr.
72						75-80 ft: DOLOMITE and SANDSTONE, as above, with minor LIMESTONE, light gray (N7), hard, microcrystalline, dry, faint hydrocarbon odor.
74		1.2				
76						
78						
80		13.1				Well Total Depth = 80 feet at 1115 hours on (12/13/94)
82						
84						
86						
88						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-78**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 85 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 13.08 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Roy Spruill Log By Bob Davis Date 12/12-13/94 Permit # _____
 Checked By Dixie Maramba License No. _____

See Site Map
For Boring Location

COMMENTS:

Located on North side of arroyo approximately 800 feet east of MW-57. A 5/8" surface casing was set 11 feet below grade. Surface casing sticks up 25 inches above grade. Total length of surface casing is 13 feet 1 inch. From 11 feet to 80 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2.1							Well spud for surface casing at 1505 12/12/94.
0							0-8 ft: Alluvium, SILTSTONE, moderate yellowish brown (10 yr 4/2) loose, dry.
2							
4							
6							
8							7-10 ft: SANDSTONE, yellowish gray (5 yr 8/1), silty, very fine grained, moderately hard, noncalcareous, dry, no hydrocarbon odor.
10		0					10-15 ft: SANDSTONE, as above, interbedded with minor DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, fractures, dry, occasional hematite staining.
12							Rate of penetration about 20 ft/hr.
14		0					15-20 ft: DOLOMITE, dark yellowish orange (10 yr 6/6), very hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor.
16							Rate of penetration 20 ft/hr.
18							
20		0					20-25 ft: DOLOMITE, as above, dry, no hydrocarbon odor, pale yellowish brown (10 yr 6/2) to dark yellowish orange (10 yr 6/6).
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-78**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26		0				25-30 ft: DOLOMITE, as above.
28						Rate of penetration about 12 ft/hr.
30		0				30-35 ft: Dolomitic SANDSTONE, grayish black (N2), fine quartz grains, very hard, noncalcareous, with minor DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, dry. No hydrocarbon odors.
32						Rate of penetration about 15 ft/hr.
34		9.9				35-40 ft: Dolomitic SANDSTONE, pale yellowish orange (10 yr 8/6) to pale yellowish brown (10 yr 6/2), as above.
36						Rate of penetration about 30 ft/hr.
38						40-45 ft: DOLOMITE, brownish gray (5 yr 4/1), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odors.
42						Rate of penetration about 15 ft/hr.
44		12.9				45-50 ft: Sandy DOLOMITE, grayish black (N2) and DOLOMITE, as above.
46						Rate of penetration about 15 ft/hr.
48						50-55 ft: Sandy DOLOMITE and dolomite, as above, with SILTSTONE, dark yellowish brown (10 yr 6/6), moderately soft, dry, no hydrocarbon odor.
50		0				Rate of penetration about 30 ft/hr.
52						55-60 ft: SANDSTONE, grayish orange (10 yr 7/4) to dark yellowish brown (10 yr 4/2), very fine grained, hard, well
54						
56		0				



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-78**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						
58						cemented, calcareous, in fractures, dry, no hydrocarbon odor, interbedded with DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures. Rate of penetration about 15 ft/hr.
60		3.2				60-65 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish brown (10 yr 6/6), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor, interbedded with minor SANDSTONE, as above.
62						
64						
66		0				65-70 ft: SANDSTONE, as above, with interbedded DOLOMITE. Rate of penetrtrion about 30 ft/hr.
68						
70		0				70-75 ft: Sandy DOLOMITE, light gray (N7), medium gray (N5) to grayish orange (10 yr 7/4), very hard, fine grained quartz inclusions, dolomite is microcrystalline, dry, fair hydrocarbon odor. Rate of penetration about 15 ft/hr.
72						
74						
76		40				75-80 ft: Sandy DOLOMITE, as above. Dry, no hydrocarbon odor. Rate of penetration about 10 ft/hr.
78						
80		0				80-85 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), hard microcrystalline, cherty, conchoidal fractures. Dry, no hydrocarbon odor.
82						
84						
86		0				TD @ 85 ft. 1610 hrs. 12/13/94.
88						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-79**

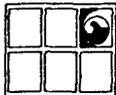
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 80 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 8 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Roy Spruill Log By Bob Davis Date 12/14/94 Permit # _____
 Checked By Mike Maramba License No. _____

**See Site Map
For Boring Location**

COMMENTS:

 Located approximately 150 ft SSW of BH-30 (MW-7). Set 8.625" surface casing to 5.5 ft. below ground with 2.5 ft. above ground. From 5.5 feet to 80 feet is open borehole.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.5						Spud at 1345 hrs, 12/14/94.
0						0-1 ft: Alluvium, SILT, moderate yellowish brown (10 yr 5/4), loose, unconsolidated.
2						1-5 ft: DOLOMITE, grayish orange (10 yr 7/4), hard, microcrystalline, cherty, conchoidal fractures, dry. Rate of penetration about 20 ft/hr.
4		0				5-10 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), as above. Rate of penetration about 12 ft/hr.
6		0				10-15 ft: DOLOMITE, as above. Rate of penetration about 15 ft/hr.
8		0				15-20 ft: DOLOMITE, as above, interbedded with dolomitic SANDSTONE, pale yellowish brown (10 yr 6/2), fine grained, moderately hard, well cemented. Rate of penetration 15 ft/hr.
10		0				20-25 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor.
12						
14						
16						
18						
20						
22						
24						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-79**

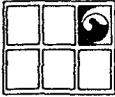
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24							Rate of penetration about 10 ft/hr.
26		0					25-30 ft: DOLOMITE, as above, with minor dolomitic SANDSTONE, medium dark gray (N4), fine grained, moderately hard, well cemented, noncalcareous, dry, no hydrocarbon odor. * Set temporary surface casing to 2.5 feet to control caving. Rate of penetration 20 ft/hr.
28							
30		0					30-35 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish brown (10 yr 4/2), as above, interbedded with SANDSTONE, light olive gray (5 yr 6/1) to dark yellowish orange (10 yr 6/6), fine grained, occasionally silty, moderately soft, minor hematite staining, dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
32							
34		0					35-40 ft: DOLOMITE, as above, dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
36							
38							
40		0					40-45 ft: SANDSTONE, pale yellow brown (10 yr 6/2) to medium dark gray (N4), silty, fine grained, soft to moderately hard, occasional hematite staining, with minor DOLOMITE, as above. Dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
42							
44		0					45-50 ft: SANDSTONE, as above, interbedded with dolomitic sandstone, medium dark gray (N4), moderately hard, fine grained, well cemented, non-calcareous and DOLOMITE, dark yellowish brown (10 yr 6/2), hard, microcrystalline, conchoidal fractures, dry, no hydrocarbon odor. Rate of penetration about 15 ft/hr.
46							
48							
50		0					50-55 ft: DOLOMITE and SANDSTONE, as above, dry, faint hydrocarbon odor. Rate of penetration about 12 ft/hr (with connection).
52							
54							
56		20.4					



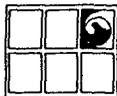
GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-79**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56							55-80 ft: DOLOMITE, pale yellow brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, interbedded with dolomitic SANDSTONE, yellowish orange (10 yr 6/6), hard, fine grained, well cemented, fractures, non-calcareous, dry, no hydrocarbon odor. Rate of penetration about 12 ft/hr.
58						80-85 ft: DOLOMITE and dolomitic SANDSTONE, as above, dry, moderate hydrocarbon odor.	
60		17.2					Rate of penetration about 12 ft/hr.
62							
64							
66		53.1					65-70 ft: DOLOMITE/dolomitic SANDSTONE, as above, cuttings are 90% powder, fine grains (after washing) are highly effervescent with 10% HCL., possibly limey sand, dry, moderate hydrocarbon odor.
68							
70		7.1					70-75 ft: Lithology, as above, dry, no hydrocarbon odor.
72							
74							
76		0				75-80 ft: Lithology, as above, dry, moderate hydrocarbon odor.	
78							
80		34.4				Well TD @ 80 ft., 1955 hrs. 12/14/94.	
82							
84							
86							
88							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-80**

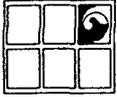
Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
 Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052
 Surface Elev. _____ Total Hole Depth 90 ft. Diameter 7.875 in.
 Top of Casing _____ Water Level Initial _____ Static _____
 Screen: Dia _____ Length _____ Type/Size _____
 Casing: Dia 8.625 in. Length 18.92 ft. Type Steel
 Fill Material _____ Rig/Core Failing 1500
 Drill Co. WT Water Well Service Method Air Rotary
 Driller Roy Spruill Log By Bob Davis Date 12/14-15/94 Permit # _____
 Checked By [Signature] License No. _____

See Site Map
For Boring Location

COMMENTS:

Located approximately 80 feet East of MW-70. Set 8 5/8" surface casing to 16.8 feet below ground with 2.3 feet above ground. From 16.8 feet to 90 feet is open barehole.

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
2.25						Spud well 1005 hours, 12/14/94.
0						Alluvium - dolomite/limestone coarse gravel and cobbles.
2						0-5 ft: Alluvium continues.
4						
6		0				5-10 ft: Dolomite gravels/DOLOMITE, pale yellowish brown (10 yr 6/2), hard, microcrystalline, cherty, conchoidal fractures, dry, no hydrocarbon odor.
8						
10		0				10-15 ft: DOLOMITE, as above, with minor cherty, dark yellowish orange (10 yr 6/6).
12						
14		0				15-20 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to grayish orange (10 yr 7/4), microcrystalline, hard, conchoidal fractures interbedded with thin beds of SILTSTONE, dark yellowish brown (10 yr 6/6), soft, friable, dry, no hydrocarbon odor.
16						Rate of penetration about 20 ft/hr.
18						
20		0				20-25 ft: SANDSTONE, dark yellowish orange (10 yr 6/6), fine grained, silty, moderately hard, non-calcareous. Sandy DOLOMITE, dark yellowish brown (10 yr 4/2), hard, fine quartz grains. Minor DOLOMITE, pale yellowish brown (10 yr 6/2), microcrystalline, cherty, conchoidal fractures. Dry, no hydrocarbon odor.
22						
24						



Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	O ₂ (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						Rate of penetration about 10 ft/hr.
26		0				25-30 ft: Predominately DOLOMITE, as above, with minor SANDSTONE and sandy dolomite.
28						Rate of penetration about 8 ft/hr (with connection).
30		0				30-35 ft: DOLOMITE, grayish orange (10 yr 7/4) to pale yellowish brown (10 yr 6/2), microcrystalline, hard, cherty, conchoidal fractures, minor hematite staining, dry, no hydrocarbon odor.
32						Rate of penetration about 15 ft/hr.
34		0				35-40 ft: DOLOMITE, as above, interbedded with SANDSTONE, dark yellowish brown (10 yr 4/2), fine grained, well cemented, dolomitic, dry, no hydrocarbon odor.
36						Rate of penetration about 20 ft/hr.
38		0				40-45 ft: DOLOMITE, as above, interbedded with minor thin beds of SANDSTONE, brownish gray (5 yr 4/1), moderate soft, fine grained, dry, no hydrocarbon odor.
40						Rate of penetration about 15 ft/hr.
42		0				45-50 ft: DOLOMITE and SANDSTONE, as above, with sandy DOLOMITE, light gray (N7), hard, fine quartz grains, microcrystalline, non-calcareous, dry, no hydrocarbon odor.
44						Rate of penetration about 15 ft/hr.
46		0				50-55 ft: Lithology, as above, dry, no hydrocarbon odor.
48						Rate of penetration about 15 ft/hr.
50		0				
52						
54		0				
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-80**

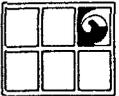
Project MOC/Indian Basin Gas Plant

Owner Marathon Oil Company

Location Indian Basin, Carlsbad, New Mexico

Proj. No. 023350052

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
56						55-60 ft: SANDSTONE, pale yellowish brown (10 yr 6/2), very fine grained, hard, well cemented, dolomitic, non-calcareous, with interbedded DOLOMITE, dark yellowish orange (10 yr 6/6), microcrystalline, hard, cherty, conchoidal fractures. Dry, moderate hydrocarbon odor. Rate of penetration about 15 ft/hr.
58						
60		89.0				60-65 ft: DOLOMITE, pale yellowish brown (10 yr 6/2) to dark yellowish orange (10 yr 6/6), as above, dry, no hydrocarbon odor. Rate of penetration about 12 ft/hr.
62						
64						65-70 ft: DOLOMITE, pale yellowish brown (10 yr 6/2), as above, dry, moderate hydrocarbon odor. Rate of penetration about 15 ft/hr.
66		19.6				
68						70-75 ft: DOLOMITE, as above. Rate of penetration about 15 ft/hr.
70		68.8				
72						75-80 ft: DOLOMITE, as above, interbedded with minor SANDSTONE, dark yellowish orange (10 yr 6/6), fine to medium grained, poorly sorted, round to subrounded, calcareous, well cemented. Rate of penetration about 12 ft/hr.
74						
76		4.5				80-85 ft: DOLOMITE and SANDSTONE, as above. Rate of penetration about 15 ft/hr.
78						
80		0				85-90 ft: DOLOMITE and SANDSTONE, as above.
82						
84						
86						
88						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well **MW-80**

Project MOC/Indian Basin Gas Plant Owner Marathon Oil Company
Location Indian Basin, Carlsbad, New Mexico Proj. No. 023350052

Depth (ft.)	Well Completion	O (ppm)	Sample ID	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
88						
90		0				Well TD @ 90 ft. below grade.
92						
94						
96						
98						
100						
102						
104						
106						
108						
110						
112						
114						
116						
118						
120						