GW - 21

GENERAL CORRESPONDENCE

YEAR(S):

1994 - 1991

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

November 30, 1994

CERTIFIED MAIL
RETURN RECEIPT NO. Z 765 962 844

Mr. Noel Garza
Marathon Oil Company
P.O. Box 1324
Artesia, New Mexico 88211

RE: GLYCOL SKIMMER
DISCHARGE PLAN GW-21
MARATHON OIL COMPANY
INDIAN BASIN GAS PLANT

Dear Mr. Garza:

As a result of an inspection by the Oil Conservation Division (OCD), the glycol skimmer was found to be lacking an inspection port between the inner and outer vessels as required by the discharge plan. Please provide the (OCD) with a plan by which Marathon proposes to install the above mentioned port.

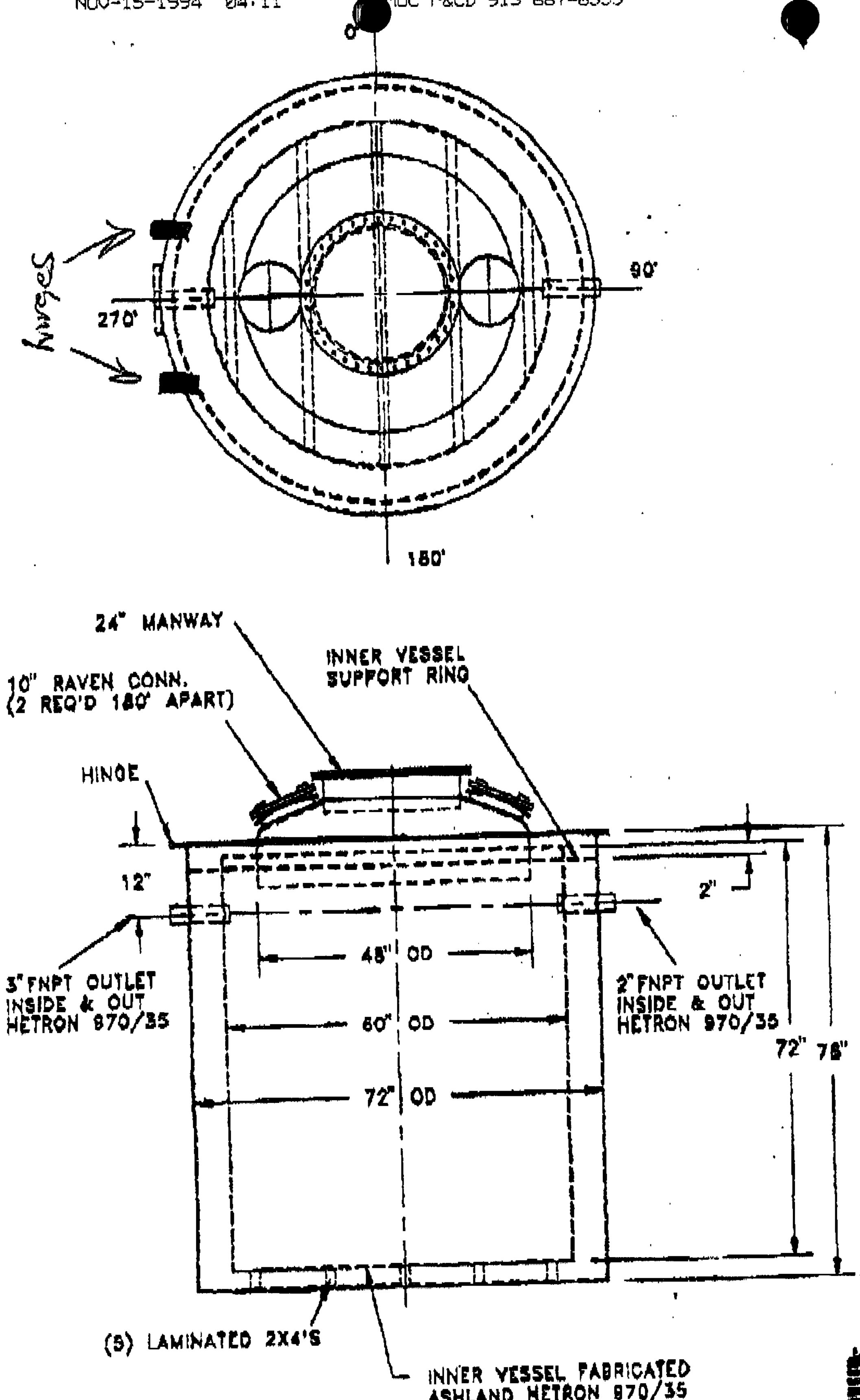
If you have any questions on this matter, please feel free to contact me at (505) 827-7155.

Sincerely,

Mark Ashley

Mark Ashley
Environmental Geologist
Environmental Bureau

xc: Robert J. Menzie, Jr., Marathon Oil Company, Midland, Texas



GLYCOL SKIMMER
(MARATHON)

PERMIAN TANK

Affidavit of Publication

No. 14897

STATE OF NEW MEXICO,

County of Eddy:

Gary D. Scott being duly sworn, says: That he is the Publisher of The Artesia Daily Press, a daily newspaper of general circulation, published in English at Artesia, said county and state, and that the hereto attached Legal Notice

was published in a regular and entire issue of the said Artesia Daily Press, a daily newspaper duly qualified for that purpose within the meaning of Chapter 167 of the 1937 Session Laws of the state of New Mexico for 1 days" consecutive weeks on the same day as follows:

First Publication November 23, 1994

Second Publication

Third Publication

Fourth Publication

Subscribed and sworn to before me this 12th day of December 19 94

Notary Public, Eddy County, New Mexico

My Commission expires September 23, 1996

Copy of Publication

LEGAL NOTICE

NOTICE OF PUBLICATION
STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to the New Mexico Water Quality Control Commission Regulations, the following discharge plan applications have been submitted to the Director of the Oil Conservation Division, 2040 South Pacheco, Santa Fe, New Mexico 87505, Telepphone (505)827-7131:

(GW-22) - Amoco Production Company, N.E. Spencer, Manager Plant Operations, P.O. Box 3092, Houston, Texas, 77253, has submitted a discharge plan application for renewal for their Empire Abo Gas Plant located in the NE/4 SE/4 Section 3, Township 18 South, Range 27 East, NMPM, Eddy County, New Mexico. Approximately 17,500 gallons per day of waste water with a total dissolved solids concentration 11,000 mg/1 will be collected and stored in an above ground closed top steel tank prior to transport to an OCD appproved offsite disposal facility. Groundwater most likely to be affected in the event of an accidental discharge is at a depth approximately 50 feet with a total dissolved solids concentration of approximately 300 mg/1. The discharge plan addresses how spills, leaks, and other accidental discharges to the surface will be managed.

(GW-21) - Marathon Oil Company, Robert Menzie, Jr., Production Environmental Representative, P.O. Box 552, Midland, Texas, 79792-0552, has submitted a discharge plan application for renewal for their Indian Basin Gas Plant located in the NE/4 Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. Approximately 84,000 gallons per day of waste water will be stored in above ground closed top steel tanks prior to disposal at an OCD approved disposal facility. Total dissolved solids concentration of the wast water is approximately 12,00 mg/1 total dissolved solids Groundwater most likely to b affected in the event of an acci dental discharge is at a depth of approximately 240 fee with a total dissolved solids concentration of 550 mg/1. The discharge plan addresses how spills, leaks and other accidental discharges to the surface will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The discharge plan application may be viewed at the above address between 8:00 a.m. and 4:00 p.m., Monday thru Friday. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. Request for public heairng shall set forth the reasons why a hearing shall be held. A hearing will be held if the director determines that there is significant public interest.

If no hearing is held, the Director will approve or disapprove the plan based on the information available. If a public hearing is held, the Director will approve tha plan based on the information in the plan and information presented at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 17th day of November, 1994.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
s-William J. LeMay
WILLIAM J. LEMAY,
Director

SEAL

Published in the Artesia Daily Press, Artesia, N.M. November 23, 1994.

Legal 14897

U.S. FISH & WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

NEW MEXICO ECOLOGICAL SERVICES STATE OFFICE
2105 OSUNA NE
ALBUQUERQUE, NEW MEXICO 87113
Telephone: (505) 761-4525 Fax Number: (505) 761-4542

December 1, 1994

William J. Lemay, Director
New Mexico Water Quality Control Commission
State Land Office Building
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Dear Mr. Lemay:

This responds to the Oil Conservation Division's (OCD) public notice dated November 17, 1994, regarding the State of New Mexico's proposal to renew the discharge plan for the applicants listed below.

> **(GW-22) - Amoco Production Company.** The manager of plant operations has submitted a discharge plan for renewal of their Empire Abo Gas Plant located in the NE/4 SE/4 Section 3, Township 18 South, Range 27 East, Eddy County, New Mexico. Approximately 17,000 gallons per day (gpd) of waste water will be collected and stored in an above ground, closed top, steel tank prior to disposal in an OCD-approved injection well.

> **(GW-21) - Marathon Oil Company.** The production representative has submitted a discharge plan for renewal or their Indian Basin Gas Plant located in the NE/4 Section 23, Township 21 South, Range 23 East, Eddy County, New Mexico. Approximately 84,000 gpd of waste water will be collected and stored in an above ground, closed top, steel tank prior to disposal in an OCD-approved injection well.

It is our understanding that all waste water produced by the applicant will be contained within a pipe, a closed tank, or transport vehicle. No produced water will be discharged into a surface impoundment or open-topped tank where it could become available to wildlife, except in case of accidental breach of a pipe or storage tank. Therefore, the U.S. Fish and Wildlife Service has no objection to the Oil Conservation Division granting approval for the discharge plan application outlined above.

Thank you for the opportunity to review and comment on this discharge plan application. If you have any questions, please contact Joel D. Lusk at (505) 761-4525.

Sincerely,

Brian Hanson

for Jennifer Fowler-Propst
State Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico

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

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

November 18, 1994

ARTESIA DAILY PRESS
P. O. Box 179
Artesia, New Mexico 87210

ATTN: ADVERTISING MANAGER

RE: NOTICE OF PUBLICATION

Dear Sir/Madam:

Please publish the attached notice one time immediately on receipt of this request. Please proofread carefully, as any error in a land description or in a key word or phrase can invalidate the entire notice.

Immediately upon completion of publication, please send the following to this office:

1. ***Publisher's affidavit in duplicate.***
2. ***Statement of cost (also in duplicate.)***
3. ***CERTIFIED invoices for prompt payment.***

We should have these immediately after publication in order that the legal notice will be available for the hearing which it advertises, and also so that there will be no delay in your receiving payment.

Please publish the notice no later than November 25*, 1994.*

Sincerely,

Sally Martinez

Sally E. Martinez
Administrative Secretary

Attachment

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

November 18, 1994

ALBUQUERQUE JOURNAL
717 Silver Southwest
Albuquerque, New Mexico 87102

RE: NOTICE OF PUBLICATION

ATTN: ADVERTISING MANAGER

Dear Sir/Madam:

Please publish the attached notice one time immediately on receipt of this request. Please proofread carefully, as any error in a land description or in a key word or phrase can invalidate the entire notice.

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Please publish the notice no later than November 25 *, 1994.*

Sincerely,

Sally Martinez

Sally E. Martinez
Administrative Secretary

Attachment

NOTICE OF PUBLICATION

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

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(GW-21) - Marathon Oil Company, Robert Menzie, Jr., Production Environmental Representative, P.O. Box 552, Midland, Texas, 79702-0552, has submitted a discharge plan application for renewal for their Indian Basin Gas Plant located in the NE/4 Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. Approximately 84,000 gallons per day of waste water will be stored in above ground closed top steel tanks prior to disposal at an OCD approved disposal facility. Total dissolved solids concentration of the waste water is approximately 12,000 mg/l total dissolved solids. Groundwater most likely to be affected in the event of an accidental discharge is at a depth of approximately 240 feet with a total dissolved solids concentration of 550 mg/l. The discharge plan addresses how spills, leaks and other accidental discharges to the surface will be managed.

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If no hearing is held, the Director will approve or disapprove the plan based on the information available. If a public hearing is held, the Director will approve the plan based on the information in the plan and information presented at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 17th day of November, 1994.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

SEAL

WILLIAM J. LEMAY, Director

NOTICE OF PUBLICATION

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

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GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 17th day of November, 1994.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

SEAL

WILLIAM J. LEMAY, Director

ACKNOWLEDGEMENT OF RECEIPT
OF CHECK/CASH

I hereby acknowledge receipt of check No. [redacted] dated 10-24-94,

or cash received on 11-15-94 in the amount of $ 1717.50

from Marathon Oil Co

for (GW-21) Indian Basin Gas Plant
(Facility Name) (DP No.)

Submitted by: ______ Date: ______

Submitted to ASD by: CHRIS EUSTICE Date: 11-17-94

Received in ASD by: H Monday Date: 11/17/94

Filing Fee ✓ New Facility ____ Renewal ✓

Modification ____ Other ______
(specify)

Organization Code 521.07 Applicable FY 95

To be deposited in the Water Quality Management Fund.

Full Payment ____ or Annual Increment ____

THIS CHECK IS VOID IF GREEN COLORED BACKGROUND IS ABSENT

FORM 208 REV. 1-90

Marathon Oil Company
MIDLAND, TEXAS

56-382
412

NO. [redacted]

PAY TO THE ORDER OF

MO. DAY YR.
10 | 24 | 94

NMED Water Quality Management Fund
P. O. Box 2088
Santa Fe, NM 87501

MATCH AMOUNT IN WORDS WITH NUMBERS
***$1,717.50**
VOID AFTER 180 DAYS

One Thousand Seven Hundred Seventeen and 50/100

FIRST NATIONAL BANK OF ASHLAND
AN AFFILIATE OF
NATIONAL CITY BANK
CLEVELAND, OHIO

[redacted]

Mid-Con[illegible]t Region
Production United States

Marathon Oil Company

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

RECEIVED

NOV 1 1994

OIL CONSERVATION DIV.
SANTA FE

October 31, 1994

Mr. Roger Anderson
Environmental Bureau
New Mexico Oil Conservation Division
Land Office Building
Santa Fe, New Mexico 87504-2088

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

Dear Mr. Anderson:

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, 1994.

Attached are two copies of the Groundwater Discharge Plan document for your review and approval. One copy has been transmitted to the New Mexico Oil Conservation Division (OCD) District office in Artesia, New Mexico. Also, enclosed is a $1717.50 check to cover both the filing and renewal fees. This plan was prepared in accordance with Section 3 of the New Mexico Water Quality Control Commission Regulations and the OCD guidance document entitled "Guidelines for the Preparation of Groundwater Discharge Plans at Natural Gas Processing Plants, Oil Refineries, and Gas Compressor Stations." If you have any questions regarding the document, please contact Noel R. Garza at the plant (505-457-2621) or Robert J. Menzie, Jr. in our Midland office (915-687-8312).

I hereby certify that I am familiar with the information contained in and submitted with this document and such information is true, accurate, and complete to the best of my knowledge.

Sincerely,

R. F. Unger

R. F. Unger
Production Manager
Midland Operations

xc: N. R. Garza
R. J. Menzie, Jr.
M. W. Ashley, NMOCD - Artesia

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

August 25, 1994

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-111-334-160

Mr. Robert J. Menzie, Jr.
Production Environmental Representative
Marathon Oil Company
P.O. Box 552
Midland, Texas 79702

RE: PIPELINE SPILL REMEDIATION
MARATHON INDIAN BASIN GAS PLANT
EDDY COUNTY, NEW MEXICO

Dear Mr. Menzie:

The New Mexico Oil Conservation Division (OCD) has completed a review of the Marathon Oil Company's (MOC) July 29, 1994 "INDIAN BASIN GAS PLANT, LINE #1 RELEASE REMEDIATION WORKPLAN". This document presents Marathon's workplan for remediation of soils contaminated as a result of a July 13, 1994 leak of condensate and produced water at MOC's Indian Basin Gas Plant.

The above referenced workplan is approved with the following condition:

1. MOC will submit a report containing the results of the remedial activities to the OCD for approval by November 4, 1994.

Please be advised that OCD approval does not relieve MOC of liability should the remedial actions fail to adequately remediate contaminants related to MOC's activities. In addition, OCD approval does not relieve you of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions please contact me at (505) 827-5885.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: OCD Artesia District Office

Mid-Con.. .nt Region
Production United States

OIL CONSER... ..N DIVISION
RECEIVED

Marathon Oil Company

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

AM 8 50

July 29, 1994

Mr. William Olson
State of New Mexico
Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

RE: Indian Basin Gas Plant
Line #1 Release Remediation Workplan

Dear Mr. Olson:

Per the 15-day written report requirement in the State of New Mexico Water Quality Control Commission (WQCC) Regulations Part 1, Section 1-203(6), "Notification of Discharge-Removal," Marathon Oil Company is submitting a workplan for Oil Conservation Division approval to address contaminated soil related to a 552-barrel spill consisting of 125 barrels of condensate and 427 barrels of produced water from Line #1 at the Indian Basin Gas Plant. Marathon intends to initiate work as described in the attached workplan on the morning of August 31, 1994 following a site safety meeting scheduled for 7:00 am.

If you have any questions concerning this project, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie, Jr.

Robert J. Menzie, Jr.
Production Environmental Representative

Attachment

xc: Mark Ashley, NMOCD, Artesia
N. R. Garza, Indian Basin Gas Plant

INDIAN BASIN GAS PLANT
LINE #1 RELEASE
REMEDIATION WORKPLAN

Indian Basin Gas Plant
329 Marathon Road
Lakewood, New Mexico 88254
Eddy County

Submitted by
Marathon Oil Company
on behalf of the
Indian Basin Gas Plant Owners

July 29, 1994

INTRODUCTION

This proposed workplan has been prepared in response to the 15-day written report requirement in the State of New Mexico Water Quality Control Commission (WQCC) Regulations Part 1, Section 1-203(6), "Notification of Discharge - Removal." At the Oil Conservation Division's (OCD) request, Marathon Oil Company is submitting a workplan for OCD approval to address contaminated soil related to a 552-barrel spill of condensate and produced water from a production pipeline within the Indian Basin Gas Plant on Marathon-owned property that occurred on July 15, 1994. The spill consisted of approximately 125 barrels of condensate and 427 barrels of produced water. The Indian Basin Gas Plant is located at 329 Marathon Road, Lakewood, New Mexico 88254 in Eddy County (Figure 1).

INTERIM MEASURES

The Line #1 leak was discovered on the afternoon of July 13 by a plant operator on routine rounds. A wet area was observed above Line #1 at the southern plant area approximately 80 feet west of the inlet separators (Figure 2). Marathon immediately took steps to shut in and blow down Line #1. One high pressure dry gas pipeline is buried beneath Line #1 and presented a safety hazard during the excavation to repair Line #1. Marathon shut in and blew down this dry gas pipeline. Shovels and a backhoe were then used to excavate around the pipelines to expose the problem area. A corroded dresser coupling connecting two lengths of polyvinyl chloride (PVC) piping was leaking from one 1/8-inch hole. This faulty coupling was replaced with a section of poly pipe and the excavation was backfilled.

VERBAL AND WRITTEN SPILL REPORTING

On July 15, 1994 a verbal notification of the spill event was made to Mark Ashley with the OCD, Artesia office. On July 22, 1994 a written report summarizing the spill nature, volume, and description of repair was submitted to OCD offices in Santa Fe and Artesia via an OCD Notification of Fire, Breaks, Spills, Leaks, and Blowouts standard reporting form.

WORKPLAN

The following corrective action steps are identified for source reduction associated with contaminated soil adjacent to and below the Line #1 pipeline. Workplan activities are scheduled for August 31, 1994.

Excavation

Marathon proposes to initially excavate contaminated soil related to the pipeline leak with hand shovels to expose all pipelines in the area of the excavation. After these pipelines have been located exactly, a backhoe will be used to excavate the remaining contaminated soil to approximately 12 feet or to the depth that the backhoe can safely operate. An exclusion or safe zone will be established around the excavation to prevent onsite personnel from approaching the edge of the excavation. Sloping of one or more of the sidewalls or construction of earthen benches may be necessary to allow the backhoe to excavate to the target depth.

Soil Sampling

One grab soil sample will be collected from contaminated soils immediately below the pipeline where the release occurred. A three by three grid consisting of nine grab soil samples will be collected from the bottom of the excavation. In addition, two soil samples will be collected from each sidewall of the excavation (i.e. east, west, north, and south). A total of 18 samples will be collected. The backhoe will be used to remove undisturbed soil from the bottom and sidewalls of the excavation for sampling purposes. Soil samples will be collected by Marathon personnel from the backhoe bucket at the edge of the exclusion zone. The soil samples will be collected in wide-mouth jars and placed on ice in a cooler at the site.

Laboratory Analysis

The soil samples will be sent overnight to Analytical Technologies, Inc. in Albuquerque, New Mexico for benzene, toluene, ethylbenzene, and total xylene (BTEX; EPA Method 8020), and total recovery petroleum hydrocarbon (TRPH; EPA Method 418.1) analyses. The turnaround time for BTEX and TRPH preliminary results will be 24 hours.

Excavation Cleanup Standards

Marathon proposes to remove soil that exceeds the suggested concentrations in the New Mexico Spill and Leak Guidelines for sites where the depth to groundwater is less than 50 feet. Therefore, the proposed excavation cleanup standards for TRPH, total BTEX, and benzene concentration in the soil are 100 mg/kg, 50 mg/kg, and 10 mg/kg, respectively.

Backfill of Excavation

If the laboratory results indicate that the cleanup standards proposed above have been met, the excavation will be backfilled with clean fill dirt and compacted. This clean fill dirt will be acquired from previously treated soil removed from the Indian Basin Gas Plant landfarm.

If the laboratory results indicate that the proposed cleanup standards have not been met, additional soil will be excavated, if possible, from the area where the laboratory results indicated the proposed cleanup standard was exceeded. Additional soil samples will be collected from this area after sufficient material is removed to satisfy the Marathon project manager. These samples will be submitted for laboratory analysis of only the constituent that did not meet the proposed standards. Upon receipt of results that are below the proposed cleanup standard, the excavation will be backfilled with clean fill dirt and compacted.

Soil Treatment and Disposition

Marathon proposes to treat the nonhazardous, contaminated soil in the Indian Basin Gas Plant landfarm to reduce the TRPH and total BTEX concentrations in the soil to below 3,000 mg/kg and 50 mg/kg, respectively. Bioremediation of the soil to these levels can be accomplished by performing nutrient and freshwater addition, as well as periodic tilling. Marathon proposes to stockpile the excavated contaminated soil on plastic sheeting in an area adjacent to the Indian Basin Gas Plant landfarm until the soil removed from the Line #1 excavation can be loaded into the landfarm treatment cell and treated separately from soil removed from other locations. Marathon will test periodically to determine when soil meets the cleanup standards.

Upon determination that cleanup standards have been met, Marathon proposes to use the treated soil for construction of secondary containment berms within the gas plant or stormwater berms on the south side of the plant.

Health and Safety Plan

A site safety meeting will be conducted by Marathon personnel before work begins on the morning of August 31, 1994. Excavation safety and other hazards associated with the workscope activities described above will be discussed.

State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

[✓] Telephone [ ] Personal	Time 1115	Date 7/15/94

Originating Party	Other Parties
Noel Garza, Bob Menzie - Marathon	Bill Olson - Envir. Bureau
Mark Ashley - OCD Artesia	

Subject

Marathon Indian Basin Spill ~~Condensate Spill~~

Discussion

Spill estimates at 125 bbls condensate 400 bbls produced water noticed through metering at gathering system. Shut in line. Spill surfaced at plant boundary. Dug up and discovered leak in a dresser coupling. Leak has been repaired

Told them to follow Leak & Spill guidelines and submit report on spill and work plan for remediation within 1 week as required by regs.

Conclusions or Agreements

They will submit ~~a~~ written report and work plan within one week.

Distribution OP
file < Remediation
Roger Anderson

Signed Bill Olson

State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☑ Telephone ☐ Personal	Time 0850 hrs.	Date 7/15/94

Originating Party	Other Parties
Mark Ashley - OCD Artesia	Bill Olson - Envir. Bureau

Subject

Marathon Indian Basin Gas Plant

Discussion

Noel Garza just called to report spill between Rocky Arroyo (site of last leak) and the plant. 125 bbls condensate lost and 400 bbls produced water lost.

Conclusions or Agreements

He is leaving for the site to inspect and will report back upon return to office

Distribution
file
Roger Anderson

Signed Bill Olson

Marathon Oil Company

Mid-Continent Region
Production United States

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

March 30, 1994

Mr. Roger C. Anderson
State of New Mexico, Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504-2088

RE: INDIAN BASIN GAS PLANT
EXEMPT WASTE DISPOSAL

Dear Mr. Anderson:

This letter is a follow-up to our phone conversation today requesting your approval to inject neutralized potassium hydroxide (KOH) waste into our two Class II injection wells. The KOH was used for cleaning piping and tanks in direct contact with the gas processing production stream. During this phone conversation you provided the verbal approval for this discharge. Four drums of this exempt waste are currently being stored in the Indian Basin Gas Plant drum storage area. The spent KOH has a pH of 14. Marathon will neutralize the KOH waste to a pH of between 4 and 9. The neutralized waste will then be transferred to the skimmer basin, thereby becoming part of the waste disposal stream that is injected into our two wells which are currently permitted for saltwater disposal. Marathon intends to modify our two existing injection permits to allow the discharge of exempt, plant processing liquid wastes into these wells.

During this same telephone conversation, you also approved our request to place nine drums of hydrocarbon-contaminated resin, gravel, and charcoal (activated carbon) into our landfarm on the west side of the Indian Basin Gas Plant. Marathon considers this waste to be exempt. Our intent is to modify the Indian Basin Gas Plant Groundwater Discharge Plan during the renewal process this summer to allow landfarming of exempt hydrocarbon-containing solid waste in addition to hydrocarbon-containing soil, the latter being the current permitted landfarming material.

Thank you for assisting us with the proper handling of these wastes. If you have any questions, please contact me at (915) 687-8312.

Sincerely,

Robert J. Menzie Jr.

Robert J. Menzie, Jr.
Production Environmental Representative

xc: C. M. Schweser, IBGP

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

November 8, 1993

CERTIFIED MAIL
RETURN RECEIPT NO. P-176-012-043

Mr. R. F. Unger, Production Manager
Midland Operations
Marathon Oil Company
P.O. Box 552
Midland, TX 79702

RE: Discharge Plan GW-21 Renewal
Indian Basin Gas Plant
Eddy County, New Mexico

Dear Mr. Unger,

On November 26, 1984, the original groundwater discharge plan, GW-21 for the Indian Basin Gas Plant located in the SW/4 NE/4 of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico, was approved by the Director of the Oil Conservation Division (OCD), and was renewed on October 30 1989. This discharge plan was required and submitted pursuant to Water Quality Control Commission (WQCC) regulations and was approved for a period of five years. The current approval will expire on November 26, 1994.

If your facility continues to have potential or actual effluent or leachate discharges and you wish to continue operation, you must renew your discharge plan. The OCD is reviewing discharge plan submittals and renewals carefully and the review time can extend for several months. Please indicate whether you have made, or intend to make, any changes in you system, and if so, please include these modifications in your application for renewal.

Note that the completed and signed application form must be submitted with your discharge plant renewal request.

If you no longer have any actual or potential discharges please identify this office. If you have any questions, please do not hesitate to contact Bobby Myers at (505)827-4080.

Sincerely,

Roger C. Anderson

Roger C. Anderson
Environmental Bureau Chief

RCA/rlm
xc: OCD Hobbs Office

2d
KP

Feds start probe of Carlsbad oil spill

Groundwater found to be contaminated

By TONY DAVIS
Staff reporter

Federal officials are investigating whether Marathon Oil Co. violated any laws when more than 2 million gallons of oil and wastewater leaked nearly a year ago from its pipeline near Carlsbad.

The company recently discovered groundwater is contaminated with oil more than 200 feet underground and about 4,000 to 5,000 feet east of where the leak occurred. In one monitoring well, Marathon's tests found a foot-thick oil layer floating on top of the area's groundwater table.

This was one of the largest oil leaks or spills in the state's history. Marathon discovered it in mid-April.

Tests of the water contamination show it is chemically different than the kind of oil that leaked from the Marathon pipeline, said Bill Ryder, a spokesman for the Pittsburgh-based company.

But state Oil Conservation Division officials say they're holding Marathon responsible for the water contamination because no one else operates in the area. The contamination could have come from an earlier spill, state officials said.

And more oil has turned up in cracks and fractures in bedrock lying about 60 feet underground near the leak site. It too, could be heading to the groundwater, officials said.

Dale Tunnell, a special law enforcement agent for the U.S. Bureau of Land Management in Santa Fe, said the bureau has visited the company's plant site 25 miles north of Carlsbad and interviewed Marathon employees to determine if the company violated criminal or civil laws.

The leak spilled 1.47 million gallons of oil. The other 840,000 gallons were mostly salt water containing small amounts of dissolved oil from a 12-foot-deep underground pipeline.

35,000 bbl oil
20,000 bbl water

"The only thing we can get into is who caused it — was it an act of God, negligence, or what?" said Tunnell, who declined further comment on the bureau's investigation.

The oil had been leaking since November 1990, Marathon has said. The oil leaked onto the federal land management agency's property and has spread about a half-mile east into the desert.

Until Marathon found the contamination recently, state and company officials had assumed or hoped the groundwater was protected by thick, seemingly impenetrable limestone and other bedrock formations starting a short distance below the ground surface.

"It's something we are not happy to see by any stretch of the imagination," said David Boyer, environmental bureau chief for the state's Oil Conservation Division. "It is a very serious occurrence."

It doesn't appear likely that the oil will contaminate anyone's drinking wells, because the nearest well lies far east of where the water pollution stops, Boyer said.

E2 ALBUQUERQUE JOURNAL Saturday, July 20, 1991

BLM Probing Marathon After Massive Oil Leak

The Bureau of Land Management is investigating a 1.47 million-gallon oil leak in southeastern New Mexico that was discovered earlier this year, an agency official said Friday.

Bureau spokeswoman Mary O'Keeffe said officials from the bureau's law enforcement unit in Santa Fe are looking at Marathon Oil Co.'s leak, the state's largest in recent years.

O'Keeffe couldn't provide any further details. But Chris Shuey of Albuquerque's Southwest Research and Information Center, an environmental group, said the agency is looking at whether federal laws have been violated.

A state Oil Conservation Division official said last month Marathon won't be cited or fined for the leak because it didn't violate state laws.

Marathon officials discovered the leak in mid-April but said they believe the oil had been leaking since at least November 1990. About 840,000 gallons of waste water leaked with the spill.

BLM said in a statement Marathon will complete by Aug. 5 an assessment identifying the impacts caused by the leak.

Sunday, July 21, 1991 THE NEW MEXICAN B-7

BLM investigating Carlsbad-area oil leak

The Associated Press

The U.S. Bureau of Land Management's law enforcement unit is investigating a 1.47 million gallon oil leak discovered three months ago north of Carlsbad, a BLM spokeswoman said.

Mary O'Keeffe said Friday she could not provide any further details about the investigation.

But Chris Shuey of Albuquerque's Southwest Research and Information Center said the BLM is looking at whether federal laws have been violated.

Robert Stovall, an attorney for the state Oil Conservation Division, said last month Marathon Oil would not be cited or fined for the leak because it did not violate state laws.

Company officials discovered the leak in mid-April but said they believe the oil had been seeping out of an underground pipeline at the company's Lakewood plant since at least November 1990.

See New file on 4/12/91 Spill

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

May 15, 1991

CERTIFIED MAIL
RETURN RECEIPT NO. P-327-278-118

Mr. R. F. Unger, Production Manager
Midland Operations
Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

RE: April 12, 1991, Leak of Condensate and Produced Water, Marathon Indian Basin Gas Field, Eddy County, New Mexico

Dear Mr. Unger:

The New Mexico Oil Conservation Division (OCD) has received your April 22, 1991, written notification of the above leak of fluids. Verbal notification was provided to OCD on the morning of the leak discovery, as required by OCD Rule 116. Subsequent to the written notification, on April 29, 1991, OCD received a copy of the "Site Characterization Plan" (SCP) provided to the Bureau of Land Management. Both the OCD notification letter and the Site Characterization Plan provide information on the circumstances of the incident, volumes of fluids lost and interim measures being taken to investigate the extent of the spill and recover fluids.

The NMOCD has authority under both the Oil and Gas Act (70-2-1 et seq., NMSA 1978) and the New Mexico Water Quality Act (74-6-1 et seq., NMSA 1978), and rules and regulations adopted thereunder, to require actions be taken to protect public health and the environment and prevent water pollution; and to require corrective actions as are necessary or appropriate to contain, remove or mitigate the damage caused by a discharge of water pollutants. This letter is a request for your continued voluntary compliance in taking the corrective actions needed to investigate, assess, contain, remove and mitigate actual or potential environmental pollution that has been or may be caused by this spill.

OCD requests that further information be provided this agency regarding the circumstances of the incident, the progress of the technical investigation and other actions proposed to be taken by Marathon. OCD will review and comment in writing on actions already taken, review for approval proposed actions, and, if necessary, require that additional actions be undertaken if to prevent or abate pollution. The Site Characterization Plan already submitted was an excellent report providing timely information on the circumstances of the spill and immediately actions taken by Marathon in response to the spill.

Request For Information

In addition to the information provided in the SCP, Marathon is required to provide the following information:

A. Investigation Activities

1. Supply an updated map of remediation locations (soil gas measurement points, pits, borings, etc.) Please provide an updated map weekly during the investigation phase of the remediation.

2. Provide updated copies of Tables 2, 3 and 4 weekly during the investigation phase. Please revise Table 3 (Soil Boring Details) to include information on whether fluids were detected and type (water and/or condensate), fluid thickness, and indicate quality (fresh or produced water) of fluids. Include information as to whether the boreholes were completed as monitor and/or extraction wells.

3. Provide information on trenching activities (locations, rock characteristics, and type and quantity of any fluids encountered).

4. Provide weekly summaries of types and volumes of fluids recovered.

B. Site Geology

1. Provide lithologic information on the bedrock (both sandstone and dolomite) encountered at the leak site.

2. Provide additional information on the lithologic and structural characteristics of subsurface material beneath the spill site to first deep ground water (Lower Queen aquifer). Include information and interpretation on possible occurrence and continuity of vertical joint/fracture patterns in the subsurface. (Several core holes having shallow geoligic data were referenced in the attached site characteristics section of the Gas Plant Discharge Plan.)

3. Some soil boring records (Appendix G) were illegible due to photocopying problems. Please provide complete copies of all logs.

C. Water Quality

1. Provide an analysis of the quality of the produced water discharged with the condensate. The analysis should include both general water chemistry parameters and ICAP metal constituents (both shown on the attached sheets), plus arsenic, selenium and mercury by the appropriate EPA atomic adsorption method.

2. Provide information on whether any shallow fresh water has been detected by the investigation in the vicinity of the spill. Indicate which boreholes, pits or trenches, if any, have intercepted fresh water.

3. In a phone call on May 8th with Mr. Tony Kavran of Marathon and myself, Marathon committed to weekly sampling of nearby domestic water wells. Please furnish the names and locations of those wells to be sampled, and constituents to be analyzed. We request that at least one sample at each well be analyzed for general water chemistry parameters.

4. In addition to the domestic wells we request that you sample the #6 and #13 stock wells shown on Exhibit 8 of the SCP, Indian Big Springs (21S-24E-Sec. 27.210), and the first seepage water in Rocky Arroyo downstream from the spill. Propose a schedule for future periodic monitoring of these locations.

D. Miscellaneous Information

1. Provide information on the material and age of the failed section of condensate line (the SCP does not make clear whether the failed section was PVC or steel, see p. 8 and 21) and whether the failure was likely due to internal or external corrosion.

2. Exhibit 9 (5-7-91) shows elevated soil-gas concentrations at some locations that appear isolated from the spill. These locations require further investigation to determine the source of this gas.

3. Provide information on material, age and testing program for other sections of the Indian Basin Gathering lines so that a reoccurrence of this incident does not occur. Provide a map showing the location of these lines.

Proposed Remediation

A. Groundwater Monitoring

Prior to drilling deep (Lower Queen) ground water monitoring wells, locations and construction details must be approved by OCD. Because of the possibility of cross-contamination, OCD discourages the drilling of deep monitor wells within the defined plume area. Any such drilling will require that special precautions be taken to prevent downward movement of contaminated fluids.

B. Remediation Plan

As discussed on page 31 of the SCP, submit a plan for product recovery and remediation of the affected area for OCD review and approval. After review of the plan, OCD will provide comments to Marathon and the BLM. During the time of review, OCD will coordinate with BLM to prevent, to the extent possible, duplication of effort. However, OCD recognizes that as the surface owner, BLM may require work in addition to that which OCD would require. Therefore, it will be necessary for Marathon consult with BLM as to their additional requirements.

Unfortunately, due to staff limitations, OCD can not provide a full-time staff person to be on-site during investigation and remediation efforts. However, OCD Artesia and OCD Santa Fe staff will visit the site periodically to monitor progress and communicate with you or your staff on the remediation.

If you have any questions regarding the information requests in this letter or on any other issue, please contact me at the above address or by phone at (505) 827-5812.

Sincerely,

David G. Boyer

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/sl

Enclosures

cc: OCD Artesia Office
Kathy Sisneros, WWMD, Environment Department
Dick Manus, BLM - Carlsbad Office
Al Collar, BLM - Roswell Office

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

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

May 13, 1991

CERTIFIED MAIL
RETURN RECEIPT NO. P-327-278-123

Mr. R. F. Unger, Production Manager
Midland Operations
Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

RE: Site Characterization Plan, Indian Basin Gas Field

Dear Mr. Unger:

As a result of our conversation of May 8th, I am returning, without retaining a copy, Appendix F, ("GC Characterization of Condensate"), of the above document. Without making a determination as to whether the material in that Appendix is "Privileged and Confidential," I believe the detailed information provided is extraneous to OCD's part in the investigation and recovery effort. The remainder of the document is to be available for public use upon request.

In general, materials provided to the state in furtherance of our official duties are considered public records and available for inspection. The grounds on which material may be considered confidential are quite narrow. A copy of the appropriate section of the Water Quality Act (74-6-12.B) is enclosed.

If you have any questions please contact me at (505) 827-5812.

Sincerely,

David G. Boyer

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/sl

Enclosure

cc: OCD artesia Office w/enclosure
Dick Manus, BLM Carlsbad Office w/enclosure
Al Collar, BLM Roswell Office w/enclosure

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

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

July 17, 1990

CERTIFIED MAIL
RETURN RECEIPT NO. P-918-402-288

Mr. Ronald F. Morgan
Senior Environmental Engineer
Marathon Oil Company
P. O. Box 553
Midland, Texas 79702

RE: Landfarming of Hydrocarbon Stained Soils, Indian Basin Gas Plant

Dear Mr. Morgan:

We have received a copy of your June 6, 1990, letter reguesting approval to roadspread instead of landfarm hydrocarbon stained spills. We have located the original letter and apologize for the delay in responding.

After discussion with you on the procedures to be followed prior to and during spreading, this request is hereby approved with the following conditions:

1. PCB contaminated soils will not be roadspread or landfarmed.

2. Soils to be roadspread will not contain heavy metals or other constituents in excess of TCLP levels.

3. Areas eligible for roadspreading include roads and other areas where maintenance vehicles may be driven within the property boundary of the facility.

4. The material will be used for dust control or filling small potholes or depressions in the roadways. It will not be used as fill material for large scale excavation.

5. Material spread on the surface will be worked into existing soil, bladed or rolled (i.e. compacted) to prevent migration by wind.

6. To prevent offsite runoff, the material shall be spread only on level surfaces or in areas diked to prevent movement to drainage channels.

Since the concept of removal and treatment of hydrocarbon soils was presented in the discharge plan previously approved with the provision that Marathon would consult with OCD staff on specifics, this approval is not considered a discharge plan modification subject to public notice requirements.

Please be advised that the approval does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment which may be actionable under other laws and/or regulations.

If you have any questions, please contact me at (505) 827-5812.

Sincerely,

David G. Boyer

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/sl

cc: OCD Artesia Office

Mid-Con[illegible]t Region
Production United States

Marathon Oil Company

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

90 JUN 8 AM 9 09

June 6, 1990

Mr. David G. Boyer
Chief, Environmental Bureau
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe Land Office Building
Santa Fe, New Mexico 87504

Dear Mr. Boyer:

The five-year update of the Discharge Plan for Marathon's Indian Basin Gas Plant, as required by the OCD, was completed during 1989. This document, which is a comprehensive waste management plan, was approved by you on October 30, 1989.

During the planning period you and Roger Anderson inspected the plant. You identified a number of areas where valves, fittings, flanges, pumps, etc., have been leaking. Marathon submitted plans for reducing and containing such leaks. Along with the containment effort, Marathon scheduled to initiate a landfarming project for the soil contaminated areas identified by your June 29, 1989 letter.

Herein, Marathon proposes an alternative to landfarming as such. In lieu of landfarming, we propose to utilize the contaminated material for surfacing at the plant site.

We will follow a procedure of routinely analyzing for PCBs before spreading. Likewise, we will test for toxic characteristic (TC) metals utilizing the new toxic characteristics leaching procedure (TCLP).

You and I discussed your idea of surface spreading as an alternative on March 7, 1990. And we briefly discussed the matter again on March 30.

Marathon plans to proceed with such surfacing in the third quarter of this year. The proposed procedure is somewhat of a digression from the original plan. So, we hereby solicit your approval.

Sincerely,

Ronald F Morgan

Ronald F. Morgan
Senior Environmental Engineer

RFM/elg

cc: W. D. Holmes
A. J. Kavran
W. O. Snyder
S. D. York

RECEIVED

MAY -4 '90

O. C. D.
ARTESIA OFFICE

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	MARATHON OIL CO			ADDRESS	P.O. BOX 1324 ARTESIA NM 88210		
REPORT OF	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT X	OIL RFY	OTHER*
NAME OF FACILITY	INDIAN BASIN GAS PLANT						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	SW/NE			SEC. 23	TWP. 21S	RGE. 23E	COUNTY EDDY
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	20 MILES WEST OF CARLSBAD						
DATE AND HOUR OF OCCURENCE	4-30-90 5:00PM			DATE AND HOUR OF DISCOVERY	4-30-90 5:00PM		
WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED X	IF YES, TO WHOM			
BY WHOM				DATE AND HOUR			
TYPE OF FLUID LOST	CONDENSATE			QUANTITY OF LOSS	15 Bbls	VOLUME RECOVERED	0 Bbls
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY**

N/A

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

CONDENSATE TANKS OVERFILLED
SHUT DOWN CONDENSATE FEED PUMP
BEGAN TRUCKING CONDENSATE TO LOWER TANK LEVEL

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

GRAVELLED AREA (12'x50') UNDER CONDENSATE STORAGE TANKS

DESCRIPTION OF AREA	FARMING	GRAZING X	URBAN	OTHER*			
SURFACE CONDITIONS	SANDY X	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

DRY CONDITIONS
TEMPERATURE 80°F

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Howard Welker TITLE Plant Eng. DATE 5/1/90

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

5·11·90 OK M.S.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone ☐ Personal	Time: 8:15 AM	Date: 8/17/89

Originating Party	Other Parties
Carolyn Ritchie Marathon Oil (915) 639-2553	Dave Boyer, OCD ext 223

Subject: Disposal of Used Oil Field Chemicals

Discussion: Marathon has determined they are excluded from Hazardous Waste Requirements by the oil and gas exclusion (40 CFR 261.4.(b) 5) and specifically EPA's regulatory determination that workover and completion wastes are exempt. Marathon intends to blend the wastes into the crude stream, if we have no objection. I said that they need to ~~kep~~ keep records of this. I also said that even though they have

Conclusions or Agreements: determined they do not have hazardous waste, I did not want any waste containing chlorinated solvents at OCD regulated disposal sites.

Distribution: Marathon File
OCD Hobbs

Signed: David G. Boyer

STATE OF
NEW MEXICO

OIL
CONSERVATION
DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☒ Telephone ☐ Personal	Time 9 AM	Date 8/7/89

Originating Party	Other Parties
Carolyn Ritchie Marathon Oil (915) 639-2553 ext 223	David Boyer, OCD

Subject Disposal of Used Oil Field Chemicals

Discussion Marathon's analyses showed the following chemicals - 46 gallons of a mixture of chlorotoluene (6316 ppb) and 1,1,2,2 Tetrachloro ethene; 334 gallons of a mixture of bromoform (270 ppb), ~~and~~ 1,3 dichlorobenzene (130 pp.) and 1,1,2,2 Tetrachloroethene (67 ppb); 107 gallons of a bromoform mixture (578 ppb); 59 gallons of a mixture of bromoform (378 ppb) and 1,1,2,2 TCE (296 ppb); and 203 gallons of 1,1,2,2 TCE at 113 ppb.

Conclusions or Agreements

I told ~~[illegible]~~ Marathon that they should determine if they met the hazardous waste determination of 40 CFR 262.11. ~~[illegible]~~ and get back with us.

Distribution

Marathon file
OCD Hobbs

Signed David G Boyer

Mid-Continent Region
Production United States

Marathon Oil Company

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

July 13, 1989

Mr. David Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504-2088

Re: Waste Minimization

Dear Dave:

I would like to express my appreciation for the guidance and assistance you have given me concerning Marathon's efforts to minimize oil field waste throughout our operations in New Mexico. During our phone conversation this morning, we specifically discussed waste characterizations and disposal of those wastes by tank battery blending. I would like to review your directives to make sure we are in agreement as to what wastes <u>cannot</u> be tank battery blended.

You stated that no materials with a PCB content greater than 50 ppm should be disposed of in this manner. Our laboratory analysis of the materials at our Hobbs Warehouse Yard showed the PCB content to be less than 10 ppm in all cases.

You also advised me that all acids and bases must be neutralized to a pH greater than 2 and less than 12.5. Laboratory analysis has determined the pH of the Hobbs materials to range from 6.0 to 8.6.

Additionally, you said that the metals content of the materials must not be in excess of the maximum concentration of contaminants for characteristic of EP toxicity as defined by 40 CFR Part 261.24. Our laboratory analysis of the materials under consideration for this type of disposal showed that none exceeded these standards.

Finally, you stated that no chlorinated solvents must be disposed of in this manner. None of the laboratory analyses showed any detectable (<10.0 ppm) levels of chlorinated solvents.

In conclusion, I would like to thank you again for your assistance with Marathon's waste minimization efforts. If I have not correctly reviewed your directives, please let me know as soon as possible. I can be reached at 915/682-1626. Marathon Oil Company appreciates the opportunity to work in close cooperation with the New Mexico Oil Conservation Division.

Sincerely yours,

Carolyn J. Ritchie

Carolyn J. Ritchie
Associated Environmental Engineer

CJR/elk

File 400-42

*Marathon Oil
P.O. Box 552
Midland TX 79702

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

[X] Telephone [ ] Personal	Time 10 AM	Date 7/13/89

Originating Party	Other Parties
Caroline Ritchie* Marathon Oil (915) 682-1626	Dave Boyer OCD

Subject: Disposal of unused oil field chemicals, Hobbs area

Discussion: Marathon wants to dispose/recycle unused chemicals such as emulsion breakers, surfactants, and used oils (such as lube oil) by blending into oil ~~and~~ at tank batteries. These are only small quantities and an occassional occurrence. She has analyzed for organics and PCB's (all less than 50 ppm). Tank batteries would be Marathon's.

Conclusions or Agreements: I told her ~~I~~ didn't have a problem with this as long as samples had no heavy metals in excess of hazardous waste limits, no chlorinated solvents, and pH was >2 and <12.5. I am not requiring any paperwork be sent to us on this.

Distribution
Marathon file
Hobbs OCD

Signed: D G Boyer

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

June 29, 1989

CERTIFIED MAIL
RETURN RECEIPT NO. P-106-675-047

Mr. Stephen D. York, Superintendent
MARATHON OIL COMPANY
P. O. Box 1324
Artesia, New Mexico 88211

RE: Discharge Plan GW-21
Indian Basin Gas Plant
Eddy County, New Mexico

Dear Mr. York:

On June 23, 1989, members of the Oil Conservation Division (OCD) Environmental Bureau conducted a facility inspection as part of the discharge plan renewal of the above referenced facility. The following observations made during the inspection should be addressed in your renewal application:

1. There were a number of above grade storage tanks that contained oils or chemicals that were not bermed. The OCD is requiring that above grade tanks that contain materials with constituents that can be harmful to fresh water and the environment, if a sudden and catastrophic spill were to occur, must be contained at the site of the spill and mitigated immediately. Containment in a small area at the tank site allows for maximum recovery of fluids and small volumes of contaminants available for infiltration. Without berming, the rupture of a tank will spread its contents over a large area minimizing the amount that can be recovered and increasing the surface area of contaminated soil available to leach contaminants. All tanks that contain these types of materials must be bermed to prevent migration of the fluids and decrease the potential for infiltration. Therefore a commitment and completion schedule is required for the berming of vessels that contain fluids other than fresh water. The bermed areas shall be large enough to hold one-third more than the volume of the largest vessel or one-third larger than the total volume of all interconnected vessels contained within the berm.

The following are specific areas identified during the inspection that require containment:

a. The above ground saddle tanks on the North side of the facility that contain fuel, amine, etc.

b. The above ground saddle tank containing oil at the stabilizer overhead compressor.

c. Chemical storage tanks at the cooling tower.

d. D.E.A. storage tanks.

e. The skimmer tanks south of the process area.

f. Lube oil storage.

2. A number of areas were identified where valves, fittings, flanges, pumps, etc. have been leaking. Containment of these spills and/or leaks by paving or curbing or other effective means is required. The purpose of curbing and paving process areas is to prevent migration and infiltration of any spilled or leaked materials from the process units. The total process area does not need to be curbed and paved. Small containment facilities should be placed under and around valves and pumps. Vessels that have overflowed or leaked or have the potential to overflow or leak should also have containment:

The following are specific areas that require containment.

a. The pump south of the stabilizer overhead compressor.

b. The cooling tower pumps and the area around the cooling tower where spray drift ponds on the ground.

c. Recompressors.

d. Lube oil storage transfer pumps.

e. Expander and lube oil skid system.

f. The drains below the inlet condensate tanks.

g. The area between the sidewalk and the amine circulation pumps.

h. The pump on the south tank east of the D.E.A. tank.

Submit plans and a completion schedule for paving and berming, or other proposed containment methods, the above areas or any other areas where leaks or spills can occur.

3. Drummed chemicals are used throughout the facility. Some of these drums were on concrete pads with and without containment and some were on the ground. The OCD is requiring that all drums containing fluids, whether in storage or in use, be on pads with containment ample enough to hold any spills and/or leaks from the drums. Submit a plan and completion schedule for the containment of all drum areas.

4. Oil was observed pooling on the ground under the pipe run north of the generators. Submit a proposal and completion schedule for the identification of the source of the leak, cleanup of the area and elimination or containment of the source.

5. The sump in the water softener building appeared to have only an earthen bottom and to have overflowed several times. Submit a plan and completion schedule for installing an impermeable bottom in the sump and for the elimination or containment of future slump overflows.

6. The closed drain system tank was partially below grade without leak detection. Propose a method to test the integrity of this tank. If any below grade tank not presently equiped with leak detection is replaced, leak detection is required on reinstallation.

7. If Marathon desires continued use of the landfill west of the facility fence, the landfill should be fenced to prevent unauthorized access and dumping and covered to prevent blowing trash. Provide complete information on solid waste disposal practices with the renewal application.

Thank you for the courtesy extended to us during the visit. If you have any questions, please do not hesitate to contact me at (505) 327-5884.

Sincerely,

Roger C. Anderson

Roger C. Anderson
Environmental Engineer

RCA/sl

cc: OCD Artesia Office
Ronald F. Morgan, Marathon, Midland

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 2, 1989

Mr. Stephen D. York, Superintendent
MARATHON OIL COMPANY
P. O. Box 1324
Artesia, New Mexico 88211

RE: Discharge Plan GW-21
Indian Basin Gas Plant
Eddy County, New Mexico

Dear Mr. York:

Enclosed are copies of the results of the chemical analyses from samples taken during our last sampling trip at your facility.

If you have any questions regarding the results, please contact me at (505) 827-5884.

Sincerely,

Roger C. Anderson

Roger C. Anderson
Environmental Engineer

RCA/sl

754
WPCU

SCIENTIFIC LABORATORY DIVISION
ORGANIC ANALYSIS REQUEST FORM
Organic Section - Phone: 841-2570

0R89-0912-C

REPORT TO: DAVID BOYER
N.M. OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87504-2088

S.L.D. No. OR-
DATE REC. 6-27-89
PRIORITY 3
PHONE(S): 827-5812

COLLECTION CITY: Carlsbad ; COUNTY: Eddy

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) 8|9|0|6|2|3|1|1|1|0

LOCATION CODE: (Township-Range-Section-Tracts) 2|1|S+2|3|E+2|3+1|-|- (10N06E24342)

USER CODE: 8|2|2|3|5 SUBMITTER: David Boyer CODE: 2|6|0

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

This form accompanies 2 Septum Vials, ______ Glass Jugs, and/or ______

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-AA Sample Preserved with Ascorbic Acid to remove chlorine residual.
- [X] P-HCl Sample Preserved with Hydrochloric Acid (2 drops/40 ml)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS	EXTRACTABLE SCREENS
[ ] (753) Aliphatic Headspace (1-5 Carbons)	[ ] (751) Aliphatic Hydrocarbons
* [X] (754) Aromatic & Halogenated Purgeables	[ ] (755) Base/Neutral Extractables
[ ] (765) Mass Spectrometer Purgeables	[ ] (758) Herbicides, Chlorophenoxy acid
[ ] (766) Trihalomethanes	[ ] (759) Herbicides, Triazines
[ ] (774) SDWA VOC's I (8 Regulated +)	[ ] (760) Organochlorine Pesticides
[ ] (775) SDWA VOC's II (EDB & DBCP)	[ ] (761) Organophosphate Pesticides
Other Specific Compounds or Classes	[ ] (767) Polychlorinated Biphenyls (PCB's)
[ ] ______	[ ] (764) Polynuclear Aromatic Hydrocarbons
[ ] ______	[ ] (762) SDWA Pesticides & Herbicides

*Remarks: Low detection limit (10 ppb or less) requested for halogenated purgeables

FIELD DATA:

pH= 9.5; Conductivity= 13,900 umho/cm at 25 °C; Chlorine Residual=______mg/l

Dissolved Oxygen=______mg/l; Alkalinity=______mg/l; Flow Rate______ ____/____

Depth to water ______ft.; Depth of well______ft.; Perforation Interval _____-_____ft.; Casing:______

Sampling Location, Methods and Remarks (i.e. odors, etc.)

Marathon Indian Basin Gas Plant - Final Effluent
~~Comming~~ commingled to injection well, oily water

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): D. Boyer Method of Shipment to the Lab: Tote (?)

CHAIN OF CUSTODY

I certify that this sample was transferred from ______ to ______

at (location) ______ on ___/___/___ - ___:___ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures ______ ______

For OCD use: Date owner notified: 8/3/89 Phone or Letter? Initials RCA

ANALYSES PERFORMED

LAB. No.: OR-

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Headspace (1-5 Carbons)
- ☐ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes
- ☐ (774) SDWA VOC's I (8 Regulated +)
- ☐ (775) SDWA VOC's II (EDB & DBCP)

Other Specific Compounds or Classes

- ☐ ______________________
- ☐ ______________________

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
* DETECTION LIMIT * ✱		+ DETECTION LIMIT + †	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: ______________________

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Not Sealed ☐ Intact: Yes ☐ No ☐. Seal(s) broken by: ______________ date: __________

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: __________. Analyst's signature: ______________________

I certify that I have reviewed and concur with the statements in this block.

Reviewers signature: ______________________

STATE OF NEW MEXICO HEALTH AND ENVIRONMENT DEPARTMENT

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud, NE
Albuquerque, NM 87106 [505]-841-2500
ORGANIC CHEMISTRY SECTION [505]-841-2570

July 25, 1989

ANALYTICAL REPORT
SLD Accession No. OR-89-0912

Distribution
(■) Submitter
(▒) SLD Files

To: NM Oil Consv. Div.
State Land Office Bldg.
P. O. Box 2088
Santa Fe, NM 87504-2088

From: Organic Chemistry Section
Scientific Laboratory Div.
700 Camino de Salud, NE
Albuquerque, NM 87106

Re: **A purgeable water sample submitted to this laboratory on June 27, 1989**

User:
OIL CONSERVATION DIV
State Land Office Bldg.
P. O. Box 2088
Santa Fe, NM 87504-2088

DEMOGRAPHIC DATA

COLLECTION		*LOCATION*
On: 23-Jun-89	*By:* Boy . . .	
At: 11:10 hrs.	*In/Near:* Carlsbad	

ANALYTICAL RESULTS: Aromatic & Halogenated Purgeable Screen

Parameter	Value	Note	MDL	Units
Halogenated Purgeables (33)	0.00	N	5.00	ppb
Benzene	3700.00		100.00	ppb
Toluene	6600.00		100.00	ppb
Ethylbenzene	200.00		100.00	ppb
p- & m-Xylene	2000.00		100.00	ppb
1,2-Dimethylbenzene	2200.00		100.00	ppb

See Laboratory Remarks for Additional Information

Notations & Comments:

MDL = Minimal Detectable Level.

A = Approximate Value; N = None Detected above Detection Limit; P = Compound Present, but not quantified; T = Trace (<Detection Limit); U = Compound Identity Not Confirmed.

Evidentiary Seals: Not Sealed ☒; Intact: No ☐, Yes ☐ & Broken By: ______________ Date: __________

Laboratory Remarks: Marathon Indian Basin- Fnl Eff
10-12 unidentified unsaturated compounds at trace to 200ppb were detected.

Analyst: Michael J. Owen
Michael J. Owen
Analyst, Organic Chemistry

7-12-89
Analysis Date

Reviewed By: Harry Eden for RFM
Richard F. Meyerhein 07/25/89
Supervisor, Organic Chemistry Section

RECEIVED

JUL 31 1989

OIL CONSERVATION DIV.
SANTA FE

154
WPll

SCIENTIFIC LABORATORY DIVISION
ORGANIC ANALYSIS REQUEST FORM
Organic Section - Phone: 841-2570

0R89-0910-C

REPORT TO: DAVID BOYER
N.M. OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87504-2088

S.L.D. No. OR-
DATE REC. 6-27-89
PRIORITY 3
PHONE(S): 827-5812

COLLECTION CITY: Carlsbad ; COUNTY: Eddy

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) 8|9|0|6|2|3|1|1|5|5

LOCATION CODE: (Township-Range-Section-Tracts) 2|1|S+2|3|E+2|3+|1|-|-|(10N06E24342)

USER CODE: 8|2|2|3|5 SUBMITTER: David Boyer CODE: 2|6|0

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

This form accompanies 2 Septum Vials, ____ Glass Jugs, and/or ____

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-AA Sample Preserved with Ascorbic Acid to remove chlorine residual.
- [ ] P-HCl Sample Preserved with Hydrochloric Acid (2 drops/40 ml)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes
- [ ] (774) SDWA VOC's I (8 Regulated +)
- [ ] (775) SDWA VOC's II (EDB & DBCP)

Other Specific Compounds or Classes

- [ ] ____
- [ ] ____

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks:

FIELD DATA:

pH= 6.5 ; Conductivity= 3000 umho/cm at 18 °C; Chlorine Residual= ____ mg/l

Dissolved Oxygen= ____ mg/l; Alkalinity= ____ mg/l; Flow Rate ____ ____/____

Depth to water ____ ft.; Depth of well ____ ft.; Perforation Interval ____-____ ft.; Casing: ____

Sampling Location, Methods and Remarks (i.e. odors, etc.)
Marathon Indian Basin Gas Plant - Cooling Tower Water
(from circulation line near amine pumps)

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): D G Boyer Method of Shipment to the Lab: Hale Car

CHAIN OF CUSTODY

I certify that this sample was transferred from ____ to ____

at (location) ____ on ___/___/___ - ___:___ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures ____ ____

For OCD use: Date owner notified: 8/3/89 Phone or Letter? Initials RCA

ANALYSES PERFORMED

LAB. No.: OR-

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- ☐ (753) Aliphatic Headspace (1-5 Carbons)
- ☐ (754) Aromatic & Halogenated Purgeables
- ☐ (765) Mass Spectrometer Purgeables
- ☐ (766) Trihalomethanes
- ☐ (774) SDWA VOC's I (8 Regulated +)
- ☐ (775) SDWA VOC's II (EDB & DBCP)

Other Specific Compounds or Classes

- ☐ ______
- ☐ ______

EXTRACTABLE SCREENS

- ☐ (751) Aliphatic Hydrocarbons
- ☐ (755) Base/Neutral Extractables
- ☐ (758) Herbicides, Chlorophenoxy acid
- ☐ (759) Herbicides, Triazines
- ☐ (760) Organochlorine Pesticides
- ☐ (761) Organophosphate Pesticides
- ☐ (767) Polychlorinated Biphenyls (PCB's)
- ☐ (764) Polynuclear Aromatic Hydrocarbons
- ☐ (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
* DETECTION LIMIT * *		+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: ______

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Not Sealed ☐ Intact: Yes ☐ No ☐. Seal(s) broken by: ______ date: ______

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: ______. Analyst's signature: ______

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: ______

STATE OF NEW MEXICO HEALTH AND ENVIRONMENT DEPARTMENT

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud, NE
Albuquerque, NM 87106 [505]-841-2500
ORGANIC CHEMISTRY SECTION [505]-841-2570

July 25, 1989

Distribution
(■) Submitter
(▩) SLD Files

ANALYTICAL REPORT
SLD Accession No. OR-89-0910

To: NM Oil Consv. Div.
State Land Office Bldg.
P. O. Box 2088
Santa Fe, NM 87504-2088

From: Organic Chemistry Section
Scientific Laboratory Div.
700 Camino de Salud, NE
Albuquerque, NM 87106

Re: **A purgeable water sample submitted to this laboratory on June 27, 1989**

User:
OIL CONSERVATION DIV
State Land Office Bldg.
P. O. Box 2088
Santa Fe, NM 87504-2088

DEMOGRAPHIC DATA

COLLECTION		LOCATION
On: 23-Jun-89	*By:* Boy . . .	
At: 10:55 hrs.	*In/Near:* Carlsbad	

ANALYTICAL RESULTS: Aromatic & Halogenated Purgeable Screen

Parameter	Value	Note	MDL	Units
Chloroform	8.00		0.50	ppb
Bromodichloromethane	3.00		0.50	ppb
Dibromochloromethane	4.00		0.50	ppb
Bromoform	2.00		0.50	ppb
Aromatic Purgeables (6)	0.00	N	0.50	ppb

See Laboratory Remarks for Additional Information

Notations & Comments:
MDL = Minimal Detectable Level.
A = Approximate Value; N = None Detected above Detection Limit; P = Compound Present, but not quantified;
T = Trace (<Detection Limit); U = Compound Identity Not Confirmed.
Evidentiary Seals: Not Sealed[X]; Intact: No[ ], Yes[ ] & Broken By: ______________ Date: __________

Laboratory Remarks: Marathon Indian Basin- Twr Wtr
Three unidentified unsaturated compounds at trace to 5ppb were detected.

Analyst: M J Owen 7-12-89
Michael J. Owen
Analyst, Organic Chemistry
Analysis Date

Reviewed By: Larry Eden for RM
Richard F. Meyerhein 07/25/89
Supervisor, Organic Chemistry Section

754
WPU

SCIENTIFIC LABORATORY DIVISION
ORGANIC ANALYSIS REQUEST FORM
Organic Section - Phone: 841-2570

OR89-0907-C

REPORT TO: DAVID BOYER
N.M. OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, NM 87504-2088

S.L.D. No. OR-
DATE REC. 6-27-89
PRIORITY 3
PHONE(S): 827-5812

COLLECTION CITY: Carlsbad ; COUNTY: Eddy

COLLECTION DATE/TIME CODE: (Year-Month-Day-Hour-Minute) 8 9 0 6 2 3 1 0 4 5

LOCATION CODE: (Township-Range-Section-Tracts) 2 1 S + 2 3 E + 2 3 + 1 (10N06E24342)

USER CODE: 8 2 2 3 5 SUBMITTER: David Boyer CODE: 2 6 0

SAMPLE TYPE: WATER [X], SOIL [ ], FOOD [ ], OTHER:

This form accompanies 2 Septum Vials, ___ Glass Jugs, and/or ___

Samples were preserved as follows:

- [ ] NP: No Preservation; Sample stored at room temperature.
- [X] P-Ice Sample stored in an ice bath (Not Frozen).
- [ ] P-AA Sample Preserved with Ascorbic Acid to remove chlorine residual.
- [X] P-HCl Sample Preserved with Hydrochloric Acid (2 drops/40 ml)

ANALYSES REQUESTED: Please check the appropriate box(es) below to indicate the type of analytical screens required. Whenever possible list specific compounds suspected or required.

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [X] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes
- [ ] (774) SDWA VOC's I (8 Regulated +)
- [ ] (775) SDWA VOC's II (EDB & DBCP)

Other Specific Compounds or Classes

- [ ] ___
- [ ] ___

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

Remarks:

FIELD DATA: * From Tank storage instead of pump.

pH= 7 ; Conductivity= 700 umho/cm at 20 °C; Chlorine Residual= ___ mg/l

Dissolved Oxygen= ___ mg/l; Alkalinity= ___ mg/l; Flow Rate ___ ___/___

Depth to water ___ ft.; Depth of well ___ ft.; Perforation Interval ___-___ ft.; Casing: ___

Sampling Location, Methods and Remarks (i.e. odors, etc.)
Marathon Indian Basin Gas Plant - Raw Water
(From West well) - Sample from Tap at Pumphouse *

I certify that the results in this block accurately reflect the results of my field analyses, observations and activities.(signature collector): David Boyer Method of Shipment to the Lab: State Car

CHAIN OF CUSTODY

I certify that this sample was transferred from ___ to ___

at (location) ___ on ___/___/___ - ___:___ and that

the statements in this block are correct. Evidentiary Seals: Not Sealed [ ] OR Seals Intact: Yes [ ] No [ ]

Signatures ___ ___

For OCD use: Date owner notified: 8/3/89 Phone or Letter? Initials RA

ANALYSES PERFORMED

LAB. No.: OR-

THIS PAGE FOR LABORATORY RESULTS ONLY

This sample was tested using the analytical screening method(s) checked below:

PURGEABLE SCREENS

- [ ] (753) Aliphatic Headspace (1-5 Carbons)
- [ ] (754) Aromatic & Halogenated Purgeables
- [ ] (765) Mass Spectrometer Purgeables
- [ ] (766) Trihalomethanes
- [ ] (774) SDWA VOC's I (8 Regulated +)
- [ ] (775) SDWA VOC's II (EDB & DBCP)

Other Specific Compounds or Classes

- [ ] ______
- [ ] ______

EXTRACTABLE SCREENS

- [ ] (751) Aliphatic Hydrocarbons
- [ ] (755) Base/Neutral Extractables
- [ ] (758) Herbicides, Chlorophenoxy acid
- [ ] (759) Herbicides, Triazines
- [ ] (760) Organochlorine Pesticides
- [ ] (761) Organophosphate Pesticides
- [ ] (767) Polychlorinated Biphenyls (PCB's)
- [ ] (764) Polynuclear Aromatic Hydrocarbons
- [ ] (762) SDWA Pesticides & Herbicides

ANALYTICAL RESULTS

COMPOUND(S) DETECTED	CONC. [PPB]	COMPOUND(S) DETECTED	CONC. [PPB]
* DETECTION LIMIT * *		+ DETECTION LIMIT + +	

ABBREVIATIONS USED:

N D = NONE DETECTED AT OR ABOVE THE STATED DETECTION LIMIT

T R = DETECTED AT A LEVEL BELOW THE STATED DETECTION LIMIT (NOT CONFIRMED)

[RESULTS IN BRACKETS] ARE UNCONFIRMED AND/OR WITH APPROXIMATE QUANTITATION

LABORATORY REMARKS: ______

CERTIFICATE OF ANALYTICAL PERSONNEL

Seal(s) Not Sealed [ ] Intact: Yes [ ] No [ ]. Seal(s) broken by: ______ date: ______

I certify that I followed standard laboratory procedures on handling and analysis of this sample unless otherwise noted and that the statements on this page accurately reflect the analytical results for this sample.

Date(s) of analysis: ______. Analyst's signature: ______

I certify that I have reviewed and concur with the analytical results for this sample and with the statements in this block.

Reviewers signature: ______

STATE OF NEW MEXICO HEALTH AND ENVIRONMENT DEPARTMENT

SCIENTIFIC LABORATORY DIVISION

700 Camino de Salud, NE
Albuquerque, NM 87106 [505]-841-2500
ORGANIC CHEMISTRY SECTION [505]-841-2570

July 25, 1989

Distribution
(■) Submitter
(※) SLD Files

ANALYTICAL REPORT
SLD Accession No. OR-89-0907

To: NM Oil Consv. Div.
State Land Office Bldg.
P. O. Box 2088
Santa Fe, NM 87504-2088

From: Organic Chemistry Section
Scientific Laboratory Div.
700 Camino de Salud, NE
Albuquerque, NM 87106

Re: **A purgeable water sample submitted to this laboratory on June 27, 1989**

User:
OIL CONSERVATION DIV
State Land Office Bldg.
P. O. Box 2088
Santa Fe, NM 87504-2088

DEMOGRAPHIC DATA

COLLECTION		*LOCATION*
On: 23-Jun-89	*By:* Boy . . .	
At: 10:45 hrs.	*In/Near:* Carlsbad	

ANALYTICAL RESULTS: Aromatic & Halogenated Purgeable Screen

Parameter	Value	Note	MDL	Units
Halogenated Purgeables (33)	0.00	N	5.00	ppb
Aromatic Purgeables (6)	0.00	N	10.00	ppb

Notations & Comments:
MDL = Minimal Detectable Level.
A = Approximate Value; N = None Detected above Detection Limit; P = Compound Present, but not quantified;
T = Trace (<Detection Limit); U = Compound Identity Not Confirmed.
Evidentiary Seals: Not Sealed [X]; Intact: No [ ], Yes [ ] & Broken By: ________ Date: ________

Laboratory Remarks: Marathon Indian Resin Raw Wtr

Analyst: M J Owen 7-12-87 **Reviewed By:** Larry Elon for RM
Michael J. Owen
Analyst, Organic Chemistry
Analysis Date
Richard F. Meyerhein 07/25/89
Supervisor, Organic Chemistry Section

859
WNM

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (505) 841-2555

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 06 | 27 | 89 LAB NO. WC 2372 USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 82235

Collection DATE 89 | 06 | 23
Collection TIME 1045
Collected by — Person/Agency Boyer / Anderson / OCD

SITE INFORMATION ►
Sample location: Marathon Indian Basin Gas Plant
Collection site description: West Water well (Raw water supply) Sample from Tap at pumphouse, before water from storage tank
Station/well code: 21S-23E-23.1
Owner:

SEND FINAL REPORT TO ►
ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg, PO Box 2088
Santa Fe, NM 87504-2088
Attn: David Boyer
Phone: 827-5812

SAMPLING CONDITIONS

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	Water level —	Discharge —	Sample type Grab
pH (00400) 7	Conductivity (Uncorrected) 700 µmho	Water Temp. (00010) 20 °C	Conductivity at 25 °C (00094) µmho

Field comments

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted 1 | ☒ NF: Whole sample (Non-filtered) | ☐ F: Filtered in field with 0.45 µm membrane filter | ☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ☐ Other-specify: ☐ A: 5ml conc. HNO_3 added ☐ A: 4ml fuming HNO_3 added

ANALYTICAL RESULTS from SAMPLES

NA		Units	Date analyzed
☒ Conductivity (Corrected) 25°C (00095)	878	µmho	7/6
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: Lab pH	7.76		6/30
☐ Other:			
☐ Other:			

A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N+, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

From NF, NA Sample:

			Date Analyzed
☒ Calcium	80	mg/1	8/04
☒ Potassium	2	mg/1	7/10
☒ Magnesium	36	mg/1	8/04
☒ Sodium	12	mg/1	7/10
☒ Bicarbonate	313	mg/1	6/30
☒ Chloride	23	mg/1	7/10
☒ Sulfate	25	mg/1	7/26
☒ Total Solids	564	mg/1	7/19
☒ CO_3	Ø		6/30
☒ B3	<0.20		7/11
☒ Cation/Anion Balance			

Analyst | Date Reported 8 | 7 | 89 | Reviewed by C. Dean

Laboratory remarks

FOR OCD USE -- Date Owner Notified ________ Phone or Letter? ________ Initals ________

CATIONS				ANIONS			
ANALYTE	MEQ.	PPM	DET. LIMIT	ANALYTE	MEQ.	PPM	DET. LIMIT
Ca	3.99	80.00	<3.0	HC03	5.13	313.00	<1.0
Mg	2.96	36.00	<0.3	SO4	1.77	85.00	<10.0
Na	0.52	12.00	<10.0	CL	0.65	23.00	<5.0
K	0.05	2.00	<0.3				
Mn	0.00	0.00		NO3	0.00	0.00	< 0.
Fe	0.00	0.00		C03	0.00	0.00	< 1.
				NH3	0.00	0.00	< 0.
				PO4	0.00	0.00	< 0.
SUMS	7.52	130.00			7.55	421.00	

Total Dissolved Solids= 564
Ion Balance = 99.64%

WC No. = 8902372
Date out/By 8/7/89 C. [illegible]

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2553

Date Received	06 27 89	Lab No	CAP 370	User Code	☒ 82235 ☐ Other:

COLLECTION DATE & TIME: yy 89 mm 06 dd 23 hh 10 mm 55

COLLECTION SITE DESCRIPTION: Cooling Tower water

COLLECTED BY: Boyer / Anderson

OWNER: Marathon Indian Basin Gas Plant

TO:

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg., PO Box 2088
SANTA FE, NM 87504-2088

ATTN: D. Boyer
TELEPHONE: 827-5812

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)
21 S + 23 E + 23 + 1

STATION/ WELL CODE:

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☐ Bailed ☐ Dipped	☐ Pump ☒ Tap	Water Level: —	Discharge: —	Sample Type: Grab

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
6.5	3000 µmho	18 °C	µmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED:
☒ WPN: Water Preserved w/HNO_3 Non-Filtered	☐ WPF: Water Preserved w/HNO_3 Filtered	☒ ICAP Scan. Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	0.2 JA		Silicon	14	
Barium	<0.1		Silver	<0.1	☐
Beryllium	<0.1		Strontium	JA ~~3.8~~ 3.7	
Boron	0.3		Tin	0.1	
Cadmium	<0.1	☐	Vanadium	<0.1	
Calcium	580.		Zinc	<0.1	
Chromium	0.5	☒ 0.60	Arsenic		☒ 0.13
Cobalt	<0.05		Selenium		☐
Copper	0.1		Mercury		☐
Iron	JA ~~3.4~~ 2.3				☐
Lead	<0.1	☐			☐
Magnesium	240.				☐
Manganese	JA ~~0.08~~ 0.08				☐
Molybdenum	<0.1				☐
Nickel	<0.1				☐

RECEIVED
OCT 10 1989
OIL CONSERVATION DIV.
SANTA FE

LAB COMMENTS: DIGESTED.

For OCD Use:
Date Owner Notified:
Phone or Letter?
Initials:

ICAP Analyst JA
Date Analyzed 7/31/89

Reviewer Jim Ashley
Date Received 10/2/89

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2553

Date Received 06/27/89 | Lab No. CAP 373 | User Code ☒ 82235 ☐ Other:

COLLECTION DATE & TIME: yy 89 mm 06 dd 23 hh 10 mm 45

COLLECTION SITE DESCRIPTION: Marathon Indian Basin Gas Plant - Raw Water (W. Well)

COLLECTED BY: Boyd / Anderson OCD

RECEIVED
OCT 1 9 1989
OIL CONSERVATION DIV.
SANTA FE

TO:

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg., PO Box 2088
SANTA FE, NM 87504-2088

ATTN: D. Boyer
TELEPHONE: 827-5812

OWNER:

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)
21 S + 23 E + 23 + / / /

STATION/ WELL CODE:

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☐ Bailed ☐ Pump	Water Level:	Discharge:	Sample Type:
☐ Dipped ☒ Tap	—	—	Grab

pH(00400)	Conductivity (Uncorr.)	Water Temp. (00010)	Conductivity at 25°C (00094)
7	700 µmho	20 °C	µmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT
Check proper boxes:
☒ WPN: Water Preserved w/HNO_3 Non-Filtered
☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED:
☒ ICAP Scan
Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	<0.1		Silicon	6.1	
Barium	<0.1		Silver	<0.1	☐
Beryllium	<0.1		Strontium	1.0	
Boron	<0.1		Tin	<0.1	
Cadmium	<0.1	☒ <0.001	Vanadium	<0.1	
Calcium	97.		Zinc	0.2	
Chromium	<0.1	☒ <0.005	Arsenic		☒ <0.005
Cobalt	<0.05		Selenium		☐
Copper	<0.1		Mercury		☐
Iron	<0.1				☐
Lead	<0.1	☒ <0.005			☐
Magnesium	38.				☐
Manganese	<0.05				☐
Molybdenum	<0.1				☐
Nickel	<0.1				☐

LAB COMMENTS:

For OCD Use:
Date Owner Notified:
Phone or Letter?
Initials:

ICAP Analyst JH
Date Analyzed 7/31/89
Reviewer Jim Ashby
Date Reveived 10/16/89

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2553

Date Received 06/27/89 Lab No. MAP 372 User Code ☒ 82235 ☐ Other:

COLLECTION DATE & TIME: yy 89 mm 06 dd 23 hh 11 mm 10

COLLECTION SITE DESCRIPTION Final Effluent commingled prior to injection

COLLECTED BY: Boyer/Anderson

OWNER: Marathon Indian Basin Gas Plant

TO:

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg., PO Box 2088
SANTA FE, NM 87504-2088

ATTN: D Boyer
TELEPHONE: 827-5812

SITE LOCATION:
County: Eddy
Township, Range, Section, Tract: (10N06E24342)
21 / S + 23 E + 23 + / | | |

STATION/ WELL CODE:

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap | Water Level: — | Discharge: — | Sample Type: Grab

pH(00400) | Conductivity(Uncorr.) µmho | Water Temp.(00010) °C | Conductivity at 25 °C (00094) µmho

FIELD COMMENTS: Sample from tap to injection well line

SAMPLE FIELD TREATMENT
Check proper boxes:
☒ WPN: Water Preserved w/HNO_3 Non-Filtered
☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED:
☒ ICAP Scan
Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	<0.1		Silicon	2.5	
Barium	<0.1		Silver	<0.1	☐
Beryllium	<0.1		Strontium	16.	
Boron	1.4		Tin	<0.1	
Cadmium	<0.1	☒ <0.001	Vanadium	<0.1	
Calcium	630.		Zinc	<0.1	
Chromium	<0.1	☒ 0.062	Arsenic		☒ 0.020
Cobalt	<0.05		Selenium		☐
Copper	<0.1		Mercury		☐
Iron	3.8				☐
Lead	<0.1	☒ <0.005			☐
Magnesium	130.				☐
Manganese	0.12				☐
Molybdenum	<0.1				☐
Nickel	<0.1				☐

RECEIVED
OCT 10 1989
OIL CONSERVATION DIV.
SANTA FE

LAB COMMENTS: DIGESTED.

For OCD Use:
Date Owner Notified:
Phone or Letter?
Initials:

ICAP Analyst JJA
Date Analyzed 7/31/89

Reviewer Jim Ashby
Date Reveived 10/2/89

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2553

Date Received 06/27/89 Lab No. CAP 373 User Code ☒ 82235 ☐ Other:

COLLECTION DATE & TIME: yy 89 mm 06 dd 23 hh 10 mm 45

COLLECTED BY: Boyer/Anderson OCD

COLLECTION SITE DESCRIPTION: Marathon Indian Basin Gas Plant - Raw Water (W. Well)

OWNER:

TO:

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg., PO Box 2088
SANTA FE, NM 87504-2088

ATTN: D. Boyer
TELEPHONE: 827-5812

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)
21 S 23 E 23

STATION/ WELL CODE:

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	Water Level: —	Discharge: —	Sample Type: Grab

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
7	700 μmho	20 °C	μmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED:
☒ WPN: Water Preserved w/HNO_3 Non-Filtered	☐ WPF: Water Preserved w/HNO_3 Filtered	☒ ICAP Scan Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	<0.1		Silicon	6.1	
Barium	<0.1		Silver	<0.1	☐
Beryllium	<0.1		Strontium	1.0	
Boron	<0.1		Tin	<0.1	
Cadmium	<0.1	☒	Vanadium	<0.1	
Calcium	97.		Zinc	0.2	
Chromium	<0.1	☒	Arsenic		☒
Cobalt	<0.05		Selenium		☐
Copper	<0.1		Mercury		☐
Iron	<0.1				☐
Lead	<0.1	☒			☐
Magnesium	38.				☐
Manganese	<0.05				☐
Molybdenum	<0.1				☐
Nickel	<0.1				☐

LAB COMMENTS:

For OCD Use:
Date Owner Notified:
Phone or Letter?
Initials:

ICAP Analyst JH
Date Analyzed 7/31/89
Reviewer
Date Reveived

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

May 15, 1989

CERTIFIED MAIL - RETURN
RECEIPT NO. P-106 675 056

Manager, Houston Division
Marathon Oil Company
Onshore Operations Production, U.S.
P. O. Box 3128
Houston, Texas 77253

Re: Discharge Plan GW-21
Indian Basin Gas Plant
Eddy County, New Mexico

Dear Sir:

On November 26, 1984, the ground water discharge plan, GW-21 for the Indian Basin Gas Plant located in Eddy County was approved by the Director of the Oil Conservation Division (OCD). This discharge plan was required and submitted pursuant to Water Quality Control Commission Regulations and it was approved for a period of five years. The approval will expire on November 26, 1989.

If your facility continues to have effluent or leachate discharges and you wish to continue discharging, please submit your application for renewal of plan approval as quickly as possible. The OCD is reviewing discharge plan submittals and renewals carefully and the review time can often extend for several months. Please indicate whether you have made, or intend to make, any changes in your discharge system, and if so, include an application for plan amendment with your application for renewal. To assist you in preparation of your renewal application, I have enclosed a copy of the OCD's guidelines for preparation of ground water discharge plans at natural gas processing plants. These guidelines will be used in review of your renewal application.

The disposal of all solid waste generated at your facility will be addressed in your discharge plan renewal. The guidelines are being revised to include the solid waste provisons as enacted by the New Mexico Legislature in the 1989 Legislative session.

If you no longer have discharges and discharge plan renewal is not needed, please notify this office.

If you have any questions, please do not hesitate to contact Roger Anderson at (505) 927-5884.

Sincerely,

David G. Boyer

DAVID G. BOYER, Chief
Environmental Bureau

DGB/dr

cc: Oil Conservation Division
Artesia, New Mexico

RECEIVED BY

JUL -7 1986

O. C. D.
ARTESIA, OFFICE

SF

NEW MEXICO OIL CONSERVATION DIVISION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR Marathon Oil Company				ADDRESS P. O. Box 552, Midland, TX 79702			
REPORT OF	FIRE	BREAK X	SPILL	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT X	OIL RFY	OTHER*
NAME OF FACILITY Indian Basin Gas Plant							
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)				SEC. 23	TWP. 20S	RGE. 23E	COUNTY Eddy
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK 20 miles NW of Carlsbad, N. Mexico							
DATE AND HOUR OF OCCURENCE Wed., June 25, 1986				DATE AND HOUR OF DISCOVERY June 27, 1986 (8:00 a.m. MST)			
WAS IMMEDIATE NOTICE GIVEN?	YES	NO X	NOT REQUIRED	IF YES, TO WHOM May Morgan			
BY WHOM Tom Zapatka				DATE AND HOUR July 1, 1986 (10:00 a.m. (CST)			
TYPE OF FLUID LOST Condensate				QUANTITY OF LOSS 188 BBL.		VOLUME RECOVERED 0	
DID ANY FLUIDS REACH A WATERCOURSE?	YES X	NO	QUANTITY 188 BBL.				

IF YES, DESCRIBE FULLY**

See Attachment

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

See Attachment

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

See Attachment

DESCRIPTION OF AREA	FARMING	GRAZING		URBAN	OTHER* rocky arroyo		
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY X	WET X	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

See Attachment

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Thomas F. Zapatka TITLE Prod. Eng. DATE July 2, 1986

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

OK MW 7/15/86

TFZ;tjm

A six-inch PVC condensate line from the field to the gas plant was washed out during heavy rains discharging an estimated 188 barrels of condensate. This line crosses a normally dry arroyo located 1/4 mile south of the plant. Heavy rains during the week of June 23-27, flooded this arroyo. When the water subsided, a section of this six-inch line was found to have been washed away. There was no evidence of any spilled condensate in the area. It was all washed away.

This section of line will be replaced and steps taken so that this will not happen again. This office, in Midland, Texas, was not notified of the incident until the morning of July 1, 1986. Marathon regrets the delay in reporting this information to you and is also taking steps to insure more timely reporting from field personnel. If any further information is required, please contact my office at (915) 687-8530. Thank you for your cooperation.

TFZ;tjm/i

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

November 26, 1984

Mr. C. L. Roberts
Manager, Houston Division
Marathon Oil Company
Onshore Operations Production, US
P.O. Box 3128
Houston, Texas 77253

Re: Discharge Plan for
Indian Basin Gas Plant

Dear Mr. Roberts:

The ground water discharge plan (GW-21) for Marathon Oil Company's Indian Basin Gas Plant located in the NE/4 of Section 23, Township 21 South, Range 23 East, Eddy County, New Mexico, is hereby approved. The approved discharge plan consists of the plan dated June 22, 1984, and the materials dated September 6, 1984 and November 21, 1984, submitted as supplements to the discharge plan.

The discharge plan was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. It is approved pursuant to Section 3-109. Please note subsections 3-109.E. and 3-109.F., which provide for possible future amendment of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

There will be no monitoring or reporting requirements. Please note that Section 3-104 of the regulations requires that "When a plan has been approved, discharges must be consistent with the terms and conditions of the plan."

Please be aware that in this discharge plan you have made commitments which are legally enforceable under the New Mexico Water Quality Act. These include constructing all aspects of your installation as designed. You are susceptible to fines should you not fulfill these obligations.

Pursuant to subsection 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire November 26, 1989, and you should submit an application for new approval in ample time before that date.

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

Sincerely,

R. L. STAMETS
Director

RLS/dp

cc: Artesia District Office

Midland District
Houston Division
Production Operations United States

Marathon Oil Company

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

RECEIVED
NOV 29 1984
OIL CONSERVATION DIVISION
SANTA FE

November 21, 1984

Mr. David G. Boyer, Hydrogeologist
State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Sante Fe, New Mexico 87501

Dear Mr. Boyer:

This memo is in response to a telephone conversation on Monday, November 19, with Mr. Phillip Baca of your staff and Mr. J. L. Smith in Midland. In that conversation, Mr. Baca requested confirmation that modifications to the closed drain system at Marathon's Indian Basin Gas Plant are complete. As indicated to Mr. Baca on that date, the modifications described in the discharge plan are both complete and in operation.

If further information is desired, please advise.

Very truly yours,

MARATHON OIL COMPANY

J. L. Yorke for GEY

G. E. Yester
District Operations Manager

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2553

Date Received 06/27/89	Lab No CAP 370	User Code	☒ 82235	☐ Other:

COLLECTION DATE & TIME: yy 89 mm 06 dd 23 hh 10 mm 55

COLLECTION SITE DESCRIPTION: Cooling Tower water

COLLECTED BY: Boyer / Anderson

TO:

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg., PO Box 2088
SANTA FE, NM 87504-2088

ATTN: D. Boyer
TELEPHONE: 827-5812

OWNER: Marathon Indian Basin Gas Plant

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)
21S+23E+23+1

STATION/ WELL CODE:

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	Water Level: —	Discharge: —	Sample Type: Grab

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
6.5	3000 µmho	18 °C	µmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED:
☒ WPN: Water Preserved w/HNO_3 Non-Filtered	☐ WPF: Water Preserved w/HNO_3 Filtered	☒ ICAP Scan Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	0.2 JAA		Silicon	14	
Barium	<0.1		Silver	<0.1	☐
Beryllium	<0.1		Strontium	JAA ~~3.8~~ 3.7	
Boron	0.3		Tin	0.1	
Cadmium	<0.1	☐	Vanadium	<0.1	
Calcium	580.		Zinc	<0.1	
Chromium	0.5	☒	Arsenic		☒
Cobalt	<0.05		Selenium		☐
Copper	0.1		Mercury		☐
Iron	JAA ~~3.4~~ 2.3				☐
Lead	<0.1	☐			☐
Magnesium	240.				☐
Manganese	JAA ~~0.08~~ 0.08				☐
Molybdenum	<0.1				☐
Nickel	<0.1				☐

LAB COMMENTS: DIGESTED.

For OCD Use: Date Owner Notified:	ICAP Analyst JAA / Reviewer
Phone or Letter?	
Initials:	Date Analyzed 7/31/89 / Date Reveived

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2553

Date Received	Lab No.	User Code	
06/27/89	CAP 372	☒ 82235	☐ Other:

COLLECTION DATE & TIME: yy 89 | mm 06 | dd 23 | hh 11 | mm 10

COLLECTION SITE DESCRIPTION: Final Effluent Commingled prior to injection

COLLECTED BY: Boyer/Anderson

OWNER: Marathon Indian Basin Gas Plant

TO:

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg., PO Box 2088
SANTA FE, NM 87504-2088

ATTN: D Boyer
TELEPHONE: 827-5812

SITE LOCATION:
County: Eddy
Township, Range, Section, Tract: (10N06E24342)
21S+23E+23+

STATION/ WELL CODE:

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

	Water Level:	Discharge:	Sample Type:
☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	–	–	Grab

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
	µmho	°C	µmho

FIELD COMMENTS: Sample from tap to injection well line

SAMPLE FIELD TREATMENT
Check proper boxes:

☒ WPN: Water Preserved w/HNO_3 Non-Filtered

☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED:

☒ ICAP Scan
Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	<0.1		Silicon	2.5	
Barium	<0.1		Silver	<0.1	☐
Beryllium	<0.1		Strontium	16.	
Boron	1.4		Tin	<0.1	
Cadmium	<0.1	☒	Vanadium	<0.1	
Calcium	630.		Zinc	<0.1	
Chromium	<0.1	☒	Arsenic		☒
Cobalt	<0.05		Selenium		☐
Copper	<0.1		Mercury		☐
Iron	3.8				☐
Lead	<0.1	☒ <0.005			☐
Magnesium	130.				☐
Manganese	0.12				☐
Molybdenum	<0.1				☐
Nickel	<0.1				☐

LAB COMMENTS: DIGESTED.

For OCD Use:
Date Owner Notified:
Phone or Letter?
Initials:

ICAP Analyst: JJA
Date Analyzed: 7/31/89
Reviewer:
Date Reveived:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

November 16, 1989

Mr. William J. Lemay, Director
New Mexico Energy, Minerals and Natural
Resources Department
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504-2088

Dear Mr. Lemay:

We have reviewed the public notice dated September 14, 1989, requesting comments for the Marathon Oil Company, Indian Basin Gas Plant discharge permit renewal. The plant is located in the SW/4 NE/4, Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico.

The plan states that approximately 29,400 gallons per day of process wastewater is collected in an above-ground steel tank prior to disposal in an OCD approved Class II disposal well. If the above-ground storage tank is not currently covered, the Fish and Wildlife Service recommends that the Indian Basin Gas Plant screen the tank to prevent migratory birds from gaining access to wastewater.

Thank you for the opportunity to comment. If the Service can be of any assistance, or you have any questions concerning our comments, call Rick Roy at (505) 883-7877.

Sincerely yours,

John C. Peterson
Field Supervisor

cc:
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife Enhancement, Albuquerque, New Mexico

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (505) 841-2555

859
WNN

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 06/27/89	LAB NO. WC 2375	USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 82235	
Collection DATE 89/06/23	SITE INFORMATION ►	Sample location: Marathon Indian Basin Gas Plant	
Collection TIME 1110		Collection site description: Final Effluent — Commingled, sample from tap on line to injection well	
Collected by — Person/Agency: Boyer/Anderson /OCD			

SEND FINAL REPORT TO ►

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg, PO Box 2088
Santa Fe, NM 87504-2088

Attn: David Boyer

Phone: 827-5812

Station/well code: 21S-23E-23.1

Owner:

SAMPLING CONDITIONS

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	Water level —	Discharge —	Sample type Grab
pH (00400) 9.5	Conductivity (Uncorrected) 13,900 μmho	Water Temp. (00010) 25 °C	Conductivity at 25°C (00094) μmho

Field comments

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted 1	☒ NF: Whole sample (Non-filtered)	☐ F: Filtered in field with 0.45 μmembrane filter	☐ A: 2 ml H_2SO_4/L added
☒ NA: No acid added	☐ Other-specify:	☐ A: 5ml conc. HNO_3 added	☐ A: 4ml fuming HNO_3 added

ANALYTICAL RESULTS from SAMPLES

NA		Units	Date analyzed
☒ Conductivity (Corrected) 25°C (00095)	19496	μmho	7/6
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: lab pH	7.05		7/10
☐ Other:			
☐ Other:			

A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N +, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

From NF, NA Sample:

			Date Analyzed
☒ Calcium	128	mg/l	8/04
☒ Potassium	53	mg/l	7/10
☒ Magnesium	144	mg/l	8/04
☒ Sodium	3930	mg/l	7/11
☒ Bicarbonate	1235	mg/l	7/10
☒ Chloride	7955	mg/l	7/11
☒ Sulfate	58.5	mg/l	7/27
☒ Total Solids	11,980	mg/l	7/19
☒ CO_3	0		7/10
☒ Br	<0.20		7/12
☒ Cation/Anion Balance			

Analyst	Date Reported	Reviewed by
	8/17/89	[signature]

Laboratory remarks

FOR OCD USE -- Date Owner Notified ________ Phone or Letter? ________ Initals ________

CATIONS			
ANALYTE	MEQ.	PPM	DET. LIMIT
Ca	6.39	128.00	<3.0
Mg	11.83	144.00	<0.3
Na	170.94	3930.00	<10.0
K	1.36	53.00	<0.3
Mn	0.00	0.00	
Fe	0.00	0.00	
SUMS	190.51	4255.00	

Total Dissolved Solids= 11980
Ion Balance = 77.49%

ANIONS			
ANALYTE	MEQ.	PPM	DET. LIMIT
HCO3	20.24	1235.00	<1.0
SO4	1.22	58.50	<10.0
CL	224.40	7955.00	<5.0
NO3	0.00	0.00	< 0.
CO3	0.00	0.00	< 1.
NH3	0.00	0.00	< 0.
PO4	0.00	0.00	< 0.
	245.86	9248.50	

WC No. = 8902375
Date out/By [illegible] 8/17

859
WNN

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (505) 841-2555

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 06/27/89 LAB NO. WC 2371 USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 82235

Collection DATE 89/06/23

Collection TIME 1035

Collected by — Person/Agency Boyer/Anderson /OCD

SITE INFORMATION ►

Sample location Marathon Indian Basin Gas Plant

Collection site description Cooling Tower water (from circulation line near amine pumps)

SEND FINAL REPORT TO ►

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg, PO Box 2088
Santa Fe, NM 87504-2088

Attn: David Boyer

Phone: 827-5812

Station/ well code 215-231-23.1

Owner

SAMPLING CONDITIONS

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	Water level —	Discharge —	Sample type Grab
pH (00400) 6.5	Conductivity (Uncorrected) 3000 µmho	Water Temp. (00010) 18 °C	Conductivity at 25°C (00094) µmho

Field comments

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted 1 | ☒ NF: Whole sample (Non-filtered) | ☐ F: Filtered in field with 0.45 µm membrane filter | ☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ☐ Other-*specify:* ☐ A: 5ml conc. HNO_3 added ☐ A: 4ml fuming HNO_3 added

ANALYTICAL RESULTS from SAMPLES

NA		Units	Date analyzed
☒ Conductivity (Corrected) 25°C (00095)	4445	µmho	7/6
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: Lab pH	6.65		6/30
☐ Other:			
☐ Other:			

A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N +, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

From NF, NA Sample:

			Date Analyzed
☒ Calcium	~~532~~ 508	mg/l	8/04
☒ Potassium	40	mg/l	7/10
☒ Magnesium	~~242~~ 253	mg/l	8/04
☒ Sodium	287	mg/l	7/10
☒ Bicarbonate	366.8	mg/l	6/30
☒ Chloride	445	mg/l	7/10
☒ Sulfate	~~1993~~ 1867	mg/l	7/26
☒ Total Solids	4518	mg/l	7/19
☒ CO_3	Ø		6/30
☒ BR	<0.20		7/11
☒ Cation/Anion Balance			

Analyst	Date Reported	Reviewed by
	8/7/89	[signature]

Laboratory remarks

FOR OCD USE -- Date Owner Notified ______ Phone or Letter? ______ Initals ______

CATIONS				ANIONS			
ANALYTE	MEQ.	PPM	DET. LIMIT	ANALYTE	MEQ.	PPM	DET. LIMIT
Ca	25.35	508.00	<3.0	HC03	0.60	36.80	<1.0
Mg	20.78	253.00	<0.3	SO4	38.90	1867.00	<10.0
Na	12.48	287.00	<10.0	CL	12.55	445.00	<5.0
K	1.02	40.00	<0.3				
Mn	0.00	0.00		NO3	0.00	0.00	< 0.
Fe	0.00	0.00		C03	0.00	0.00	< 1.
				NH3	0.00	0.00	< 0.
				PO4	0.00	0.00	< 0.
SUMS	59.64	1088.00			52.05	2348.80	

Total Dissolved Solids= 4518
Ion Balance = 114.57%

WC No. = 8902371
Date out/By CO 8/17

Affidavit of Publication

Copy of

No. 12920

STATE OF NEW MEXICO,
County of Eddy:

Gary D. Scott being duly sworn, says: That he is the Publisher of The Artesia Daily Press, a daily newspaper of general circulation, published in English at Artesia, said county and state, and that the hereto attached Legal Notice

was published in a regular and entire issue of the said Artesia Daily Press, a daily newspaper duly qualified for that purpose within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico for 1 days consecutive weeks on the same day as follows:

First Publication September 27, 1989

Second Publication

Third Publication

Fourth Publication

and that payment therefore in the amount of $

has been made.

Gary D. Scott

Subscribed and sworn to before me this 27th day of September, 19 89

Barbara Ann Beans
Notary Public, Eddy County, New Mexico

My Commission expires September 23, 1991

LEGAL NOTICE

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, the following discharge plan renewal has been submitted for approval to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

(GW-21) Marathon Oil Company, W.O. Synder, Mid-Continent Region Production Manager, P.O. Box 552, Midland, TX 79702, has submitted for approval a ground water discharge plan renewal for its Indian Basin Gas Plant located in the SW/4 NE/4, Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. Approximately 29,400 gallons per day of process waste/water is collected in an above-ground steel tank prior to disposal in an OCD approved class II disposal well. The total dissolved solids concentration of the waste water is approximately 12,000 mg/l. Ground water most likely to be affected by any discharge to the surface is at a depth of 240 feet with a total dissolved solids concentration of approximately 550 mg/l. The discharge plan addresses how spills, leaks or other discharges to the ground at the plant will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. A request for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 14th day of September, 1989. To be published on or before October 1, 1989.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION
s- William J. LeMay
WILLIAM J. LEMAY,
Director

SEAL

Published in the Artesia Daily Press, Artesia, N.M. September 27, 1989.

Legal 12920

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

Notice is hereby give that pursuant to New Mexico Water Quality Control Commission Regulations, the following discharge plan renewal has been submittd for approval to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

(GW-21) Marathon Oil Company, W.O. Snyder, Mid-Continent Region Production Manger, P.O. Box 552, Midland, TX 79702, has submitted for approval a ground water discharge plan renewal for its Indian Basin Gas Plant located in the SW/4 NE/4, Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. Approximately 29,400 gallons per day of process waste water is collected in an above-ground steel tank prior to disposal in an OCD approved class II disposal well. The total dissolved solids concentration of the waste water is approximately 12,000 mg/1. Ground water most likely to be affected by any discharge to the surface is at a depth of 240 feet with a total dissolved solids concentration of approximately 550 mg/1. The discharge plan addresses how spills, leaks or other discharges to the ground at the plant will be managed.

Any interested person may obtain further information fom the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. A request for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

Given under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 14th day of September, 1989. To be published on or before October 1, 1989.

Journal September 28, 1989

RECEIVED

OCT - 2 1989

OIL CONSERVATION DIV.
SANTA FE

STATE OF NEW MEXICO } ss
County of Bernalillo

THOMAS J. SMITHSON
.... being duly sworn declares and says that he is .... NAT'L ADV. MGR. of the Albuquerque Journal, and that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Session Laws of 1937, and that payment therefore has been made or assessed as court costs; that the notice, a copy of which is hereto attached, was published in said paper in the regular daily edition,

for ....1.......... times, the first publication being on the ...28.......... day of ....Sept........ ,198 9......., and the subsequent consecutive publications on .... ,198......

Thomas J. Smithson

OFFICIAL SEAL
Signature: Angela M. Archibeque
ANGELA M. ARCHIBEQUE
NOTARY PUBLIC NEW MEXICO
Bond Filed with Secretary of State
Commission Expires 6/30/92

Sworn and subscribed to before me, a Notary Public in and for the County of Bernalillo and State of New Mexico, this ..28.. day of ....Sept................ ,198 9..

PRICE $ 22.22...............................

Statement to come at end of month.

EDJ-15 (R-2/86)

ACCOUNT NUMBER ....C 80932..............

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

October 30, 1989

CERTIFIED MAIL
RETURN RECEIPT NO. P-106 675-118

Mr. W. O. Snyder, Production Manager
Marathon Oil Company
P. O Box 552
Midland, Texas 79702

RE: **Discharge Plan GW-21**
Indian Basin Gas Plant
Eddy County, New Mexico

Dear Mr. Snyder:

The ground water discharge plan renewal (GW-21) for the Marathon Oil Company Indian Basin Gas Plant located in the SW/4, NE/4, Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico, is hereby approved. The original discharge plan was approved on November 26, 1984 and expired on November 26, 1989. The renewal application consists of the original discharge plan as approved November 26, 1984 and the application dated August 18, 1989.

The discharge plan was submitted pursuant to Section 3-106 of the New Mexico Water Quality Control Commission Regulations. It is renewed pursuant to Section 3-109.F., which provides for the possible future amendments of the plan. Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations.

There will be no routine monitoring or reporting requirements.

Please be advised that all exposed pits, including lined pits and open top tanks, shall be screened, netted, or otherwise rendered nonhazardous to wildlife to include migratory birds.

Please note that Section 3-104 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 3-107.C., you are 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 3-109.G.4., this plan approval is for a period of five (5) years. This approval will expire November 26, 1994 and you should submit an application for renewal in ample time before that date. It should be noted that all gas processing plants and oil refineries in excess of twenty-five years of age will be required to submit plans for, or the results of an underground drainage testing program as a requirement for discharge plan approval or renewal.

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

Sincerely,

William J. LeMay
Director

WJL/RCA/sl

cc: OCD Artesia Office

C. L. Ro[illegible]ts
Manage[illegible]ouston Division
Onshore Operations
Production, United States

RECEIVED
SEP 1[illegible] 1984
OIL CONSERVATION DIVISION

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/629-6600

September 6, 1984

Mr. Joe D. Ramey, Director
State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Dear Mr. Ramey,

This memo is in response to Mr. David G. Boyer's memo of August 1, 1984, (received August 3, 1984). Mr. Boyer and Mr. J. L. Smith in Midland discussed parts of this memo in a telephone conversation on Tuesday, August 7. As stated in Marathon's discharge plan for the Indian Basin Gas Plant, work has been completed to gather, treat, commingle, and inject for disposal purposes all normal plant discharges. Pursuant to Mr. Boyer's memo, additional work is in progress to modify the closed drain system that will better enable the collection of infrequent discharges associated with process malfunctions and emergencies. It is anticipated that the modifications to the closed drain system will be complete by October 1, 1984.

The following is a resume of the additional information requested by Mr. Boyer.

Drain Systems

There are two types of process drain systems used at the Indian Basin Gas Plant. The closed drain system, previously mentioned, is used on an infrequent basis primarily when a process malfunction occurs and pressure must be relieved from a particular process unit. When modifications are complete, this system will consist of steel piping leading from process units to a fiberglass tank on the southwest side of the plant. Liquids can then be recovered and/or disposed of, as appropriate from this collection tank.

The second type of drain system used is the open drain system. Steel collection pots, located at many processing units, collect liquids that could otherwise cause a housekeeping problem. Steel piping connects these pots with a concrete drain system that empties into a steel skimmer basin. The skimmer basin separates condensate from the other fluid. The condensate is returned to the condensate separation tanks and the remaining fluid is pumped to the salt water collection tank for disposal purposes. This system handles only small volumes of fluid but serves an important housekeeping function.

There are no evaporation ponds or pits at the plant. Blowdown waters used to be discharged onto the ground. The analysis of these waters is shown in the discharge plan submitted in 1981. The ground where these waters were discharged does not appear to need reclaiming. As discussed in the current discharge plan, these discharges are gathered and injected for disposal purposes into a Class II disposal well.

The locations of the skimmer basin and closed drain system collection tank are shown on the attached plot plan. The closed drain system, as mentioned, is currently undergoing modification.

Discharge Quantities

There are essentially four discharges associated with normal plant operations. These discharges are:

a.) produced salt water
b.) cooling tower blowdown
c.) sulfur recovery unit waste heat boiler and condenser blowdown
d.) waste heat boiler and process steam-boiler blowdown

Discharge volumes are dependent upon plant and/or field operations. The discharge quantity of a.) (above) may range from 500-800 barrels per day. Based on a recent evaluation, the quantity of discharge b.) is estimated to be 26 barrels per day. Discharges c.) and d.) are approximately 14 barrels per day. Therefore, approximately 40 barrels per day of blowdown waters are gathered in the blowdown collection tank.

Salt Water Disposal System

Capacities of the salt water and blowdown collection tanks are 1000 barrels and 167 barrels, respectively. The fluid in the blowdown tank is chemically treated for compatibility with the salt water, then commingled with the salt water. A positive displacement pump is used to transfer this fluid through a three-inch steel (coated and wrapped) line to the disposal well where it is injected. The disposal line is buried under the ground from the plant to the disposal well, for protection.

Sampling and Analytical Techniques

When it was decided that samples of the commingled produced salt water and blowdown water were needed for the discharge plan, representatives of Martin Water Labs in Midland, Texas, were contacted. The needed analysis was discussed. They also prepared the sample containers with the necessary preservatives.

At the plant, the outlet piping from both the salt water and blowdown collection tanks leads into the suction side of positive displacement injection pumps. Grab samples were collected on the discharge side of the injection pump being operated on May 17, 1984. It was noted that the fluid levels in both tanks were decreasing while the pump was in operation. It is therefore anticipated the sample would be representative of the commingled stream. This injection system is manually started when sufficient fluid has accumulated in the collection tanks. The samples were analyzed by representatives of Martin Water Labs per Section 3-107 of the New Mexico Water Quality Control Commission Regulations.

Major Spills, Leaks, or Disposal Well Downtime

Although much work has been done to prevent spills of salt water, condensate and/or chemicals, sometimes spills do occur due to equipment failure, etc. When this happens, responsible actions will be taken by Marathon personnel to recover as much of the fluid as reasonably possible. The notification procedures outlined in Rule 116 of the New Mexico Oil Conservation Division Regulations (attached) will be followed.

Fortunately, many leaks are detected in the early stages, before a major spill occurs. Also, if extended disposal well downtime occurs, equipment can be contracted to collect and/or dispose of the fluids.

Conclusion

As previously mentioned, the work necessary to gather, treat, commingle, and inject for disposal purposes the normal plant discharges has been completed. This system is in operation. Currently, modifications are being made to the closed drain system to better gather infrequent type discharges associated with process operations. This work should be completed by October 1, 1984.

Also, Mr. Boyer requested a more legible copy of the memorandum report, Queen and Related Aquifers in the Indian Basin. This memorandum was reportedly supplied to Marathon by the Oil Conservation Division in 1981. This was discussed with Mr. Boyer on Tuesday, August 7.

If you have any further questions, please advise.

Sincerely,

MARATHON OIL COMPANY

C. L. Roberts

C. L. Roberts

JLS/bgr

Attachment

RULE 115. WELL AND LEASE EQUIPMENT

Christmas tree fittings or wellhead connections shall be installed and maintained in first class condition so that all necessary pressure tests may easily be made on flowing wells. On oil wells the Christmas tree fittings shall have a test pressure rating at least equivalent to the calculated or known pressure in the reservoir from which production is expected. On gas wells the Christmas tree fittings shall have a test pressure equivalent to at least 150 per cent of the calculated or known pressure in the reservoir from which production is expected.

Valves shall be installed and maintained in good working order to permit pressures to be obtained on both casing and tubing. Each flowing well shall be equipped to control properly the flowing of each well, and in case of an oil well, shall be produced into an oil and gas separator of a type generally used in the industry.

RULE 116. NOTIFICATION OF FIRE, BREAKS, LEAKS, SPILLS, AND BLOWOUTS

The Division shall be notified of any fire, break, leak, spill, or blowout occurring at any injection or disposal facility or at any oil or gas drilling, producing, transporting, or processing facility in the State of New Mexico by the person operating or controlling such facility.

"Facility," for the purpose of this rule, shall include any oil or gas well; any injection or disposal well, and any drilling or workover well; any pipe line through which crude oil, condensate, casinghead or natural gas, or injection or disposal fluid (gaseous or liquid) is gathered, piped, or transported (including field flow-lines and lead-lines but not including natural gas distribution systems); any receiving tank, holding tank, or storage tank, or receiving and storing receptacle into which crude oil, condensate, injection or disposal fluid, or casinghead or natural gas is produced, received, or stored; any injection or disposal pumping or compression station including related equipment; any processing or refining plant in which crude oil, condensate, or casinghead or natural gas is processed or refined; and any tank or drilling pit or slush pit associated with oil or gas well or injection or disposal well drilling operations or any tank, storage pit, or pond associated with oil or gas production or processing operations or with injection or disposal operations and containing hydrocarbons or hydrocarbon waste or residue, salt water, strong caustics or strong acids, or other deleterious chemicals or harmful contaminants.

Notification of such fire, break, leak, spill, or blowout shall be in accordance with the provisions set forth below:

1. Well Blowouts. Notification of well blowouts and/or fires shall be "immediate notification" described below. ("Well blowout" is defined as being loss of control over and subsequent eruption of any drilling or workover well, or the rupture of the casing, casinghead, or wellhead of any oil or gas well or injection or disposal well, whether active or inactive, accompanied by the sudden emission of fluids, gaseous or liquid, from the well.)

2. "Major" Breaks, Spills, or Leaks. Notification of breaks, spills, or leaks of 25 or more barrels of crude oil or condensate, or 100 barrels or more of salt water, none of which reaches a watercourse or enters a stream or lake; breaks, spills, or leaks in which one or more barrels of crude oil or condensate or 25 barrels or more of salt water does reach a watercourse or enters a stream or lake; and breaks, spills, or leaks of hydrocarbons or hydrocarbon waste or residue, salt water, strong caustics or strong acids, gases, or other deleterious chemicals or harmful contaminants of any magnitude which may with reasonable probability endanger human health or result in substantial damage to property, shall be "immediate notification" described below.

3. "Minor" Breaks, Spills, or Leaks. Notification of breaks, spills, or leaks of 5 barrels or more but less than 25 barrels of crude oil or condensate, or 25 barrels or more but less than 100 barrels of salt water, none of which reaches a watercourse or enters a stream or lake, shall be "subsequent notification" described below.

4. Gas Leaks and Gas Line Breaks. Notification of gas leaks from any source or of gas pipe line breaks in which natural or casinghead gas of any quantity has escaped or is escaping which may with reasonable probability endanger human health or result in substantial damage to property shall be "immediate notification" described below. Notification of gas pipe line breaks or leaks in which the loss is estimated to be 1000 or more MCF of natural or casinghead gas but in which there is no danger to human health nor of substantial damage to property shall be "subsequent notification" described below.

5. Tank Fires. Notification of fires in tanks or other receptacles caused by lightning or any other cause, if the loss is, or it appears that the loss will be, 25 or more barrels of crude oil or condensate, or fires which may with reasonable probability endanger human health or result in substantial damage to property, shall be "immediate notification" as described below. If the loss is, or it appears that the loss will be at least 5 barrels but less than 25 barrels, notification shall be "subsequent notification" described below.

6. Drilling Pits, Slush Pits, and Storage Pits and Ponds. Notification of breaks and spills from

any drilling pit, slush pit, or storage pit or pond in which any hydrocarbon or hydrocarbon waste or residue, strong caustic or strong acid, or other deleterious chemical or harmful contaminant endangers human health or does substantial surface damage, or reaches a watercourse or enters a stream or lake in such quantity as may with reasonable probability endanger human health or result in substantial damage to such watercourse, stream, or lake, or the contents thereof, shall be "immediate notification" as described below. Notification of breaks or spills of such magnitude as to not endanger human health, cause substantial surface damage, or result in substantial damage to any watercourse, stream, or lake, or the contents thereof, shall be "subsequent notification" described below, provided however, no notification shall be required where there is no threat of any damage resulting from the break or spill.

IMMEDIATE NOTIFICATION. "Immediate Notification" shall be as soon as possible after discovery and shall be either in person or by telephone to the district office of the Division district in which the incident occurs, or if the incident occurs after normal business hours, to the District Supervisor, the Oil and Gas Inspector, or the Deputy Oil and Gas Inspector. A complete written report ("Subsequent Notification") of the incident shall also be submitted in duplicate to the appropriate district office of the Division within ten days after discovery of the incident.

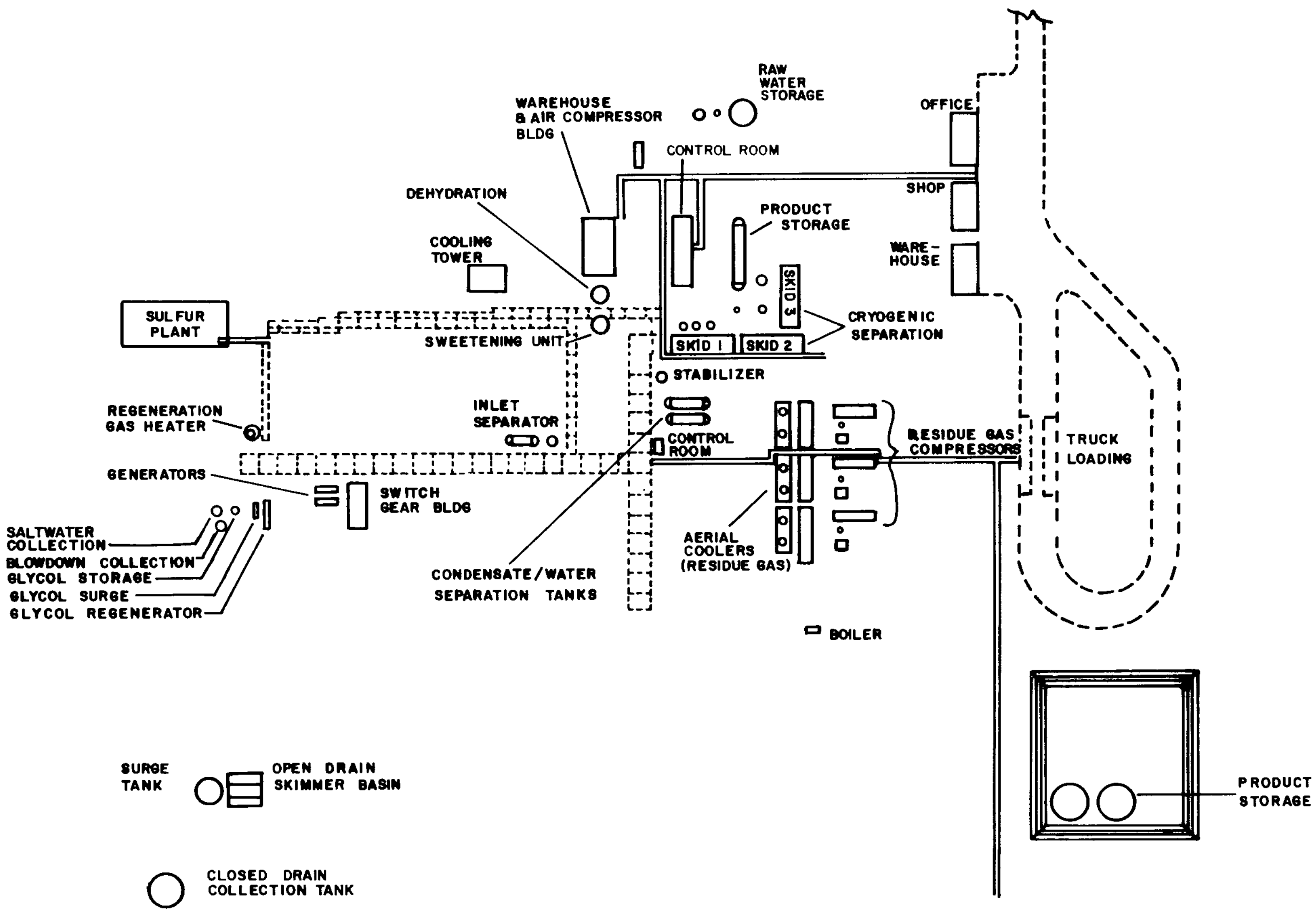
SUBSEQUENT NOTIFICATION. "Subsequent Notification" shall be a complete written report of the incident and shall be submitted in duplicate to the district office of the Division district in which the incident occurred within ten days after discovery of the incident.

CONTENT OF NOTIFICATION. All reports of fires, breaks, leaks, spills, or blowouts, whether verbal or written, shall identify the location of the incident by quarter-quarter, section, township, and range, and by distance and direction from the nearest town or prominent landmark so that the exact site of the incident can be readily located on the ground. The report shall specify the nature and quantity of the loss and also the general conditions prevailing in the area, including precipitation, temperature, and soil conditions. The report shall also detail the measures that have been taken and are being taken to remedy the situation reported.

WATERCOURSE, for the purpose of this rule, is defined as any lake-bed or gully, draw, stream bed, wash, arroyo, or natural or man-made channel through which water flows or has flowed.

RULE 117. WELL LOG, COMPLETION AND WORKOVER REPORTS

Within 20 days after the completion of a well drilled for oil or gas, or the recompletion of a well into a different common source of supply, a completion report shall be filed with the Division on Form C-105. For the purpose of this rule, any hole drilled or cored below fresh water or which penetrates oil or gas-bearing formations or which is drilled by an "owner" as defined herein shall be presumed to be a well drilled for oil or gas.



∘ FLARE

SCALE: NONE

HOUSTON DIVISION
MIDLAND DISTRICT

INDIAN BASIN GAS PLANT
PLOT PLAN

EDDY COUNTY, NEW MEXICO

RECEIVED

SEP 1 0 1984

MARATHON OIL CO.
Environmental & Safety
Midland, Texas

NOTICE OF PUBLICATION

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

SANTA FE, NEW MEXICO

Notice Dates:
10/2/84 (ARTESIA)
10/3/84 (ALB.)

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plan has been submitted for approval to the Director of the Oil Conservation Division, P. O. Box 2088, State Land Office Building, Santa Fe, New Mexico 87501, telephone (505) 827-5800.

MARATHON OIL COMPANY, Indian Basin Gas Plant (NE 1/4, Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico), C. L. Roberts, Manager, Houston Division, P. O. Box 3128, Houston, Texas 77253, has modified its existing facility to commingle all waste water discharges for injection into a Class II disposal well. The waste stream includes up to 33,600 gallons per day (gpd) of produced salt water, 1100 gpd of cooling tower blowdown, and approximately 600 gpd of boiler and condensate blowdown. Previously the cooling tower effluents were discharged onto the ground near a dry arroyo. The ground water most likely to be affected by any discharges from surface facilities is at a depth of approximately 200 to 250 feet with a total dissolved solids concentration of about 575 mg/l.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modifications, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and a public hearing may be requested by an interested person. Requests for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN Under the Seal of the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 28th day of September, 1984.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

R. L. STAMETS
Acting Director

S E A L

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

August 1, 1984

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Marathon Oil Company
P.O. Box 552
Midland, Texas 79702

Attention: J. L. Smith

Re: Discharge Plan for
Marathon Oil Company
Indian Basin Gas Plant
in Eddy County, NM

Dear Mr. Smith:

The OCD has reviewed your discharge plan application for the above facility (received July 2, 1984). Recently completed modifications of your Indian Basin facilities have greatly simplified OCD's review of your discharge plan since process effluents are no longer discharged onto the surface of the ground. However, I do have several questions, comments, or requests for additional information:

1) Provide for our files a facility site plan or large scale aerial photograph(s) showing the current plant layout. Include thereon the location of the process equipment shown in Figure 1. 4

2) Information submitted in 1981 indicated that prior to installation and operation of the new facilities, discharges were to dry arroyos at the plant. Were any evaporation ponds used for disposal at the site, and if so what is their current status (dry, drying, etc.) and proposed final disposition (covered and

reclaimed, etc.)?

3) Provide the relative amounts of blowdown effluents from the cooling tower waste, heat boilers, process boiler, sulfur recovery unit boiler and sulfur condensers that make up the average 25 barrels per day to be mixed with produced salt water for disposal.

4) Regarding the analysis of comminged water in Figure 4 (p.10), indicate type of sample (grab or time-composited), date of sample, and laboratory performing the analysis.

5) Provide a legible copy of the memorandum report on site hydrology provided in the appendix.

6) Regarding the discussion on page 15, Marathon has referred to the definition of "Toxic Pollutant" given in Section 1-101.UU of the Water Quality Control Commission (WQCC) Regulations. The definition lists several types of contaminants that may, under certain conditions, be considered a "Toxic Pollutant". These include solvents and biocides as well as hydrocarbon components and processing by-products. Some of these may indeed exist in the various blowdown effluents, but not at significant concentrations. Because of this and because discharges are self-contained in tanks and pipelines, the OCD at this time is not asking for specific "Toxic Pollutant" information.

7) In the event the salt water disposal well or disposal line is shut-in for workover or repairs, what procedures are to be followed to prevent unauthorized discharges to the surface or subsurface? Are the holding tanks of sufficient size to store effluents during a breakdown? Provide a contingency plan addressing these questions and the procedures to be followed in the event of major spills, disposal pipeline failure, extended disposal well downtime, etc.

8) In addition to the process effluent discharges, the WQCC regulations cover any discharges onto or below the surface of the ground from routine housekeeping practices if they involve machinery oils, solvents, toxic pollutants or other

contaminants listed in Section 3-103 of the Regulations. Therefore, there should be no unpermitted discharges to unlined sumps or pits for disposal of solvents, cleaning fluids, waste engine oils, etc.

If plant practices currently involve disposal of any effluents in this manner, provide information on such disposal and what, if any, changes are proposed. Additional geotechnical information may be required for soils, hydrology, pit design, etc., if practices of this type occur and are proposed to continue unchanged.

Enclosed for your use is an updated (through November 13, 1983) copy of the WQCC Regulations. If you have any questions regarding the Regulations or the information requested in this letter, please contact me at the above address or at (505) 827-5812.

Sincerely,

David G. Boyer

DAVID G. BOYER
Hydrogeologist

DGB/dp

cc: C. L. Roberts, Marathon, Houston
OCD Artesia Field Office

Memo

From
DAVID G. BOYER
Hydrogeologist

OK JR

To Joe

This is my first DP review letter. The questions I've asked reflect the type of things I believe important to iron out before approval of the plan, even for a plant that commingles all effluents and sends to a disposal well. If their answers to these questions and information requests are adequate (especially #2, 7 & 8), I expect to be able to recommend your approval of the plan at that time.

PS. Dick has reviewed letter

Dave

Oil Conservation Division
P.O. Box 2088 Santa Fe, N.M. 87501

C. L. Roberts
Manager, Houston Division
Onshore Operations
Production, United States

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/629-6600

June 22, 1984

Mr. Joe D. Ramey, Director
State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

As requested, enclosed are two copies of the Discharge Plan for Marathon Oil Company's Indian Basin Gas Plant in Eddy County, New Mexico.

This Plan was prepared in accordance with Part 3 of the New Mexico Water Quality Control Commission Regulations and covers all discharges from the Plant. These discharges are gathered, treated, commingled, and injected for disposal purposes into the Paddock formation through the Marathon Federal SWD Well No. 1. Therefore, under normal operating conditions, there are no discharges onto the surface of the natural ground from the Plant.

If you have any questions on material contained in this Plan, please contact J. L. Smith in Midland, Texas at 915/682-1626.

Very truly yours,

C. L. Roberts

C. L. Roberts

CLR/JLS/mhh

Marathon Oil Company
Indian Basin Gas Plant Discharge Plan

Submitted to

State of New Mexico
Energy and Minerals Department
Oil Conservation Division

June, 1984

C. L. Roberts
Manager, Houston Division
Onshore Operations
Production, United States

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
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Very truly yours,

C. L. Roberts

C. L. Roberts

CLR/JLS/mhh

Table of Contents

PLANT HISTORY

The Indian Basin Gas Field was discovered in 1962 in the west central portion of Eddy County, New Mexico. This field is approximately 20 miles west-northwest of Carlsbad and 28 miles south-southwest of Artesia. The upper Pennsylvanian is the main production reservoir. The gas and liquid production is metered at each well site.

In 1965, construction of the Indian Basin Gas Plant (IBGP) was begun. The Plant was put on line in early 1966 with a design capacity of 120 MMCFD.

An expansion to the Plant in 1968 allowed residue gas sales to increase in excess of 200 MMCFD.

In early 1981, a cryogenic modification to the Plant was completed. This allowed a majority of the old process equipment to be taken out of service. The Plant capacity is still considered to be 200 MMCFD and the products are natural gas, demethanized hydrocarbon mix, condensate and sulfur.

In September, 1983, the construction of a new three-stage Claus sulfur recovery unit was completed. It has a capacity of 25 long tons per day.

PROCESS FLOW DESCRIPTION

INDIAN BASIN GAS PLANT

The following describes the process flow diagram shown on Figure 1.

1.) Gas and small quantities of liquids are separated. The liquids are transferred to the condensate and salt water separation system.

2.) Commingled salt water and liquid hydrocarbons are separated. The water flows to a storage tank. The condensate flows to a stabilizer.

3.) The condensate is stabilized, cooled, and put in storage tanks for sale. The overhead vapors are cooled, recompressed, and injected back into the inlet gas stream (1).

4.) The inlet gas and stabilizer gas is sweetened using DEA solvent.

5.) The DEA solvent is regenerated in a low pressure still using steam for re-boil heat.

6.) Acid gas from the DEA still is processed in a Claus sulfur recovery unit. The sulfur is sold as a pure liquid product. The discharge water from the boiler and condensers is collected in the blowdown tank (16).

7.) Sweet gas from No. (4) is dehydrated using a molecular sieve system.

8.) The sieve beds are regenerated with hot dry gas which is then cooled and returned to the sweetening system inlet.

9.) Dry gas is processed in a cryogenic system for a high level of ethane and propane removal. This cryogenic system was completed and put on line during the early part of 1981.

10.) The liquid product is sweetened with DEA and sold as a single mixed product to Mid-America Pipeline Company (MAPCO).

11.) Residue gas is recompressed from 400 psig to 1000 psig for sales to Natural Gas Pipeline Company (NGPL).

12.) Exhaust waste heat is utilized to produce process steam heat. The discharge water from the boilers flows to the blowdown tank (16).

13.) Two turbine generators supply approximately 1000 kw electricity to the plant.

14.) Three parallel compressors supply 125 psig air for the plant instrument air system.

15.) The cooling tower handles approximately 4000 gpm of water and includes a continuous water blowdown to control concentrations cycles. This discharge flows to the blowdown tank (16).

16.) The blowdown tank collects discharge water from the sulfur plant, boiler system, and cooling tower. Hence, all plant discharges are collected here. The water is chemically treated to attain compatibility with the rock formation in the disposal zone.

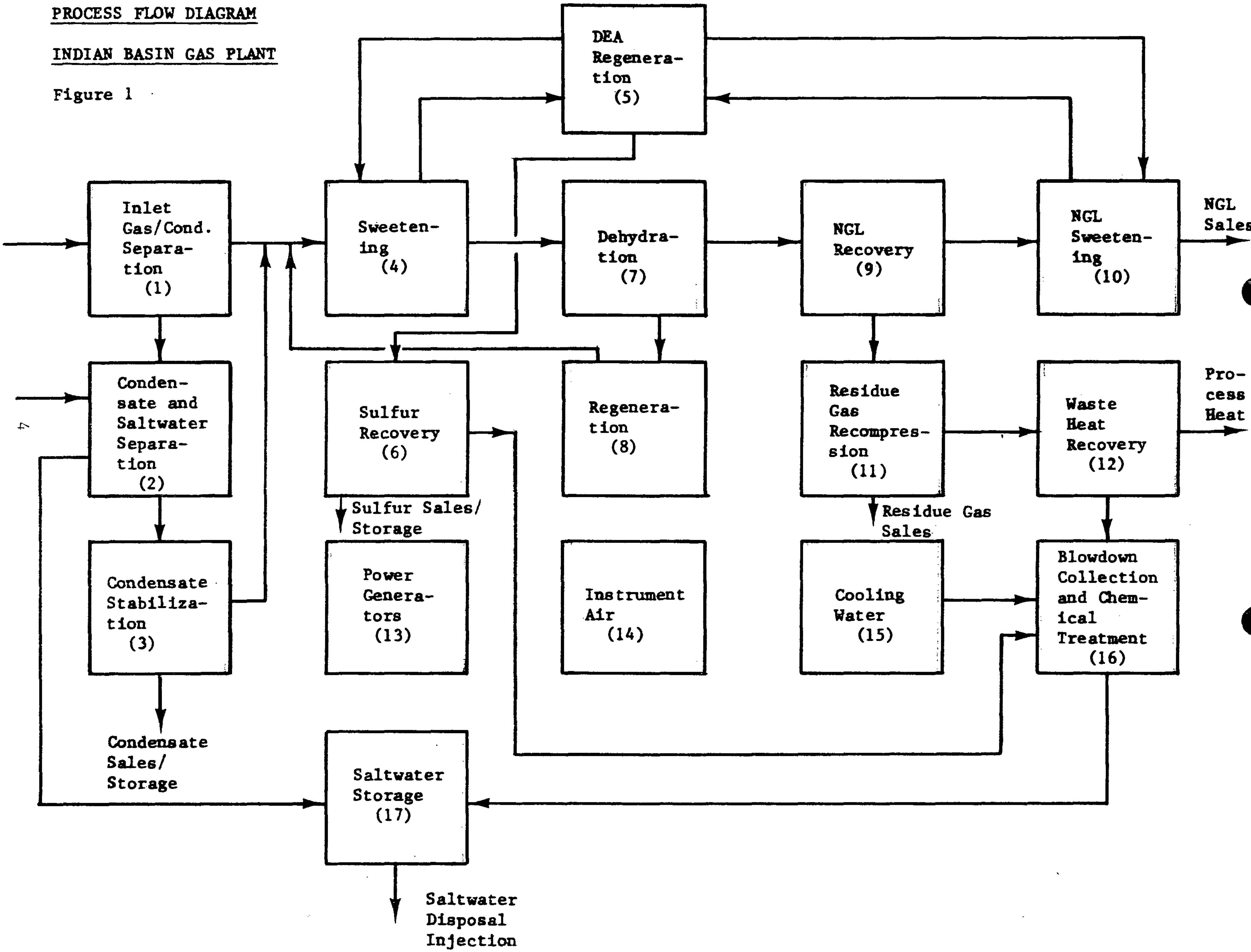
17.) The treated discharge water is mixed with the salt water and is injected in the salt water disposal well using a positive displacement pump.

The Plant is manned by operations personnel 24 hours per day.

PROCESS FLOW DIAGRAM

INDIAN BASIN GAS PLANT

Figure 1



DISCHARGE INFORMATION

There are four discharges associated with Marathon's Indian Basin Gas Plant. These discharges are the:

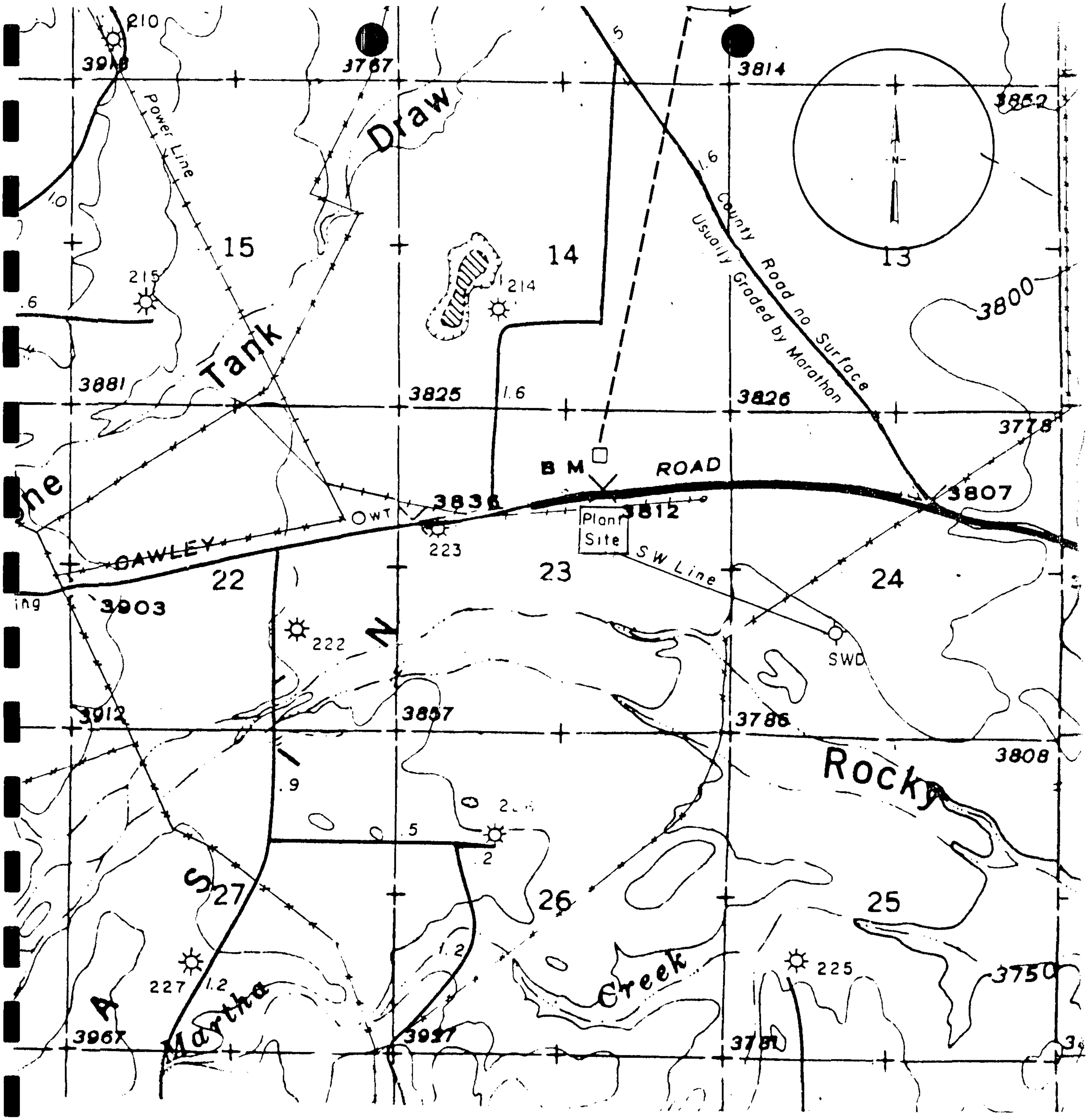
a.) produced salt water
b.) cooling tower blowdown
c.) sulfur recovery unit waste heat boiler and condenser blowdown
d.) waste heat boiler and process steam boiler blowdown

There are no discharges, under normal operating conditions, onto the surface of the natural ground from the Plant. Discharge a (above) is collected in a salt water holding tank prior to disposal. Discharges b, c, and d are collected in another holding tank, chemically treated for compatibility, commingled with the Indian Basin Field produced waters and injected into Marathon's salt water disposal well. This well is the Marathon Federal SWD Well No. 1 located in Unit K of Section 24, Township 21S, Range 23E, Eddy County, New Mexico (approximately one mile east-southeast of the Plant). The location of this well with reference to the Plant is shown in Figure 2. This commingled stream primarily consists of produced salt water and is injected for disposal purposes into the Paddock formation at approximately 2534 feet to approximately 2726 feet through 2 3/8 inch tubing with a packer set at approximately 2450 feet in 4 1/2 inch casing (see Figure 3).

Marathon was granted the authority to use this well for salt water disposal purposes by the Oil Conservation Commission of the State of New Mexico on October 30, 1965. On March 14, 1984, Marathon requested that the Oil Conservation Division for the State of New Mexico amend the Administrative Order SWD-55 to permit the injection of the subject commingled stream. This request is shown on page 8 and is based on the regulatory interpretation that this disposal well will continue to be identified as a Class II well under New Mexico's Underground Injection Control (UIC)* program.

Marathon is currently pursuing the approvals for a second disposal well for the Indian Basin Gas Plant. This second well will serve as a back-up well in the event problems are experienced with the Marathon Federal SWD Well No. 1.

*memorandum included in appendix



210
3767
3814
3852
Draw
5
1.6
Power Line
1.0
15
14
13
215
214
.6
County Road no Surface
Usually Graded by Marathon
3800
Tank
3881
3825
1.6
3826
3778
B M
ROAD
3836
3812
3807
Plant Site
OWT
223
CAWLEY
22
23
24
SW Line
3903
222
SWD
3912
3857
3786
3808
Rocky
.9
.5
.2
27
26
25
1.2
227
1.2
225
3750
Creek
Martha
3967
3927
3781

Figure 2

MARATHON OIL COMPANY
"DIAGRAMMATIC SKETCH OF DISPOSAL WELL"
MARATHON FEDERAL, WELL NO. 1
INDIAN BASIN AREA
EDDY CO., NEW MEXICO
SCALE: NONE

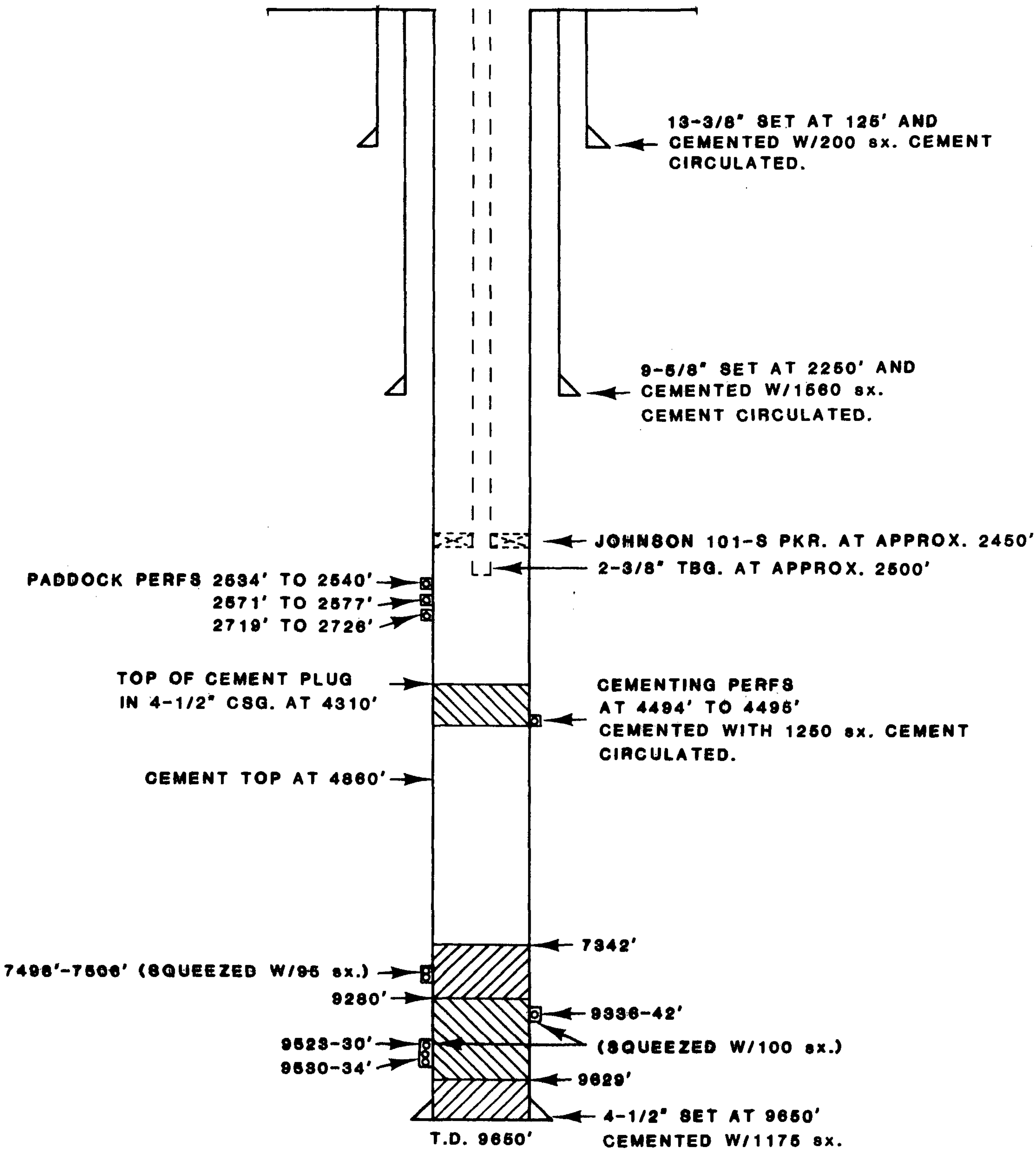


Figure 3

C. L. [illegible]erts
Mana[illegible], Houston Division
Onshore Operations
Production, U.S. & Canada

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77001
Telephone 713/629-6600

March 14, 1984

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Attn: Joe D. Ramey

Dear Mr. Ramey:

Marathon Oil Company requests, effective May 1, the amendment of the Indian Basin Gas Plant Discharge Plan submitted to the State of New Mexico, Energy and Minerals Department, Oil Conservation Division, in November, 1981. With this amendment Marathon will eliminate all surface discharges at the Indian Basin Gas Plant.

It is requested that the referenced plan be amended to show that the plant's surface discharges,

- continuous blow-down from the cooling tower and
- condensed steam blow-down from all boilers,

will be commingled and injected with Indian Basin Field produced waters. (Marathon is currently permitted to inject salt water into Marathon Federal Well No. 1 located in Unit K of Section 24, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico.)

Under this requested amendment, the blow-down from the cooling tower and condensed steam will be treated in a separate holding tank to assure compatibility with produced waters before injection.

Furthermore, Marathon requests the Commission's amendment to their Administrative Order SWD-55 Of October 30, 1965, to permit the injection of the subject commingled stream.

Sincerely,

MARATHON OIL COMPANY

C. L. Roberts

C. L. Roberts
Houston Onshore Division Operations Manager

RFM/bgr

QUANTITY, QUALITY, AND TREATMENT OF DISCHARGES

Quantity:

a.) The cooling tower blowdown is normally a continuous blowdown done for the purposes of maintaining optimum chemical usage from system additives and conserving feedwater. The primary function of the chemical treatments in the cooling tower system are:

- corrosion inhibition
- antifoulant
- microbiocide

b.) The blowdowns from the waste heat boilers, process boiler, sulfur recovery unit waste heat boiler, and sulfur condensers serve essentially the same purpose as the cooling tower blowdown. Primary functions of the chemical treatments in the boilers are:

- corrosion inhibition
- scale control
- sludge conditioner
- oxygen scavenger

Approximately 25 barrels and 550 barrels of cooling tower/boiler blowdown and produced salt water, respectively, are injected for disposal purposes on a daily basis.

Quality:

Figure 4 is a summary of the analysis performed on the commingled stream of Plant blowdown water and produced salt water. The analysis of the commingled stream shows the characteristics of this fluid, prior to injection.

Treatment:

Hardness salts are present in the blowdown water. Without treatment, this can result in the precipitation of salts resulting in deposit formation. An organic dispersant is added to the blowdown collection tank to prevent deposits from forming. With the hardness salts complexed by the dispersant, the blowdown water can be commingled with the produced salt water and safely injected into the disposal well.

ANALYSIS OF COMMINGLED DISCHARGE

Component	Commingled Stream (mg/l)*
Aluminum (Al)	0.00
Arsenic (As)	0.000
Barium (Ba)	0.0
Boron (B)	0.49
Cadmium (Cd)	0.00
Calcium (Ca)	496.
Chloride (Cl)	4,723.
Chromium (Cr)	0.00
Cobalt (Co)	0.00
Copper (Cu)	0.00
Cyanide (CN)	0.0
Fluoride (F)	4.0
Iron (Fe)	3.9
Lead (Pb)	0.00
Magnesium (Mg)	92.
Manganese (Mn)	0.00
Mercury, Total (Hg)	0.0018
Nickel (Ni)	0.00
Nitrate (NO_3 as N)	1.1
pH	8.39
Phenols	0.00
Selenium (Se)	0.00
Silver (Ag)	0.00
Sulfate (SO_4)	1,566.
Total Dissolved Solids (Calculated)	11,939.
Total Hardness as $CaCO_3$	1620.0
Zinc (Zn)	0.20

*represents total Plant discharge prior to injection

Figure 4

LOCATION OF SURFACE WATER AND GROUNDWATER SOURCES

There are no surface bodies of water within several miles of the Plant site. There is a normally dry arroyo approximately 1/4 mile south of the Plant. This arroyo is commonly known as Rocky Arroyo and it primarily travels in an east/west direction in the vicinity of the Plant. In the past, the only time this arroyo will contain water is during heavy rainfall periods.

Marathon Oil Company currently maintains two (2) water wells for use by the Indian Basin Gas Plant. Both water wells are located within the Plant boundaries, and they both produce water from the lower Queen aquifer.

Water Well #1 primarily supplies process water to the Plant and produces from a tubing depth of 230 feet. Water Well #2 is considered to be an auxillary water well and its primary function is fire protection. This well produces from a depth of approximately 270 feet.

From available literature, there is no evidence to indicate there is an upper Queen aquifer in the area of the IBGP. Also, there are no known groundwater discharge sites within one mile of the Plant.

DEPTH TO AND TDS CONCENTRATION OF THE GROUNDWATER

Using the memorandum report "Queen and Related Aquifers in the Indian Basin,"* the upper Queen aquifer does not exist in the area of Marathon's Water Well #1 which is within the Plant boundaries. The author of the above memorandum also stated that during the drilling of Marathon's Water Well #1, in July, 1965, no water was encountered above approximately 240'. This evidence indicates there is no upper Queen aquifer in the vicinity of the Indian Basin Gas Plant.

Depth to the lower Queen aquifer based on well records from Marathon's Water Well #1 at the IBGP is approximately 240 feet. An analysis of freshwater from this well shows a TDS concentration of approximately 578 mg/l.

*report included in appendix

FLOODING POTENTIAL OF THE SITE

The location of the Indian Basin Gas Plant is such that susceptibility to flooding is virtually non-existent. Rocky Arroyo is located at a slightly lower elevation than the Plant site, and it will periodically have flowing water due to rainfall. This arroyo, however, poses little, if any, threat to the Plant.

INFORMATION ON GEOLOGIC CONDITIONS

As noted before, where Marathon's Indian Basin Gas Plant Water Well No. 1 was drilled in July, 1965, no water was encountered above approximately 240 feet. The logs of a well drilled in the vicinity of the Plant were correlated with a core hole drilled in an adjacent section. Interpretation shows the geologic interval from approximately 60' to 250' to be mainly dolomite and anhydrite that appears to be dense in nature. This geological condition should serve to protect the lower Queen aquifer from surface contaminants.

TOXIC POLLUTANTS

Excluding the produced salt water, there is no interface of the Plant feedwater with any of the product under normal operating conditions. If an interface did occur, the Plant product would be degraded. This condition would be immediately detected and corrected.

Because there is normally no interface between the Plant product and feedwater, no "toxic pollutants" should exist in the blowdown waters.

MONITORING AND REPORTING

As noted previously, Marathon operates two (2) fresh water wells from the lower Queen aquifer for the purpose of supplying feedwater to the Plant. Since there is no known evidence to indicate the presence of the upper Queen aquifer near the Plant site, these two (2) water wells can be used in a groundwater monitoring program, as needed.

At present, Marathon has no specific monitoring devices in the vadose zone or elsewhere. Both fresh water wells are maintained in working condition and samples from the lower Queen aquifer can be easily obtained and analyzed. Information and results will be available to the authorized agency.

CONCLUSION

There are essentially four discharges from Marathon's Indian Basin Gas Plant. These discharges consist of:

a.) produced salt water
b.) cooling tower blowdown
c.) sulfur recovery unit waste heat boiler and condenser blowdown
d.) waste heat boiler and process steam boiler blowdown.

Under normal operating conditions, there are no discharges onto the surface of the ground from the Plant. The discharges are collected in holding tanks, treated, commingled, and injected into Marathon's salt water disposal well. This fluid is injected for disposal purposes into the Paddock formation at approximately 2534 feet to approximately 2726 feet through 2 3/8 inch tubing with a packer set at approximately 2450 feet in 4 1/2 inch casing.

On March 14, 1984, Marathon requested that the Oil Conservation Division for the State of New Mexico amend the Administrative Order SWD-55 to permit the injection of the commingled stream. Also, Marathon is pursuing the approvals for a second disposal well for the Indian Basin Gas Plant. This second well will serve as a back-up well in the event problems are encountered with the existing disposal well.

APPENDIX

UNDERGROUND INJECTION CONTROL PROGRAM FOR CLASS II WELLS
Memorandum of Agreement
Between
The State of New Mexico
and
The United States Environmental Protection Agency,
Region 6

ADDENDUM NO. 1

That wells used for disposal of waters brought to the surface in connection with oil or natural gas production, when such waters are recovered at gas plants, will be regulated (permitted, reviewed, inspected, etc.) in the same manner as any such well on an individual lease or in a community disposal system.

That such wells will also be so regulated when said produced water is commingled with waste waters from any such gas plant where such plant is an integral part of production operations provided that the waters are not classified as a hazardous waste at the time of injection.

Oil Conservation Division

Joe D. Ramey, Director

June 10, 1982
Date

Environmental Protection Agency, Region 6

Frances E. Phillips

Dick Whittington,
Regional Administrator

June 28, 1982
Date

MEMORANDUM REPORT

Queen and Related Aquifers in the Indian Basin

This report deals with aquifers in and related to the Queen formation in the Queen outcrop area in Indian Basin from Township 23 South, Range [illegible] East north and northeast through Township 21 South, Range 24 East. A map, two cross sections and a well tabulation are attached hereto and made a part of this report. Only a part of the total Queen outcrop area is covered and will be incorporated in the complete Indian Basin Report when that report is finalized.

The Queen formation in this area outcrops in a band approximately 2 to [illegible] miles in width and is roughly parallel to the Azotea Mesa and Seven Rivers Hills. The strike is roughly northwest and dip is to the northeast, tending slightly more east than northeast at a rate of 100 to 125' per mile. The Queen formation in this area is of interbedded gypsum, sandstone, siltstone, and dolomite.

Material used in this report was obtained from a study of logs and well records available; notes made by the writer in 1964, 1965, and 1966 while studying the development of the Indian Basin Gas field; records in the Oil Conservation Commission Office, Artesia; from published and unpublished information available in the State Engineer office including the Motts Report, the transcript of the "Carlsbad" hearings, Geologic Map of New Mexico by Dane and Bachman of 1965, Subsurface Geologic Methods by Leroy; and from conversations with long time residents of the area.

A study of all material available indicates there are three aquifers present in the area of study from land surface to the bottom of the Queen. They are: (1) The alluvium (2) The upper Queen aquifer, possibly the Shattuck member, more commonly known as the Red Sand or Artesia Red Sand and (3) The bottom Queen aquifer, in the base of the Queen and possibly along the Queen-Grayburg contact zone.

The alluvium is rather thin and found primarily on valley or arroyo floors and alluvial fans in and along Rocky Arroyo. In times of wet weather the alluvium aquifer contributed some flow to Indian Big Springs and Rocky Arroyo. Mr. William Shafer, a long time resident, reports that 30 to 40 years ago, there were many small springs and seeps into Rocky Arroyo but at that time there was much more rain than now.

The upper aquifer in the Queen formation, probably being the Shattuck member or the Artesia Red Sand can be picked on some of the available logs and followed to the area of Indian Big Springs. Referring to the two cross sections, the well tabulation, and map; on cross-section X-X' wells #3, 4, and 5 and on cross-section Y-Y' wells #6, 7, 8, 9, and 10, and the wells marked B and D on the map, this aquifer is plotted from the logs. The wells Y-10 and X-5 are the same, being Lowe's #1 Staple oil test well.

A water well was drilled by Lowe at the site of the #1 Staples oil test well, to a reported depth of 250' and the water level was measured at 82'. This water level compares with the water level of Indian Big Springs as taken from the U.S.G.S. quadrangle map. Well No. 6 on cross-section Y-Y' is Shafer's commercial well located 21.24.20.443 with a reported total depth of 75' (Mott's Report) and the water level was measured at 40'. This water level at 40' projected into Y-Y' fits exceptionally well into the upper aquifer. Also wells marked "B" and "D" fit the pattern of the upper aquifer. Well "B" is Shafer's domestic well (Bar well, C-1130) with a reported depth of 130' and with the water level measured at 51'. This fits exceptionally well into the cross-sections X-X' and Y-Y' as deriving its water from the upper aquifer.

The lower aquifer in the Queen formation has no name I am aware of and is separated from the upper aquifer by 100 to 300 feet of sandstone, dolomite and sandy dolomite. From interpretation of the gamma ray logs available, this material is quite dense, and no water flows have been reported to have been encountered between the upper and lower aquifers.

The correlation points (C.P.) shown on the cross-sections, are, in my opinion, the top of the lower aquifer. One water well was drilled and was watched closely. This was Marathon Oil Company's well 21.23.23.232 with a T.D. of 255'. The driller of this well reported water from 185' to 255' on his well record, however, I watched the drilling very closely and notes made during July 1965 and personal recollection indicates no water was encountered above about 240'. This depth on Marathon's sample description log is correlated with and used as the top of the lower Queen aquifer on the cross-sections.

Summary:

In the course of this study approximately 70 well logs and well records were examined. Part of these logs and records are of wells to the north of Township 21 South, Range 24 East and will be used in the continuation of this study. The remainder are in the immediate area of study.

On those logs and records of wells lying within the area covered by this report, the top of the lower Queen aquifer could be picked with reasonable accuracy. The bottom of the upper aquifer could be picked in areas where it was present and in some cases the top could be picked, however, due to logging methods, if the upper aquifer was on the surface or very near the surface, the picking of top and bottom was sometimes questionable.

The logs and well records of wells spotted on the attached map are representative of all of the logs examined, and the picking of the two aquifers shown on cross-sections X-X' and Y-Y' are confirmed by the study and comparison of those not plotted.

Conclusion:

In the area under study, there are two distinct aquifers in the Queen formation. The upper aquifer, which supplies water to Shafer's commercial well 21.23.20.442, Shafer's domestic well (Dar well C-1100) 21.24.20.144, is also the main source of water to Indian Big Springs. Also probably tapping the upper aquifer may be a few ranch and stock wells on the eastern edge of the Queen outcrop. The lower aquifer supplies water to the Davidson well in 20.23.10.431 (C-1371) and to Marathon Oil Company's water well 21.23.23.232 (RA-5131). I know of no other wells using the lower aquifer as a source in this area. Marathon Well #2

In this study, I have found no evidence which would indicate that the upper Queen aquifer and the lower Queen aquifer are interconnected. I do have notes made from conversations with the drillers that there is a dry zone between the upper and lower aquifers in the area where the upper aquifer is at or near the surface.

The natural discharge areas of the two Queen aquifers have not as yet been determined, but it is my opinion that the lower Queen aquifer does not contribute to the flow of Indian Big Springs or wells in Rocky Arroyo. It is hoped that in the continuation of this study, the discharge areas can be determined.

September 29, 1967

R. E. Collins, Jr.
R. E. Collins, Jr.
Water Resources Engineer

WELL TABULATION

All Surface Elevations are above sea level
and are reported except where noted.

Cross-Section X-X'

Well #1 Location: 22.23.17.230
Elevations: surface - 4171'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 4021'

Well #2 Location: 22.23.11.141
Elevations: surface - 3907'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3741'

Well #3 Location: 22.24.6.114
Elevations: surface - 3954'
top upper aquifer - 3871'
bottom upper aquifer - 3826'
correlation point - 3574'
Notes: Reliable report of first water at 450' (elevation 340[illegible]')

Well #4 Location: 21.24.26.341
Elevations: surface - 40[illegible]3'
top upper aquifer - 3637'
bottom upper aquifer - 3612'
correlation point 3443'

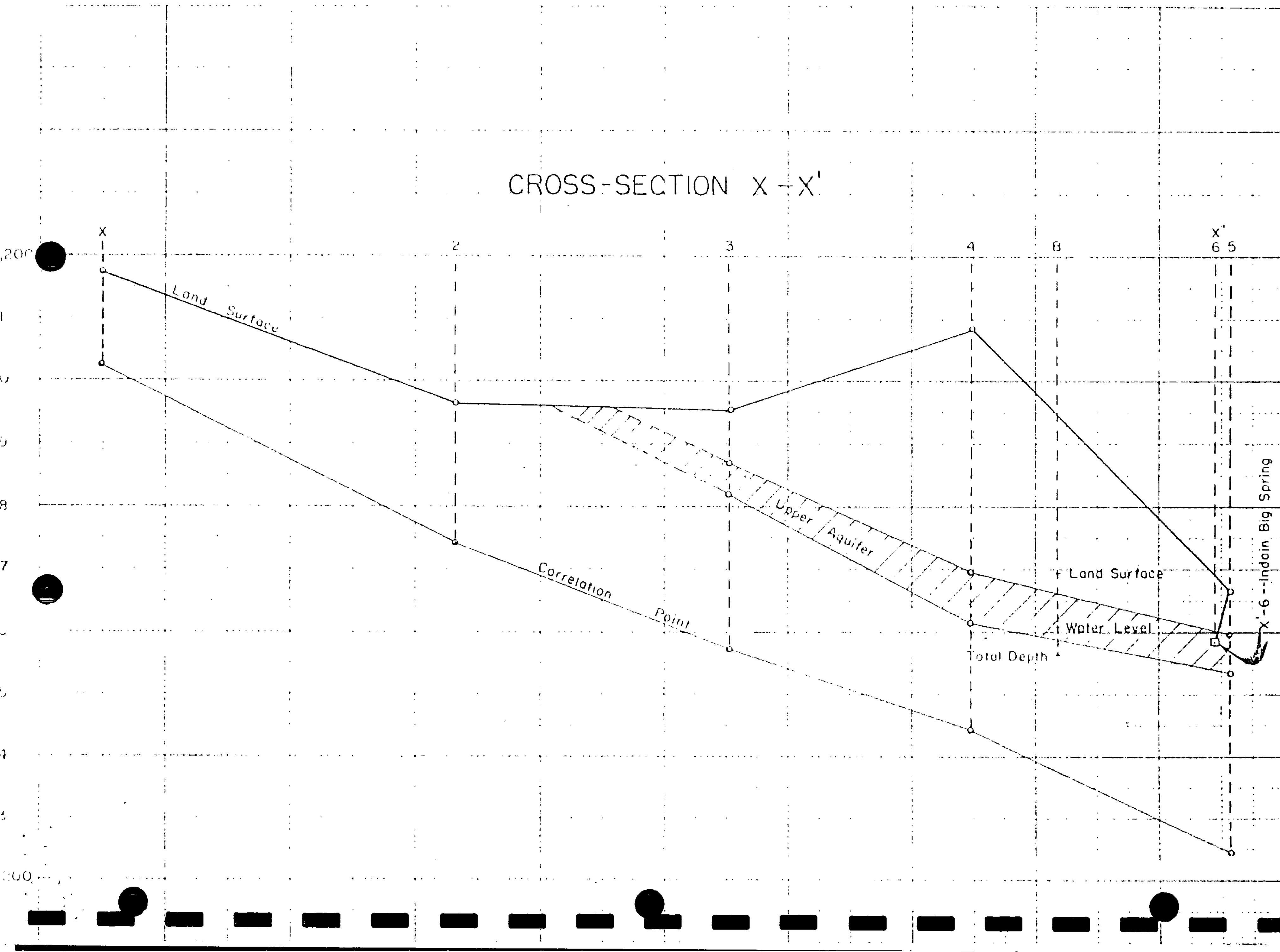
Well #5 Location: 21.24.22.324
Elevations: surface - 3638'
top upper aquifer - 352[illegible]'
bottom upper aquifer - 3496'
correlation point - 3243'

Indian Big Springs Location: 21.24.27.210
Elevation: surface - 3566' (USGS Quad)

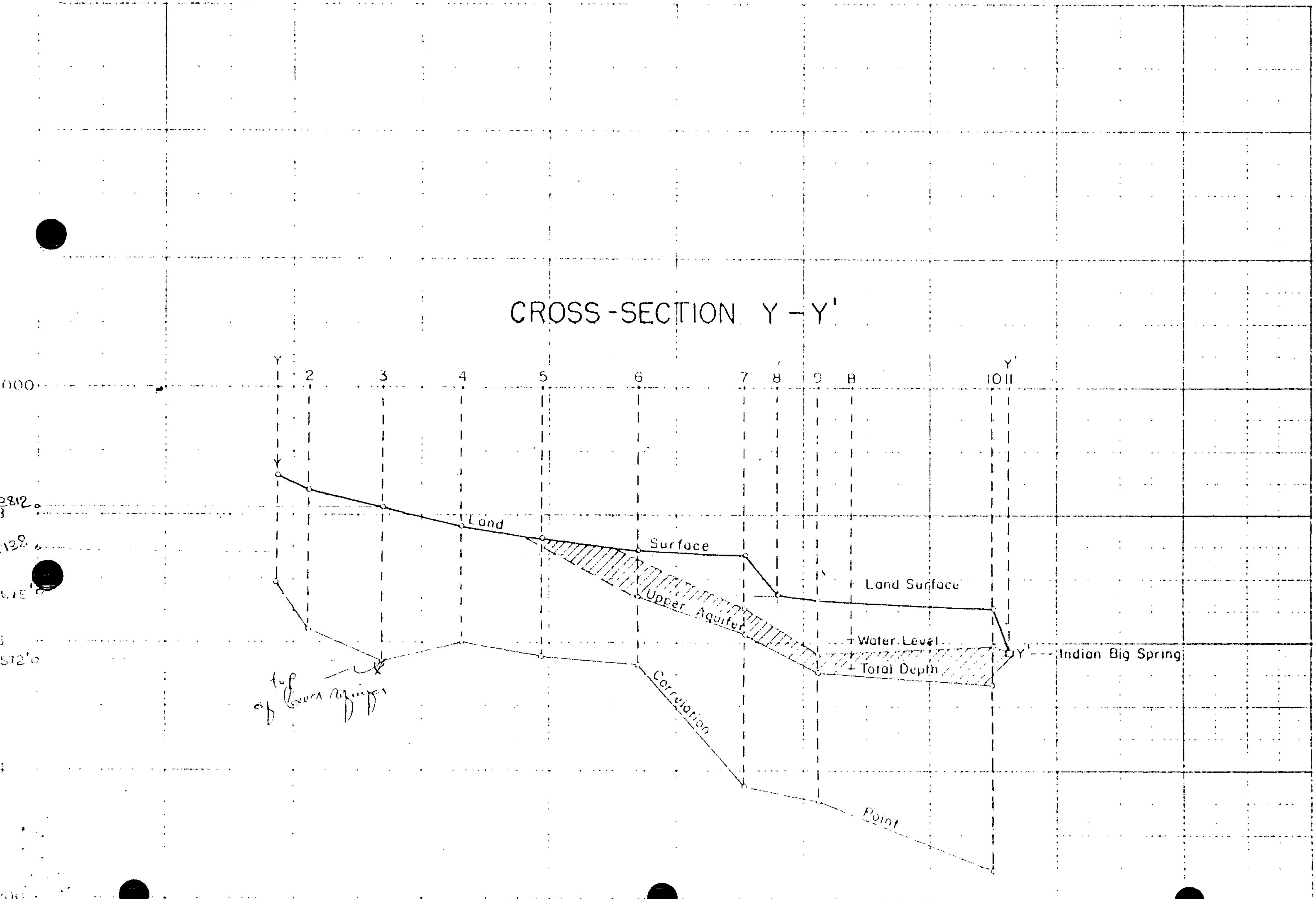
Cross-Section Y-Y'

Well #1 Location: 21.23.22.420
Elevations: surface - 3662'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3600'

To accompany Memorandum Report "Queen and Related Aquifers in the Indian Basin"



To accompany Memorandum Report "Queen and Related Aquifers in the Indian Basin"



Well #2 Location: 21.23.23.130
Elevations: surface - 3343'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3318'

Well #3 Location: 21.23.23.232 RA-5131
Elevations: surface - 3812'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3572'

Well #4 Location: 21.23.24.333
Elevations: surface - 3785'
top upper aquifer - probably on surface
bottom upper aquifer - at or near surface
correlation point - 3600'

Well #5 Location: 21.23.24.422
Elevations: surface - 3766'
top upper aquifer - probably on surface
bottom upper aquifer - 3700'?
correlation point - 3578'

Well #6 Location: 21.24.19.414
Elevations: surface - 3746'
top upper aquifer - probably on surface
bottom upper aquifer - 3672'
correlation point - 3560'

Well #7 Location: 21.24.20.431
Elevations: surface - 3733'
top upper aquifer - 3653'
bottom upper aquifer - 3612'
correlation point - 3334'

Well #8 Location: 21.24.20.443 Shafer's commercial well
Elevations: surface - 3675' (USGS Quad)
total depth - 75'
water level 40'
Notes: Reported capable of producing 250-300 gpm with 15 h.p. motor through 4" discharge.

Well #9 Location: 21.24.21.333
Elevations: surface - 3670'
top upper aquifer - 3581'
bottom upper aquifer - 3550'
correlation point - 3351'

Well #10 (same as well 5 on X-X' cross-section)
Location: 21.24.22.324
Elevations: surface - 3663'
top upper aquifer - 3598'
bottom upper aquifer - 3493'
correlation point - 3243'

Indian Big Springs Location: 21.24.27.210
Elevation: surface - 3586'

Wells Shown on Map but Not on Cross-Sections

Well "B" Shafer domestic well Location: 21.24.26.114 (C-1126)
Elevations from USGS Quad - 3695'
Reported depth 133'
Water Level 91'
Notes: Reported capable of producing 250 to 300 gpm.

Top of
red sand 265' from sample log
elevation
top red sand 3735'
elevation correlation point - 3415'
Notes: The log available is a very poor print of original but the points in question compare very favorably.

Well "C" Location: 21.24.28.321
Elevations: surface - 3838'
top upper aquifer - could not make satisfactory pick, probably very close or at surface.
bottom upper aquifer - 3615'
correlation point - 3482'

Well "D" oil test (driller's name not available) Location: 21.21.6.310
Elevation: 3940' (reported elevation 3760' is questionable USGS Quad sheet shows elevation to be 3930 to 3950)

Well "E" Location: 22.24.5.132
Elevations: surface - 4012'
top upper aquifer - could not make satisfactory pick
bottom upper aquifer - 3740?
correlation point 3577

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

May 21, 1984

Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

Attention: Robert P. Scott

Gentlemen:

In accordance with your letter of May 14, 1984, you are hereby granted an extension of the filing deadline on your Indian Basin Gas Plant Discharge Plan to July 15, 1984.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Midland District
Houston Division
Production Operations United States

Marathon Oil Company

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

May 14, 1984

Mr. Joe D. Ramey
State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Dear Mr. Ramey,

Due to unexpected time delays, the development of a new Discharge Plan for Marathon's Indian Basin Gas Plant has been regretfully delayed. Modifications are being completed to commingle, for disposal, the various Plant blowdowns with the produced waters from the Indian Basin Gas Field. Once this work is complete, a chemical analysis of the commingled stream will be performed, as requested.

Therefore, Marathon respectfully requests an extension of the filing deadline for the Plan. The original filing deadline is June 1, 1984. Extension of the deadline date by approximately one month will provide a sufficient amount of time to successfully complete this Discharge Plan.

Sincerely,

MARATHON OIL COMPANY

Robert P. Scott
District Operations Manager

JLS/bgr

bxc: N. R. Daniels
J. C. Howell
R. F. Morgan
J. L. Smith
W. J. Treybig
C. H. Baskin

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

April 4, 1984

Marathon Oil Company
P. O. Box 3128
Houston, Texas 77001

Attention: Mr. C. L. Roberts

Gentlemen:

Since your original Discharge Plan for your Indian Basin Plant was submitted in November, 1981, and since your letter of March 14, 1984, indicates a change from the plan, I believe it would be appropriate for you to file a new discharge plan.

Please file a new plan by June 1, 1984.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

C. L. Roberts
Manager, Houston Division
Onshore Operations
Production, U.S. & Canada

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77001
Telephone 713/629-6600

March 14, 1984

RECEIVED
MAR 29 1984
OIL CONSERVATION DIVISION
SANTA FE

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Attn: Joe D. Ramey

Dear Mr. Ramey:

Marathon Oil Company requests, effective May 1, the amendment of the Indian Basin Gas Plant Discharge Plan submitted to the State of New Mexico, Energy and Minerals Department, Oil Conservation Division, in November, 1981. With this amendment Marathon will eliminate all surface discharges at the Indian Basin Gas Plant.

It is requested that the referenced plan be amended to show that the plant's surface discharges,

- continuous blow-down from the cooling tower and
- condensed steam blow-down from all boilers,

will be commingled and injected with Indian Basin Field produced waters. (Marathon is currently permitted to inject salt water into Marathon Federal Well No. 1 located in Unit K of Section 24, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico.)

Under this requested amendment, the blow-down from the cooling tower and condensed steam will be treated in a separate holding tank to assure compatibility with produced waters before injection.

Furthermore, Marathon requests the Commission's amendment to their Administrative Order SWD-55 Of October 30, 1965, to permit the injection of the subject commingled stream.

Sincerely,

MARATHON OIL COMPANY

C. L. Roberts

C. L. Roberts
Houston Onshore Division Operations Manager

RFM/bgr

SF / file

Form C-120-A
3-30-60

NEW MEXICO OIL CONSERVATION COMMISSION
MONTHLY WATER DISPOSAL REPORT

Submit this report in triplicate to the approriate District Office, Oil Conservation Commission.

Disposal System Operator: MARATHON OIL COMPANY

Disposal System: INDIAN BASIN SWD SYSTEM

County: EDDY

Month: January 19 82

LEASE	WELL NO.	LOCATION UL	S	T	R	DISPOSED WATER BARRELS	CUMULATIVE DISPOSED WATER-BARRELS	AVERAGE INJECTION PRESSURES
Marathon Federal SWD	1	K	24	21S	23E	20,595	2,851,723	1,850
TOTAL								

RECEIVED
FEB 17 1982
O. C. D.
ARTESIA, OFFICE

I hereby certify that the above is true and complete to the best of my knowledge and belief.

Remarks:

Name: W. J. Durghig

Company: MARATHON OIL COMPANY

Title: Plant Superintendent

C. L. Roberts
Manager, Houston Division
Onshore Operations
Production, U.S. & Canada

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77001
Telephone 713/629-6600

November 10, 1981

Mr. Oscar Simpson
Water Resources Specialist
New Mexico Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Dear Mr. Simpson:

As requested by Mr. Joe D. Ramey of the Oil Conservation Division, enclosed are two copies of the discharge plan for Marathon Oil Company's Indian Basin Gas Plant in Eddy County, New Mexico.

This plan was prepared in accordance with Part 3 of the New Mexico Water Quality Control Commission Regulations and covers all surface discharges from the plant. References to "toxic pollutants" were included in this plan.

If you have any questions on material contained in this plan, please contact J. L. Smith in Midland, Texas at (915) 682-1626.

Sincerely,

C. L. Roberts

C. L. Roberts

CLR/JLS/mhh

Marathon Oil Company
Indian Basin Gas Plant Discharge Plan

Submitted To

State Of New Mexico
Energy and Minerals Department
Oil Conservation Division

November, 1981

C. L. Roberts
Manager, Houston Division
Onshore Operations
Production, U.S. & Canada

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77001
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Sincerely,

C. L. Roberts

C. L. Roberts

CLR/JLS/mhh

Table of Contents

PLANT HISTORY

The Indian Basin Gas Field was discovered in 1962 in the west central portion of Eddy County, New Mexico. This field is approximately 20 miles west-northwest of Carlsbad and 28 miles south-southwest of Artesia. The upper Pennsylvanian is the main reservoir. The gas and liquid production is metered at each well-site.

In 1965, construction of the Indian Basin Gas Plant was begun. The plant was put on line in early 1966 with a design capacity of 120 MMCFD.

An expansion to the plant in 1968 allowed residue gas sales to increase in excess of 200 MMCFD.

In early 1981, a cryogenic modification to the plant was completed. This allowed a majority of the old process equipment to be taken out of service. The plant capacity is still considered to be 200 MMCFD and the products are natural gas, demethanized hydrocarbon mix, condensate and sulfur.

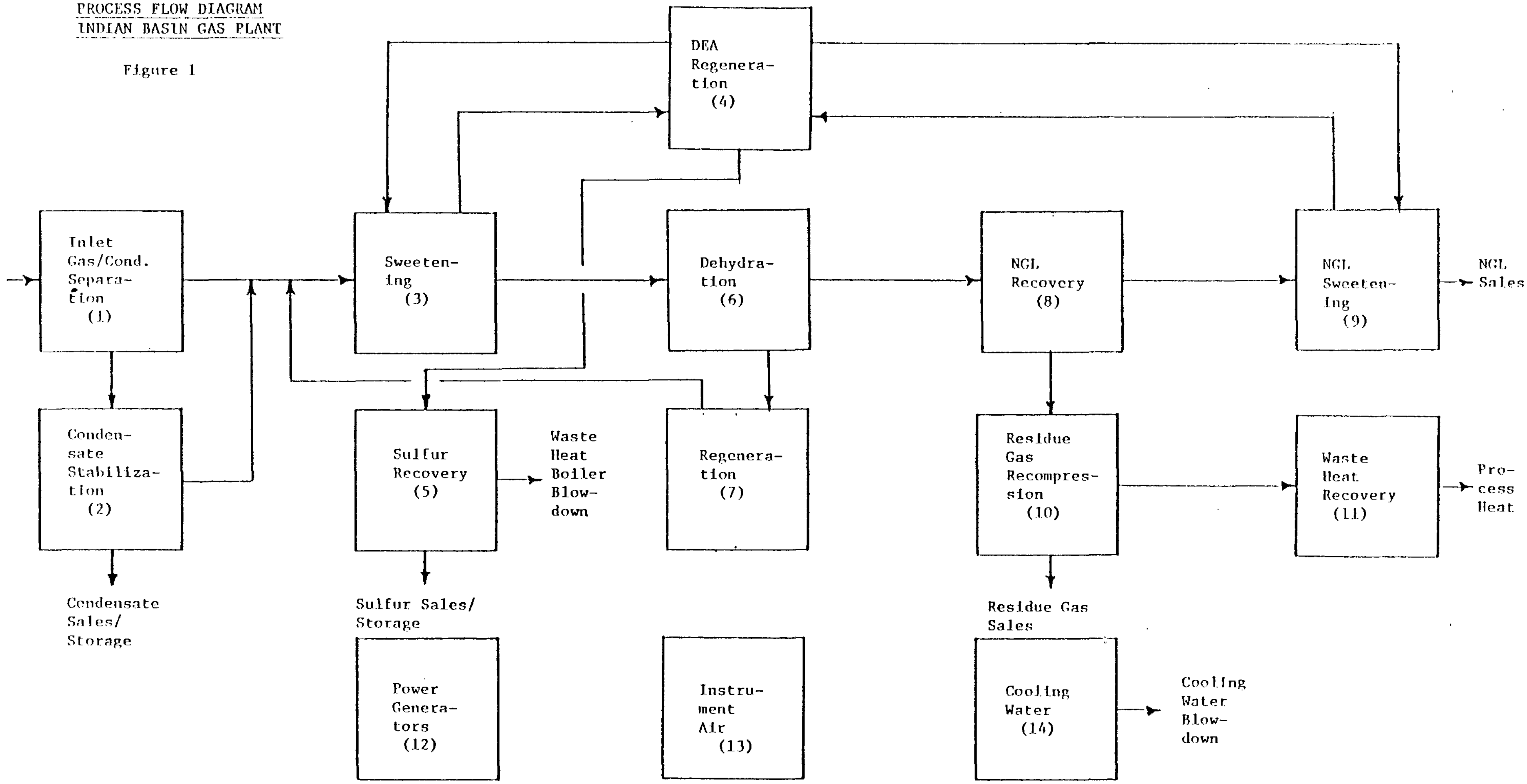
PROCESS FLOW DESCRIPTION

INDIAN BASIN GAS PLANT

1. Gas and liquid hydrocarbons are separated.
2. The liquid hydrocarbons are stabilized by fractionating out light components. The stabilized liquid is sold as "sour condensate."
3. The inlet gas and stabilizer gas is sweetened using DEA solvent.
4. The DEA solvent is regenerated in a low pressure still using steam for reboil heat.
5. Acid gas from the DEA still is processed in a Claus sulfur recovery unit. The sulfur is sold as a pure liquid product. An intermittent discharge from this unit occurs on the westside of the plant.
6. Sweet gas from No. 3 is dehydrated using a molecular sieve system.
7. The sieve beds are regenerated with hot dry gas which is cooled and returned to the sweetening system inlet.
8. Dry gas is processed in a cryogenic system for a high level of ethane and propane removal. This cryogenic system was completed and put on line during the early part of 1981.
9. The liquid product is sweetened with DEA and sold as a single mixed product.
10. Residue gas is recompressed from 400 psig to 1000 psig for sales to NGPL.
11. Exhaust waste heat is utilized to produce process steam heat.
12. Two turbine generators supply approximately 1000 kw electricity to the plant.
13. Three parallel compressors supply 125 psig air for the plant instrument air system.
14. The cooling tower handles approximately 4000 gpm of water and includes a continuous water blowdown to control concentration cycles. This blowdown water is metered prior to dishcarge on the southside of the plant.

PROCESS FLOW DIAGRAM
INDIAN BASIN GAS PLANT

Figure 1



Discharge Information

There are presently two (2) discharges on to the surface of the natural ground from the Marathon Oil Company Indian Basin Gas Plant. Both discharges gravity to lower elevations and evaporate to the atmosphere and/or soak into the soil. The discharges are the:

a) Cooling tower blowdown (continuous discharge)
b) Sulfur recovery unit waste heat boiler blowdown (intermittent discharge)

Water is separated from the field gas production and is disposed of into the Marathon Federal SWD Well No. 1 located in Unit K of Section 24, Township 21S, Range 23E, Eddy County, New Mexico. Salt water is being injected for disposal purposes into the Paddock formation at approximately 2534 feet to approximately 2726 feet through 2 3/8 inch tubing with a packer set at approximately 2450 feet in 4 1/2 inch casing. Marathon was granted authority to use this well for salt water disposal on October 30, 1965 by the Oil Conservation Commission of the State of New Mexico.

Evidence indicates the primary groundwater source in the Indian Basin Gas Plant area to be the lower Queen aquifer at a depth of approximately 240 feet. It is the purpose of this discharge plan to primarily cover the two (2) surface discharges but if further information is desired on the salt water disposal system, it will be furnished upon request.

Quantity, Quality, And Flow Characteristics Of Discharge

Quantity:

a) The cooling tower blowdown is essentially a continuous blowdown done for the purposes of getting optimum chemical benefit from system additives and maintaining feedwater conservation. The function of the chemical treatments in the cooling tower system are:

-corrosion inhibition
-antifoulant
-microbiocide

The cooling tower blowdown is metered prior to discharge. The average discharge rate, as measured is approximately four (4) gallons per minute (gpm).

b) The sulfur recovery unit waste heat boiler blowdown serves essentially the same purpose as the cooling tower blowdown. The functions of the chemical treatments in the waste heat boiler are:

-corrosion inhibition
-scale control
-sludge conditioner
-oxygen scavenger

This blowdown is an intermittent discharge and somewhat smaller in volume than the cooling tower blowdown. The discharge is not physically measured and is estimated to be approximately 1.6 gpm (This number was obtained using a ten (10) percent blowdown rate for the total steam production of the unit.)

Quality:

Figure 2 is a summary of the laboratory testing done on the lower Queen groundwater and both the cooling tower blowdown and the sulfur recovery unit waste heat boiler blowdown. A 24-hour composite sample was taken of the cooling tower blowdown since this is a continuous discharge. The sulfur recovery unit waste heat boiler blowdown is an intermittent discharge and a grab sample was used for this analysis. A grab sample was also taken of the groundwater from the No. 1 water well.

All samples were taken and analyzed in accordance with the guidelines set forth in the New Mexico Water Quality Control Commission Regulations 3-107B. It should also be noted that sampling was conducted during times that would be indicative of normal plant operation.

GROUND WATER AND EFFLUENT TEST RESULTS

Component	Standard (mg/l)	Ground Water (mg/l)	Cooling Tower Effluent (mg/l)	Sulfur Unit Effluent (mg/l)
Arsenic (As)	0.1 mg/1	0.000	0.000	0.000
Barium (Ba)	1.0 mg/1	0.	0.	0.
Cadium (Cd)	0.01 mg/1	0.00	0.00	0.00
Chromium (Cr)	0.05 mg/1	0.00	0.00	0.00
Cyanide (CN)	0.2 mg/1	0.0	0.0	0.0
Fluoride (F)	1.6 mg/1	0.3	* 3.5	1.0
Lead (Pb)	0.05 mg/1	0.00	0.00	0.00
Total Mercury (Hg)	0.002 mg/1	* 0.008	* 0.006	* 0.010
Nitrate (NO_3 as N)	10.0 mg/1	* 15.0	* 15.0	* 25.0
Selenium (Se)	0.05 mg/1	0.00	0.00	0.00
Silver (Ag)	0.05 mg/1	0.00	0.00	0.00
Uranium (U)	5.0 mg/1	0.002	0.027	**
Chloride (Cl)	250. mg/1	16.	7.	128
Copper (Cu)	1.0 mg/1	0.00	0.00	0.00
Iron (Fe)	1.0 mg/1	0.0	* 3.0	* 5.0
Manganese (Mn)	0.2 mg/1	0.00	0.00	0.00
Phenols	0.005 mg/1	< 0.005	* 0.008*	* 0.032*
Sulfate (SO_4)	600. mg/1	161	* 624	297
Total Dissolved Solids (TDS)	1000. mg/1	578	* 1278	* 1356
Zinc (Zn)	10.0 mg/1	0.00	0.00	0.00
pH	between 6 and 9	6.8	7.0	* 11.96
Aluminum (Al)	5.0 mg/1	0.0	0.0	0.0
Boron (B)	0.75 mg/1	0.0	0.0	0.0
Cobalt (Co)	0.05 mg/1	0.00	0.00	0.00
Molybdenum (Mo)	1.0 mg/1	~0	~0	~0
Nickel (Ni)	0.2 mg/1	0.00	0.00	0.00
BOD	< 30 mg/1	0	8	**
COD	< 125 mg/1	0	* 170	**

* grab samples
** not tested

Figure 2

Quantity, Quality, And Flow Characteristics Of Discharge (Cont.)

Flow Characteristics:

a) The cooling tower blowdown is discharged onto the surface of the ground on the southside of the plant. This is a one (1) stream continuous discharge that flows in a southerly direction toward a normally dry arroyo named Rocky Arroyo. This arroyo is approximately 1/4 mile south of the plant and is at a slightly lower elevation. Only during abnormal conditions will the cooling tower blowdown reach Rocky Arroyo. These conditions would include heavy rainfall and problems experienced by the plant where fewer cycles would be run in the cooling tower. It should be noted when fewer cycles are run in the cooling tower water, the TDS and related components will be at a lower than normal concentration.

b) The sulfur recovery unit waste heat boiler blowdown is a separate discharge on the westside of the plant. This is a small intermittent discharge which flows in an earthen ditch that runs in a southerly direction. Because of the quantity of this discharge, the effluent disappears approximately 100 yards from the discharge site and the only reason any component of this discharge would reach Rocky Arroyo would be due to heavy rainfall.

Analysis of Testing Results

The following is a listing of effluent components that exceed the stated standards for groundwater of 10,000 mg/l or less:

Cooling Tower Blowdown

- -Fluoride (F)
- -Total Mercury (Hg)*
- -Nitrate (NO_3 as N)*
- -Iron
- -Phenols
- -TDS
- -Sulfate (SO_4)
- -COD

Sulfur Unit Boiler Blowdown

- -Total Mercury (Hg)*
- -Nitrate (NO_3 as N)*
- -Iron
- -Phenols
- -TDS
- -pH

With the exception of phenols, there are no treatments responsible for these concentrations exceeding the standards. A phenolic type solvent is used as a microbiocide in the cooling tower water but is not used in the sulfur unit boiler water. *

Iron is the product of corrosion in the piping systems. (It is believed that concentrating the feedwater components by cycling is the primary reason for the higher than standard concentrations.

*groundwater concentration exceeds standard

Location of the Discharge & Groundwater Sources

The location of the discharges relative to the plant site are shown on Figure 3, which is a map segment of the Indian Basin Gas Field in Eddy County, New Mexico. The cooling tower blowdown is labeled as #1 and the sulfur recovery unit waste heat boiler blowdown is labeled as #2.

There are no bodies of water within several miles of the plant site. There is a normally dry arroyo approximately 1/4 mile south of the plant. This arroyo is commonly known as Rocky Arroyo and it primarily travels in an east/west direction in the vicinity of the plant. In the past, the only time this arroyo will contain water is during heavy rainfall periods. There are no known groundwater discharge sites within one (1) mile of either discharge.

Marathon Oil Company currently maintains two (2) water wells for use by the Indian Basin Gas Plant. Both water wells are located within the plant boundries, and they both produce water from the lower Queen aquifer.

Water Well #1 primarily supplies process water to the plant and produces from a tubing depth of 230 ft. Water Well #2 is considered to be an auxillary water well and its primary function is fire protection. This well produces from a depth of approximately 270 ft.

From available literature, there is no evidence to indicate there is an upper Queen aquifer in the area of the IBGP. Because of this, it is believed the most appropriate wells to be used for groundwater monitoring purposes would be the two (2) Marathon water wells currently producing from the lower Queen aquifer. Either and/or both of these lower Queen water wells can be used for groundwater monitoring purposes.

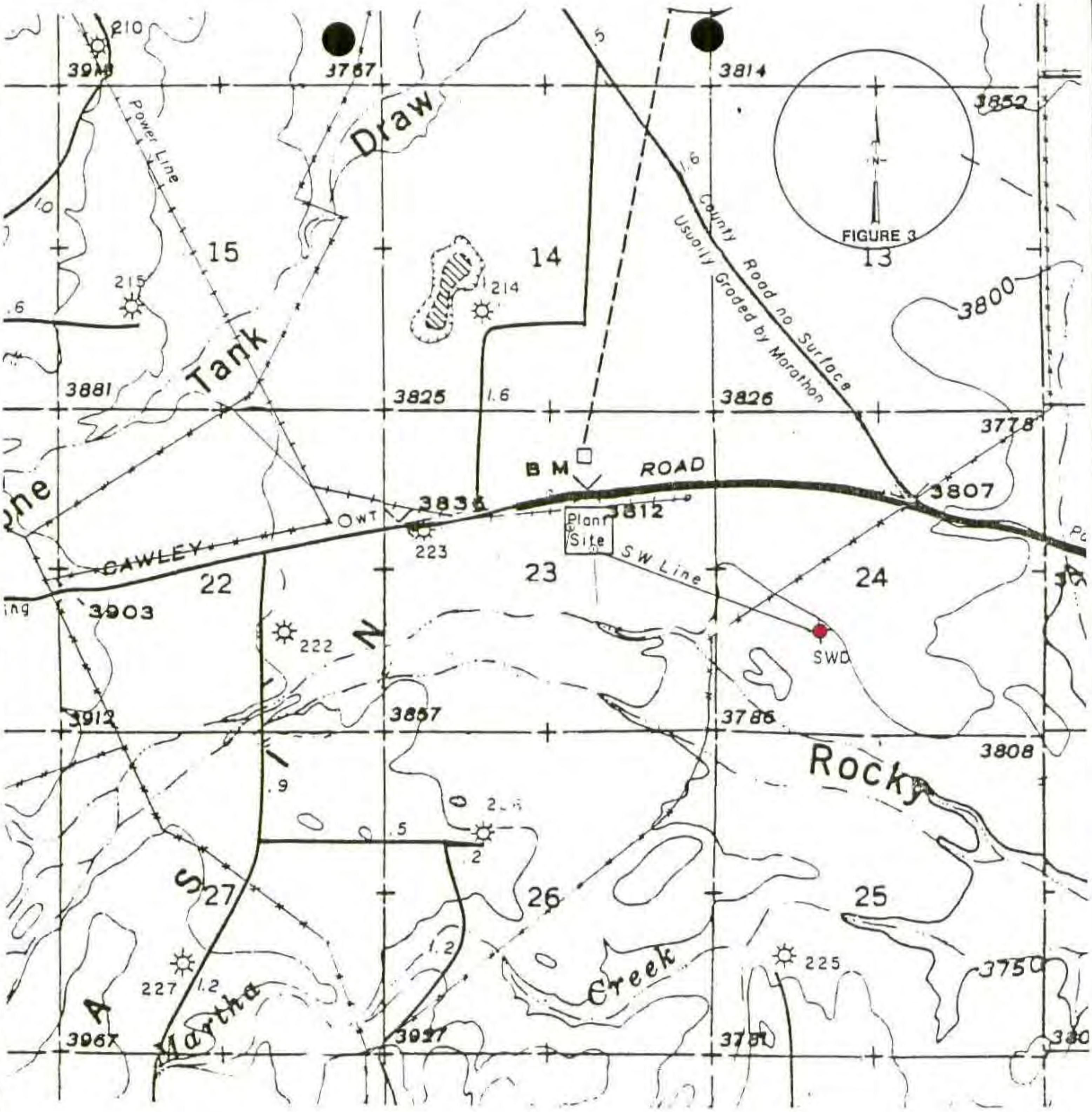

Draw
Tank
Power Line
County Road no Surface
Usually Graded by Marathon
FIGURE 3
N
15
14
13
22
23
24
27
26
25
B M
ROAD
CAWLEY
Plant Site
S W Line
SWD
Rocky
Creek
Martha
3814
3852
3800
3881
3825
3826
3778
3807
3812
3903
3912
3857
3786
3808
3750
3967
3927
210
215
214
223
222
225
227
OWT

Figure 3

Depth To And TDS Concentration Of The Groundwater

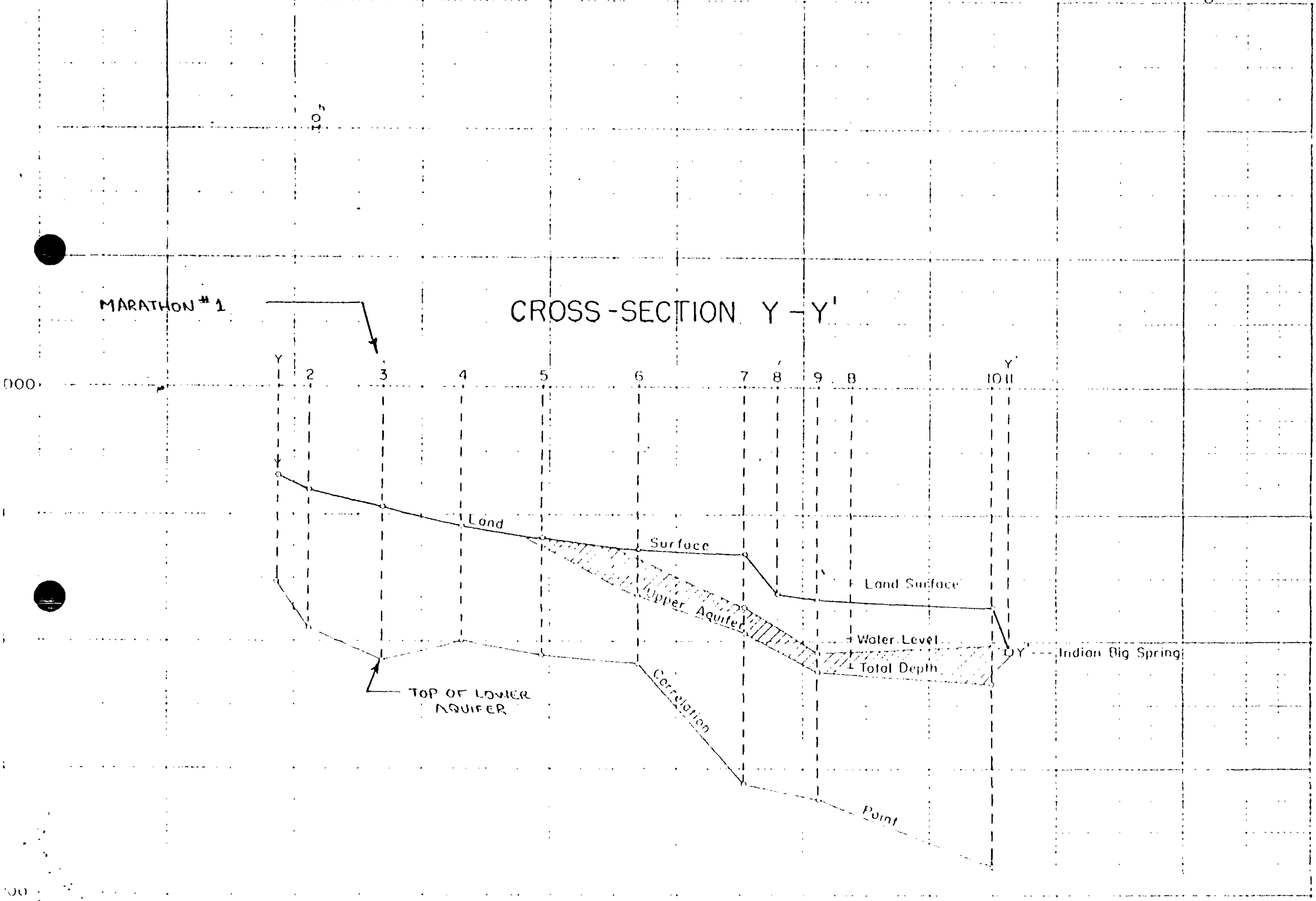
Using Figure 4 & 5 of the memorandum report "Queen and Related Aquifers in the Indian Basin,"* cross section Y-Y indicates the upper Queen aquifer does not exist in the area of Marathon's Water Well #1 which is within the plant site boundries. The author of the above memorandum also stated that during the drilling of Marathon's Water Well #1, in July 1965, data and personal recollection indicates no water was encountered above approximately 240'. This evidence indicates there is no upper Queen aquifer in the vicinity of the Indian Basin Gas Plant and the shallowest fresh water aquifer in this area is the lower Queen.

Depth to the lower Queen aquifer based on well records from Marathon's Water Well #1 at the IBGP is approximately 240 ft. An analysis of freshwater from this well shows a TDS concentration of approximately 578 mg/l.

*report included in appendix

To accompany Memorandum Report "Queen and Related Aquifers in the Indian Basin"

Figure 4



(2)

Figure 5

Well #2 Location: 21.23.26.130
Elevations: surface - 3843'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3318'

Well #3 Location: 21.23.23.232 RA-3131
Elevations: surface - 3812'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3572'

Well #4 Location: 21.23.24.323
Elevations: surface - 3785'
top upper aquifer - probably on surface
bottom upper aquifer - at or near surface
correlation point - 3600'

Well #5 Location: 21.23.24.422
Elevations: surface - 3763'
top upper aquifer - probably on surface
bottom upper aquifer - 3700'?
correlation point - 3578'

Well #6 Location: 21.24.19.414
Elevations: surface - 3745'
top upper aquifer - probably on surface
bottom upper aquifer - 3672'
correlation point - 3560'

Well #7 Location: 21.24.20.431
Elevations: surface - 3733'
top upper aquifer - 3653'
bottom upper aquifer - 3612'
correlation point - 3334'

Well #8 Location: 21.24.20.443 Shafer's commercial well
Elevations: surface - 3375' (USGS Quad)
total depth - 75'
water level 40'
Notes: Reported capable of producing 250-300 gpm with 15 h.p. motor through 4" discharge.

Well #9 Location: 21.24.21.333
Elevations: surface - 3670'
top upper aquifer - 3541'
bottom upper aquifer - 3532'
correlation point - 3351'

Well #10 (same as well 5 on X-X' cross-section)
Location: 21.24.22.324
Elevations: surface - 3663'
top upper aquifer - 3582'
bottom upper aquifer - 3403'
correlation point - 3243'

Flooding Potential Of The Site

The location of the Indian Basin Gas Plant is such that susceptability to flooding is virtually non-existent. Rocky Arroyo is located at a slightly lower elevation than the gas plant site, and it will periodically have flowing water due to rainfall runoff. Normally, this is a dry arroyo.

Methods To Be Available For Sampling And For Measurement Or Calculation Of Flow

The cooling tower blowdown is measured prior to discharge using a conventional type meter. This meter was installed on October 1, 1981 and should serve as one of the more accurate methods to measure this continual discharge. This meter is also used to help control the number of cycles in the cooling tower water. The cooling tower blowdown rate has been monitored since meter installation and has demonstrated an average discharge rate of approximately four (4) gpm. This discharge rate should slightly increase during the summer months because of increased evaporation of cooling tower water and thus the need to run fewer cycles. W. Sem

The sulfur unit waste heat boiler blowdown is intermittent and the amount of discharge is not physically measured like the cooling tower blowdown. Using a ten (10) percent blowdown factor for the 8000#/hr steam produced, the approximate discharge rate is calculated to be 1.6 gpm. This method should be representative of the blowdown rate during the normal operation of this unit. Visual observation of this blowdown rate supports the calculated rate.

Marathon Oil Company presently has no effluent monitoring devices for either discharge. Marathon does, however, possess a composite sampling device which was used to obtain the 24-hour composite sample of cooling tower blowdown. Grab samples were taken of the sulfur unit waste heat boiler blowdown since this is an intermittent discharge. Any follow-up and/or periodic analysis can be done using either the composite sampling device or the grab sampling technique. Samples can be analyzed using the approved methods of analysis.

190 Bbls/Day

Depth To And Lithological Description Of Rock At Base Of Alluvium

The following is an interpretation of the formation characteristics from the surface to the lower Queen aquifer. This interpretation is based on information from the core hole I-24-21S-23E drilled by Marathon in an adjacent where section and correlated with the log of the well E-23-21S-23E drilled near the Indian Basin Gas Plant.

0- 60':	Mainly sandstone with some dolomite
60-130':	Mainly dolomite
130-530':	Dolomite and Anhydrite

Indications are the interval from approximately 60 feet to the lower Queen aquifer is a tight formation. This type interval should offer a degree of protection to the lower Queen aquifer from surface components. (wrong) no data to prove this statement

Additional Information On Geologic Conditions

According to the memorandum report "Queen and Related Aquifers in the Indian Basin" by R. B. Collins, Jr. (copy attached), when the Marathon Oil Company water well 21.23.23.232 was drilled in July 1965, no water was encountered above about 240 feet. This well is the Indian Basin Gas Plant Water Well #1 and based on the cited report, there is no upper Queen aquifer in the vicinity of the plant. The author also indicates he was unable to find any evidence to indicate the upper and lower Queen aquifers are interconnected.

Provide previous H_2O ANALY

As noted before, logs of a well drilled in the vicinity of the plant were correlated with a core hole drilled in an adjacent section. This interpretation shows the geologic interval from approximately 60' to 250' to be mainly dolomite and anhydrite that appears to be dense in nature. A degree of protection from surface constituents should be offered the lower Queen aquifer by this type geological condition. Porous ??

Toxic Pollutants

There is no interface with either the cooling tower water nor the sulfur unit waste heat boiler water with any product of the plant operations under normal operating conditions. If an interface such as this did occur, the plant product would be degraded and the condition would be detected by the routine product testing requirements. This interface condition would then be immediately corrected. difuse un-normal

Because there is normally no interface between product and waters that are eventually discharged, the only "toxic pollutant" that has the capability of existing in discharged waters because of treatment practices is phenols. This is because a phenolic type solvent is used as a microbiocide in the cooling tower water. This chemical is not, however, used in the sulfur unit boiler water.

Monitoring, Reporting, and Other Requirements

As noted previously, Marathon operates two (2) fresh water wells from the lower Queen aquifer for the purpose of supplying feedwater to the plant. Since there is no known evidence to indicate the presence of the upper Queen aquifer near the plant site, these two (2) water wells can be used in a groundwater monitoring program. depends on location of wells

The cooling tower blowdown is metered prior to discharge and serves as an accurate method to determine a discharge rate. This meter will be maintained as it serves additional purposes in its function. The discharge rate from the sulfur unit waste heat boiler is not measured in the same manner as the cooling tower blowdown. The sulfur unit boiler blowdown is intermittent and a representative rate can be calculated using a ten (10) percent blowdown factor with the total steam production of the boiler. Marathon possesses a 24-hour composite sampling device that can also be used for additional monitoring.

At present, Marathon has no specific monitoring devices in the vadose zone or elsewhere. Both water wells are maintained and samples from the lower Queen aquifer can be easily obtained and analyzed. Information and results will be available to the authorized agency. Periodic reporting to the authorized agency can also be done upon request.

Conclusion

The surface discharges at the Indian Basin Gas Plant are essentially groundwater used as plant feedwater with additives to prevent scaling, corrosion, bacteria and algae growth. The system additives are contingent upon the number of times water in either the cooling tower or the sulfur unit waste heat boiler is cycled. The number of times water is cycled is dependent upon chemical analysis done on a routine basis. The primary benefits to optimum cycling are:

- get the most benefit from chemicals used
- feedwater conservation

Since both discharges are essentially feedwater with chemical additives, it appears the primary problem with certain component concentrations in the discharges is due to the effects of cycling. Cycling tends to concentrate not only feedwater components, but also any additives to the system because as more cycles are run - the concentrations will build because of evaporation.

The TDS concentration can be reduced by running fewer cycles. This will also reduce the concentration of components that make up the TDS concentration. Although this procedure will bring the effluent constituents closer to the standards, the disadvantages are more chemicals will have to be used, thereby increasing chemical treating costs and more feedwater would be needed to maintain fewer cycles.

Because there is recognized importance to protect groundwater for both present and future use, Marathon will cooperate fully with feasible plans to accomplish this purpose.

APPENDIX

Need better copy of original

MEMORANDUM REPORT

Queen and Related Aquifers in the Indian Basin

This report deals with aquifers in and related to the Queen formation in the Queen outcrop area in Indian Basin from Township 23 South, Range 23 East north and northeast through Township 21 South, Range 24 East. A map, two cross sections and a well tabulation are attached hereto and made a part of this report. Only a part of the total Queen outcrop area is covered and will be incorporated in the complete Indian Basin Report when that report is finalized.

The Queen formation in this area outcrops in a band approximately 8 to 9 miles in width and is roughly parallel to the Azotea Mesa and Seven Rivers Hills. The strike is roughly northwest and dip is to the northeast, tending slightly more east than northeast at a rate of 100 to 125' per mile. The Queen formation in this area is of interbedded gypsum, sandstone, siltstone, and dolomite.

Material used in this report was obtained from a study of logs and well records available; notes made by the writer in 1964, 1965, and 1966 while studying the development of the Indian Basin Gas field; records in the Oil Conservation Commission Office, Artesia; from published and unpublished information available in the State Engineer Office including the Motts Report, the transcript of the "Carlsbad" hearings, Geologic Map of New Mexico by Dane and Bachman of 1965, Subsurface Geologic Methods by Leroy; and from conversations with long time residents of the area.

A study of all material available indicates there are three aquifers present in the area of study from land surface to the bottom of the Queen. They are: (1) The alluvium (2) The upper Queen aquifer, possibly the Shattuck member, more commonly known as the Red Sand or Artesia Red Sand and (3) The bottom Queen aquifer, in the base of the Queen and possibly along the Queen-Grayburg contact zone.

The alluvium is rather thin and found primarily on valley or arroyo floors and alluvial fans in and along Rocky Arroyo. In times of wet weather the alluvium aquifer contributed some flow to Indian Big Springs and Rocky Arroyo. Mr. William Shafer, a long time resident, reports that 30 to 40 years ago, there were many small springs and seeps into Rocky Arroyo but at that time there was much more rain than now.

The upper aquifer in the Queen formation, probably being the Shattuck member or the Artesia Red Sand can be picked on some of the available logs and followed to the area of Indian Big Springs. Referring to the two cross sections, the well tabulation, and map; on cross-section X-X' wells #3, 4, and 5 and on cross-section Y-Y' wells #6, 7, 8, 9, and 10, and the wells marked B and D on the map, this aquifer is plotted from the logs. The wells Y-10 and X-5 are the same, being Lowe's #1 Staple oil test well.

A water well was drilled by Lowe at the site of the #1 Staples oil test well, to a reported depth of 250' and the water level was measured at 52'. This water level compares with the water level of Indian Big Springs as taken from the U.S.G.S. quadrangle map. Well No. 8 on cross-section Y-Y' is Shafer's commercial well located 21.24.20.443 with a reported total depth of 75' (Mott's Report) and the water level was measured at 40'. This water level at 40' projected into Y-Y' fits exceptionally well into the upper aquifer. Also wells marked "B" and "D" fit the pattern of the upper aquifer. Well "B" is Shafer's domestic well (Bar well, C-1130) with a reported depth of 130' and with the water level measured at 91'. This fits exceptionally well into the cross-sections X-X' and Y-Y' as deriving its water from the upper aquifer.

The lower aquifer in the Queen formation has no name I am aware of and is separated from the upper aquifer by 100 to 300 feet of sandstone, dolomite and sandy dolomite. From interpretation of the gamma ray logs available, ~~this material is quite dense,~~ and no water flows have been reported to have been encountered between the upper and lower aquifers.

The correlation points (C.P.) shown on the cross-sections, are, in my opinion, the top of the lower aquifer. One water well was drilled and was watched closely. This was ~~Marathon Oil Company's well 21.24.[illegible] a T.D. of 255'~~. The driller of this well reported water from 195' to 255' on his well record, however, I watched the drilling very closely and notes made during July 1965 and personal recollection indicates no water was encountered above about 240'. This depth on Marathon's sample description log is correlated with and used as the top of the lower Queen aquifer on the cross-sections.

Summary:

In the course of this study approximately 70 well logs and well records were examined. Part of these logs and records are of wells to the north of Township 21 South, Range 24 East and will be used in the continuation of this study. The remainder are in the immediate area of study.

On those logs and records of wells lying within the area covered by this report, the top of the lower Queen aquifer could be picked with reasonable accuracy. The bottom of the upper aquifer could be picked in areas where it was present and in some cases the top could be picked, however, due to logging methods, if the upper aquifer was on the surface or very near the surface, the picking of top and bottom was sometimes questionable.

The logs and well records of wells spotted on the attached map are representative of all of the logs examined, and the picking of the two aquifers shown on cross-sections X-X' and Y-Y' are confirmed by the study and comparison of those not plotted.

Conclusion:

In the area under study, there are two distinct aquifers in the Queen formation. The upper aquifer, which supplies water to Shafer's commercial well 21.23.23.442, Shafer's domestic well (Dar well C-1100) 21.24. 20.144, is also the main source of water to Indian Big Springs. Also probably tapping the upper aquifer may be a few ranch and stock wells on the eastern edge of the Queen outcrop. The lower aquifer supplies water to the Davidson well in 20.23.10.431 (C-1371) and to ~~[illegible] Carmack's water well [illegible] ([illegible]). I know of no other wells using the lower aquifer as a source in this area.~~

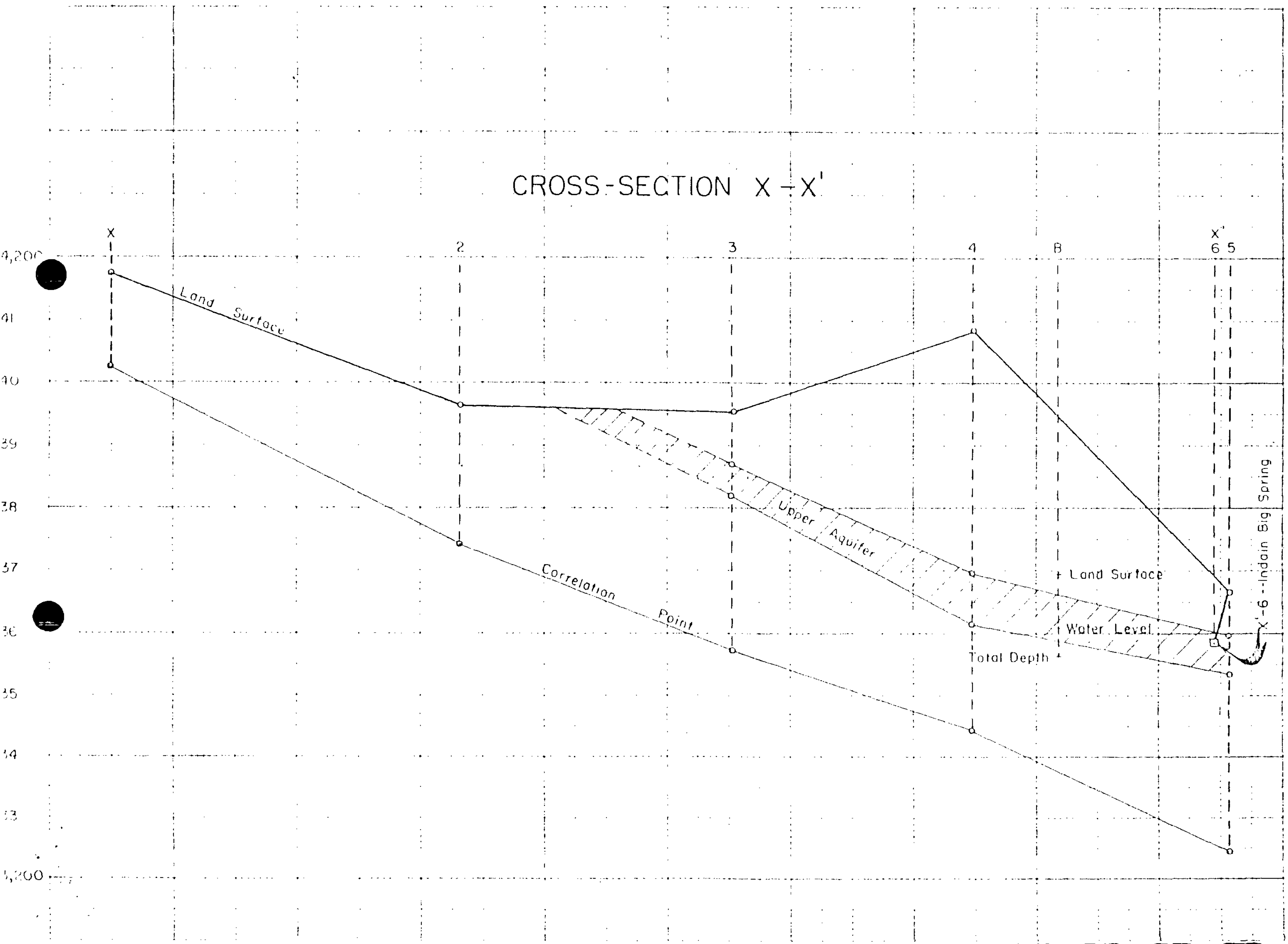
~~In this study, [illegible] indicate that the upper Queen aquifer and the lower Queen aquifer [illegible]. I do have notes made from conversations with the [illegible] dry zone between the upper and lower aquifers in the area where the upper aquifer is at or near the surface.~~

The natural discharge areas of the two Queen aquifers have not as yet been determined, but it is my opinion that the lower Queen aquifer does not contribute to the flow of Indian Big Springs or wells in Rocky Arroyo. It is hoped that in the continuation of this study, the discharge areas can be determined.

September 23, 1967

R. B. Collins, Jr.
R. B. Collins, Jr.
Water Resources Engineer

To accompany Memorandum Report "Queen and Related Aquifers in the Indian Basin"



WELL TABULATION

All Surface Elevations are above sea level
and are reported except where noted.

Cross-Section X-X'

Well #1 Location: 22.22.17.230
Elevations: surface - 4171'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 4021'

Well #2 Location: 22.23.11.141
Elevations: surface - 3867'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3741'

Well #3 Location: 22.24.6.114
Elevations: surface - 3954'
top upper aquifer - 3871'
bottom upper aquifer - 3826'
correlation point - 3574'
Notes: Reliable report of first water at 450' (elevation 3401')

Well #4 Location: 21.24.33.341
Elevations: surface - 4008'
top upper aquifer - 3837'
bottom upper aquifer - 3612'
correlation point 3443'

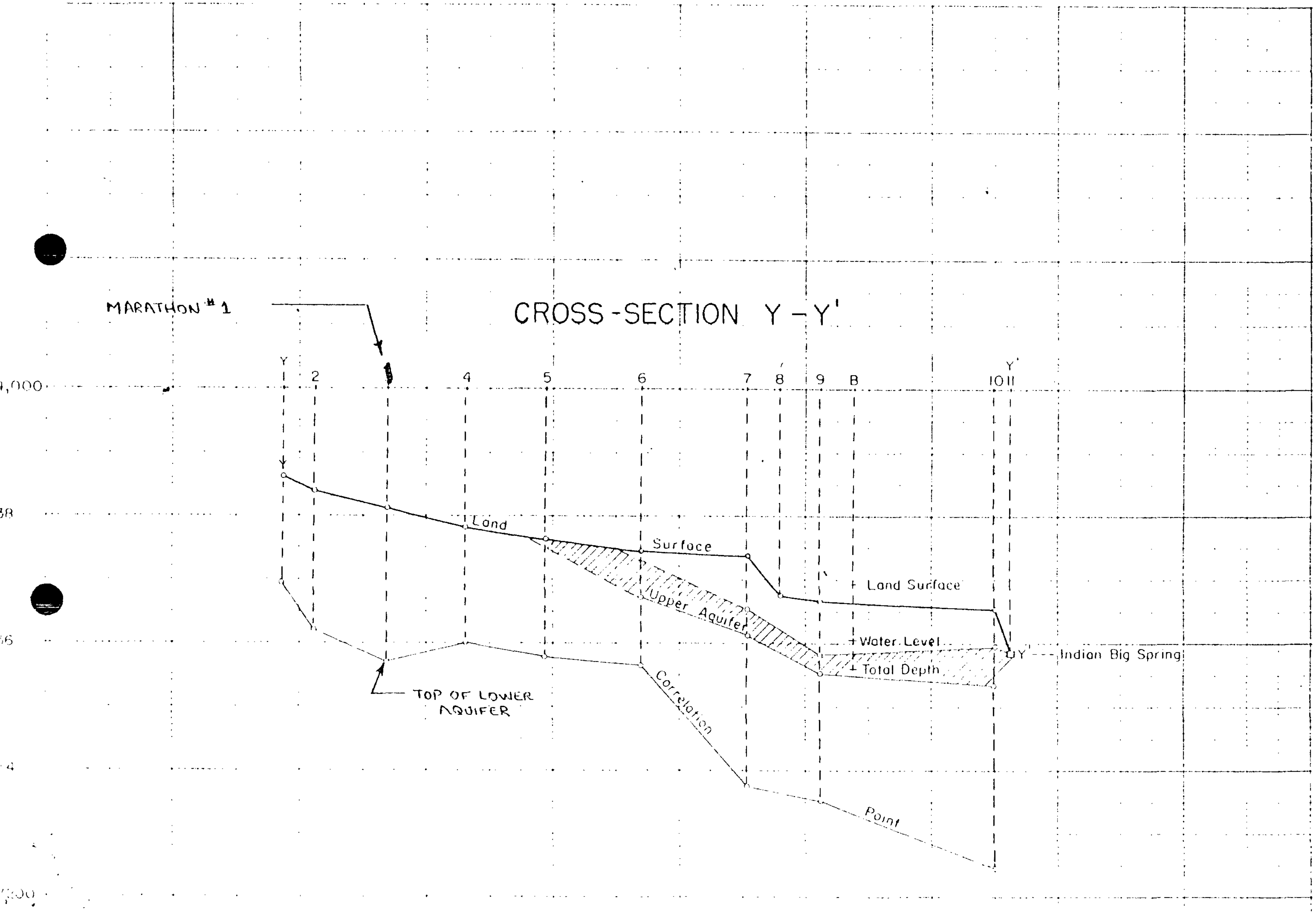
Well #5 Location: 21.24.22.324
Elevations: surface - 3838'
top upper aquifer - 3520'
bottom upper aquifer - 3408'
correlation point - 3243'

Indian Big Springs Location: 21.24.27.218
Elevation: surface - 3536' (USGS Quad)

Cross-Section Y-Y'

Well #1 Location: 21.23.22.420
Elevations: surface - 3562'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3600'

To accompany Memorandum Report "Queen and Related Aquifers in the Indian Basin"



Well #2 Location: 21.23.23.130
Elevations: surface - 3843'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3818'

Well #3 Location: ~~21.23.25.232~~ RA-5131
Elevations: surface - 3812'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3572'

Well #4 Location: 21.23.24.323
Elevations: surface - 3785'
top upper aquifer - probably on surface
bottom upper aquifer - at or near surface
correlation point - 3600'

Well #5 Location: 21.23.24.422
Elevations: surface - 3766'
top upper aquifer - probably on surface
bottom upper aquifer - 3700'?
correlation point - 3578'

Well #6 Location: 21.24.19.414
Elevations: surface - 3746'
top upper aquifer - probably on surface
bottom upper aquifer - 3672'
correlation point - 3560'

Well #7 Location: 21.24.20.431
Elevations: surface - 3733'
top upper aquifer - 3653'
bottom upper aquifer - 3615'
correlation point - 3304'

Well #8 Location: 21.24.20.443 Shafer's commercial well
Elevations: surface - 3675' (USGS Quad)
total depth - 75'
water level 40'
Notes: Reported capable of producing 250-300 gpm with 15 h.p. motor through 4" discharge.

Well #9 Location: 21.24.21.333
Elevations: surface - 3670'
top upper aquifer - 3531'
bottom upper aquifer - 3503'
correlation point - 3351'

Well #10 (same as well 5 on X-X' cross-section)
Location: 21.24.22.324
Elevations: surface - 3663'
top upper aquifer - 3535'
bottom upper aquifer - 3423'
correlation point - 3243'

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

August 28, 1981

Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

Attention: Jeffrey L. Smith

Re: Discharge Plan for Indian
Basin Gas Plant

Mr. Smith:

Pursuant to the letter of July 30, 1981 by Jeffrey L. Smith of Marathon Oil Company requesting a 90 day extension of time for Indian Basin Gas Plant, the extension of time is hereby granted.

The extension of time was granted on the basis that Marathon Oil Company needs additional time to determine the feasibility of Disposing Plant effluent through injection into a disposal well. The extention of time for Indian Basin Discharge Plan is hereby extended from August 15, 1981 to November 15, 1981.

If you have any questions regarding this matter please call on me at 505-827-2534.

Sincerely,

OSCAR A. SIMPSON
Water Resources Specialist

OAS/jc

Midland District
Houston Division
Production Operations, U.S. & Canada

Marathon Oil Company

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

July 30, 1981

New Mexico Energy and Minerals Department
P. O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Attention: Mr. Oscar Simpson

Dear Mr. Simpson:

As mentioned to you in our phone conversation of July 15, 1981, Marathon Oil Company is in the process of determining the feasibility of injecting the Indian Basin Gas Plant effluent into a disposal well. Several tests are presently being done and an engineering evaluation will be needed when the results are obtained.

The reason for this work is to determine a long-term solution to the disposal problem of the plant effluent. This solution would meet both state and federal regulations governing underground injection.

Due to the amount of work involved in determining a solution, I am requesting that you grant Marathon Oil Company a 90-day extension to the submittal of discharge plans for the Indian Basin Gas Plant. These plans are presently due August 15, 1981, and an extension would permit Marathon enough time to properly determine both an approved and feasible effluent injection method.

Very truly yours,

MARATHON OIL COMPANY

Jeffrey L. Smith

Jeffrey L. Smith
Associate Safety Engineer

JLS/sg

xc: R. P. Scott
R. S. Wilson
R. L. McLean
C. C. Saathoff
W. J. Treybig

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

April 7, 1981

R. L. McLehin
Marathon Oil Company
P. O. Box 552
Midland, Texas 79702

Re: Request for Discharge Plans

Dear Mr. McLehin:

Under provisions of the regulations of the Water Quality Control Commission you are hereby notified that the filing of discharge plans for Marathon's Indian Basin Plant (6-22S-24E) is required. Discharge plans are defined in Section 1-101.1 of the regulations and a copy of the regulations is enclosed for your convenience.

These plans should cover all discharge of effluent at the plant sites or adjacent to the plant sites. Section 3-106A. of the regulations requires submittal of the discharge plans within 120 days of receipt of this notice unless an extension of this time period is sought and approved.

The discharge plans should be prepared in accordance with Part 3 of the Regulations. Due to a recent court decision references to "toxic pollutants" may be ignored.

If there are any questions on this matter, please do not hesitate to call me or Oscar Simpson at 827-3260. Mr. Simpson has been assigned responsibility for review of all discharge plans.

Very truly yours,

JOE D. RAMEY
Division Director

JDR/OS/og

cc: Oil Conservation Division - Hobbs
Marathon Oil Company, P. O. Box 2409, Hobbs, N. Mex.

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, the following discharge plan renewal has been submitted for approval to the Director of the Oil Conservation Division, State Land Office Building, P.O. Box 2088, Santa Fe, New Mexico 87504-2088, Telephone (505) 827-5800:

(GW-21) Marathon Oil Company, W.O. Snyder, Mid-Continent Region Production Manager, P.O. Box 552, Midland, TX 79702, has submitted for approval a ground water discharge plan renewal for its Indian Basin Gas Plant located in the SW/4 NE/4, Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. Approximately 29,400 gallons per day of process waste water is collected in an above-ground steel tank prior to disposal in an OCD approved class II disposal well, The total dissolved solids concentration of the waste water is approximately 12,000 mg/l. Ground water most likely to be affected by any discharge to the surface is at a depth of 240 feet with a total dissolved solids concentration of approximately 550 mg/l. The discharge plan addresses how spills, leaks or other discharges to the ground at the plant will be managed.

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which comments may be submitted to him and public hearing may be requested by any interested person. A request for public hearing shall set forth the reasons why a hearing should be held. A hearing will be held if the Director determines there is significant public interest.

If no public hearing is held, the Director will approve or disapprove the proposed plan based on information available. If a public hearing is held, the Director will approve or disapprove the proposed plan based on information in the plan and information submitted at the hearing.

GIVEN under the Seal of New Mexico Oil Conservation Commission at Santa Fe, New Mexico, on this 14th day of September, 1989. To be published on or before October 1, 1989.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY, Director

S E A L

Mid-Continent Region
Production United States

Marathon Oil Company

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

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(including cover sheet).

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ASAP

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Marathon Oil Company

Mid-Continent Region
Production United States

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

PRIVILEGED & CONFIDENTIAL

...of the Interior

...1-1778

...Plan - Indian Basin Field

...site Characterization Plan for the gathering line ...Basin Gas Plant. Requirements of this report were ... this information will satisfy your needs.

...this report is being reviewed, we can only ... efforts on a location-by-location basis. I ... critical characterization work.

...dominated by soil-gas survey ...ment and we must now progress ...delineation. This will require a ...bedrock) to confirm the existence of ...water. ... the case of the soil program, ... some trial-and-error and flexibility to ... It is possible that once we more ...condensate and/or water, we may ...s. For this reason I believe ... we proceed with our delineation ...preliminary list of locations and

...proceed

~~CONFIDENTIAL~~ [redacted]

SITE CHARACTERIZATION PLAN

INDIAN BASIN GAS PLANT

EDDY COUNTY, NEW MEXICO

Prepared by:

MARATHON OIL COMPANY
Mid-Continent Region
Midland, Texas

April 29, 1991

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SITE CHARACTERIZATION PLAN

1.0 INTRODUCTION

1.1 Site Location

The Indian Basin Gas Plant (IBGP) is located in Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico (refer to EXHIBIT 1, topographic map of the Indian Basin Gas Plant, located in the Exhibit section). The plant is approximately 25 (driving) miles from Carlsbad, New Mexico. A general road map and directions to the plant (from Carlsbad) are included as EXHIBIT 2. The leak site is located approximately 0.2 miles due south of the plant. Further descriptive information on this site is provided in Section 3.1.

1.2 Topographical Description

The Indian Basin Gas Plant lies in the eastern portion of the Indian Basin, whose topography dips gently eastward at about 50 feet per mile. Small intermittent streams traverse the Basin in an east to northeasterly direction. The most prominent of these streams, Rocky Arroyo, has cut a canyon through a cuesta located 3 miles east of the gas plant. This cuesta forms the 250 to 400 foot western slope of the Azotea Mesa and Seven Rivers Hills.

The gas plant is located north of Rocky Arroyo in Section 23, T-21-S, R-23-E. A U.S.G.S. benchmark is less than a quarter mile away, therefore surface elevations in the area should be quite accurate. Topographic maps of the Bandanna Point Quadrangle and the Martha Creek Quadrangle are included as EXHIBIT 1 and EXHIBIT 3, respectively.

Rocky Arroyo directly south of the Indian Basin Gas Plant consists of a general braided stream topography approximately 1700 feet in width from north to south. Within this channel are two Arroyo stream beds separated by a higher, more vegetated area whcih comprises the majority of this system. The northern channel has the least amount of vegetation and is compresed of predominantly large boulders and cobbles. It also shows the most evidence of past active water transport, having developed a 10 to 12 foot high cut back on its north side. The southern Arroyo also contains a gravel surface, however, it has a much less defined channel and appears to be less active. The center portion of the overall Arroyo system is slightly higher in elevation, contains considerable grass and brushy vegetation, and shows little signs of surface water activity.

These three areas can be observed on the USGS, seven and one-half minute Martha Creek quadrangle map in Section 23, T-21-S,R-23-E, just to the south of the plant site. The 3800 feet contour is deflected to the west on the north and south sides of the Arroyo system indicating the location of the two gravel filled channels described above. The same contour deflects to the east, showing the area of generally higher topography in the center of Rocky Arroyo. This corresponds to the more vegetated area which comprises the majority of the Arroyo system.

1.3 Land Use Description

The Indian Basin Gas Plant is situated near the middle of the Indian Basin gas field which extends across several townships. Well density in the Indian Basin Field averages about 1.5 wells per section. The field is located primarily on federal land. The land surface is sparsely vegetated, and is used for grazing. A descriptive map is included as EXHIBIT 4.

New Mexico Highway 137 traverses the Rocky Arroyo Canyon approximately 4 miles east of the gas plant, then skirts the west flank of Azotea Mesa. Additionally, the Panaman Cawley Road runs from the Canyon west to the gas plant and beyond. Several other light duty roads branch from these roads to individual well sites. A General Highway map is included as EXHIBIT 5.

1.4 Surface Water

The leak occurred subsurface in the northern channel of a dry wash named Rocky Arroyo. It is believed that surface water has not flowed in this portion of the arroyo since 1986. Nearest flowing surface water in the arroyo was determined to be at a point approximately 4.75 miles downstream. A stagnate pool of water is also present approximately 1.0 mile southeast in another channel of the arroyo system. Sample

1.5 Climatological Description

The nearest data available to characterize the climate at the Indian Basin Gas Plant is from a climatology station located six miles south of Artesia, New Mexico. The gas plant is located 28 miles south-southwest of Artesia. Temperature and precipitation data are collected at this site and are summarized below for the period 1951 to 1974.

ARTESIA, NEW MEXICO CLIMATOLOGY

Period	Average Daily Temperature (degree F)		Average Precipitation (Inches) for Period
	Maximum	Minimum	
January	58.0	24.5	0.33
July	95.6	65.9	1.60
Annual	77.4	44.7	9.78

Station Location: Six miles south of Artesia, New Mexico.
Station Elevation: 3,320 feet above sea level.

These conditions result in the area being classified as arid (less than 10 inches of precipitation), although a few years of higher amounts of precipitation could raise the average enough to classify the area as semi-arid (10 to 20 inches of precipitation).

1.6 Facility Description

Marathon Oil Company operates the Indian Basin Gas Plant. The plant is located in the Indian Basin Field about 25 miles northwest of Carlsbad, New Mexico. The plant currently processes about 130 million standard cubic feet per day (MMSCFD) of natural gas. The gas is produced from the Indian Basin Morrow and Indian Basin Upper Penn. Residue gas and recovered liquids are both sold via pipeline.

Field condensate is gathered, stabilized, and sold via truck from a central location on the plant site. The field condensate and produced water gathering system consists of 50 miles of line. The system contains four primary low pressure lines that feed to the stabilization equipment at the Plant.

2.0 REGIONAL HYDROGEOLOGY

2.1 Hydrogeology

A memorandum report on the Queen aquifers located in the vicinity of the Indian Basin Gas Plant is provided in APPENDIX A. The memorandum report was prepared in 1987 by R. B. Collins, Jr., a Water Resources Engineer with the State of New Mexico. Mr. Collins did a thorough job of evaluating the local groundwater conditions and shallow subsurface geology. He established the presence of two aquifer zones in the general area of the Indian Basin Gas Plant. Correlation of these two aquifers to gamma ray logs from 71 oil and gas wells (typical log included in APPENDIX B) resulted in the attached maps showing the elevation of the base of the Upper Queen aquifer (EXHIBIT 6) and the elevation of the top of the Lower Queen aquifer (EXHIBIT 7). These maps indicate both aquifers dip generally from WSW to ENE at a fairly constant rate. Minor interventions in the regional dip do occur and an example is the lessening of dip in the area of the Indian Basin Gas Plant. This may indicate an area of slight counter regional dip. These maps confirm Mr. Collins' conclusions that the Upper Queen aquifer is absent in the area of the plant and that the Lower Queen aquifer is located approximately 150 to 200 feet below the surface. A review of the geological outcrops around the plant and sample logs

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~~80 ft ... contour map (exhibit 8)~~

from the area also support Mr. Collins' conclusion that the section between the Upper and Lower aquifer is impermeable and prevents the two aquifers from being interconnected.

2.2 Groundwater Systems

Water wells in the area appear to be using both Upper and Lower Queen aquifers (where present) as sources for domestic or stock watering purposes. Marathon has two water wells located on the plant site which are obtaining water from the Lower Queen aquifer.

A map of the known water wells in the area is provided in EXHIBIT 8. TABLE 1 contains a listing of summary data for each well. APPENDIX C presents copies of water well records on file from the State Engineers office in Santa Fe and Roswell. Files could not be located for several of the water wells on the map.

3.0 EMERGENCY RESPONSE ACTIONS

3.1 Release Background and Regulatory Response

At 10:30 a.m. (MDT) on April 12, 1991 indication of an accidental discharge from a condensate/produced water gathering line was discovered by Marathon personnel. The location of the leak is approximately 0.2 miles south of the Indian Basin Gas Plant in the northern channel of Rocky Arroyo. Subsequent investigation found the leak to exist in a 6-inch condensate/produced water gathering line (Line #4) and actions were immediately initiated to shut-in production from the 23 gas wells that produce into this gathering line. Following shut-in of these wells, block valves were closed on the gas and liquid lines on each side of the line leak. Blowdown efforts were undertaken to evacuate the systems.

Excavation efforts successfully located the leak in a steel 6-inch section of line approximately 5-feet below the arroyo channel bed. This section of line was repaired and placed back into operation on April 16, 1991.

Within an hour of the release detection the appropriate Federal and State regulatory authorities were notified by telephone. These notifications were made by supervisory personnel on location following Marathon's written procedures contained in the Mid-Continent Region

Contingency/Response Plan and in the Indian Basin Gas Field Spill Prevention, Control and Countermeasure Plan (SPCC). Both of these internal plans address the actions and procedures to be taken in the event of accidental releases or discharges of oil, condensate or produced water to the environment. A copy of the SPCC Plan is contained in APPENDIX D.

The following agencies were contacted on April 12, 1991; the National Response Center in Washington, D. C. (Petty officer Siefring, 11:22 a.m. Case No.67729); the Bureau of Land Management (BLM) in Carlsbad, New Mexico (Sharon Patuele, 11:17 a.m.) and the New Mexico Oil Conseration Division (OCD) in Artesia, New Mexico (Mike Williams, 11:12 a.m.). All times are Mountain Daylight Time. In accordance with NMOCD Rule 116, a written report was submitted to the OCD Artesia office within ten days after discovery of the incident. A copy of this notification is attached in APPENDIX E. An interim report was also submitted to the BLM on April 22, 1991, and is also provided in APPENDIX E.

As dictated by Marathon's Contingency/Response Plan, extensive internal reporting requirements exist in addition to the external reporting discussed in the previous paragraph. As a result of the release, Marathon's Corporate Emergency Response Plan was activated. This plan was developed by corporate personnel to aid and assist the various components within Marathon Oil Company in the event of a major emergency. The leader of the Corporate Emergency Response Team (CERT) was notified and their group mobilized in the event that their assistance was required. The CERT team members consist of numerous key personnel in Marathon's organization who have expertise in responding to emergency situations. One such component of CERT is the Technical Environmental Support Team (TEST). Their group was mobilized and sent to the site to assist local Marathon personnel in the initial response actions and investigatory work.

3.2 Product Properties

The section below describes the chemical and physical properties of the unstabilized condensate. Typically, the condensate is a clear colorless liquid with a pungent odor and is highly volatile and flammable. The samples described below were obtained from Well #222 and from the inlet condensate tank on April 14, 1991. Additional information regarding distillation properties of the condensate is provided in APPENDIX K. The released condensate was similar in physical and chemical properties.

3.2.1 Chemical Description

Chemical properties - Liquid Analysis

Condensate from Well #222

	MOL %	LV %	WT %
CO2	0.06	0.02	0.03
METHANE	2.54	1.11	0.51
ETHANE	2.10	1.45	0.79
PROPANE	2.74	1.95	1.51
ISO-BUTANE	1.17	0.99	0.85
NORMAL BUTANE	2.77	2.25	2.01
ISO-PENTANE	2.18	2.05	1.96
NORMAL PENTANE	2.39	2.24	2.16
HEXANE PLUS	84.05	87.94	90.18
Totals	100.00	100.00	100.00

Specific gravity	0.655	Sample Date: 4-14-91
Pounds/gallon	5.461	
Pounds/gallon C5+	5.583	
Vapor pressure	77.1	
Density (GM/CC)	0.654	

Condensate from Inlet Tank

	MOL %	LV %	WT %
CO2	0.02	0.01	0.01
METHANE	0.63	0.27	0.12
ETHANE	0.31	0.21	0.11
PROPANE	0.72	0.50	0.38
ISO-BUTANE	0.50	0.41	0.35
NORMAL BUTANE	1.49	1.18	1.03
ISO-PENTANE	1.76	1.61	1.51
NORMAL PENTANE	1.62	1.47	1.39
HEXANE PLUS	92.95	94.34	95.10
Totals	100.00	100.00	100.00

Specific gravity	0.666	Sample Date: 4-14-91
Pounds/gallon	5.555	
Pounds/gallon C5+	5.588	
Vapor pressure	21.3	
Density (GM/CC)	0.666	

A sample of the released condensate was collected from Excavation #A11 on April 19, 1991 and the gas chromatographic characterization of this sample is provided in APPENDIX F.

3.2.2 Product Volatilization

Condensate from Well #222, sample as received:
Specific gravity 0.7282
Weathered 12 hrs. @ 68 degree F
Volume loss 29.5%
Specific gravity 0.7433 @ 12 hours

Condensate from Inlet Tank, sample as received:
Specific gravity 0.7293
Weathered 12 hrs. @ 68 degree F
Volume loss 25.0%
Specific gravity 0.7392 @ 12 hours

	Before Weathering		After Weathering	
	H_2S ppm	Mercaptan ppm	H_2S ppm	Mercaptan ppm
Well #222	227	123	49	420
Inlet Tank	129	257	15	999

Condensate from well #222, sample as received:
Specific gravity 0.7433 @ 12 hrs.
Weathered 24 hrs. @ 68 degree F
Volume loss 39.6%
Specific gravity 0.7457 @ 24 hrs.

Condensate from tank, sample as received:
Specific gravity 0.7292 @ 12 hrs.
Weathered 24 hrs. @ 68 degree F
Volume loss 36.0%
Specific gravity 0.7782 @ 24 hours

3.3 Product Biodegradation

Observations were made upon excavation of soils at numerous locations in the Rocky Arroyo channel. Black, moist soils and rocks were encountered in a 2-to 3-foot zone immediately above the bedrock and in the liquid layer. This black soil smelled pungent - similar to the odor from biodegradation processes and possibly including hydrogen sulfide. It appears that an anaerobic (or similar) microbiological zone has set up through the Arroyo channel and is reducing hydrocarbons in the free product zone. Hydrogen sulfide, if present, may be evolved from this process as well as evolution from liquid condensate. Laboratory evaluations of biological activity in the subsurface environment is planned.

3.4 Investigatory Excavations

During the first several days following the discovery of the leak, fourteen excavations were made in the arroyo in an attempt to delineate the extent of leaked fluids migration (the locations of the excavations are shown on the location plat provided as EXHIBIT 9). Three of the excavations, numbered 1, 3, and A8, were subsequently filled in with excavated materials. Perforated 4-inch PVC was placed vertically in six excavations, numbered 2, 4, 5, 7, 8, and A9, within which free fluids were not observed. Clean gravel was placed over the perforated interval and excavated materials were backfilled around the 4-inch PVC in these excavations, which are currently being used to monitor fluid migration. Security caps have been installed over the tops of the 4-inch PVC.

3.5 <u>Product/Recovery Well Excavations</u>

Slotted 24-inch galvanized conduit was placed vertically in the remaining five excavations, numbered 6, 9, 10, A10, and A11, within which free fluids were observed. Clean gravel was placed over the slotted intervals and excavated materials were backfilled around the 24-inch conduit. Security caps were placed over the top of each 24-inch conduit.

3.6 <u>Soil Gas Survey</u>

A soil gas survey consists of measuring volatile organic compounds contained in soil pore air space. These gases can typically occur from the volatilization of organic compounds which may have migrated into the subsurface.

On April 17, 1991, Roberts/Schornick and Associates (RSA) initiated a soil gas survey at the site of the condensate release. Prior to initiating the survey, a surveyed network based on 200 foot by 200 foot grids was established to accurately locate the soil gas survey stations in the area of the condensate release. The soil gas survey was conducted using a Geoprobe Soil Gas Survey System. This system consists of hydraulically pushing a hollow rigid sampling tube that has a small recessed screen assembly into the soil to depths generally ranging from 1.0 to 10.0 feet. A vacuum pump is then connected to the hollow sampling tube and a vacuum is applied, thereby causing soil gases to migrate into the tube via the screen. An organic vapor monitor (OVM) which measures volatile hydrocarbon gases is then connected to the exhaust assembly of the vacuum pump to monitor for volatile gases. The discharged soil hydrocarbon gases are generally monitored for a period of 10 to 30 minutes and the resultant OVM reading recorded. The OVM has a detection limit of 100 parts per billion of total ionizable hydrocarbons based upon an isobutylene standard.

From April 17, 1991 to April 28, 1991, approximately sixty (60) soil gas probe readings were attempted in the gridded areas as shown on EXHIBIT 9. Successful soil gas measurements were obtained at approximately fifty-six (56) of the soil probe sites. However, at four (4) locations, the soil gas probe was unable to penetrate the soil horizon due to large cobbles or boulders. At most of the soil gas survey sites, attempts were made to obtain soil gas readings at depth intervals of approximately 1.0 foot and again at approximately 5.0 feet. At about thirty-seven (37) of the sixty (60) soil gas survey locations, soil gas readings were obtained at or near these two (2) depth intervals. At the remaining nineteen (19) successful survey locations, the soil probe was able to penetrate only to about 1-foot before refusal.

The soil gas survey was useful in defining the general lateral extent of the gaseous phase in the subsurface. Although the complete boundary of the condensate occurrence in the subsurface has not yet been fully defined, further soil gas and/or soil borings will be made in order to more accurately locate the condensate plume boundary. The approximate location of the hydrocarbon gas plume in the alluvial deposits as defined on April 28, 1991 by the soil gas survey, excavations, and soil borings, is shown on EXHIBIT 9. A summary of the soil gas survey readings for various depth intervals is presented in TABLE 2. The location of these soil probe measurement stations are shown in EXHIBIT 9.

3.7 Soil Characterization Borings

The drilling and sampling of soil characterization borings began April 18, 1991, and through April 28, 1991, twenty (20) borings have been completed. The total depths ranged from 3.0 to 15.1 feet below the ground surface. Soil samples were taken to provide a primary understanding of the extent of condensate impacts to the shallow alluvial soils and groundwater, if present.

Soil borings were drilled from the surface to total depth utilizing a CME-75 mobile drilling rig equipped with 7-1/4 inch O.D. continuous flight hollow stem augers. Soil samples generally were obtained at

5-foot intervals using a split-barrel sampler. The drilling contractor, Sergent, Hauskins and Beckwich of Albuquerque, New Mexico, was under the professional supervision of Roberts/Schornick and Associates, Inc., Norman, Oklahoma.

A summary of soil boring details is presented in TABLE 3 and the soil boring logs are presented in APPENDIX G.

All downhole sampling equipment, as well as drilling equipment, which came in contact with the borehole, was thoroughly cleaned before commencement of drilling or sampling operations and between each soil boring. Decontamination was accomplished by washing the equipment utilizing a high pressure/high temperature water stream. Drill cuttings from soil boring operations were collected on and covered with plastic sheeting until proper disposal can be arranged.

Visual litholigic descriptions were made in the field of all recovered soil samples. Soils were classified according to the Unified Soil Classification System (ASTM D-2488 and ASTM D-2049). Discrete samples were taken at approximately 5-foot intervals when adequate sample recoveries permitted. Each discrete sample was placed in properly labeled, clean, glass containers and sealed with a foil layer and screw lid. Within one hour of sampling, soil gas measurements were taken from the headspace of each sample container using an organic vapor monitor. Soil descriptions, classifications, and soil gas measurements are presented in the soil boring records found in APPENDIX G. A summary of the soil headspace gas measurements is presented in TABLE 4.

The locations of soil borings were selected based upon the location of the condensate line, topography, and results of soil gas vapor measurements. EXHIBIT 9 shows the location of all soil boring locations as of April 28, 1991.

3.8 Monitoring/Recovery Well

On April 26, 1991, RSA installed a monitoring well in boring BH-14 (MW-1) in the alluvial deposits of the Rocky Arroyo southeast at the Marathon Indian Basin Gas Plant (EXHIBIT 9). The monitor well was drilled to a depth of about 14.3 feet below ground level and was screened from 9.4 feet to 14.32 feet below ground level. The screen was set in the five (5) foot interval directly above the bedrock.

The depth to fluid measured in this well on April 26, 1991 was about 11.26 feet from ground level. At the location of the monitoring well, approximately 3.74 feet of fluid saturation was present in the alluvial deposits overlying the bedrock. The well construction diagram is presented in APPENDIX H.

3.9 Rain Contingency Plan

Marathon has developed an action plan to address the potential dispersion of hydrocarbons at the leak site in the event of surface/subsurface flows following rains. The plan, which has been approved by the BLM, is included as APPENDIX I. The plan calls for a diversion to be placed upstream of the leak site, and a collection basin downstream of the leak site. Since the plan submittal, the BLM had agreed that diversion and collection of the fluids in the central channel will not be necessary. Operations to divert and collect fluids in the northern channel are ongoing.

3.10 Free Product Recovery

Free fluids have been collected using vacuum trucks from each excavation. Since backfill of the excavations, fluids are being recovered only from those excavations completed with 24-inch conduit. A continuous pumping operation was established on April 26, 1991 at excavation #A-11, the excavation which has continuously "produced" the most fluids. A small pump has been set on the northern bank of the arroyo above the 24-inch conduit in #A-11, and fluids are being pumped into a frac tank. Vacuum truck withdrawls from the remaining 24-inch conduits continue.

Cummulative fluid recovery, as of Sunday, April 28, 1991 is 629 barrels of condensate and 495 barrels of water. All fluids are being transported to the plant and pumped into the condensate skim tank system. Condensate is being recovered through this operation and ultimately sold. Produced water is currently being trucked to a contract disposal site.

3.11 Area Groundwater and Surface Water Sampling

The following samples of area groundwater and surface water have been obtained and reflect results obtained through April 28, 1991.

Sample	Analyte	Results	Detection Level
Plant water well #1 (Partial) analysis 4-26-91	Benzene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L
	Chloride	16.6 mg/L	
Plant water well #2-1 (duplicate of #1) (Partial) analysis 4-26-91	Benzene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L
	Chloride	16.7 mg/L	
Plant water well #2 (Partial) analysis 4-26-91	Benzene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L
	Chloride	16.8 mg/L	
W. Biebelle Stock tank well water (Lymon) 4-19-91	Benzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L

Stock tank water supply 4-24-91	Benzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L

Prior analyses of the plant water supply is provided in APPENDIX J.

Surface Water Samples - downstream Arroyo channels

		Results	Detection Level
Water #1 (R24E, T21S, S27) 13:50 hrs 4-19-91	Benzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L
Water #2 (R24E, T21S, S27) 15:18 hrs 4-19-91	Benzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L
Water #3 (R24E, T21S, S27) 17:46 hrs 4-19-91	Benzene	N.D. -	5 ug/L
	Toluene	N.D. -	5 ug/L
	Ethylbenzene	N.D. -	5 ug/L
	Xylenes	N.D. -	5 ug/L

* Note: N.D. = non-detected

3.12 Pipeline Repair and Testing Program

Steel or PVC? See p. 8

Following isolation of the line leak, the 6-inch PVC line was cut on the north and south banks of the arroyo. Some 1700-feet of 4-inch poly line was pulled internally through the 6-inch PVC between these points, and connected to the 6-inch system using flanges. The working pressure of the 4-inch poly line is 160 psig, while the 6-inch PVC line has a 200 psig working pressure.

Following tie-in, the 4-inch internal line and some 4,300 feet of the northern 6-inch PVC line were hydrotested. The normal operating pressure of the condensate line is approximately 30 psig. As a safety measure, the hydrotest was conducted to 100 psig. The test proved successful, and following removal of the blinds, production from wells connected to Line 4 was resumed at 11:30 p.m. on April 16, 1991.

An eight-foot section of the line at the site of the leak was removed prior to the repairs listed above. This line section was transported to Marathon's Production Technology Center in Littleton, Colorado, where failure analysis is on going.

3.13 Site Safety

All personnel on site have received training persuant to OSHA Regulation 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response. The following persons have received 40 hours of training:

- RSA Environmental Consultants
- Drilling Rig Operators
- Marathon's Environmental Representatives from PTC in Littleton, CO.
- Marathon Site Safety Engineer

All other persons directly involved in site operations, both Marathon and contractor employees, received a 4-hour training class consisting of the following subject material:

- Trenching and sloping
- Confined space entry
- Vacuum truck operation
- Hydrogen Sulfide Safety
- Hazard communication for condensate
- Noise and hearing protection
- Monitoring techniques and devices
- Fire safety
- Emergency action/reponse, and
- Respiratory protection and rescue air pack use.

All visitors receive a 10-minute safety orientation prior to entry onto the site to ensure that they are aware of potential hazards and the appropriate actions necessary should an emergency arise. Trained personnel escort all visitors for the duration of their stay on site.

Several methods of monitoring are being used on site to ensure the health and safety of all workers. Personal hydrogen sulfide monitors are provided to personnel who have potential for exposure at or near 10 ppm. Tri-function monitors are being used for all excavation and vacuum recovery operations to ensure that flammable vapors are well below explosive levels, that hydrogen sulfide concentrations in the workers' breathing zone are below 10 ppm, and that adequate oxygen is present for confined space entry. Organic vapor monitors, or passive sampling badges, have also been used to monitor personal exposure levels.

Emergency equipment is located at the work site for prompt access and response should an emergency situation arise. Equipment includes:

. 150 lb. wheeled fire extinquishers

. 30 lb. hand-portable fire extinquishers

. rescue air packs (self contained breathing apparatus)

. safety belts with retrieval lines

. breathing air trailer with work units, and

. wind sock

4.0 ONGOING/FUTURE CHARACTERIZATION WORK

4.1 Soil Characterization Borings

4.1.1 Shallow Alluvial Formation

Soil borings to characterize the shallow alluvial formation and to further delineate the limits of condensate migration will be drilled and sampled as was discussed in section 3.7. The exact number and location of these borings will be evaluated based upon the results of the soil gas survey. The borings will be made in order to define the shallow alluvial geological conditions. Information from these borings will be used to develop geological cross-sections, isopach maps, and structure maps. In addition, a soil gas headspace assessment may be conducted to evaluate for the presence of condensate. All soil characterization borings will be drilled per ASTM engineering guidelines. Soil samples from each boring will be collected using split-spoon sampling methodology at intervals of between 2.5 to 5.0 feet and described on boring records. All soil characterization boreholes not completed as wells will be plugged back to surface using a cement-bentonite grout mix.

4.1.2 Deeper Bedrock Formation (Queen)

Drilling below bedrock will only occur through steel or PVC conductor casing, securely cemented 5 to 10 feet into bedrock. Before drilling into the bedrock using an air/percussion drilling rig, the integrity of the hydraulic seal between the bedrock and the conductor casing will be assured.

Bedrock cuttings will be continuously collected and described on boring records. The deep bedrock borings will be drilled to determine aquifer characteristics and their interrelation with the overlying, alluvial groundwater, if present. The bedrock borings will define the groundwater occurrence in the Queen formation and to provide information necessary to construct geological cross section.

4.2 Soil Gas Survey

Additional soil gas survey locations may be required to accurately define the lateral extent of the condensate plume. If additional soil gas survey locations are required, then soil gas readings will be taken, as per the methodology described in Section 3.6. Updated soil gas maps will be prepared that incorporate any additional soil gas survey data.

4.3 Monitoring Well Installation

Deep or shallow?
>120 14 ft

Groundwater monitoring wells will be installed into the uppermost groundwater system that occurs beneath the site. If groundwater is present in the shallow alluvial deposits, then monitoring wells will be installed to monitor groundwater quality and occurrence directly above the bedrock surface. Ground water monitoring wells will also be installed into the next deeper bedrock groundwater system present in the underlying Queen formation. These wells will be installed to characterize the vertical extent of the condensate/produced water plume. The exact number and location of wells will depend upon the results of the soil gas survey, soil characterization borings, and excavations. A brief description of well construction methodologies is presented below.

4.3.1 Shallow Alluvial Wells

Groundwater monitoring wells will be installed into the uppermost groundwater system that may occur beneath the site. A seasonal perched groundwater may exist upon the bedrock surface (10 to 20 feet deep) but within the alluvial deposits. Information taken from these wells may allow for the evaluation of groundwater flow direction, free floating product occurrence, and chemical quality of the shallow alluvial groundwater, if present.

The shallow alluvial wells will be constructed of 4-inch PVC. These wells will not penetrate into the underlying Queen formation. These wells will be completed to serve two (2) purposes, the first being to serve as groundwater characterization wells and the second to serve as potential recovery wells. All wells will be installed using EPA approved methodologies.

4.3.2 Deep Bedrock Formation

As described in Section 4.1.2., deep bedrock borings will only be advanced below the top of the bedrock formation after setting a steel or PVC conductor casing 5 to 10 feet into the bedrock formation. Surface conductor casings are needed to insure that there is no potential to cross-contaminate deeper horizons via the well borehole.

The underlying bedrock will be drilled utilizing an air percussion drilling rig to a depth until the first groundwater bearing horizon is encountered (approximately 150-200 feet below ground).

Bedrock monitor wells will be completed by installing 4-inch, factory slotted, PVC, screw-coupled, screen (0.020 slot) and casing to selected depths below the conductor. The screened interval will be selected so as to monitor the uppermost portion of the bedrock aquifer. Each monitor well will be fitted with an expandable locking cap and a protective steel outer casing anchored in concrete. The use of 4-inch wells will allow the wells to be used as recovery wells, if required.

completion zone

The positioning of bedrock monitor wells will be selected after evaluation of the drilling data derived from shallow soil borings and shallow monitor well installation(s). Any bedrock monitor wells will be nested (completed adjacent to) with a shallow monitor well so as to allow for a comparison of the two groundwater surfaces in order to determine the hydraulic relationships between the groundwater systems.

4.4 Groundwater Quality Characterization

Groundwater samples will be collected from wells installed into the shallow alluvial deposits and the deeper bedrock formation. The groundwater collected from each well will be analyzed for benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), total petroleum hydrocarbons (TPH), chloride, total dissolved solids, and pH. These parameters were selected because they are specific environmental indicators of the condensate and produced water that were released into the subsurface. All groundwater samples will be collected using strict EPA-approved well purging and sampling methodology.

ALSO C/A

Based upon the analytical results, isopleth (constituent concentration) maps may be prepared that show the concentration of these constituents, if any, in the groundwater beneath the site. In addition, the groundwater levels in the monitoring wells will be measured and referenced to mean sea level elevation in order to determine groundwater flow direction and the hydraulic relationship between the shallow alluvial groundwater, if any, and the next deeper bedrock groundwater system. The thickness of any free condensate product present on the groundwater surface will also be measured and, if present, a map showing the free product thickness on the groundwater surface will be prepared.

4.5 Laboratory Evaluations

4.5.1 Venting Technology

Laboratory testing will be performed on soil removed from the saturated zone of the A-11 excavation with the purpose of determining if forced air drive or evacuation techniques will allow us to remediate the affected soil.

Columns will be set up using both forced air drive and vacuum sweeps conducted on the representative samples of the soil with appropriate testing before and after ventilation to determine the degree of hydrocarbon removal as a function of time. This technology may prove applicable due to the fact that the condensate is very volatile and should ventilate very readily.

4.5.2 Bioremediation

Using similar soils evacuated from the saturated zone in the contaminated area, Marathon plans to carry out column studies to determine if bioremediation is a viable technology in lieu of venting or if bioremediation would compliment a venting program. These column studies will evaluate the resident hydrocarbon bacteria populations and identify any other suitable bacteria strains which may accelerate the bioremediation process. Additionally, other information will be gathered from these studies such as nutrient requirements, oxygen demand and water infiltration rates.

4.6 Remediation Plan

Marathon will prepare a Plan which will address product recovery and remediation once the site characterization investigation has been completed. This plan will be submitted to the appropriate regulatory agencies for review and approval.

APPENDIX A

Memorandum Report

Queen and Related Aquifers in Indian Basin

MEMORANDUM REPORT

Queen and Related Aquifers in the Indian Basin

This report deals with aquifers in and related to the Queen formation in the Queen outcrop area in Indian Basin from Township 23 South, Range 23 East north and northeast through Township 21 South, Range 24 East. A map, two cross sections and a well tabulation are attached hereto and made a part of this report. Only a part of the total Queen outcrop area is covered and will be incorporated in the complete Indian Basin Report when that report is finalized.

The Queen formation in this area outcrops in a band approximately 3 to 9 miles in width and is roughly parallel to the Azotez Mesa and Seven Rivers Hills. The strike is roughly northwest and dip is to the northeast, tending slightly more east than northeast at a rate of 100 to 125' per mile. The Queen formation in this area is of interbedded gypsum, sandstone, siltstone, and dolomite.

Material used in this report was obtained from a study of logs and well records available; notes made by the writer in 1964, 1965, and 1966 while studying the development of the Indian Basin Gas field; records in the Oil Conservation Commission Office, Artesia; from published and unpublished information available in the State Engineer Office including the Motts Report, the transcript of the "Carlsbad" hearings, Geologic Map of New Mexico by Dane and Bachman of 1965, Subsurface Geological methods by Leroy; and from conversations with long time residents of the area.

A study of all material available indicates there are three aquifers present in the area of study from land surface to the bottom of the Queen. They are: (1) The alluvium (2) The upper Queen aquifer, possibly the Shattuck member, more commonly known as the Red Sand or Artesia Red Sand and (3) The bottom Queen aquifer, in the base of the Queen and possibly along the Queen-Grayburg contact zone.

The alluvium is rather thin and found primarily on valley or arroyo floors and alluvial fans in and along Rocky Arroyo. In times of wet weather the alluvium aquifer contributed some flow to Indian Big Springs and Rocky Arroyo. Mr. William Shafer, a long time resident, reports that 30 to 40 years ago, there were many small springs and seeps into Rocky Arroyo but at that time there was much more rain than now.

The upper aquifer in the Queen formation, probably being the Shattuck member or the Artesia Red Sand can be picked on some of the available logs and followed to the area of Indian Big Springs. Referring to the two cross-sections, the well tabulation, and map; on cross-section X-X' wells #3, 4, and 5 and on cross-section Y-Y' wells #6, 7, 8, 9, and 10, and the wells marked B and D on the map, this aquifer is plotted from the logs. The wells Y-10 and X-5 are the same, being Lowe's #1 Staple oil test well.

A water well was drilled by Lowe at the site of the #1 Staples oil test well, to a reported depth of 250' and the water level was measured at S2'. This water level compares with the water level of Indian Big Springs as taken from the U.S.G.S. quadrangle map. Well No. 8 on cross-section Y-Y' is Shafer's commercial well located 21.24.26.443 with a reported total depth of 75' (Mott's Report) and the water level was measured at 40'. This water level at 40' projected into Y-Y' fits exceptionally well into the upper aquifer. Also wells marked "B" and "D" fit the pattern of the upper aquifer. Well "B" is Shafer's domestic well (Bar well, C-1136) with a reported depth of 138' and with the water level measured at 91'. This fits exceptionally well into the cross-sections X-X' and Y-Y' as deriving its water from the upper aquifer.

The lower aquifer in the Queen formation has no name I am aware of and is separated from the upper aquifer by 100 to 300 feet of sandstone, dolomite and sandy dolomite. From interpretation of the gamma ray logs available, this material is quite dense, and no water flows have been reported to have been encountered between the upper and lower aquifers.

The correlation points (C.P.) shown on the cross-sections, are, in my opinion, the top of the lower aquifer. One water well was drilled and was watched closely. This was Marathon Oil Company's well 21.23.23.232 with a T.D. of 255'. The driller of this well reported water from 195' to 255' on his well record, however, I watched the drilling very closely and notes made during July 1965 and personal recollection indicates no water was encountered above about 240'. This depth on Marathon's sample description log is correlated with and used as the top of the lower Queen aquifer on the cross-sections.

Summary:

In the course of this study approximately 70 well logs and well records were examined. Part of these logs and records are of wells to the north of Township 21 South, Range 24 East and will be used in the continuation of this study. The remainder are in the immediate area of study.

On these logs and records of wells lying within the area covered by this report, the top of the lower Queen aquifer could be picked with reasonable accuracy. The bottom of the upper aquifer could be picked in areas where it was present and in some cases the top could be picked, however, due to logging methods, if the upper aquifer was on the surface or very near the surface, the picking of top and bottom was sometimes questionable.

The logs and well records of wells spotted on the attached map are representative of all of the logs examined, and the picking of the two aquifers shown on cross-sections X-X' and Y-Y' are confirmed by the study and comparison of those not plotted.

Conclusion:

In the area under study, there are two distinct aquifers in the Queen formation. The upper aquifer, which supplies water to Shafer's commercial well 21.23.23.443, Shafer's domestic well (Bar well C-1136) 21.24.23.144, is also the main source of water to Indian Big Springs. Also probably tapping the upper aquifer may be a few ranch and stock wells on the eastern edge of the Queen outcrop. The lower aquifer supplies water to the Davidson well in 23.23.10.431 (C-1371) and to Marathon Oil Company's water well 21.23.23.232 (BA-5131). I know of no other wells using the lower aquifer as a source in this area.

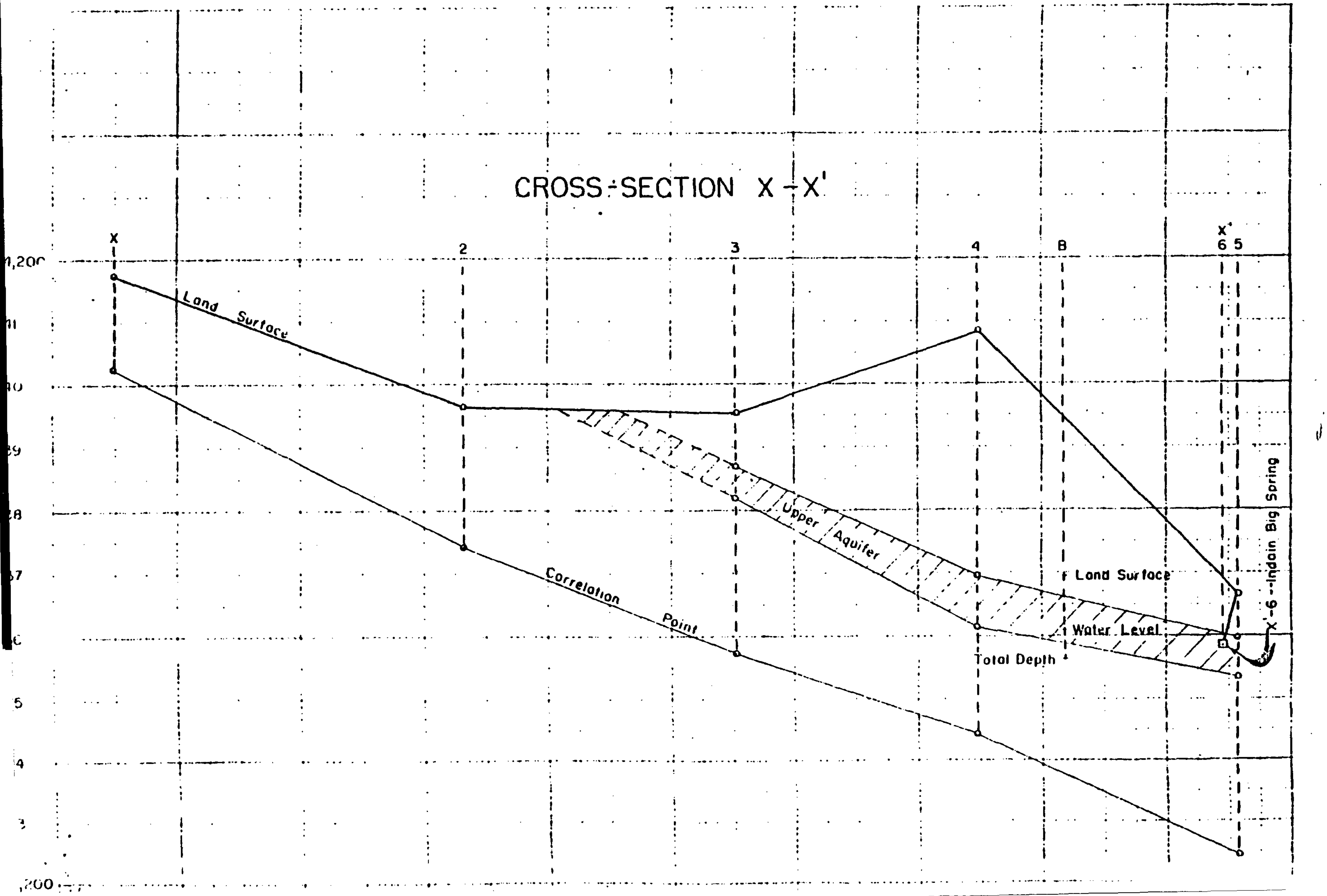
In this study, I have found no evidence which would indicate that the upper Queen aquifer and the lower Queen aquifer are interconnected. I do have notes made from conversations with the drillers that there is a dry zone between the upper and lower aquifers in the area where the upper aquifer is at or near the surface.

The natural discharge areas of the two Queen aquifers have not as yet been determined, but it is my opinion that the lower Queen aquifer does not contribute to the flow of Indian Big Springs or wells in Rocky Arroyo. It is hoped that in the continuation of this study, the discharge areas can be determined.

Original Signed By:
R. B. Collins, Jr.
Water Resources Engineer

September 23, 1987

To accompany Memorandum Report "Queen and Related Aquifers in the Indian Basin"



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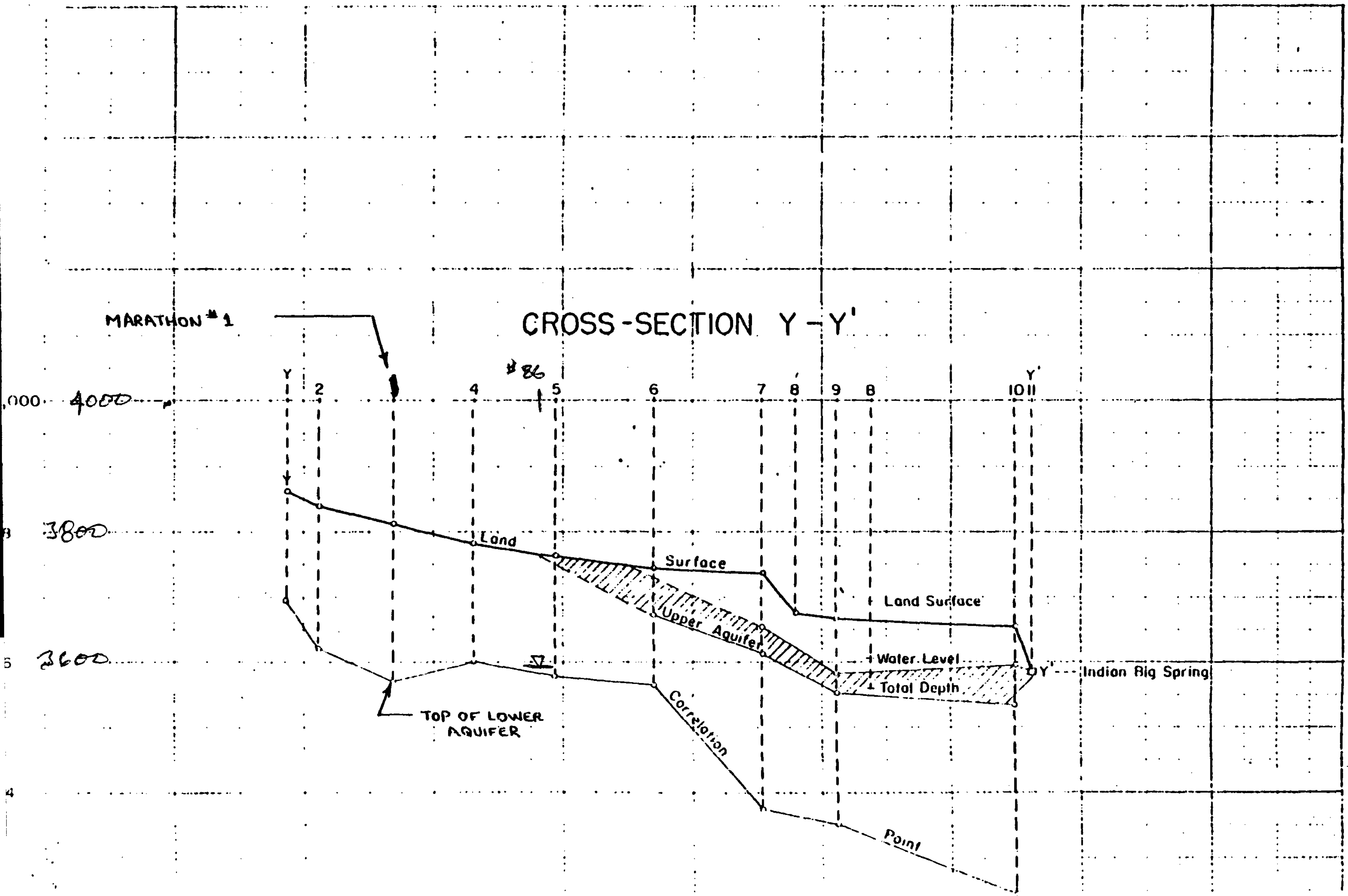

WELL TABULATION

All surface Elevations are above sea level and are reported except where noted.

Cross-Section X-X'

Well #1 Location: 22.23.17.230
Elevations: surface - 4171'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 4021'

Well #2 Location: 22.23.11.141
Elevations: surface - 3967'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3741'

Well #3 Location: 23.24.6.114
Elevations: surface - 3954'
top upper aquifer - 3871'
bottom upper aquifer - 3826'
correlation point - 3574'
Notes: Reliable report of first water at 456' (elevation 3498)'

Well #4 Location: 21.24.33.341
Elevations: surface 4068'
top upper aquifer - 3697'
bottom upper aquifer - 3612'
correlation point 3443'

Well #5 Location: 21.24.23.324
surface 3638'
top upper aquifer - 3596'
bottom upper aquifer - 3498'
correlation point - 3243'

Indian Big Springs Location: 21.24.27.210
Elevation: surface 3536' (USGS Quad)

Cross-section Y-Y'

Well #1 Location: 21.23.32.420
Elevations: surface - 3862'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3660'

Well #2 Location: 21.23.23.130
Elevations: surface 3843'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3618'

Well #3 Location: 21.23.23.232 RA-6131
Elevations: surface - 3812'
top upper aquifer - not present
bottom upper aquifer - not present
correlation point - 3572'

Well #4 Location: 21.23.24.323
Elevations: surface -3785'
top upper aquifer - probably on surface
bottom upper aquifer - at or near surface
correlation point - 3600'

Well #5 Location: 21.23.24.422
Elevations: surface - 3766'
top upper aquifer - probably on surface
bottom upper aquifer - 3700'7
correlation point - 3578'

Well #6 Location 21.24.19.414
Elevations: surface 3746'
top upper aquifer - probably on surface
bottom upper aquifer - 3672'
correlation point - 3508

Well #7 Location: 21.24.20.481
Elevations: surface - 3738'
top upper aquifer - 3653'
bottom upper aquifer - 3615'
correlation point - 3384'

Well #8 Location: 21.24.20.443 Shafer's commercial well
Elevations: surface - 3675' (USGS Quad)
total depth - 75'
water level 40'
Notes: Reported capable of producing 250 - 300 gpm with 15 h.p. motor through 4" discharge.

Well #9 Location 21.24.21.330
Elevations: surface - 3670'
top upper aquifer - 3556'
bottom upper aquifer - 3356'
correlation pint - 3351'

Well #10 (Same as well 5 on X-X' cross-station)
Location: 21.24.22.324
Elevations: surface - 3666'
top upper aquifer - 3598'
bottom upper aquifer - 3493'
correlation point - 3243'

Indian Big Springs   Location: 21.24.27.210
Elevation: surface - 3536'

Wells Shown on Map but Not on Cross-Sections

Well "B" Shafer domestic well Location: 21.24.25.114 (C-1136)
Elevations from USGS Quad - 3695'
Reported depth 138'
Water Level 91'
Notes: Reported capable of producing 250 to 300 gpm.

Top of
red sand   205' from sample log
elevation
top red sand 3735'
elevation correlation point - 3415'
Notes: The log available is very poor print of original but the points in question compare very favorably.

Well "C"   Location: 21.24.29.321
Elevations: surface - 3636'
top upper aquifer - could not make satisfactory pick, probably very close or at surface.

Well "D" oil test (driller's name not available) Location: 21.24.3.410
Elevation: 3946' (reported elevation 3960' is questionable USGS Quad sheet shows elevation to be 3560 to 3950)

Well "E"   Location: 23.24.5.132
Elevations: surface - 4812'
top upper aquifer - could not make satisfactory pick
bottom upper aquifer - 3743'
correlation point 3577

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20.431 RRB
Well #7 Location: 21.24.20.481
Elevations: surface - 3738'
top upper aquifer - 3653'
bottom upper aquifer - 3615'
correlation point - 3384'

67, 29.221 RRB
Well #8 Location: 21.24.~~20.443~~ Shafer's commercial well
Elevations: surface - 3675' (USGS Quad)
total depth - 75'
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correlation point 3577

APPENDIX B

Typical Gamma Ray Geophysical Log

TYPE LOG

24-21s-23e

Schlumberger

COMPENSATED NEUTRON
FORMATION DENSITY

COMPANY COTTON PETROLEUM CORPORATION

WELL FEDERAL "24" #1

FIELD INDIAN BASIN

COUNTY EDDY STATE NEW MEXICO

660' FSL & 660' FEL

24 | 21-S | 23-E

Other Services: DLL CYBERLOOK

Log to Surface

G.L. Elev. 3796

K.B. 11 Ft. Above Perm. Datum

K.B.

Elev.: K.B. 3807, D.F., G.L. 3796

Date	6-21-79
Run No.	ONE
Depth—Driller	7650
Depth—Logger	7665
Btm. Log Interval	7650
Top Log Interval	SURF
Casing—Driller	8 5/8 @ 2000
Casing—Logger	2000
Bit Size	7 7/8
Type Fluid in Hole	DRISPAC
Dens. | Visc.	9.2 | 32
pH | Fluid Loss	9.5 | 6.8 ml
Source of Sample	CIRC
Rm @ Meas. Temp.	.071 @ 123 °F
Rmf @ Meas. Temp.	.053 @ 123 °F
Rmc @ Meas. Temp.	
Source: Rmf | Rmc	C
Rm @ BHT	.063 @ 139 °F
Circulation Stopped	1000
Logger on Bottom	1600
Max. Rec. Temp.	139
Equip. | Location	8075 | HOBBS
Recorded By	HORABAN
Witnessed By	EDGE

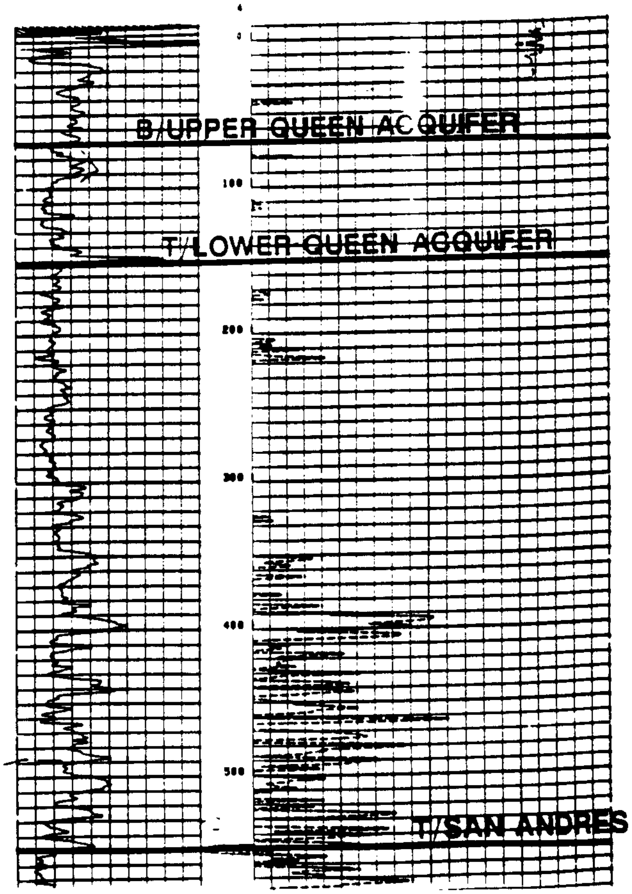
CALIPER DIAM. IN INCHES 6 16

GAMMA RAY API UNITS 0 100; 100 200

CORRECTION GRAMS/CC 0 -.25 .25 0 -.25

BULK DENSITY GRAMS/CC 2.0 2.5 3.0; 1.0 1.5 2.0

CNL POROSITY—% 30 20 10 0 -10



APPENDIX C

Water Well Records

FE-1 State of New Mexico 1 (1)
State Engineer

WELL SCHEDULE

Source of data: Obser [X] Owner [ ] Other ____

Date January 12 1954 Record by Metts

LOCATION: County Eddy Map 117.2.2

OWNER ~~A.B. Cothay~~ Forrest Lee

DRILLER ____ Completed ____ 19__

TOPO SITUATION ____ U.S.G.S. Elev ~~3802.9~~ 3802.9; USGS 38029; B22 P43 S.E.O. = 3803.7

DEPTH 25 ft [X] Rept [ ] Meas Use Stock

CASING 5 (?) in to ____ ft Log ____

PUMP: Type Piston Make ____

Ser.no./model ____ Size of dischg ____ in.

PRIME MOVER: Make windmill HP ____

Ser.no. ____ Power/Fuel wind

PUMP DRIVE: [ ] Gear Head [ ] Belt Head [ ] Pump Jack

Make ____ Ser.no ____ [ ] VHS

WATER LEVEL: 14.60 ft ~~rept~~ meas 1-12 1954 above below

top of wooden clamps

which is 0.40 ft above below LS

PERMANENT RP is ____

which is ____ ft above below described MP and ____ ft above below LS

REMARKS 2-1-78 O'Hare well is located 9 feet south

AQUIFER(S): Pqc

Well No. ____ on Photo none DPN 15-20021

File No ____ Loc. No. 21.23.14.21221

Remarks cont. of a 2 foot tall x 16 foot diameter steel storage tank. No visible casing. 2 in. x 4 in. column stumps appear to be resting on grass only. Well is abandoned. USGS location is .14.214. Water sample collected by U.S.G.S. on 1-12

SKETCH:

N

INITIAL WATER-LEVEL MEASUREMENT	Depth to water: Below MP 1st	2nd	3rd	Below LS
Date 1 12, 1954				14.6[illegible]
Hour ____ AM PM Obs WM				0.4
Not POA ( ) POA ( )	14.60			14.2[illegible]

W L meas after pump shut off ____ min. Pumping W L (

Remarks ____

STATE ENGINEER
Technical Division

Owner Forrest Lee
Use Abd. Stock

	Depth to water: Below MP 1st	2nd	Below LSD	Water level elev
Date 1 12, 1954			14.60	3803
Hour ____ AM PM Obs WM			0.40	14
Not POA ( ) POA ( )	14.60		14.20	3789

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks ____

	Depth to water: Below MP 1st	2nd	Below LSD	Water level elev
Date 2 22, 1978	15.00	14.00	12.84	3803
Hour 2?? AM PM Obs KZO	2.16	1.14	0.40	12
Not POA (X) POA ( )	12.84	12.86	12.44	3791

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks ____

	Depth to water: Below MP 1st	2nd	Below LSD	Water level elev
Date [illegible] 1, 19[illegible]	12.80	12.90	[illegible]	3803
Hour [illegible] AM PM Obs [illegible]	0.08	0.17	[illegible]	
Not POA (X) POA ( )	[illegible]	[illegible]	12.36	3791

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks Very little water

Date [illegible], 19[illegible]				
Hour [illegible] AM PM Obs [illegible]				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )
Remarks [illegible] 3.1 below LS

Latitude ____ Longitude 15-20021
File No ____ Location No 21.23.14.21221

FE-1

State of New Mexico
State Engineer

2 (2)

WELL SCHEDULE

Source of data: Obser [X] Owner [ ] Other

Date OCTOBER 6 1983 Record by GROSECLOSE & NUNEZ

LOCATION: County EDDY Map 117.22

OWNER FOREST LEE

DRILLER ______ Completed ______ 19__

TOPO SITUATION ______ SED Elev 3846

DEPTH 256 ft [X] Rept [ ] Meas Use STOCK

CASING ______ in to ______ ft Log ______

PUMP: Type SUBM. Make ______

Ser.no./model ______ Size of dischg 2 in.

PRIME MOVER: Make STA-RITE HP 2

Ser.no. ______ Power/Fuel ELECTRIC

PUMP DRIVE: [ ] Gear Head [ ] Belt Head [ ] Pump Jack

Make ______ Ser.no ______ [ ] VHS

WATER LEVEL: 216.94 ft rept/meas Oct 6 1987 above/below Top of 1/4" vertical nipple

which is 0.05 ft above/below LS

PERMANENT RP is top of 1/2 circular conc. base

which is 0.05 ft above/below described MP and ______ ft above/below LS

REMARKS Well shown on topo. Disc south/south

AQUIFER(S): Pgr

Well No. ____ on Photo ______ DPN 15-05148

File No ______ Loc. No. 21.23.22.341111

STATE ENGINEER
Technical Division

Owner Forest Lee	Depth to Water: Below MP 1st	Below MP 2nd	Below LSD	Water Level Elev
Use stock				
Date Oct 6, 1987	230.00	225.00	216.94	3846
Hour 11:29 AM Obs KO-DU	13.04	8.06	0.05	217
Not POA (X) POA ( )	216.96	216.94	216.89	3629

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

Date ____ ____, 19__				
Hour ____ AM PM Obs ____				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

Date ____ ____, 19__				
Hour ____ AM PM Obs ____				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

Date ____ ____, 19__				
Hour ____ AM PM Obs ____				
Not POA ( ) POA ( )				

W L meas after pump shut off ______ min. Pumping W L ( )

Remarks ______

Latitude ______ Longitude 15-05148

File No ______ Location No 21.23.22.241444

Remarks cont. EAST 12' to A 24' DIA X 5' TALL STEEL TANK

water sample collected by U.S.G.S. on 1-11-56

water sample collected by ... 6/30/87 ... 70

SKETCH:

N

INITIAL WATER-LEVEL MEASUREMENT	Depth to Water: Below MP 1st	2nd	3rd	Below LS
Date 24 6, 1987	230.00	225.00		216
Hour 11:29 AM Obs [illegible]	13.04	8.06		0.
Not POA (X) POA ( )	216.96	216.94		216

W L meas after pump shut off ______ min. Pumping W L

Remarks ______

QUALITY CONTROL SHEET — STATE ENGINEER

DATE	COLLECTOR	P.O.C	REMARKS & USE	RES
6/30/87	O.U	O.P	Stk.	9

Aquifer(s) Pgr D.P.N ______

File No ______ Location No. 21.23.22.2

Form WR-23

FIELD ENGR. LOG

STATE ENGINEER OFFICE

4

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to th nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely an accurately as possible when any well is drilled, repaired or deepened. When this form is used as a pluggin record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Lowe Drilling Company

Street and Number P. O. Box 832

City Midland State T xas

Well was drilled under Permit No. RA-5060 and is located in t

SW ¼ NW ¼ NW ¼ of Section 23 Twp. 21 S Rge. 23E

(B) Drilling Contractor W. C. Garner License No.

Street and Number

City State

Drilling was commenced May 19 6

Drilling was completed May 19 6

Elevation at ~~top of casing~~ Topo. in feet above sea level 3835 Total depth of well 253

State whether well is shallow or artesian Depth to water upon completion 200

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1				
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
8 5/8			0	15				

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FILED

DEC 1954

OFFICE GROUND WATER SUPERVISOR ROSWELL, NEW MEXICO

FOR USE OF STATE ENGINEER ONLY

Date Received

File No. RA-5060 Use Comm. & OWD Location No. 21.23.23.~~113~~ . 13324

FE-1

State of New Mexico
State Engineer

(4)

WELL SCHEDULE

Source of data: Obser [X] Owner [ ] Other ______

Date January 12 1978 Record by O'Hare & Chavez

LOCATION: County Eddy Map 117.2.2

OWNER Lowe Drilling Co.

DRILLER W. C. Garner Completed May 1962

TOPO SITUATION flat ______ SED Elev 3834.0

DEPTH 225 ft [X] Rept [ ] Meas Use Abd. OWD

CASING 8 5/8 OD Steel in to ______ ft Log drillers

PUMP: Type None Make ______

Ser.no./model ______ Size of dischg ______ in.

PRIME MOVER: Make ______ HP ______

Ser.no. ______ Power/Fuel ______

PUMP DRIVE: [ ] Gear Head [ ] Belt Head [ ] Pump Jack

Make ______ Ser.no ______ [ ] VHS

WATER LEVEL: 207.60 ft rept / meas 1-12 1978 above / below top of casing

which is 0.50 ft above / below LS

PERMANENT RP is —

which is ____ ft above / below described MP and ____ ft above / below LS

REMARKS Well is located 132 feet south west of

AQUIFER(S): Pgn

Well No. ____ on Photo ______ DPN 15-20022

File No RA-5060 Loc. No. 21.23.23.133241

Remarks cont. oil well, Ralph Lowe #1 Indiana Basin — 1980 ft FNL & 660 ft. FWL

6/30/87 [illegible]

[illegible] Well located

[illegible]

SKETCH:

N

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER Below MP 1st	2nd	3rd	Below LS
Date January 12, 1978				207.
Hour 10:30 AM/PM Obs KEO EAC				0.
Not POA (X) POA ( )	207.60			207.

W L meas after pump shut off ____ min. Pumping W L

Remarks M-Scope measurement.

STATE ENGINEER
Technical Division

Owner Lowe Drilling

Use Abd. OWD

	Depth to Water Below MP 1st	2nd	Below LSD	Water Level Elev
Date 1-12, 1978			207.60	3834
Hour 10:30 AM/PM Obs KEO EAC			0.50	207
Not POA (X) POA ( )	207.60		207.10	3627

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks M-Scope measurement

	Depth to Water Below MP 1st	2nd	Below LSD	Water Level Elev
Date [illegible], 19[illegible]			206.4[illegible]	3834
Hour [illegible] AM/PM Obs [illegible]			0.50	206
Not POA (X) POA ( )	[illegible]		205.9[illegible]	3628

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks M-S[illegible]

	Depth to Water Below MP 1st	2nd	Below LSD	Water Level Elev
Date [illegible], 1987			205.32	3834
Hour [illegible] AM/PM Obs KEO			0.50	205
Not POA (X) POA ( )	205.32		204.82	3629

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks M-Scope

	Depth to Water Below MP 1st	2nd	Below LSD	Water Level Elev
Date ____, 19__				
Hour ____ AM/PM Obs ____				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks

Latitude ______ Longitude 15-20022

File No RA-5060 Location No 21.23.23.133241

Form WR-23 STATE ENGINEER OFFICE 5

FIELD ENGR. LOG

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to th nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely ar accurately as possible when any well is drilled, repaired or deepened. When this form is used as a pluggi record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Marathon Oil Co.

Street and Number Box 2107

City Hobbs State N. M.

Well was drilled under Permit No. ______ and is located in t

NE ¼ SW ¼ NE ¼ of Section 23 Twp. 21 Rge. 23

(B) Drilling Contractor Abbott Brothers License No. Wd-46

Street and Number Box 637

City Hobbs State N. M.

Drilling was commenced June 25 19 65

Drilling was completed July 19 65

Elevation at top of casing in feet above sea level ______ Total depth of well ______

State whether well is shallow or artesian ______ Depth to water upon completion ______

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	195	255	60	Sandy lime
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
7	20	8	0	165	165	none	none	
				~~Cemented at~~	165 and	~~Drilled open~~		
					hole to bottom.			

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
				40	

Section 5 PLUGGING RECORD

Name of Plugging Contractor ______ License No. ______

Street and Number ______ City ______ State ______

Tons of Clay used ______ Tons of Roughage used ______ Type of roughage ______

Plugging method used ______ Date Plugged ______ 19__

Plugging approved by:

______
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received

1965 JUL 21 AM 8:18

File No. RA-5131 Use [illegible] Location No. 21.23.23.232

5A

Revised June

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Marathon Oil Co. Owner's Well No. 1-A

Street or Post Office Address P.O. Box 2409

City and State Hobbs, New Mexico 88240

Well was drilled under Permit No. RA-5131-S and is located in the:

a. NW ¼ NE ¼ SW ¼ NE ¼ of Section 23 Township 21S Range 23E N.M.

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. ____ of the ____ Subdivision, recorded in Eddy County.

d. X= ____ feet, Y= ____ feet, N.M. Coordinate System ____ Z the ____

(B) Drilling Contractor Abbott Bros. License No. WD-46

Address P.O. Box 637, Hobbs, New Mexico 88240

Drilling Began 8/25/75 Completed 8/28/75 Type tools Cable Size of hole 12¼

Elevation of land surface or ____ at well is ____ ft. Total depth of well 292

Completed well is [X] shallow [ ] artesian. Depth to water upon completion of well 180

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
180	292	112	Lime	350.00

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From
10	30	Welded	0	163	163	None	None

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
					Cement at top.

Section 5. PLUGGING RECORD

Plugging Contractor ____

Address ____

Plugging Method ____

Date Well Plugged ____

Plugging approved by:

____ State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad ____ FWL ____ FSL ____

File No. RA-5131-S Use INDUSTRIAL Location No. 21.23.23.23

FE-1

State of New Mexico
State Engineer

(5)

WELL SCHEDULE

Source of data: Obser [X] Owner [ ] Other ____

Date July 7 1965 Record by R.B. Collins, Jr.

LOCATION: County Eddy Map 17.2.2

OWNER Marathon Oil Co.

DRILLER Abbot Bros Completed 7-1 1965

TOPO SITUATION ____ SEO Elev 3810.1

DEPTH 255 ft [X] Rept [ ] Meas Use Dom & Com

CASING 7 in to 165 ft Log drillers

PUMP: Type Submersible Make Rapidayton

Ser.no./model A-30C413 Size of dischg 3/4 in.

PRIME MOVER: Make ____ HP 3

Ser.no. ____ Power/Fuel electricity

PUMP DRIVE: [ ] Gear Head [ ] Belt Head [ ] Pump Jack

Make ____ Ser.no ____ [ ] VHS

WATER LEVEL: 182.15 ft rept/meas 7-19 1965 above/below

of 1½" o.d. [illegible]

____ which is 1.20 ft above/below LS

PERMANENT RP is [illegible]

[illegible]

which is [illegible] ft above/below described MP and 0 ft above/below LS

REMARKS Marathon Gas Plant Well tested 175 gpm

AQUIFER(S): Pyn

Well No. __ on Photo [illegible] DPN [illegible]

File No RA-5131 Loc. No. 21.23.23.29233

Remarks cont. but sucked air at 200 gpm. [illegible] both domestic pressure system and 1000 [illegible] steel storage tank. Water sample [illegible] 7-6-65 tested 10 ppm chloride

Well located 1670 FNL + 1799 FEL.

[illegible]

SKETCH: [illegible]

N

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER Below MP 1st	2nd	3rd	Bel LS
Date 7 19, 1965	200.00			182
Hour __ AM/PM Obs RBC	17.85			1.
Not POA ( ) POA ( )	182.15			180.

W L meas after pump shut off ____ min. Pumping W L

Remarks ____

STATE ENGINEER
Technical Division

Owner [illegible] / Use [illegible]	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date 7 19, 1965	[illegible]		[illegible]	3710
Hour __ AM/PM Obs [illegible]	[illegible]			[illegible]
Not POA ( ) POA ( )				[illegible]

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks ____

Date ____ , 19__				
Hour __ AM/PM Obs __				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks ____

Date ____ , 19__				
Hour __ AM/PM Obs __				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks ____

Date ____ , 19__				
Hour __ AM/PM Obs __				
Not POA ( ) POA ( )				

W L meas after pump shut off ____ min. Pumping W L ( )

Remarks ____

Latitude ____ Longitude ____

File No ____ Location No ____

QUALITY CONTROL SHEET — STATE ENGINEER

DATE	COLLECTOR	P.O.C	REMARKS & USE	RE
6/30/87	D.H.	17	Dom & Com	61 17

Aquifer(s) Pgc D.P.N. 15-06730

File No. RA-5131 Location No. 21.23

Form WR-23

FIELD ENGR. LOG

STATE ENGINEER OFFICE

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WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugg record, only Section 1A and Section 5 need be completed.

Section 1

		x	

(Plat of 640 acres)

(A) Owner of well Betty C. Willis

Street and Number P.O. Box 736

City Carlsbad State New Mexico

Well was drilled under Permit No. ~~27983~~ [illegible] and is located in

¼ NW ¼ NE ¼ of Section 8 Twp. 22 S Rge. 23E.

(B) Drilling Contractor Artesia Drilling Co. License No. W D [illegible]

Street and Number P.O. Box 196

City Artesia State New Mex.

Drilling was commenced June 15, 19[illegible]

Drilling was completed July 17 19[illegible]

Elevation at top of casing in feet above sea level .... Total depth of well 648'

State whether well is shallow or artesian Shallow Depth to water upon completion 628'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	625	648	23	White Lime
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
7"	20#	10			23	None		

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor .... License No. ....

Street and Number .... City .... State ....

Tons of Clay used .... Tons of Roughage used .... Type of roughage ....

Plugging method used .... Date Plugged 19

Plugging approved by:

....
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received STATE ENGINEER OFFICE 1966 SEP 29 AM 8:40 ✓

File No. RA-4242 Use Dom. [illegible] Location No. 22.23.8.[illegible]

FE-1

State of New Mexico
State Engineer

12

WELL SCHEDULE

Source of data: Obser [X] Owner [ ] Other

Date February 4 1948 Record by R.S. Jones USGS

LOCATION: County Eddy Map 117.2.2

OWNER ~~C.D. Fuller~~ H.M. Kincaid

DRILLER Completed April 1933 BK.23 PG.51 SE04111.9

TOPO SITUATION topo Elev 4105

DEPTH 487 ft [ ] Rept [ ] Meas Use Stock

CASING 8 5/8 in to 12 ft Log

PUMP: Type Piston Make

Ser.no./model Size of dischg in.

PRIME MOVER: Make windmill HP

Ser.no. Power/Fuel wind

PUMP DRIVE: [ ] Gear Head [ ] Belt Head [ ] Pump Jack

Make Ser.no [ ] VHS

WATER LEVEL: 473.50 ft rept/meas 2-4 1948 above/below top of 6" x 6" wooden column clamps

which is 1.00 ft above/below LS

PERMANENT RP is

which is ___ ft above/below described MP and ___ ft above/below LS

REMARKS Blowing well 1-5-78 Atkins & Chavez

AQUIFER(S): Pgr

Well No. on Photo none DPN 15-20136

File No Loc. No. 22.23.13.331332

Remarks cont. This well at site labelled on old topo quad 117.2.0 as Mendoza Ranch. Equipment now is Aermotor WM on factory steel tower. Discharge is 3" reduced into 1½" black plastic, running about 45' East into a 5 foot tall x 24 foot diameter steel tank (galvanized). R.P. is 2 foot x 2 foot concrete around casing 0.52' below M.P. and 0.48' above L.S. Newer concrete has been spread to reach all four W.M. tower legs

SKETCH:

N

12-11-80 RLT & HWP found section corner - S.W. corner of section 13 and W ¼ corner of section 13. Well is in section 13 as shown on new topo quad 117.2.2, and not at section 14.444 as original USGS location

Temp 66°

Water sample collected by U.S.G.S. 6-15-54

INITIAL WATER-LEVEL MEASUREMENT	DEPTH TO WATER Below MP 1st	2nd	3rd	Below LS
Date 2 4, 1948				473.50
Hour 1 PM Obs RSJ USGS				1.00
Not POA ( ) POA ( )	473.50			472.50

W L meas after pump shut off ___ min. Pumping W L (

Remarks

STATE ENGINEER
Technical Division

Owner H.M. Kincaid / Use Stock	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date Feb 4, 1948			472.50	4111
Hour 1:10 PM Obs [illegible]			1	[illegible]
Not POA ( ) POA ( )	473.50		[illegible]	[illegible]

W L meas after pump shut off ___ min. Pumping W L ( )

Remarks

	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date Jan 5, 19[illegible]	[illegible]	[illegible]	[illegible]	4112
Hour AM PM Obs JDA EAC	7.12	2.11	1	477
Not POA ( ) POA ( )	[illegible]	[illegible]	[illegible]	[illegible]

W L meas after pump shut off ___ min. Pumping W L ( )

Remarks

	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date Jan 25, 19[illegible]		[illegible]		
Hour 9 K AM PM Obs FET				
Not POA (/) POA ( )				

W L meas after pump shut off ___ min. Pumping W L ( )

Remarks [illegible]

	DEPTH TO WATER Below MP 1st	2nd	Below LSD	WATER LEVEL ELEV
Date Oct 7, 1987		[illegible]		
Hour 4:00 AM PM Obs FET				
Not POA (X) POA ( )				

W L meas after pump shut off ___ min. Pumping W L ( )

Remarks [illegible]

Latitude Longitude

File No Location No

QUALITY CONTROL SHEET — STATE ENGINEER

DATE	COLLECTOR	P.O.C	REMARKS & USE	RESULTS	
6-15-54	USGS				
7/9/87	KO JS	EDP	Stk. WM. 66°	SC 806	CL 17

Aquifer(s) PGR D.P.N 15-20136

File No Location No. 22.23.13.331

FE-1 State of New Mexico State Engineer 13 (13)

WELL SCHEDULE

Source of data: Obser ☐ Owner ☐ Other

Date June 22 1954 Record by W. Mott USGS

LOCATION: County Eddy Map 117.2.2

OWNER

DRILLER Completed 19

TOPO SITUATION Moderate S.E. slope SEO Elev 3779.6

DEPTH ft ☐ Rept ☐ Meas Use Stock

CASING 6 5/8 in to ft Log

PUMP: Type Piston Make

Ser.no./model Size of dischg in.

PRIME MOVER: Make windmill HP

Ser.no. wooden tower Power/Fuel wind

PUMP DRIVE: ☐ Gear Head ☐ Belt Head ☐ Pump Jack

Make Ser.no ☐ VHS

WATER LEVEL: 12.50 ft rept/meas 6-22-1954 above/below top of casing

which is 1.85 ft above/below LS

PERMANENT RP is concrete slab ±1' diam.

which is 1.85 ft above/below described MP and 0.0 ft above/below LS

REMARKS U.S.G.S. location 21.24.19.111 1-11-78 KSO

AQUIFER(S): Qal

Well No. on Photo none DPN 15-20023

File No Loc. No. 21.23.24.22221

Remarks cont. 1-5-AC. Whole mill very abandoned. Bad David Bradley W.M. in place on wooden tower. Badly rusted 8 foot tall x 8 foot diameter steel tank 5 feet north of well. Well is located 350 feet S 50° W of 1966 section corner brass cap T 21S R24E

SKETCH:

N

INITIAL WATER-LEVEL MEASUREMENT	Below MP 1st	Below MP 2nd	Below MP 3rd	Below LS
Date 6 22, 1954				12.
Hour AM/PM Obs WM				1.
Not POA ( ) POA ( )	12.50			10.

W L meas after pump shut off min. Pumping W L

Remarks

STATE ENGINEER
Technical Division

Owner

Use Abnd Stock

	Below MP 1st	Below MP 2nd	Below LSD	WATER LEVEL ELEV
Date 6 22, 1954			[illegible]	[illegible]
Hour AM/PM Obs WM			[illegible]	[illegible]
Not POA ( ) POA ( )	[illegible]		[illegible]	[illegible]

W L meas after pump shut off min. Pumping W L ( )

Remarks

Date 10 12, 19[illegible]			[illegible]	[illegible]
Hour AM/PM Obs [illegible]			[illegible]	
Not POA ( ) POA ( )	[illegible]		[illegible]	[illegible]

W L meas after pump shut off min. Pumping W L ( )

Remarks

Date 1 11, 1978	[illegible]	[illegible]	[illegible]	[illegible]
Hour 4:10 AM/PM Obs KO/SIF	[illegible]	[illegible]	[illegible]	
Not POA (X) POA ( )	[illegible]	[illegible]	[illegible]	[illegible]

W L meas after pump shut off min. Pumping W L ( )

Remarks

Date [illegible] [illegible], 19[illegible]	[illegible]	[illegible]	[illegible]	
Hour [illegible] AM/PM Obs [illegible]	[illegible]	[illegible]	1.8[illegible]	
Not POA (X) POA ( )	21.1[illegible]	21.1[illegible]	[illegible]	[illegible]

W L meas after pump shut off min. Pumping W L ( )

Remarks

Latitude Longitude 15-20[illegible]

File No Location No [illegible]

STATE ENGINEER
Technical Division

Owner

Use Abandoned Stock

	Below MP 1st	Below MP 2nd	Below LSD
Date Jan 11, 1983	35.00	36.00	32.42
Hour 11:15 AM Obs KD	2.58	3.57	1.85
Not POA (X) POA ( )	32.42	32.43	30.57

W L meas after pump shut off min. Pumping W

Remarks

Date [illegible] [illegible], 19[illegible]	[illegible]	[illegible]	[illegible]
Hour [illegible] AM/PM Obs [illegible]	[illegible]	[illegible]	1.85
Not POA (X) POA ( )	17.50	17.50	15.6[illegible]

W L meas after pump shut off min. Pumping W

Remarks

Date , 19			
Hour AM/PM Obs			
Not POA ( ) POA ( )			

W L meas after pump shut off min. Pumping W

Remarks

Date , 19			
Hour AM/PM Obs			
Not POA ( ) POA ( )			

W L meas after pump shut off min. Pumping W

Remarks

Latitude Longitude 15-2002[illegible]

File No Location No 21.23.24.22[illegible]

Form WR-23

STATE ENGINEER OFFICE (14) 14

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Hugh Kincaid

Street and Number Queen Route

City Carlsbad State N.Mex.

Well was drilled under Permit No. ____ and is located in the

____ ¼ ____ ¼ ____ ¼ of Section 19 Twp. 22S Rge. 24E

(B) Drilling Contractor A.H. Moreland License No. WD-II

Street and Number 524 Standpipe Road

City Carlsbad State N. Mex.

Drilling was commenced January 2 19 58

Drilling was completed April 7 19 58

Elevation at top of casing in feet above sea level ____ Total depth of well 345

State whether well is shallow or artesian shallow Depth to water upon completion ____

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	210	214	4	Blue Shale
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor ____ License No. ____

Street and Number ____ City ____ State ____

Tons of Clay used ____ Tons of Roughage used ____ Type of roughage ____

Plugging method used ____ Date Plugged ____ 19__

Plugging approved by:

____
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received FILED MAY 20 1958 OFFICE GROUND WATER SUPERVISOR

File No. Mis Use Stock Location No. 22.24.19.22

Form WR-23

STATE ENGINEER OFFICE 15 (15)

FIELD ENGR. LOG

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completel accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plu record, only Section 1A and Section 5 need be completed.

Section 1

		X	

(Plat of 640 acres)

(A) Owner of well Betty C. Willis

Street and Number P.O. Box 786

City Carlsbad State New Mexi

Well was drilled under Permit No. 28215 5 256 and is located

¼ NW ¼ NE ¼ of Section 20 Twp. 22S Rg. 2

(B) Drilling Contractor Artesia Drilling Co. License No. WD

Street and Number P.O. Box 196

City Artesia State New Mex

Drilling was commenced ~~July 20th~~ 19

Drilling was completed September 9th 19

Elevation at top of casing in feet above sea level Total depth of well 541'

State whether well is shallow or artesian Shallow Depth to water upon completion 528

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	538	541	3	White Lime
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
~~7"~~	~~20#~~	~~10~~			24	None		

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

STATE ENGINEER OFFICE

Date Received 1966 SEP 29 AM 8:40

File No. RA-5256 Use [illegible] Location No. 22.23.20.

APPENDIX D

SPCC PLAN

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

PART I
GENERAL INFORMATION

1. Name of facility Indian Basin Gas Field
2. Type of facility Onshore Production Facility
3. Location of facility Eddy County, New Mexico, approximately 20 miles W-NW of Carlsbad, New Mexico
4. Name and address of owner or operator:

   Name Marathon Oil Company

   Address P. O. Box 552
   Midland, Texas 79702

5. Designated person accountable for oil spill prevention at facility:

   Name and title S. D. York, Plant Superintendent

6. Facility experienced a reportable oil spill event during the twelve months prior to Jan. 10, 1974 (effective date of 40 CFR, Part 112). (If YES, complete Attachment #1.) No

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

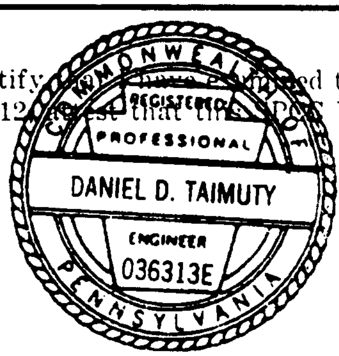
Signature

Name John F. Strong

Title Production Manager

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.



(Seal)

Daniel D. Taimuty
Printed Name of Registered Professional Engineer

Signature of Registered Professional Engineer

Date July 28, 1988

Registration No. PE-036313-E State PA

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment
2 Condensate Storage Tanks	Leaks Tank Rupture	3400		S	No*

Discussion:

Marathon Oil Company has not experienced a spill event at these facilities during the entire time the field and gas plant have been in production.

*Currently in use are two horizontal vessels (old natural gasoline storage tanks) for condensate storage. These vessels do not have containment dikes.

*Attach map if appropriate.

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

Responses to statements should be: YES, NO, or NA (Not Applicable).

8. Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable. (If NO, complete Attachment #2.) Yes

9. Inspections and Records
   A. The required inspections follow written procedures. Yes
   B. The written procedures and a record of inspections, signed by the appropriate supervisor or inspector, are attached. Yes

   Discussion: The Corporate Risk Division of Marathon Oil Company makes an annual inspection of these facilities. Records are available at plant office.

   Daily visual inspection is made by operating personnel.

   Semi-annual inspection is conducted by the plant superintendent.

   In May, 1988, a new policy was implemented. A Mid-Continent Region spill report (see attached form) is to be completed by any employee following his/her knowledge of a spill into the environment as soon as practical after the spill has been investigated and the source and affected area secured. Such records serve to show the physical integrity of Marathon's operations. (CONTINUED BELOW)

10. **Personnel Training and Spill Prevention Procedures**
   A. Personnel are properly instructed in the following:
   (1) operation and maintenance of equipment to prevent oil discharges, and Yes
   (2) applicable pollution control laws, rules, and regulations. Yes

   Describe procedures employed for instruction: Instructions are narrative. Environmental Control and Site Security are discussed at safety meetings. Safety meetings are held on a semi-annual basis. Potential spill situations are reported immediately to the foreman and also reported by the safety committee on a monthly basis. Such situations are corrected.

   B. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. Yes

   Describe briefing program: Operation Management frequently reviews environmental standards at safety meetings. Such reviews assure an adequate understanding of SPCC. Operating superintendents are periodically requested to update Contingency Plans. Superintendents thereby assess and revise procedures when necessary.

   CONTINUED FROM ABOVE: Site security and loss prevention surveys also serve the inspection requirements of SPCC. Maintenance needs are expressed periodically at safety meetings. The minutes from safety meetings also serve to document Marathon's efforts in SPCC. Through the years, it was not considered practical to attach records to the plan.

Name of facility: Indian Basin Gas Plant and Field Producing Facilities

Operator: Marathon Oil Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

A. **Facility Drainage**

1. Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc. *(Note: Flapper-type valves should not be used)*:

By plant operators.

There are no drains in the dikes. Removal of oil within the dike is accomplished by a vacuum truck. It has not been necessary to remove any such oil in the history of the plant.

2. Drainage from undiked areas is controlled as follows (include description of ponds, lagoons, or catchment basins and methods of retaining and returning oil to facility):

~~(Attachment #2 applies.)~~

3. The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3):

Plant personnel visually inspects fluids.

Record of such drainage is maintained on Attachment #3.

There are no drains in the dikes. It has not been necessary to remove rain water in the history of the plant.

In any case, personnel are instructed not to dispose of such water into a storm drain or open water cause.

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

PART II. ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or NA (Not Applicable).]

B. **Bulk Storage Tanks**

1. Describe tank design, materials of construction, fail-safe engineering features, and if needed, corrosion protection: (Atmospheric tanks.) The storage tanks are API design, welded steel. The storage tanks are storing the product (stabilized condensate) under atmospheric conditions.

2. Describe secondary containment design, construction materials, and volume: ~~Earthen dike around condensate storage tanks. Volume sufficient to hold total storage - 6000 bbl.~~

3. Describe tank inspection methods, procedures, and record keeping: Marathon Oil Company Corporate Risk Division conducts an annual survey visually.

   Operating personnel visually inspect these tanks during each shift. Operating personnel gauge tanks at 7:00AM each morning: Office personnel calculate daily production.

4. Internal heating coil leakage is controlled by one or more of the following control factors: NA
   (a) Monitoring the steam return or exhaust lines for oil.
   Describe monitoring procedure:

   (b) Passing the steam return or exhaust lines through a settling tank, skimmer, or other separation system. NA
   (c) Installing external heating systems. NA

5. Disposal facilities for plant effluents discharged into navigable waters are observed frequently for indication of possible upsets which may cause an oil spill event.
   Describe method and frequency of observations: Continuous blow-down from the cooling tower and condensed steam blow-down from all boilers are commingled and injected with Indian Basin Field produced waters. The blow-down from the cooling tower and the condensed steam are treated in a separate holding tank to assure compatibility with produced waters before injection.

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or NA (Not Applicable).]

C. **Facility Transfer Operations, Pumping, and In-plant Process**

1. Corrosion protection for buried pipelines:
   (a) Pipelines are wrapped and coated to reduce corrosion. Yes
   (b) Cathodic protection is provided for pipelines if determined necessary by electrolytic testing. Yes
   (c) When a pipeline section is exposed, it is examined and corrective action taken as necessary. Yes

2. Pipeline terminal connections are capped or blank-flanged and marked if the pipeline is not in service or on standby service for extended periods. Yes
   Describe criteria for determining when to cap or blank-flange: Continuous plant operation.

3. Pipe supports are designed to minimize abrasion and corrosion and allow for expansion and contraction. Yes
   Describe pipe support design: Steel stanchion.
   Wear plate protection at points of wear and contact.

4. Describe procedures for regularly examining all above-ground valves and pipelines (including flange joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces): Annual Corporate Risk Division inspection.
   Nondestructive testing when warranted.
   Visual observation by plant oeprator while on duty.
   Periodic site security inspections.

5. Describe procedures for warning vehicles entering the facility to avoid damaging aboveground piping: Signs and traffic barrier guards where needed.

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[*Response to statements should be: YES, NO, or NA (Not Applicable).*]

D. **Facility Tank Car & Tank Truck Loading/Unloading Rack**

Tank car and tank truck loading/unloading occurs at the facility. (If YES, complete 1 through 5 below.) Yes

1. Loading/unloading procedures meet the minimum requirements and regulations of the Department of Transportation. Yes

2. The unloading area has a quick drainage system. No

3. The containment system will hold the maximum capacity of any single compartment of a tank truck loaded/unloaded in the plant. ______
   Describe containment system design, construction materials, and volume: Waterways not vulnerable to such a spill in this remote area.

4. An interlocked warning light, a physical barrier system, or warning signs are provided in loading/unloading areas to prevent vehicular departure before disconnect of transfer lines. No
   Describe methods, procedures, and/or equipment used to prevent premature vehicular departure: Company supervised loading or unloading, on condensate. The truck must be grounded prior to the actual loading of the truck. The groundwire on the truck is necessary to active the electric signal to the transfer pump. The circuit breaker must be unlocked by company personnel prior to any movement of the condensate. Delivery tickets are made for each truck shipment.

5. Drains and outlets on tank trucks and tank cars are checked for leakage before loading/unloading or departure. Yes

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or NA (Not Applicable).]

E. **Security**

1. Plants handling, processing, or storing oil are fenced. No
2. Entrance gates are locked and/or guarded when the plant is unattended or not in production. NA
3. Any valves which permit direct outward flow of a tank's contents are locked closed when in non-operating or standby status. Yes
4. Starter controls on all oil pumps in non-operating or standby status are:
   (a) locked in the off position; Yes
   (b) located at site accessible only to authorized personnel. Yes
5. Discussion of items 1 through 4 as appropriate:
   Gas plant is attended 24 hours per day each day of the year.
6. Discussion of the lighting around the facility:
   Flood lighting and localized area lighting approved by Marathon Oil Company's Corporate Risk Division.

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

(Prior to completing Part II, Alternate B, refer to regulations and instructions page 7.)

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

A. Facility Drainage

1. Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc.): No field storage.

2. The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3): NA

3. Field drainage ditches, road ditches, and oil traps, sumps, or skimmers, if such exist, are inspected at regularly scheduled intervals for accumulations of oil. Yes
   Describe inspection procedures, intervals, and methods employed to remove oil: Daily by the responsible pumper. Semi-annual traverse of all field gathering lines and field facilities by the plant superintendent or his representative. In the instance of a leak disturbed area, are appropriately groomed.

B. Bulk Storage Tanks

1. Describe tank design, materials of construction, and fail-safe engineering features: No field storage.

Name of facility: Indian Basin Gas Plant and Field Producing Facilities

Operator: Marathon Oil Company

PART II. ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

2. Describe secondary containment design, construction materials, and volume: NA

3. Describe tank examination methods and procedures: No field storage tanks.

C. **Facility Transfer Operations**

1. Describe scheduled basis for examinations of above-ground valves and pipelines and salt water disposal facilities: An annual visual inspection is made by the foreman or other supervisory personnel. Daily inspections are conducted by the pumper. Such inspections are inherent to Marathon's site security.

2. Describe flowline maintenance program to prevent spills: Pipe sleeves or clamps are used to repair leaks. When conditions warrant, new pipe is installed.

D. **Oil Drilling and Workover Facilities**

1. A blowout preventer (BOP) assembly and well control system is installed before drilling below any casing string and, as required during workover operations. Yes
2. The BOP assembly is capable of controlling any expected wellhead pressure. Yes
3. Casing and BOP installations conform to state regulations. Yes

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

SPCC PLAN, ATTACHMENT #.
OIL SPILL CONTINGENCY PLANS AND
WRITTEN COMMITMENT OF MANPOWER, EQUIPMENT, AND MATERIALS

Secondary containment or diversionary structures are impracticable for this facility for the following reasons (attach additional pages if necessary):

Due to the areal extent of the field and limited hydrocarbons present in the process units and gathering lines, full secondary containment is considered impracticable.

Yes

A strong oil spill contingency plan is attached. Yes

A written commitment of manpower, equipment, and materials is attached. Yes

Name of facility Indian Basin Gas Plant and Field Producing Facilities

Operator Marathon Oil Company

OIL SPILL CONTINGENCY PLAN

In the case of an oil spill from a producing well, a testing vessel, a tank, flowline or any other related oil field equipment, the following action will be implemented to protect human life and regain control of the spill as rapidly as possible. All steps should be carefully considered, to ensure control of the spill is effectively and efficiently regained.

1) Shut off the source contributing to the spill. Analyze the type of spill and determine the most appropriate immediate action to be taken to contain the spill.

2) If the spill contains hydrocarbons, collect lighters and matches from personnel working in the area.

3) Obtain labor and equipment to construct a containment barrier as rapidly as possible. (See the attached directory.)

4) As required have vacuum truck(s) pick up pooled or contained liquids.

5) As necessary the use of absorbent material (straw, dirt, lost circulation material, commercial sorbents, etc) should be utilized to remove standing volume which cannot be efficiently removed by a vacuum truck.

6) Restrict access to the affected area to only those persons involved in control, containment, and clean-up operations.

7) Notify the company representative in charge of the facility of the spill and action being taken who will in turn notify his respective supervisor.

8) As required, the Production Foreman will notify the regulatory agency of the spill.

9) Keep livestock from affected area and if necessary, as appropriate notify the landowner and other surface users of the situation.

10) The person in charge of the spill response activities shall keep a daily log of response activities. The log book shall be bound, not loose leaf. Entries shall be dated, timed and signed.

11) The Duty Officer at the National Response Center must be notified immediately when a spill reaches "waters of the U.S.," or it appears likely that the spill will reach "waters of the U.S."

Mid-Cor.. ənt Region
Production United States

Marathon Oil Company

P.O. Box 552
'lidland, Texas 79702
:lephone 915/682-1626

SPCC PLAN

COMMITMENT OF MANPOWER, EQUIPMENT AND MATERIALS

TO: OPERATIONS SUPERVISORS

THIS IS YOUR AUTHORITY TO EXPEDITIOUSLY COMMIT MANPOWER, EQUIPMENT AND MATERIALS NECESSARY TO ARREST AND CONTAIN AND INITIATE CLEANUP OF ANY HARMFUL QUANTITY OF OIL OR HAZARDOUS MATERIAL DISCHARGED FROM THIS FACILITY. THIS AUTHORITY MAY BE DELEGATED BY YOURSELVES TO THE PERSON IN CHARGE OF THE FACILITY TO ENSURE THAT NECESSARY ACTIVITIES ARE IMPLEMENTED AS QUICKLY AS POSSIBLE AFTER A SPILL IS NOTED.

J. F. Strong
Production Manager

JFS/elk

7/13/88

Mid-Con. .nt Region
Production United States

Marathon Oil Company

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

SPCC PLAN INSPECTION PROCEDURES

INDIAN BASIN FIELD
EDDY COUNTY, NEW MEXICO

1. As part of his normal routine, the pumper(s) will visually inspect the field's production facilities for accumulations, leaks of oil or other hazardous substances. The pumper must perform the inspection at least once a week.

2. The production facilities to be inspected will include but are not limited to wellheads, flowlines, valves, tanks, vessels, miscellaneous fittings (flanges, etc.), sumps and ditches.

3. In the event that an accumulation or leak is discovered, the pumper shall initiate the actions detailed in the current SPCC Plan.

4. The pumper shall record his weekly inspection on the attached Site Security Inspection Form.

W. D. Holmes

W. D. Holmes
Operations Superintendent

LIST OF EMERGENCY EQUIPMENT AND SERVICES

Field Atoka Penn, Indian Basin, Revelation, North Shugart

SPILLS

Equipment and Services Available to Contain and Cleanup Spills on Land, Rivers, Creeks, and/or Coastal Bays

Available Equipment/Service	Source or Organization	Location	Telephone N
Cleanup Service	Stevenson Roack Tank Co.	Artesia, NM	505-746-322
Earth Moving	Sweat Constr. Co.	Loco Hills, NM	505-677-351
	Berry Constr. Co.	Artesia, NM	505-746-34
	Globe Construction Co.	Hobbs, NM	505-392-65
Fire Control	Carlsbad Fire Department	Carlsbad, NM	505-885-31
	Artesia Fire Department	Artesia, NM	505-746-27
Oil Field Haulers	B. F. Walker	Hobbs, NM	505-392-55
	W. M. Walker	Hobbs, NM	505-397-24
Portable Tanks	Hardin-Houston	Hobbs, NM	505-393-50
	Diamond Rental, Inc.	Hobbs, NM	505-392-64
Vacuum Trucks	I & W Service	Lovington, NM	505-677-21

COMPANY PERSONNEL NOTIFICATION LIST

Indian Basin Gas Plant - (505) 457-2621		Home Telephone
York, Stephen D.	Plant Superintendent	(505) 746-3374
Berghorn, Matthew T.	Plant Engineer	(505) 746-2161
Hodges, Joe E.	Gang Pusher	(505) 746-9447
Barnett, Jimmy B.	Operator	(505) 746-2818
Moreno, Manuel S.	Roustabout	(505) 748-2175
Waldrip, Bruce W.	Operator	(505) 457-2252
Canada, Donald R.	Field Operator	(505) 748-1060
Case, Anthony W.	Operator	(505) 746-4014
Garrett, Kenton R.	Electrician	(505) 748-2932
Klein, Timothy P.	Mechanic	(505) 484-3675
Manthei, Don W.	Welder	(505) 457-2213
Rouse, David B.	Operator	(505) 746-2619
Winters, Timonthy L.	Field Operator	(505) 746-4662
Davis, Larry D.	Operator Helper	(505) 748-3752
Bowen, Patrick N.	Operator Helper	(505) 748-3570
Ivy, Jack L.	Operator Helper	(505) 746-9078
Rauch, Jack P.	Operator Helper	(505) 748-3121
Kucel, Joel D.	Roustabout	(505) 748-9050
London, Steve A.	Instrument Repairman	(505) 885-6843
Wilson, James E.	Tester	(505) 746-6481
Harrison, Jerry J.	Field Operator	(505) 365-2962
Miller, Ginger J.	Clerk	(505) 746-9711

Midland, Texas - (915) 682-1626		
Gordy, Craig W.	E/S Supervisor	(915) 687-6051
Holmes, William D.	Operations Supt.	(915) 687-6305
Snyder, William O.	Region Manager Midland Operations	(915) 689-9911

SITE SECURITY INSPECTION

(To be completed by pumper or site supervisor on a weekly basis.)

Date	Location	Inspection Results	Corrective Actions

Code

1.) Thief hatches not secured
2.) Sell line/valve on tank not secured
3.) LACT Unit not secured
4.) Heater treater not secured
5.) Header not secured
6.) Fencing not adequate
7.) Possible electrical hazard
8.) Possible hazard, other
9.) Signs/I.D. not adequate
10.) Oil spill
11.) Other
12.) No deficiencies found
13.) Does not conform to SPCC Plan or Spill Prevention measures.

11/83

MARATHON OIL COMPANY - MID-CONTINENT REGION

SPILL REPORT

This form is to be completed for any spill (regardless of size) of any oilfield liquid onto the surface of the ground.

NOTE: Completion of this form does not eliminate the need to verbally report all discharges to your supervisor as soon as practicable after the source has been stopped and containment/cleanup operations have been mobilized as appropriate.

SPILL DATE MO DA YR	EST. SPILL TIME	AM PM	ESTIMATED SPILL VOLUME	TYPE OF FLUID SPILLED	VOLUME RECOVERED

LOCATION OF SPILL (State, County, Field, Lease, Well or Rig): ____________________

____

CAUSE OF SPILL: ____________________

____

____

Did the spill occur on location within a company made containment or drainage catchment area? __ Yes __ No If you checked "Yes" to the proceding question, provided such system adequately contained the spill, it is not necessary to complete the remainder of this form. Simply sign and date the report and forward to your supervisor.

DESCRIPTION OF SPILL AREA (Including proximity to watercourse): ____________________

____

ACTION TAKEN TO CONTAIN OR CLEANUP SPILL: ____________________

____

____

SURFACE: Sandy __ Sandy Loam __ Clay __ Rocky __ Wet __ Dry __ Snow __
Cultivated __ Grazing __ Vacant __ Rural __ Residential __

APPARENT DAMAGE TO ENVIRONMENT AND PROPERTY: ____________________

____

PROPERTY OWNER NOTIFIED: Yes __ No __ Date: ________ By: ____________________

Name of Property Owner: ____________________

HOW WAS SPILL FIRST NOTED: ____________________

____

Person Initiating Report/Date | Supervisor Review/Date | Supervisor Review/Date

The back of this form to be completed by Superintendent and/or Environmental Dept., as applicable.

LOCATION OF SPILL (State, County, Field, Lease, Well or Rig): ______________________

____

DATE OF SPILL: ______________

NOTIFICATION OF REGULATORY AGENCIES:

A. Agency ______________ Telephone No. ________ Time ______
Date ______________ Person Contacted ______________
Comments ______________________________

B. Agency ______________ Telephone No. ________ Time ______
Date ______________ Person Contacted ______________
Comments ______________________________

C. Agency ______________ Telephone No. ________ Time ______
Date ______________ Person Contacted ______________
Comments ______________________________

PERSON MAKING CONTACT WITH AGENCIES: ______________

DISTRIBUTION -

ORIGINAL COPY: Environmental and Safety Dept.

OTHER COPIES: ______________
(To Be Completed by ______________
Supt.) ______________

SUPERINTENDENT COMPLETING THIS SECTION: ______________

IF CORPORATE OFFICE NOTIFIED:

Person Contacted: ______________ Time ________ Date ______

Person Filing Report: ______________ ______________ ______
Print Name Signature Date

FORM: MCR - 4/27/88

APPENDIX E

OCD Notification Report

and

BLM Notification Report

Mid-Continent Region
Production United States

Marathon Oil Company

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

April 22, 1991

Mr. M. B. Williams
Supervisor and Oil & Gas Inspector
New Mexico Oil Conservation Division
811 S. First Street
P. O. Drawer DD
Artesia, New Mexico 88210

Dear Mr. Williams:

In accordance with the applicable Rules and Regulations, the New Mexico Oil Conservation Division (NMOCD) was notified at 11:12 a.m. (MST) on April 12, 1991, of the discovery of a potential leak in a subsurface liquid gathering line which occurred directly south of the Marathon-operated Indian Basin Gas Plant.

Attached is a completed NMOCD report entitled "Notification Of Fire, Breaks, Spills, Leaks, and Blowouts". This completed written report is intended to fulfil the subsequent notification requirements as specified in Rule 116.

Should you have any questions, please direct your inquiries to me at the number indicated on the letterhead.

Sincerely,

R. F. Unger

R. F. Unger
Production Manager
Midland Operations

RFU/101/jmh

Attachment

OIL CONSERVATION DIVISION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	MARATHON OIL COMPANY	ADDRESS	P. O. BOX 552, MIDLAND, TX 79702

REPORT OF	FIRE	BREAK	SPILL	LEAK	BLOWOUT	OTHER*
				XX		

TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY	OTHER*
				XX			

NAME OF FACILITY: INDIAN BASIN GAS PLANT - GATHERING SYSTEM

LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	SEC.	TWP.	RGE.	COUNTY
NW/4 SE/4	23	21S	23E	EDDY

DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK: APPROXIMATELY 25 MILES NW OF CARLSBAD

DATE AND HOUR OF OCCURENCE	ESTIMATED TO HAVE COMMENCED 11/90	DATE AND HOUR OF DISCOVERY	4/12/91 @ 10:30 A.M.

WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED	IF YES, TO WHOM
	XX			MIKE WILLIAMS; ARTESIA, NM

BY WHOM	STEVE YORK, GAS PLANT SUPERINTENDENT	DATE AND HOUR	4/12/91 @ 11:12 A.M.

TYPE OF FLUID LOST	CONDENSATE AND PRODUCED WATER	QUANTITY OF LOSS	SEE ATTACHMENT	VOLUME RECOVERED	SEE ATTACHME

DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO	QUANTITY
			SEE BELOW

IF YES, DESCRIBE FULLY**

THE LEAK OCCURRED UNDER A DRY ARROYO THAT QUALIFIES AS A WATERCOURSE. THE ARROYO IS PRESENTLY DRY AND IT IS BELIEVED IT HAS NOT FLOWED WATER IN THIS AREA IN 5 YEARS.

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

SEE ATTACHMENT

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

SEE ATTACHMENT

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER*
		XX		OILFIELD

SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW
				XX		XX	

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

AT PRESENT VERY DRY AND WINDY

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED R. F. Unger R. F. UNGER TITLE PRODUCTION MANAGER, MIDLAND OPERATIONS DATE 4-22-91

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

ATTACHMENT

QUANTITY OF LOSS:

Up to 35,000 barrels of condensate and 20,000 barrels of produced water.

VOLUME RECOVERED:

As of 4-21-91, 307 barrels condensate and 207 barrels water.

CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN:

The cause of the leak was determined to be a hole in a subsurface gathering line. Within one hour of discovery, Indian Basin Field employees had initiated shutting in the 23 wells supplying this gathering line and appropriate regulatory notifications (New Mexico Oil Conservation Division, Bureau of Land Management, and the National Response Center) were completed.

Once the shutting-in of the wells was complete, efforts were focused on relieving the residual pressure in the line. Subsequently, work was directed to physically isolating the section of pipeline containing the leak from the rest of the system. This work was complete within 28½ hours after the discovery of the first evidence of a leak.

Following positive isolation of this section of the pipeline, work was directed toward removing any residual fluid in the line. This was accomplished by flushing the line with water introduced at one end and recovering the fluids at the opposite end of this section of the pipeline that had been isolated from the remainder of the gathering system. This work was completed within 44½ hours after the discovery of the first evidence of a leak.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN:

Since the leak in the line occurred subsurface, the affected area is not readily apparent. However, work has been undertaken to define the extent of the subsurface affected area. This work has already defined the primary extent of the affected area in three directions and is presently focussing on the eastern boundary. Of utmost importance in the cleanup efforts is the recovery of free liquids. Efforts in this regard were initiated within 5½ hours after discovery of the first evidence of the leak and have since been ongoing. The operation to recover free liquids has continued to expand as the extent of the affected area is defined. Efforts in this regard will be directed to maximize free liquid recovery. As of April 21, 11 recovery and monitoring wells were in place, with a total of approximately 514 barrels of fluid recovered. Recovery operations, as well as further characterization of the affected area are ongoing.

RFU/100/jmh

Mid-Continent Region
Production United States

Marathon Oil Company

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

April 22, 1991

United States Department of the Interior
Bureau of Land Management
P. O. Box 1778
1011 East Mermod
Carlsbad, New Mexico 88221-1778

Attn: District Engineer

Re: Interim Report
Indian Basin Field Incident

Dear Sir:

In accordance with NTL 3A, the Bureau of Land Management (BLM) was notified at 11:17 a.m. (MST) on April 12, 1991 of the discovery of a potential leak in a subsurface liquid gathering line which occurred directly south of the Marathon-operated Indian Basin Gas Plant. On April 15, 1991, a BLM Representative (Ms. Nancy Queen) arrived on site and reviewed the area of the leak. The following is an interim written report pursuant to the requirements of NTL 3A and provides the appropriate information as requested.

A. The date and time of the occurrence, and the date and time reported to USGS (now BLM).
Response: Discovery of the actual site of the leak occurred at approximately 10:30 a.m. (MST) on April 12, 1991. The BLM office in Carlsbad was notified at 11:17 a.m. (MST) on April 12, 1991. Further investigation tends to indicate that the leak began during November, 1990.

B. The location where the incident occurred, including surface ownership and lease number.
Response: The location of the leak is subsurface in a dry wash named Rocky Arroyo. The location is described as NW/4 SE/4 Sec. 23, T21S, R23E, Eddy County, New Mexico.

C. The specific nature and cause of the incident.
Response: The cause of the leak was determined to be a hole in a water and condensate gathering line. The line at the point of the leak runs approximately 5 feet subsurface through Rocky Arroyo.

D. A description of the resultant damage.
<u>Response</u>: Since the leak in the line occurred subsurface, the affected area is not readily apparent. However, work is underway to define the extent of the affected area in three directions and is presently focussing on the fourth, the eastern boundary.

E. The action taken and the length of time required for control of the incident, for containing the discharged fluids, and for subsequent cleanup.
<u>Response</u>: Within approximately one hour of discovery, Indian Basin Field employees had initiated shutting in the 23 wells supplying this gathering line and appropriate regulatory notifications (Bureau of Land Management, New Mexico Oil Conservation Division, and the National Response Center) were completed.

Once all the wells were shut in, approximately 3½ hours after the initial discovery of the leak, efforts were focussed on relieving the residual pressure in the line. Subsequently, work was directed to physically isolating the section of pipeline containing the leak from the rest of the gathering system. This work was complete within 28½ hours after the discovery of the first evidence of a leak.

Following positive isolation of this section of the pipeline, work was directed toward removing any residual fluid in the line. This was accomplished by flushing the line with water introduced at one end and recovering the fluids at the opposite end of this section of the pipeline that had been isolated from the remainder of the gathering system. This work was completed within 44½ hours after the discovery of the first evidence of a leak.

Of utmost importance in the cleanup efforts is the recovery of free liquids. Efforts in this regard were initiated within 5½ hours after discovery of the first evidence of the leak and have since been ongoing. The operation to recovery free liquids has continued to expand as the extent of the area is defined. Efforts in this regard will be directed to maximize free liquid recovery. As of April 21, 11 recovery and monitoring wells were in place, with a total of approximately 514 barrels of fluid recovered. Recovery operations, as well as further characterization of the affected area are ongoing.

F. The estimated volumes discharged and the volumes lost.
<u>Response</u>: The estimated volume discharged is up to 35,000 barrels of condensate and 20,000 barrels of produced water. As of April 21, 1991, 307 barrels of condensate and 207 barrels of water had been recovered, with recovery operations continuing.

G. The cause of death when fatal injuries are involved.
Response: No fatalities or injuries resulted from this release.

H. Actions that have been or will be taken to prevent a recurrence of the incident.
Response: Existing systems and operating procedures are currently under review. Improvements will be made, as necessary, to prevent a recurrence of this type of incident.

I. Other Federal or State agencies notified of the incident.
Response: On April 12, 1991, the New Mexico Oil Conservation Division was notified at approximately 11:12 a.m. (MST), the New Mexico Air Quality Board was notified at 4:50 p.m. (MST), and the National Response Center was notified at 11:22 a.m. (MST) of the leak.

J. Other pertinent comments or additional information requested by the District Engineer.
Response: Requested information was provided to the BLM Representative viewing the site on April 15, 1991.

Should you have any questions, please direct your inquiries to me at the number indicated on the letterhead. Additional interim reports will be forthcoming as appropriate.

Sincerely,

R. F. Unger

R. F. Unger
Production Manager
Midland Operations

RFU/099/jmh

APPENDIX G

Soil Boring Logs

BORING RECORD

GEOLOGIC UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start 16:11 Stop 16:3[illegible] B.L. Elev.								BACKGROUND HNU READING SOIL: 0.1 AIR: 0.2
	0	[illegible] Cobbly sand, [illegible] [illegible], Cobbles and boulders from 10 cm to 3 cm [illegible]	GW			NS		NS	2.5	5.0 ppm
						1	0.1		3.5	
						NR	NR		4.0	1.4 ppm
	5.0 5.1	[illegible], dry. [illegible] 10 yr 7/2 to pale brown 5 yr 5/[illegible]				2	0.1		5.1	
						NR	NR		5.5	
		Boring terminated at 5.[illegible] [illegible] Not [illegible] Boring [illegible] HNU Reading: 4.5 ppm NR No Recovery NS Not Sampled [illegible] [illegible]								

	CME CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)
	STANDARD PENETRATION TEST	L	LABORATORY TEST LOCATION
	UNDISTURBED SAMPLE	+	PENETROMETER, (TONS / FT.^{2})
	WATER TABLE (24 HOURS)		

JOB NAME / NUMBER: [illegible]

BORING NUMBER: BH-1

DATE DRILLED: 04-15-91

DRILLING METHOD: HSA

DRILLED BY: SHB

LOGGED BY: TUL

CHECKED BY: B[illegible]

ROBERTS-SCHORNICK & ASSOCIATES, INC.

Environmental Consultants

[illegible]

PAGE

[illegible] Boring [illegible]

4.6
1.63
2.37

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM = 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	SAMPLE HNU READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS
		Start 10 00 Stop: 10 25 G L Elev								BACKGROUND HNU READING: SOIL: 0.1 PPM AIR: 0.2 PPM
	0	Alluvium - Bouldery-cobbley. Gravelly silt, nonindurated, unconsolidated, boulders + cobbles from 10 cm - 3 m, Rounded well, [illegible] [illegible] and [illegible]	GW			NS			0 2.5	
	3.0				•	1	1.0	X	3.7	
		Auger refusal at 3.0' g indurated. not Observed NR No Recovery NS Not Sampled Sand vent at 2.37' Borehole HNU Reading: 0.3 ppm Background: 0.3 ppm Soil Vent HNU Reading after 24 Hrs.: 0.1 ppm								

CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)	JOB NAME/ NUMBER Marathon/91029
WATER TABLE (24 HOURS)		BH-2

DATE DRILLED 4-19-91
DRILLING METHOD HSA
DRILLED BY SHB
MJL
[illegible]

ROBERTS/SCHORNICK & ASSOCIATES, INC.

Rocky Canyon
BH-1

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x 1 (2 4 6 8 10 12 14 16 18)
		Start. 19:45 : Stop. 16:19			
		G.L. Elev.			
	0	Alluvium - Gravelly Cobbles, Silts, [illegible] [illegible] [illegible], Cobbles and boulders from 10 cm to 3 cm, rounded, dolomitized, dry, Grayish brown 10YR 5/2,	GW		
	50				
	100				
	12.7	Auger refusal at 12.0'			
		Groundwater Not Observed During Drilling			
		Borehole HNU Reading .21 ppm			
		NS: Not Sampled			
		NR: No Sample Recovery			

SAMPLE

NUMBER	HNU READING	RECOVERY	DEPTH
1	0.1		0 – 1.5
NS	NS		2.5
2	1.8	0.6	3.3
NR	NR		4.0
3	4.8	1.1	5.1
NR	NR		5.7
NS	NS		9.0
4	0.3	1.2	10.2
NR	NR		10.7
NS	NS		12.0
[illegible]	0.4	[illegible]	[illegible]
NR	NR		12.7

REMARKS

BACKGROUND HNU READIN

SOIL: 0.1

AIR: 0.1

CME CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HOURS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

+ PENETROMETER (TONS / FT^2)

ROBERTS/SCHORNICK & ASSOCIATES INC.

Environmental Consultants

[illegible]

JOB NAME / NUMBER: Marathon/91

BORING NUMBER: BH-3

DATE DRILLED: 04-19-91

DRILLING METHOD: HSA

DRILLED BY: SH+B

LOGGED BY: MUL

CHECKED BY: BS

Location [illegible] W 600

BORING RECORD

GEOLOGIC UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x ___ (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start 10:45 Stop: 11:30 G.L Elev								BACKGROUND HNU READING SOIL: 0.1 AIR: 0.4
	0 – 11.0	Alluvium, Bouldery, Cobbly-Gravelly Silt, unconsolidated, light brownish gray to grayish brown, 10YR 6/2 to 5/2, dry, v. hard drilling, Cobbles-boulders from 10-cm to 2-m, gravels, rounded, poorly sorted	GW			1	0.2		0 – 1.0	
						NS			2.5	
						2	0.4	17	4.0	0.1 ppm
	5.0					3	0.4	14	5.5	0.1 ppm
						NS	NS		9.0	
						4	0.2	0.8	9.5	
	10.0					NR	NR		10.5	0.1 ppm
	11.0	Dolomite, grayish brown, 10YR 5/2, Massive hard,								

Auger refusal at 11.0'

Groundwater Not observed during drilling

NR: No Recovery
NS Not Sampled

Borehole HNU (through augers) . 0.1 ppm

Soil vent installed to 8.0 Ft.

Soil Vent headspace after 24 HRS:

Soil Vent HNU Reading after 24 HRs 0.1 ppm

LEGEND	
CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+ PENETROMETER, (TONS / FT.^{2})
WATER TABLE (24 HOURS)	

JOB NAME / NUMBER: Marathon/91

BORING NUMBER: BH-4

DATE DRILLED 04-22-91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY PJL

CHECKED BY BJS

PAGE 1

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants

Location: 600 West, 1700 South

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start 17 50 Stop 18 33								BACKGROUND HNU READING SOIL: 0.1 AIR: 0.2
	0	Cobbly Sand, brown 10YR to light brown with gray 10YR, Cobbles - boulders from 10 cm to 1.5 m, dry, v. hard	GW			1	0.7		1.0	
						NS	NS		2.5	
						2	1.8	1.2	3.7	
						NR	NR		4.0	
	50					3	0.8	1.1	5.1	
						NR	NR			
						NS	NS		6.8	
						4	0.6	1.6	8.2	
		Auger refusal at 6.0' Groundwater not observed during drilling Borehole HNU (after augering): 1.2 ppm Soil vapor tube at 6.25' Borehole HNU from soil vapor tube after 24 hrs: [illegible] ppm NR: No Recovery NS: No Sample								

Legend		
CME CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L	LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+	PENETROMETER, (TONS / FT^2)
WATER TABLE (24 HOURS)		

ROBERTS/SCHORNICK & ASSOCIATES INC.
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JOB NAME / NUMBER: [illegible] 910
BORING NUMBER: BH-5
DATE DRILLED: 04-20-91
DRILLING METHOD: HSA
DRILLED BY: SHP
LOGGED BY: MJL
CHECKED BY: BJS
PAGE 1

RSA FORM 5 [illegible] REV. [illegible] Location E [illegible]

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS (BACKGROUND HNU READING SOIL: 0.1 P AIR: 0.1 P)
		Start: 09 55 Stop: 10.10 G.L. Elev								
	0	Alluvium - Boundary. Cobbles, gravelly sand, light grayish brown, 10YR 6/2, unsorted, gravel from 1.0cm to 10cm, cobbles and boulders from 10cm to 1-m, unsorted, dolomitized	GW			NS	NS		0 2.5	0.1
						1	0.1		2.5	
						NR	NR		3.5	
	40					NS	NS		4.0	0.1
	50	Dolomite, light brown, 10YR 8/2, massive, jointed, fractured								
		Auger refusal at 4.0'								
		Groundwater Not Observed During Boring								
		NR: No Recovery NS: Not Sampled								
		Borehole HNU Reading: [illegible]								
		Soil Vent Installed at 2.5'								
		Soil Vent HNU Reading After 24 Hrs: 0.1 ppm								

CME CONTINUOUS AUGER SAMPLER | WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST | L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE | + PENETROMETER, (TONS / FT.^{2})
WATER TABLE (24 HOURS)

JOB NAME / NUMBER: Manotho [illegible]
BORING NUMBER: BH-6
DATE DRILLED: 04-21-91
DRILLING METHOD: HSA
DRILLED BY: HSB
LOGGED BY: MJL
CHECKED BY: RJS
PAGE 1

ROBERTS SCHORNICK & ASSOCIATES, INC.
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Location: 300' E of Sec. [illegible] 55' N of [illegible]

E 1342
S 1800

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM X 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	SAMPLE HNU READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS
		Start 10:50 Stop 11:40 G.L. Elev								BACKGROUND HNU READING SOIL: 0.1 AIR: 0.1
	0	Alluvium - Bouldery Cobbly - Gravelly Silt, light grayish brown to grayish brown, 10 yr 6/2 to 5/2, unconsolidated, dry. Cobbles - boulders from 10 cm - 3 m, unsorted, dolomite, poorly sorted	Gw			NS			0 - 2.5	
	4.0 / 4.1					1	0.1	14	2.5 - 3.9	
		Dolomite, grayish brown 10 yr 5/2, Massive, fractured, jointed								
		Auger Refusal at 4.0 ft. Groundwater not observed during drilling Borehole HNU Reading (through augers): 0.1 ppm NR: No Recovery NS: Not Sampled Soil vent tube installed to 2.0' Soil vent Headspace Measurement after 24 hrs.: 0.1 ppm								

CME CONTINUOUS AUGER SAMPLER | WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST | L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE | + PENETROMETER, (TONS / FT^2)
WATER TABLE (24 HOURS)

JOB NAME / NUMBER: Monarch /91
BORING NUMBER: BH-7
DATE DRILLED: 04-21-91
DRILLING METHOD: HSA
DRILLED BY: SHB
LOGGED BY: MJL
CHECKED BY: BJS

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants

PAGE 1

RSA FORM 3 3/84 REV 1

E 1367

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start: 16:31 Stop: 17:03 G.L. Elev.								BACKGROUND HNU READING SOIL: 0.2 P AIR: 0.4 P
	0	Alluvium Boundary. Cobbly Silt, brown, saturated, grayish brown, 10 yr 5/2, poorly sorted, uncommon Cobbles – boulders from 10 cm to 2 m, grading, v. hard drilling	Gw			1	0.7		0 / 1.0	
						NS			4.0	
	5.0					2	0.4	0.8	4.0 / 5.5	
						NR				
						NS			9.0	0.8
						3	1.0	0.3	9.9	
	10.0					NR			10.6	
	11.0					NR			11.2	
	11.2	Dolomite, grayish brown, 10 yr 5/2, Massive, v. hard								

Auger Refusal at 11.0'
Borehole HNU Reading (through auger): 0.1 ppm
Groundwater not observed During Drilling
NS: Not Sampled
NR: No Recovery
Soil Vent tube installed to 11.0'
Soil vent Headspace 24 Hrs:

CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+ PENETROMETER, (TONS / $FT.^2$)
WATER TABLE (24 HOURS)	

JOB NAME / NUMBER: Marathon / 90...
BORING NUMBER: BH-9
DATE DRILLED 04-22-91
DRILLING METHOD HSA
DRILLED BY SHB
LOGGED BY TUL
CHECKED BY AJS
PAGE 1

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants

Location: 600 E / 1100 S

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x 0.1 (2 4 6 8 10 12 14 16 18)	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start 12:20 Stop 13:12								BACKGROUND HNU READING SOIL: 0.1 AIR: 0.2
	0	G.L. Elev.							0	
		Clayey Silt, yellowish brown 10 YR 5/4, dry, unconsolidated mottles to 1.0', Calcium veins below 1.7', v. fine grained, 60% silt 40% clay v. low plasticity	CL			1	0.4	2.0	2.0	
						2	0.2		2.6	
						NR			3.0	
	5.0					3	0.2	2.0	5.0	
						NR			6.1	
		Cobbley-Bouldery Sand, orange brown, 10 YR 5/2, unconsolidated poorly sorted, unconsolidated	GW			NS				
	9.0					NR		0.0	9.0	
	10	Auger Refusal at 9.0 feet Groundwater Not Observed During Drilling NR: No Recovery NS Not Sampled Borehole HNU Reading: Sand vent tube installed to 7.5' Sand vent HNU Reading after 24 hrs: 0.9 ppm Background: 0.9 ppm								

CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+ PENETROMETER, (TONS / FT^2)
WATER TABLE (24 HOURS)	

JOB NAME / NUMBER: Monastery/9103

BORING NUMBER: BH-9

DATE DRILLED 04-23-91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MDL

CHECKED BY BJS

PAGE 1

ROBERTS-SCHORNICK & ASSOCIATES, INC.
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RSA FORM 6 3/88 REV.

Location: E600 S700

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM x ___ 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start: 16:37 Stop: 17:05 Sho Bkgr: 09:50 Finish: 10:50 G.L. Elev.								BACKGROUND HNU READING SOIL: 0.2 P AIR: 0.2 P
	0	Clayey Silt, Brown, 10YR 5/3, dry, v. low plasticity, v. fine grains, 60% silt, 40% clay, Calcite veins, unconsolidated	CL			1			0.0	
						NS			2.5	
						2	0.7		4.0	
	5.0					3	0.5		4.8	
	5.5					NR			5.5	
		Bouldery-Cobbly silt, grayish brown, 10YR 5/2, unconsolidated, poorly sorted, cobbles/boulders, limes.	GL			NS		0.5	9.0	
	10.0					3	0.4		9.5	
	13.0							0.2	13.0	5.9 ppm
		Auger Refusal at 13.0'							13.2	Change bit
		Groundwater Not Observed during Drilling								
		Borehole HNU through Auger: 7.8 ppm								
		NR: No Recovery								
		NS: Not Sampled								

CME CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HOURS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER, (TONS / FT^2)

JOB NAME / NUMBER: Marathon/91152

BORING NUMBER: BH-10

DATE DRILLED: 04-23-91

DRILLING METHOD: HSA

DRILLED BY: SHB

LOGGED BY: MJL

CHECKED BY: BJS

PAGE 1

ROBERTS/SCHORNICK & ASSOCIATES, INC.

Environmental Consultants

RSA FORM 0 ... REV 1

Location: 300S ...

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM X ___ 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start: 11:17 Stop: 12:04 G.L. Elev.								BACKGROUND HNU READING SOIL: 0.1 AIR: 0.1
	0	Clayey Silt, Brown, 7.5 yr 5/2, dry, [illegible], [illegible], v. low plasticity, [illegible] [illegible] 5%, 60% Silt, 40% clay. v. fine [illegible].	CL			1			0 1.0	
						NS			2.5	
						2	0.1	1.1	4.0	
	5.0					3	0.1	1.8	5.2	
		Boulder - Cobbley Silt, grayish brown 10 yr 4/2, unconsolidated, poorly sorted, cobbles/boulders from 10-cm to 0.5 m, gravelly, [illegible]	GW			NS			9.0	
	10.0					4	0.1	0.6	10.1	
	13.0 13.1	Dolomite, gray, 5 y 4/1, crystalline, massive, v. hard, [illegible] [illegible] on [illegible]. [illegible] [illegible] on [illegible] [illegible] w/ HCL					152		13.0	152 ppm

Boring Terminated at 13.0'

Groundwater Not Observed During Boring

NR: No Recovery

NS: Not Sampled

Borehole HNU Reading at 13 ft through augers: 152 ppm

Borehole HNU Reading through augers (14:20) 156 ppm

No free product

CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+ PENETROMETER, (TONS / FT^2)
WATER TABLE (24 HOURS)	

ROBERTS/SCHORNICK & ASSOCIATES, INC.

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[illegible]

JOB NAME / NUMBER: Marathon/910

BORING NUMBER: BH-11

DATE DRILLED: 04-24-91

DRILLING METHOD: HSA

DRILLED BY: SHB

LOGGED BY: MJL

CHECKED BY: RJS

PAGE 1

RSA FORM [illegible] [illegible] REV. [illegible]

Location: 400 E

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM X ____ 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start 14:55 Stop 16 04 G.L. Elev.								BACKGROUND HNU READING SOIL: 0.1 [illegible] AIR: 0.1 [illegible]
	0	Clayey Silt, Brown, 7.5YR 5/2, dry, [illegible], v low plasticity, Caliche veins, 60% silt 40% clay, v. fine grained	CL			1			0 1.0	
						NS			2.5	
						1	0.3	1.3	3.0	
	5.0					2	0.3	1.0	5.0	
	5.2	Bouldery - Cobbly Silt, [illegible] brown 10YR 5/2, dry, [illegible], poorly sorted cobbles/boulders from [illegible] to 60 cm. [illegible]	SW			NR			5.5	
						NS			9.0	
	10.0					3	0.2	0.8	9.9	
						NR			10.5	
						NS		0.2	12.0	
	12.1 12.3 12.5	Clayey Sand, brown, 7.5YR 5/2, moist, med plasticity, [illegible], few [illegible] stringy, [illegible], Sample wet with [illegible], [illegible], 25% sand 15% [illegible]				4	220		12.5	
		Dolomite, light [illegible] brown, 10YR 5/2, Massive, v. hard								

Auger Refusal at 12.5'

NR. No Recovery

NS. Not Sampled

Borehole HNU Reading through Auger. 5.0 ppm

CME CONTINUOUS AUGER SAMPLER		WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L	LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+	PENETROMETER, (TONS / FT²)
WATER TABLE (24 HOURS)		

JOB NAME / NUMBER: Marathon/9102[illegible]

BORING NUMBER: BH-12

DATE DRILLED: 04-24-91

DRILLING METHOD: HSA

DRILLED BY: SHB

LOGGED BY: MJL

CHECKED BY: RJS

PAGE 1 OF [illegible]

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants
[illegible]

RSA FORM 6 3/84 REV. 1

Location: 275 S 1200 E

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM X ___ 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start: 10:15 Stop: 11:55 Gr. Elev.								BACKGROUND HNU READING SOIL: 0.2 AIR: 1.5
	0	Clayey silt, brown, 7.5 YR 5/2, dry, v. low plasticity, unconsolidated from 0' to 1.5', mod. compaction below 1.5', caliche veins, 60% silt, 40% clay, v. fine quartz	CL			1	0.6		1.0	
						NS		1.2	2.5	
						2	0.2		3.7	
	5.0					3	0.2	1.5	5.5	0.3 ppm
						NS		1.5	9.0	
	8.0	Bouldery - Cobbly silt, grayish brown, 10 YR 5/2, unconsolidated to mod. consolidated, gravelly, cobble/boulder from 5-cm to 20-cm, gravel to 5-cm, rounded to subrounded	GW							
	10.0					4	0.2		10.5	
						NS		0.1	14.0	220 ppm
	14.0 14.1	Bouldery clay, grayish brown, 10 YR 5/2, wet with hydrocarbon, strong odor, fine quartz Dolomite, light grayish brown, 10 YR 7/2, massive				NR			14.2	(14.1)
		Auger refusal at 14.2' NR: No Recovery NS: Not Sampled Borehole HNU through augers at 13.5': 220 ppm 12:55 No borehole fluid observed								

CME CONTINUOUS AUGER SAMPLER	WATER TABLE (TIME OF BORING)
STANDARD PENETRATION TEST	L LABORATORY TEST LOCATION
UNDISTURBED SAMPLE	+ PENETROMETER, (TONS / FT.^{2})
WATER TABLE (24 HOURS)	

JOB NAME / NUMBER: Monarch m/ 91(

BORING NUMBER: BH-13

DATE DRILLED: 04-25-91

DRILLING METHOD: HSA

DRILLED BY: HSB

LOGGED BY: MJL

CHECKED BY: BJS

PAGE 1 (

ROBERTS/SCHORNICK & ASSOCIATES INC.
Environmental Consultants

RSA FORM 8 3/88 REV. 1

Location: 5003
16005

BORING RECORD

GEOLOG UNIT	DEPTH (INCHES)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM X ___ 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start: 13:38 Stop: 14:30 G. Elev.								BACKGROUND HNU READING SOIL: 0.2 AIR: 0.5
	0	Clayey Silt, Brown, 7.5YR, dry from 0.0' to 9.0', Moist below 9.0', low to mid plasticity, v. fine grains, 60% Silt 40% Clay	CL			1			0 1.0	
						NS			2.5	
						2	0.2	NR	3.5 4.0	
	5.0					NS				
		Moist below 9.0',						0.8	9.0	
11.26	10.5					3	0.8		9.8 10.5	
						NS		1.5	13.5	
	13.5	Sandy Gravel, gray, 10YR 5/1, coarse grained, fine gray/sand grains, rounded to very subangular, Partly Soiled, odor	GW			4	11.1		14.7 15.0	
	15.0 15.1	Dolomite, light grayish brown, 10YR 5/2, Massive								
		Auger refusal at 15.0'								
		NR No Recovery NS Not Sampled								

CME CONTINUOUS AUGER SAMPLER

STANDARD PENETRATION TEST

UNDISTURBED SAMPLE

WATER TABLE (24 HOURS)

WATER TABLE (TIME OF BORING)

L LABORATORY TEST LOCATION

\+ PENETROMETER, (TONS / FT²)

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants

JOB NAME / NUMBER: Marathon/91C

BORING NUMBER: BH-14 (MW-1)

DATE DRILLED 04-25-91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY FUL

CHECKED BY BJS

PAGE 1 OF

RSA FORM 0784 REV.

Location: S 300 E 1600

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM: 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS
		Start: 16 40 - 17 46 Stop 08. 24 (4-26-91) G L Elev.								BACKGROUND HNU READING: SOIL: 0.1 PPM AIR: 0.2 PPM
	0 – 4.6	Clayey Silt brown, 7.5YR 5/2, dry, v. low plasticity, unconsolidated from 0.0' to 4.9', Calcichedoite, 60% silt, 40% clay	CL			1	0.2		0.0	
						NS		0.8	2.5	
						2	0.9		3.2	
						NR			4.0	
						3	1.0		4.9	
	5.0	Gravelly, Cobbley Silt, unconsolidated to weak consolidated, pebble to 2-cm, cobble to 10-cm, round	GW			NR			5.0	
						NS		0.6	9.0	
						4	2.6		9.6	
	10.0					NR			10.5	
	13.0					NS			13.0	
									13.1	

Auger Refusal at 13.0'

NS: Not Sampled
NR: No Recovery

Groundwater Not Observed During Drilling

Borehole HNU Reading through Auger: 0.6 ppm

CME CONTINUOUS AUGER SAMPLER

WATER TABLE (TIME OF BORING)

WATER TABLE (24 HOURS)

JOB NAME / NUMBER Marathon/91029

BH-15

DATE DRILLED 04-25-91

DRILLING METHOD HSA

DRILLED BY SH B

LOGGED BY MJC BJS

ROBERTS/SCHORNICK & ASSOCIATES, INC.

Location E 1200

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	HNU READING	RECOVERY	DEPTH	REMARKS BACKGROUND HNU READING: SOIL: ____ PPM AIR: ____ PPM
		Start: 10:08 Stop: 12:37 G.L. Elev								
	0	Sandy clay, dark yellowish brown 10YR 4/6, dry, v. low plasticity, v. fine quartz 60% clay, 40% sand	CL			1			0 1.0	
						NR		0.8	2.5	3.2 ppm
						2			3.3	
	3.5					NR			4.0	
						3		0.5	4.5	
	5.0	Boundary - Cobbley Silt, grayish brown 10YR 5/2 Poorly sorted, Mod. to poorly consolidated, Cobbles/boulders from 5-cm to 15-cm. [illegible]	GW			NR			5.5	
						NS			8.0	
						4		1.0	9.1	
	10.0					NR			9.3	
						NS				
	14.0							0.0	14.0	
									14.2	
		Auger Refusal at 14.0'								
		Groundwater Not observed during drilling								
		NR No Recovery								
		NS Not sampled								
		Borehole HNU through Augers: 22 ppm								

CME CONTINUOUS AUGER SAMPLER

WATER TABLE (TIME OF BORING)

WATER TABLE (24 HOURS)

JOB NAME / NUMBER Mountain [illegible]/91029

BH-16

DATE DRILLED 04-26-91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL BJS

ROBERTS/SCHORNICK & ASSOCIATES, INC.

Location: S 1313 W 600

BORING RECORD

GEOLOG UNIT	DEPTH (FEET)	LITHOLOGIC DESCRIPTION	UNIFIED SOIL CLASSIFICATION	GRAPHIC LOG	HNU SOIL GAS SURVEY PPM = ___ 2 4 6 8 10 12 14 16 18	SAMPLE NUMBER	SAMPLE HNU READING	SAMPLE RECOVERY	SAMPLE DEPTH	REMARKS BACKGROUND HNU READING: SOIL: ___ PPM AIR: ___ PPM
		Start: 13:30 Stop: 14:22 G.L. Elev.								
	0 – 3.0	Silty Clay, brown, 10 YR 5/3, V. low plasticity, dry, V. fine growth, 60% clay, 40% silt	CL			1 NS			1.0 2.5	
	3.0 – 10.0	Bouldery - Cobbly Silty gravel, brown, 10YR 5/2 Poorly Sorted, Cobbles/boulders from 5-cm to 15cm, moist	GW			2 3 NR NR 4 NR		1.5 0.8	4.0 4.5 5.5 9.0 9.8 10.0	

Auger refusal at 10'

Groundwater Not Observed during drilling

Borehole HNU Reading through Augers: 66 ppm

NR No Recovery
NS Not Sampled

CME CONTINUOUS AUGER SAMPLER

WATER TABLE (TIME OF BORING)

WATER TABLE (24 HOURS)

JOB NAME / NUMBER Marathon/91029

BH-17

DATE DRILLED 04-26-91

DRILLING METHOD HSA

DRILLED BY SHB

LOGGED BY MJL BS

ROBERTS/SCHORNICK & ASSOCIATES, INC.

Location: S 1400 E 100

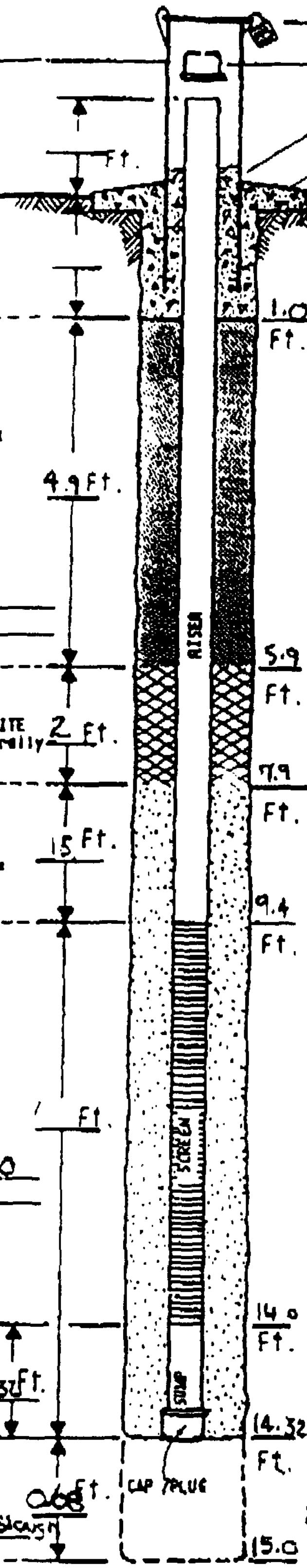
APPENDIX H

Monitor Well Construction Diagram

MONITORING WELL INSTALLATION RECORD

OBSERVATIONS | **WELL** | **SPECIFICATIONS**

.32
a 9 2
15.02



TIME DRILLING STOPED: 14:30
TIME WELL INSTALLATION BEGAN: 15 37
TIME WELL INSTALLATION FINISHED: 15 56

16.05
W.L. 11.96
TD 15.02
Stickup 1.20
W.L. 12.46
18:33

Grab Sample
Sp.C. 155x10

155
10
1,550

WELL COMPLETION MATERIALS:

LENGTH OF SCREEN USED: 5 FT.
LENGTH OF RISER USED: 10 FT.
AMOUNT OF BENTONITE USED: 30 LBS.
AMOUNT OF SAND FILTER USED: 2 (100) BAGS
AMOUNT OF CEMENT USED: ______ BAGS
AMOUNT OF CONCRETE USED: ______ YARDS

Lock: Yes ☑ No ☐
Riser Cap w/Vent. Yes ☐ No ☐
Weep Hole: Yes ☐ No ☐
Concrete Pad: Yes ☐ No ☐
Size: ______

1. Type of Riser: PVC ☐ Galvanized ☐ Teflon ☐ Stainless Steel ______ ☐ Other ______ ☐
2. Type of Riser/Screen Joints: Screw-Couple ☐ Glued-Couple ☐ Other ☐ ______
3. Type of Well Screen: PVC ☐ Galvanized ☐ Teflon ☐ Stainless Steel ______ ☐ Other ☐
4. Diameter of Riser and Well Screen: (I.D.): Riser ______ Inches, Screen ______ Inches
5. Slot Size of Screen: ______
6. Type of Screen Perforation: Factory Slotted ☐ Other ☐ ______
7. Installed Protector Pipe w/Lock: Yes ☐ No ☐
8. Borehole Diameter = ______ Inches
9. Were Drilling Additives Used? Yes ☐ No ☐ Revert ☐ Bentonite ☐ Water ☐ Air ☐ Gallons / Volume Used: ______
10. Was Float Sump or Dense Phase Sampling Cup Installed? Yes ☐ No ☐
11. Was Outer Steel Casing Used? Yes ☐ No ☐ Depth: ______ to ______ Feet.
12. How Was Well Developed? Bailing ☐ Pumping ☐ Air Surging (Air or Nitrogen) ☐ Other ______ ☐
13. Time Spent on Well Development? ______ / ______ Minutes/Hours
14. Approximate Water Volume Removed? ______ Gallons
15. Water Clarity Before Development? Clear ☐ Turbid ☐ Opaque ☐
16. Water Clarity After Development? Clear ☐ Turbid ☐ Opaque ☐
17. Did the Water have Odor? Yes ☐ No ☐ If Yes, Describe: ______
18. Did Water have any Color? Yes ☐ No ☐ If Yes, Describe: ______
19. Water Level Summary (From Top of Riser)
    Before Development ______ Ft. Date ______
    After Development ______ Ft. Date ______
    Water Level ______ Ft. Date ______
    ______ Ft. Date ______
20. Ground Surface Elevation: ______ Feet
    Top of Riser Elevation: ______ Feet

ROBERTS/SCHORNICK & ASSOCIATES, INC.
Environmental Consultants

WELL NUMBER: MW-1 (BH-14)
JOB NAME/ NUMBER: Marathon / 91029
LOCATION: E. 1600 / S. 300
INSTALLATION DATE: 04-24-91
RSA REPRESENTATIVE: M Larsen
DRILLING CONTRACTOR: S H B
DRILLING METHOD: H S A

FIELD FORM: RSA 5/87

APPENDIX I

Rain Contingency Plan

United States Department of the Interior

TAKE PRIDE IN AMERICA

BUREAU OF LAND MANAGEMENT
Carlsbad Resource Area Headquarters
P.O. Box 1778
Carlsbad, New Mexico 88221-1778

Mr. Tim Tipton
Marathon Oil Company

APR 25 1991

Dear Tim:

I have reviewed Marathon Oil Company's Indian Basin Hydrocarbon Contamination Rainfall Plan. It is my determination, after consulting with various staff specialists in the Carlsbad Resource Area and the Roswell District offices, that the actions proposed by Marathon in the Plan are consistent with emergency measures needed to contain the flow of contaminated surface and/or subsurface waters in Rocky Arroyo.

In consultation with BLM staff, I have determined that possible impacts resulting from the implementation of the Plan are minimal and that implementation of the Plan is essential to containing the contamination and limiting any further contamination. Authorization to proceed with the Plan is contingent on Marathon's assurance that all surface disturbing activities will be limited to the stream bed.

Any proposed deviations in the Plan or any unforseen events during the implementation of the plan must be reported immediately to the Carlsbad Resource Area Manager or to the BLM representative on site at the Indian Basin Plant.

Sincerely,

Richard L. Manus

Richard L. Manus
Area Manager

Mid-Continent Region
Production United States

Marathon Oil Company

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

April 25, 1991

Confidential and Business Information

U. S. Department of Interior
Bureau of Land Management
P. O. Box 1778
1011 E. Mermod
Carlsbad, New Mexico 88221-1778

Attention: Dick Mannus

Dear Dick:

Attached is a summary of Marathon's proposed action plan to address the potential dispersion of hydrocarbon contamination at Indian Basin from surface/subsurface flows following rains. Should any further information be required, please advise.

Yours very truly,

T. N. Tipton

T. N. Tipton
Operations Superintendent

TNT/nrt

Attachments

xc: R. F. Unger

Indian Basin
Hydrocarbon Contamination Rainfall Plan

Confidential and Business Information

Marathon's current assessment of the areal extent of hydrocarbon contamination is illustrated in the attached exhibit. The contamination boundaries are based upon 1) soil - gas analyses and 2) bore hole measurements of hydrocarbons. To address the potential dispersion of contamination from rainfall, the following plan is proposed.

1) Upstream diversion - As shown in the exhibit, the arroyo system in the general area consists of a northern and central channel. A southern channel also exists some 1200' to the south which is not shown on the exhibit. The leak, which occured within the northern channel, is indicated by the "X" on the condensate line at grid location D-12. In an attempt to divert surface and subsurface flows within the northern and central channels from entering the area of contamination, it is proposed to construct earthen dams across these channels upstream of respective western contamination limits. (The proposed locations of the dams are shown at grid location C/D-6 and G-10/11). Immediately upstream of each dam, a trench will be excavated across the arroyo to a depth corresponding to the bedrock top; the trenches will not be dug into the bedrock, however. A pit liner will then be placed on the downstream bank of each trench in an attempt to restrict fluid flow in the channel beds. A pump will be placed at each dam and collected water will be transported to the southern channel for drainage away from the contamination area.

2) Downstream collection - To monitor fluid flow in the northern and central channels downstream of the contamination, it is proposed to cut trenches across each channel to serve as collection basins. The trenches will be located in areas of no hydrocarbon contamination, indicated at grid locations G/H-22 and H/I-21, respectively. Again, pit liners will be placed along the downstream banks of these trenches in an effort to force fluid flow to sumps at respective southern banks. Pumps will transfer the fluids across the arroyo to separate tanks on the northern bank. Field tests for hydrocarbons and high-chloride content produced water will be taken from samples off the tanks. Fresh water would be returned to the arroyo downstream of the channel merger, at approximate grid location I-23. All hydrocarbons will be trucked to the Indian Basin Gas plant (IBGP) for processing. Water with high chlorides will be initially trucked off site for disposal. (The IBGP saltwater disposal well has recently refused to accept injection. An AFE is circulating to convert a shut-in producer to saltwater disposal. Following this conversion, all high-chloride content water would be disposed into this well).

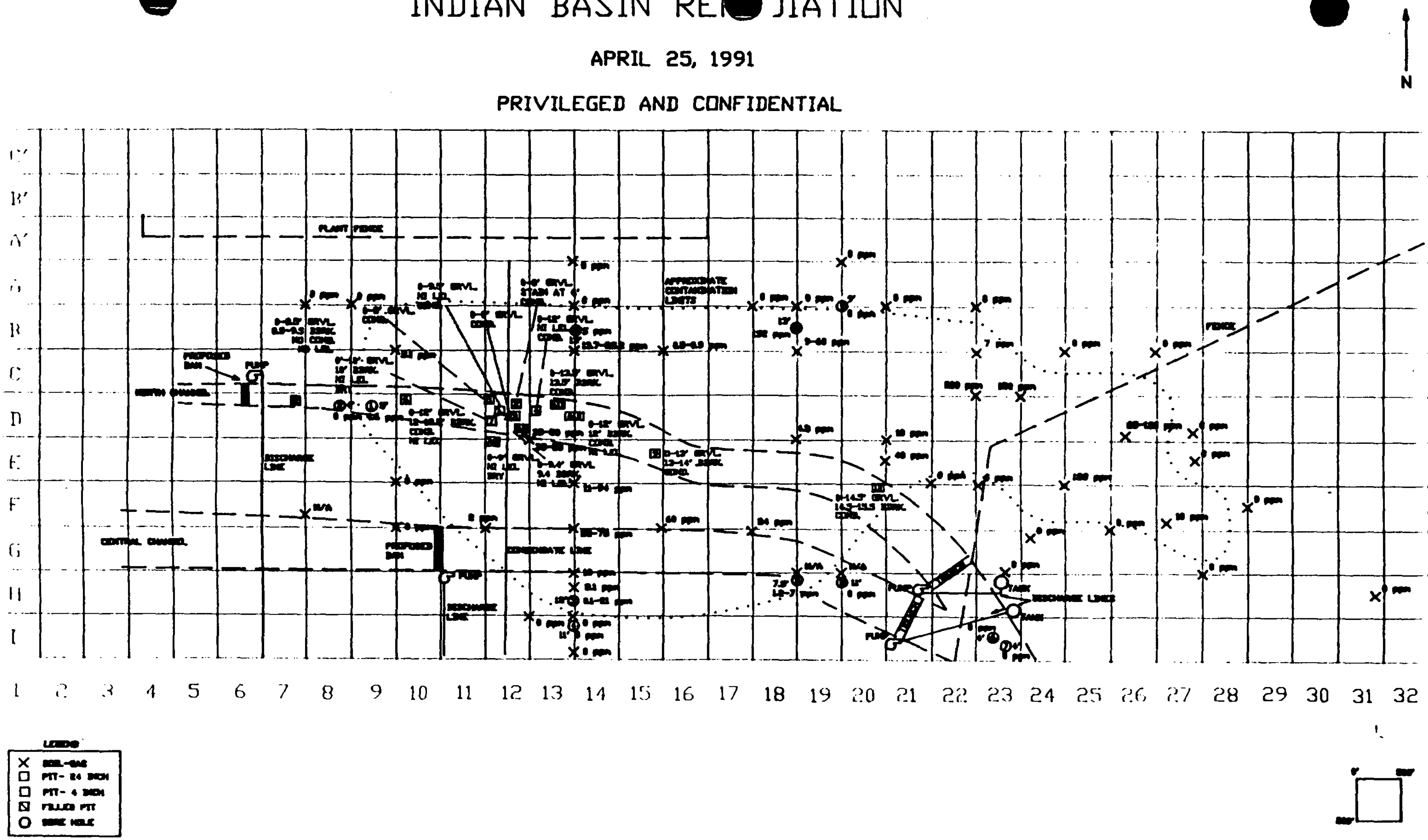
The upstream diversion proposal is Marathon's best effort at containing manageable fluid flow through the contaminated area. Obviously, a flash flood could sweep through the proposed flow restrictions and overrun the contamination area. Measures to address such a "100-year" occurrence are beyond the intentions of Marathon's plans. In addition to containment of rainfall runoff, the downstream collection proposal will likely be included in final remediation plans to be submitted for your review.

Surface material to construct the dams will be from the arroyo bottoms so that no top soil from the banks is disturbed. We will limit the extension of the dams and trenches to the confines of the channels to preserve the bank soils/surface. The locations of pumps and tanks are subject to change as surface topography dictates.

INDIAN BASIN RE[illegible]DIATION

APRIL 25, 1991

PRIVILEGED AND CONFIDENTIAL



APPENDIX J

IBGP Water Supply Analyses
(6-15-89)

General Inorganics

Client Name: Marathon Oil Company
Client ID: IBGP Drinking Water
Lab ID: 005347-0003-SA   Enseco ID: 1041865
Matrix: AQUEOUS   Sampled: 15 JUN 89   Received: 16 JUN 89
Authorized: 16 JUN 89   Prepared: See Below   Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyz Date
Alkalinity, Total as CaCO3 at pH 4.5	252	mg/L	5	310.1	NA	16 JUI
Chloride	17	mg/L	3	300.0	NA	20 JUI
Fluoride	0.6	mg/L	0.1	340.2	NA	28 JUI
Ion Balance Difference	1.8	%	--	104C	NA	29 JUI
Total Anions	9.1	meq/L	0.3		NA	29 JUI
Total Cations	9.5	meq/L	0.1		NA	29 JUI
Ammonia as N	ND	mg/L	0.1	350.1	NA	20 JUI
Nitrite as N	ND	mg/L	0.01	354.1	NA	16 JUI
Nitrate plus Nitrite as N	3.1	mg/L	0.1	353.2	NA	19 JUI
pH	7.6	units	--	150.1	NA	16 JUI
Sulfate	162	mg/L	5	300.0	NA	20 JUI
Specific Conductance at 25 deg.C	851	umhos/c	1	120.1	NA	16 JUI
Total Kjeldahl Nitrogen as N	ND	mg/L	3	351.2	NA	20 JUI
Total Dissolved Solids	530	mg/L	10	160.1	NA	20 JUI

N.D. = Not Detected
N.A. = Not Applicable

Reported By: Pam Rosas   Approved By: Tammy Bailey

Metals

Total Metals

Client Name: Marathon Oil Company
Client ID: IBGP Drinking Water
Lab ID: 005347-0003-SA Enseco ID: 1041865
Matrix: AQUEOUS Sampled: 15 JUN 89 Received: 16 JUN 89
Authorized: 16 JUN 89 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyze Date
Chromium	ND	mg/L	0.05	218.1	20 JUN 89	30 JUN
Aluminum	ND	mg/L	0.1	200.7	20 JUN 89	26 JUN
Arsenic	ND	mg/L	0.005	206.2	20 JUN 89	26 JUN
Barium	0.03	mg/L	0.01	200.7	20 JUN 89	26 JUN
Boron	0.06	mg/L	0.03	200.7	20 JUN 89	26 JUN
Cadmium	ND	mg/L	0.005	200.7	20 JUN 89	26 JUN
Calcium	106	mg/L	0.2	200.7	20 JUN 89	26 JUN
Cobalt	ND	mg/L	0.01	200.7	20 JUN 89	26 JUN
Copper	ND	mg/L	0.01	200.7	20 JUN 89	26 JUN
Iron	ND	mg/L	0.1	200.7	20 JUN 89	26 JUN
Lead	ND	mg/L	0.005	239.2	20 JUN 89	20 JUN
Magnesium	41	mg/L	0.2	200.7	20 JUN 89	26 JUN
Manganese	ND	mg/L	0.01	200.7	20 JUN 89	26 JUN
Molybdenum	ND	mg/L	0.02	200.7	20 JUN 89	26 JUN
Nickel	ND	mg/L	0.04	200.7	20 JUN 89	26 JUN
Potassium	ND	mg/L	5	200.7	20 JUN 89	26 JUN
Selenium	ND	mg/L	0.2	200.7	20 JUN 89	26 JUN
Silica as SiO2	22	mg/L	0.2	200.7	20 JUN 89	26 JUN
Silver	ND	mg/L	0.01	200.7	20 JUN 89	26 JUN
Sodium	12	mg/L	5	200.7	20 JUN 89	26 JUN
Zinc	0.04	mg/L	0.01	200.7	20 JUN 89	26 JUN

N.D. = Not Detected
N.A. = Not Applicable

Reported By: Fred Velasquez Approved By: Toni Stovall

En

Metals

Dissolved Metals

Client Name: Marathon Oil Company
Client ID: IBGP Drinking Water
Lab ID: 005347-0003-SA Enseco ID: 1041865
Matrix: AQUEOUS Sampled: 15 JUN 89 Received: 16 JUN 89
Authorized: 16 JUN 89 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyz Date
Calcium	110	mg/L	0.2	200.7	NA	21 JUN
Iron	ND	mg/L	0.1	200.7	NA	21 JUN
Magnesium	42	mg/L	0.2	200.7	NA	21 JUN
Potassium	ND	mg/L	5	200.7	NA	21 JUN
Sodium	12	mg/L	5	200.7	NA	21 JUN

N.D. = Not Detected
N.A. = Not Applicable

Reported By: Bryan Anderson Approved By: Toni Stovall

Halogenated Volatile Organics

Method 601

Client Name: Marathon Oil Company
Client ID: IBGP Drinking Water
Lab ID: 005347-0003-SA Enseco ID: 1041865
Matrix: AQUEOUS Sampled: 15 JUN 89 Received: 16 JUN 89
Authorized: 16 JUN 89 Prepared: NA Analyzed: 20 JUN 89

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2,1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

N.D. = Not Detected
N.A. = Not Applicable

Reported By: Duane Newell Approved By: Kim Zilis

Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)

Method 602

Client Name: Marathon Oil Company
Client ID: IBGP Drinking Water
Lab ID: 005347-0003-SA   Enseco ID: 1041865
Matrix: AQUEOUS   Sampled: 15 JUN 89   Received: 16 JUN 89
Authorized: 16 JUN 89   Prepared: NA   Analyzed: 20 JUN 89

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	1.0

N.D. = Not Detected
N.A. = Not Applicable

Reported By: Duane Newell   Approved By: Kim Zilis

APPENDIX K

Unstabilized Condensate Distillation Data

TABLE 1:

Summary of Water Well Data
Marathon Oil Company, Indian Basin Gas Plant
Carlsbad, New Mexico

Well No.	Location	TD	ELEV.	DEPTH to WATER	COMPLETION DATE
1	21.23.14.21221	25'	3802.9'	14.6'	01-12-54
2	21.23.22.24144	256'	3846.1'	217'	10-06-87
3*	21.23.22.443	?	?	?	?
4	21.23.23.133241	225'	3834'	208'	01-12-78
5	21.23.23.232	255'	3810'	182'	07-19-65
5A	21.23.23.23214	292'	3812'	180'	08-28-75
6*	21.24.20.333	?	?	?	?
7*	21.24.29.221	?	?	?	?
8*	22.24.4 112	?	?	?	?
9	22.23.8.211	648'	4225'	628'	07-17-66
11*	22.24.21.3112	?	?	?	?
12	22.23.13.331332	487'	4105'	474'	02-04-48
13	21.23.24.22221	?	3779'	12.5'	06-22-54
14	22.24.19.22	345'	?	210'	04-07-58
15	22.23.20.211	541'	?	528'	09-09-66

*No files available in the State Engineers Office.

TABLE 2:

Summary of Soil Gas Survey Data
Marathon Oil Company, Indian Basin Gas Plant
Carlsbad, New Mexico

Soil Probe No.	*Depth Ft.	OVM Reading, PPM (peak, vac applied)	OVM Reading, PPM, Initial (peak, w/o vacuum)
SP-1	Refusal	-----	-----
SP-2	1.0'	36	-----
SP-2	1.3'	30	-----
SP-3	Refusal	-----	-----
SP-4	0.7'	46.1	45.0
SP-4A	0.8'	35.3	21.0
SP-5	1.0'	75.1	34.0
SP-5	3.5'	55.3	11.0
SP-6	3.5'	55.3	11.0
SP-7	1.2'	3.9	2.1
SP-8	1.1'	16.0	94.7
SP-9	1.0'	0.9	12.0
SP-10	1.0'	0.9	----
SP-11	1.0'	0.0	0.0
SP-11	3.9	0.0	0.0
SP-12	1.0'	25.2	71.0
SP-12	1.4'	35.0	27.0
SP-13	1.0'	1.0	6.0
SP-13	5.0'	0.5	1.5
SP-14	1.0'	0.5	1.0
SP-14	5.0'	1.0	0.4
SP-15	1.0'	2.1	5.5
SP-15	1.4'	3.2	9.0
SP-16	1.0'	0.3 B.G.	0.0
SP-16	5.0'	0.3 B.G.	0.0
SP-17	1.0'	0.3 B.G.	0.0
SP-17	5.0'	0.3 B.G.	0.0
SP-18	1.0'	0.9	0.3
SP-18	5.0'	5.6	4.0
SP-19	1.0'	0.3 B.G.	0.0
SP-19	5.1'	0.3 B.G.	0.0
SP-20	1.0'	0.0	0.4
SP-20	5.2'	0.4	0.6
SP-21	1.0'	4.1	12.0
SP-21	5.0'	9.9	54.6
SP-22	1.0'	0.4	0.4
SP-22	5.2'	0.4	0.4
SP-23	1.0'	0.4	0.4
SP-23	5.0'	1.3	0.4
SP-24	1.0'	66	160.0
SP-24	5.0'	180	205

* From Ground Level
B.G. Background Level

Table 2: (cont'd)

Soil Probe No.	*Depth Ft.	OVM Reading, PPM (peak, vac applied)	OVM Reading PPM, Initial (peak, w/o vacuum)
SP-24	7.0'	242	161
SP-25	1.0'	223	---
SP-25	5.1'	55	158.4
SP-26	1.0'	26.5	40.1
SP-26	5.2'	148.0	309.0
SP-27	1.0'	0.0	0.0
SP-27	5.2'	0.0	0.0
SP-27	8.0'	0.0	0.0
SP-28	1.0'	1.7	0.5
SP-28	4.0'	0.0	1.0
SP-29	1.0'	1.7	0.0
SP-29	5.1'	0.5	0.5
SP-30	1.0'	0.0	0.0
SP-30	5.1'	20.0	1.0
SP-31	1.0'	7.0	4.4
SP-31	5.0'	1.9	0.6
SP-31	7.0'	2.0	4.7
SP-32	1.0'	0.0	0.0
SP-32	5.0'	0.0	0.0
SP-33	1.1'	0.0	2.0
SP-34	1.0'	2.5	2.5
SP-35	1.0'	0.0	0.0
SP-35	5.0'	0.8	0.8
SP-35	7.0'	0	0.8
SP-36	1.0'	0.7 B.G.	0.7
SP-36	3.0	3.9	0.0
SP-37	1.0'	0.7 B.G.	0.7
SP-37	5.0'	0.8	0.8
SP-38	1.0'	12.2	19.9
SP-38	3.0'	22.0	6.3
SP-39	1.0'	5.8	8.6
SP-39	3.0'	13.3	30.2
SP-40	1.0'	34.1	58.8
SP-40	3.0'	77.1	156.8
SP-41	1.0'	0.0	0.4
SP-41	3.0'	0.7	0.1
SP-42	1.0'	0.0	0.0
SP-42	3.5'	0.0	0.4
SP-43	1.0'	5.0	5.1
SP-43	5.0'	6.1	5.6
SP-44	1.0'	0.1	0.7
SP-44	5.1'	0.0	0.4
SP-45	1.0'	0.0	0.0
SP-45	5.2'	0.6	0.6
SP-46	1.0'	0.0	0.0

* From Ground Level
B.G. Background Level

Table 2: (cont'd)

Soil Probe No.	*Depth Ft.	OVM Reading, PPM (peak, vac applied)	OVM Reading PPM, Initial (peak, w/o vacuum)
SP-46	5.2'	0.0	0.0
SP-47	1.0'	30.7	54.1
SP-47	3.0'	44.2	128.0
SP-48	Refusal	----	-----
SP-49	1.1'	3.9	2.6
SP-50	1.1'	13.5	60.5
SP-51	1.0'	19.5	43.8
SP-52	Refusal	---	----
SP-53	1.0'	0.0	0.0
SP-53	2.0'	0.0	0.0
SP-54	1.0'	0.0	0.0
SP-54	2.0'	0.0	0.0
SP-54	3.0'	0.0	0.0
SP-54	4.0'	0.0	0.0
SP-54	4.4'	0.0	0.0
SP-55	1.0'	8.0	4.0
SP-55	2.0'	10.0	8.0
SP-55	3.0'	22.0	22.0
SP-55	4.0'	22.0	12.0
SP-55	4.4'	16.0	16.0
SP-56	1.0'	34.0	42.0
SP-56	2.0'	36.0	50.0
SP-57	1.0'	57.0	57.0
SP-57	1.5'	76.0	71.0
SP-58	1.0'	16.0 (22)	19.0 (22)
SP-59	1.0'	16.0	8.0
SP-59	1.2'	24.0	16.0
SP-60	1.0'	0.0	0.0
SP-60	1.7'	0.0	0.0

Note: These OVM Readings are Peak Readings with the Vac Pump on.

TABLE 3:

Summary of Soil Characterization Boring Details
Marathon Oil Company, Indian Basin Gas Plant
Carlsbad, New Mexico

Boring	Date Drilled	Method	Total Depth, Ft	Bedrock Encounter
BH-1	4-18-91	HSA	5.1	Unknown
BH-2	4-19-91	HSA	3.0	Unknown
BH-3	4-19-91	HSA	12.7	Unknown
BH-4	4-20-91	HSA	11.2	Yes
BH-5	4-20-91	HSA	7.5	Unknown
BH-6	4-21-91	HSA	4.0	Yes
BH-7	4-21-91	HSA	4.1	Possibly
BH-8	4-22-91	HSA	11.2	Possibly
BH-9	4-23-91	HSA	9.5	Unknown
BH-10	4-23-91	HSA	13.0	Possibly
BH-11	4-24-91	HSA	13.1	Yes
BH-12	4-24-91	HSA	12.5	Yes
BH-13	4-25-91	HSA	14.2	Yes
BH-14 (MW-1)	4-25-91	HSA	15.1	Yes
BH-15	4-25-91	HSA	13.0	Yes
BH-16	4-26-91	HSA	14.0	Possibly
BH-17	4-26-91	HSA	10.0	Possibly
BH-18	4-27-91	HSA	12.7	Yes

* Depths measured from ground surface in feet

HSA: Hollow Stem Auger Drilling Methods

April 28, 1991

TABLE 4:

Summary of Soil Boring Headspace Gas Measurements
Marathon Oil Company, Indian Basin Gas Plant
Carlsbad, New Mexico

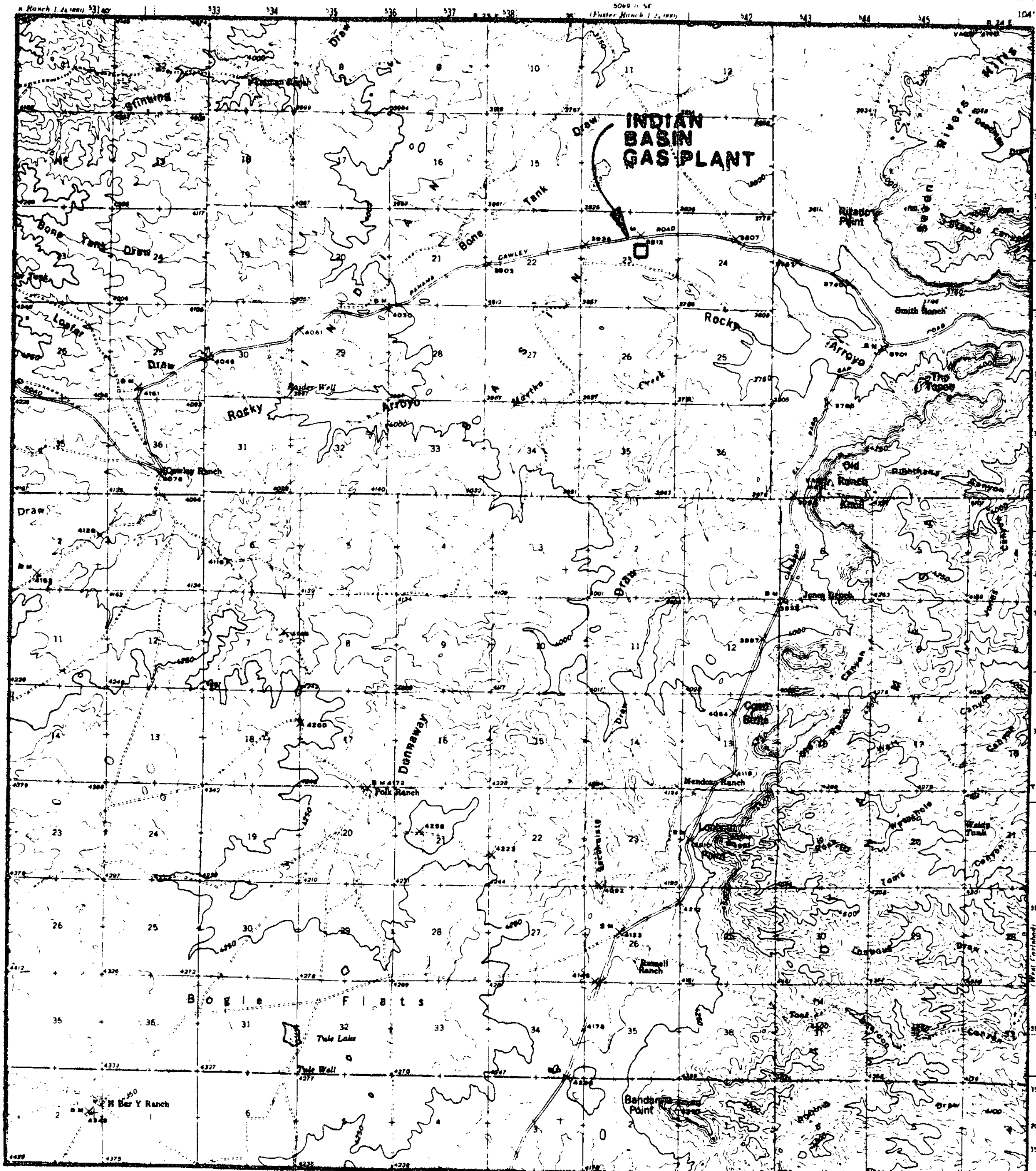
SOIL BORING	SAMPLE INTERVAL, FT	* OVM HEADSPACE READING, PPM	COMMENTS
BH-1	0 - 2.5	NS	Background
	2.5 - 3.5	0.1	Soil: 0.1 PPM
	3.5 - 4.0	NR	Air: 0.2 PPM
	4.0 - 5.1	0.1	
	5.1 - 5.3	NR	
BH-2	0 - 2.5	NS	Background
	2.5 - 3.7	1.0	Soil: 0.1 PPM
	3.7 - 4.0	NR	Air: 0.2 PPM
BH-3	0 - 1.5	0.1	Background
	1.5 - 2.5	NS	Soil: 0.1 PPM
	2.5 - 3.3	1.8	Air: 0.1 PPM
	3.3 - 4.0	NR	
	4.0 - 5.1	4.8	
	5.1 - 5.5	NR	
	5.5 - 9.0	NS	
	9.0 - 10.2	0.3	
	10.2 - 10.8	NR	
	10.8 - 12.0	NS	
	12.0 - 12.4	0.2	
	12.4 - 12.7	NR	
BH-4	0 - 1.0	0.2	Background
	1.0 - 2.5	NS	Soil: 0.1 PPM
	2.5 - 4.0	0.4	Air: 0.4 PPM
	4.0 - 5.5	0.4	
	5.5 - 9.0	NS	
	9.0 - 9.8	0.2	
	9.8 - 10.5	NR	
BH-5	0 - 1.0	0.7	Background
	1.0 - 2.5	NS	Soil: 0.1 PPM
	2.5 - 3.7	1.8	Air: 0.2 PPM
	3.7 - 4.0	NR	
	4.0 - 5.2	0.8	
	5.2 - 5.5	NR	
	5.5 - 6.0	NS	
	6.0 - 7.2	0.6	
	7.2 - 7.5	NS	
BH-6	0 - 2.5	NS	Background
	2.5 - 3.0	0.1	Soil: 0.1 PPM
	3.0 - 3.5	NR	Air: 0.1 PPM
	3.5 - 4.0	NS	

SOIL BORING	SAMPLE INTERVAL, Ft	*OVM HEADSPACE READING, PPM	COMMENTS
BH-7	0 - 2.5	NS	Background
	2.5 - 3.9	0.1	Soil: 0.1 PPM
	3.9 - 4.1	NR	Air: 0.1 PPM
BH-8	0 - 1.0	0.7	Background
	1.0 - 4.0	NS	Soil: 0.2 PPM
	4.0 - 4.6	0.4	Air: 0.4 PPM
	4.6 - 5.5	NR	
	5.5 - 9.0	NS	
	9.0 - 9.9	1.0	
	9.9 - 10.4	NR	
	10.4 - 11.2	NR	
BH-9	0 - 2.0	0.4	Background
	2.0 - 2.6	0.2	Soil: 0.1 PPM
	2.6 - 3.0	NR	Air: 0.2 PPM
	3.0 - 5.0	0.2	
	5.0 - 6.1	NR	
	6.1 - 9.0	NS	
	9.0 - 9.5	NR	
BH-10	0 - 1.0	NS	Background
	1.0 - 2.5	NR	Soil: 0.2 PPM
	2.5 - 4.0	0.7	Air: 0.2 PPM
	4.0 - 4.8	0.5	
	4.8 - 5.5	NR	
	5.5 - 9.0	NS	
	9.0 - 9.5	0.4	
	9.5 - 13.0	NS	
BH-11	0 - 1.0	NS	Background
	1.0 - 2.5	NR	Soil: 0.1 PPM
	2.5 - 4.0	0.1	Air: 0.1 PPM
	4.0 - 5.2	0.1	
	5.2 - 5.5	NR	
	5.5 - 9.0	NS	
	9.0 - 10.1	0.1	
	10.1 - 10.5	NR	
	10.5 - 13.1	NS	
BH-12	0 - 1.0	NS	Background
	1.0 - 2.5	NS	Soil: 0.1 PPM
	2.5 - 3.5	0.3	Air: 0.1 PPM
	3.5 - 5.0	0.3	
	5.0 - 5.5	NR	
	5.5 - 9.0	NS	
	9.0 - 9.8	0.2	
	9.8 - 10.5	NR	
	10.5 - 12.0	NS	
	12.0 - 12.5	220	

SOIL BORING	SAMPLE INTERVAL, FT	*OVM HEADSPACE READING, PPM	COMMENTS
BH-13	0 - 1.0	0.6	Background
	1.0 - 2.5	NS	Soil: 0.2 PPM
	2.5 - 3.7	0.2	Air: 1.5 PPM
	3.7 - 4.0	NR	
	4.0 - 5.5	0.2	
	5.5 - 9.0	NS	
	9.0 - 10.5	0.2	
	10.5 - 14.0	NS	
	14.0 - 14.2	270	
BH-14 (MW-1)	0 - 1.0	NS	Background
	1.0 - 2.5	NS	Soil: 0.2 PPM
	2.5 - 3.3	0.2	Air: 0.5 PPM
	3.3 - 4.0	NR	
	4.0 - 9.0	NS	
	9.0 - 9.8	0.4	
	9.8 - 10.5	NR	
	10.5 - 13.5	NS	
	13.5 - 14.7	11.1	
	14.7 - 15.1	220	
BH-15	0 - 1.0	0.2	Background
	1.0 - 2.5	NS	Soil: 0.1 PPM
	2.5 - 3.5	0.8	Air: 0.2 PPM
	3.5 - 4.0	NR	
	4.0 - 4.9	1.0	
	4.9 - 5.0	NR	
	5.0 - 9.0	NS	
	9.0 - 9.6	2.6	
	9.6 - 10.5	NR	
	10.5 - 13.0	NS	
BH-16	0 - 1.0	NA	Background
	1.0 - 2.5	NA	Soil: PPM
	2.5 - 3.3	NA	Air: PPM
	3.3 - 4.0	NA	
	4.0 - 4.5	NA	
	4.5 - 5.5	NA	
	5.5 - 8.0	NA	
	8.0 - 9.0	NA	
	9.0 - 9.3	NA	
	9.3 - 14.0	NA	

EXHIBIT 1

BANDANNA POINT QUAD.



C.I. : 50'

0 1 2

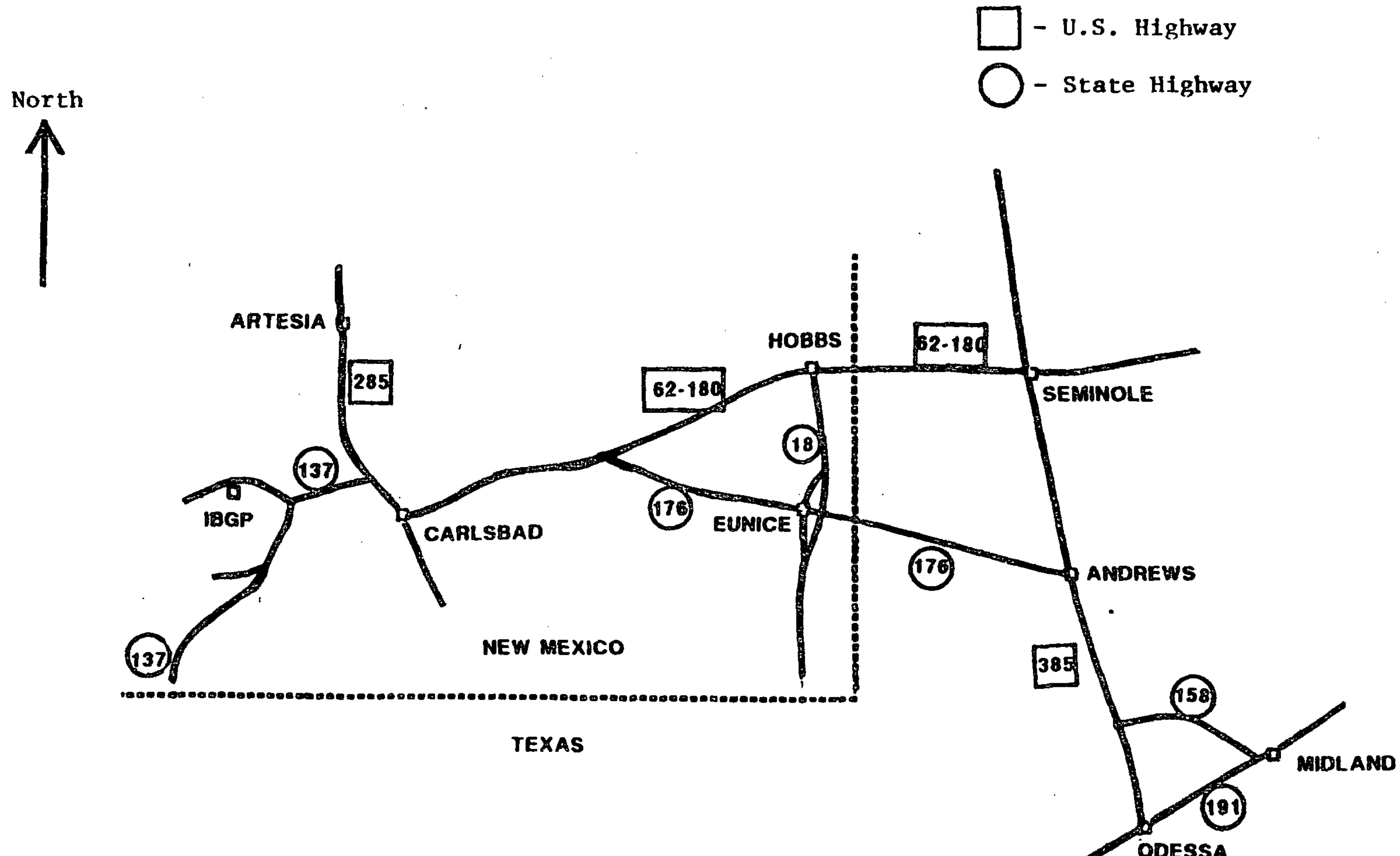
SCALE : MILES

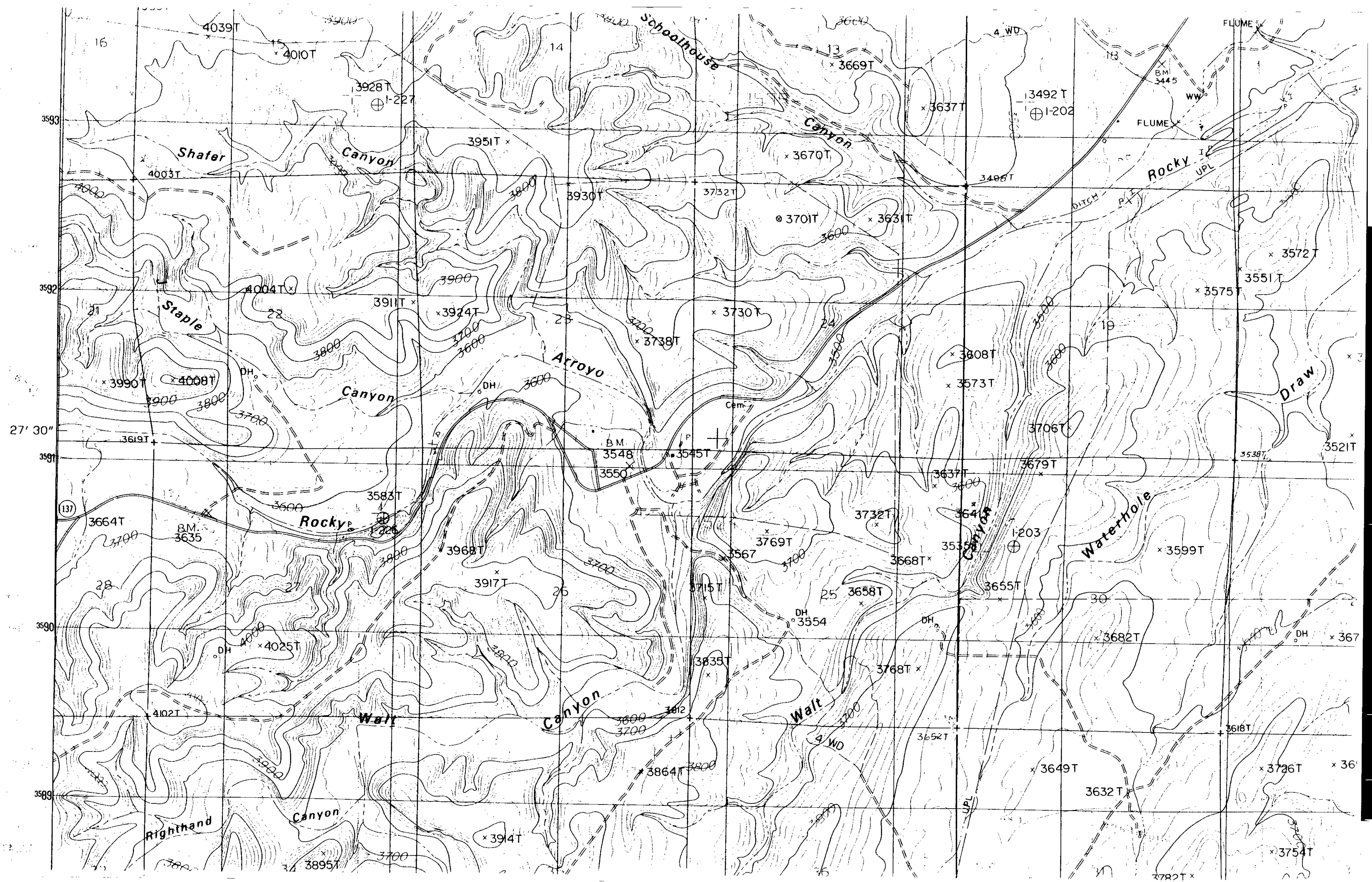
U.S.G.S. (1940)

MAP AND DIRECTIONS TO MARATHON OIL COMPANY

INDIAN BASIN GAS PLANT (from Carlsbad, New Mexico)

- U.S. Hwy 285 North for 12 miles to State Hwy 137 (Sitting Bull Falls and Guadalupe Natl. Park Hwy).
- State Hwy 137 West for 8.9 miles. The road will "Y" at this point.
- Take the right side of the "Y" exiting off State Hwy 137.
- Stay on this road for 4 miles. IBGP will be on the left side of the road.

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Schoolhouse Canyon
Staple Canyon
Arroyo
Rocky
Rocky
Waterhole Canyon
Draw
Walt Canyon
Walt
Righthand Canyon
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FLUME
DITCH
UPL
4 WD
4 WD
BM 3445
BM 3548
B.M. 3635
1-227
1-202
1-203
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27′ 30″
3593
3592
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3590
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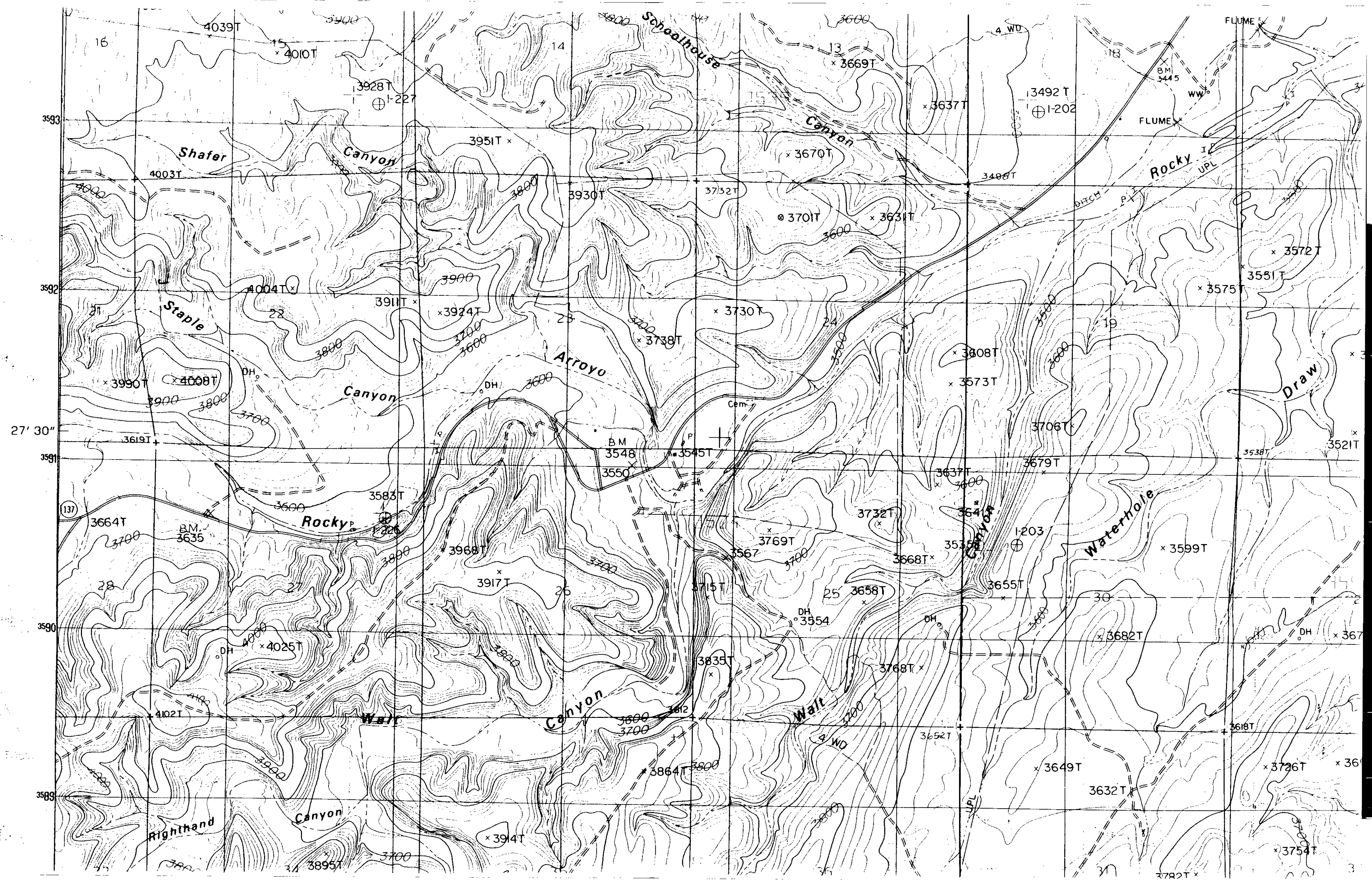

Schoolhouse Canyon
Shafer Canyon
Staple Canyon
Arroyo
Rocky
Rocky
Walt Canyon
Walt
Righthand Canyon
Waterhole Canyon
Draw
27' 30"
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3592
3591
3590
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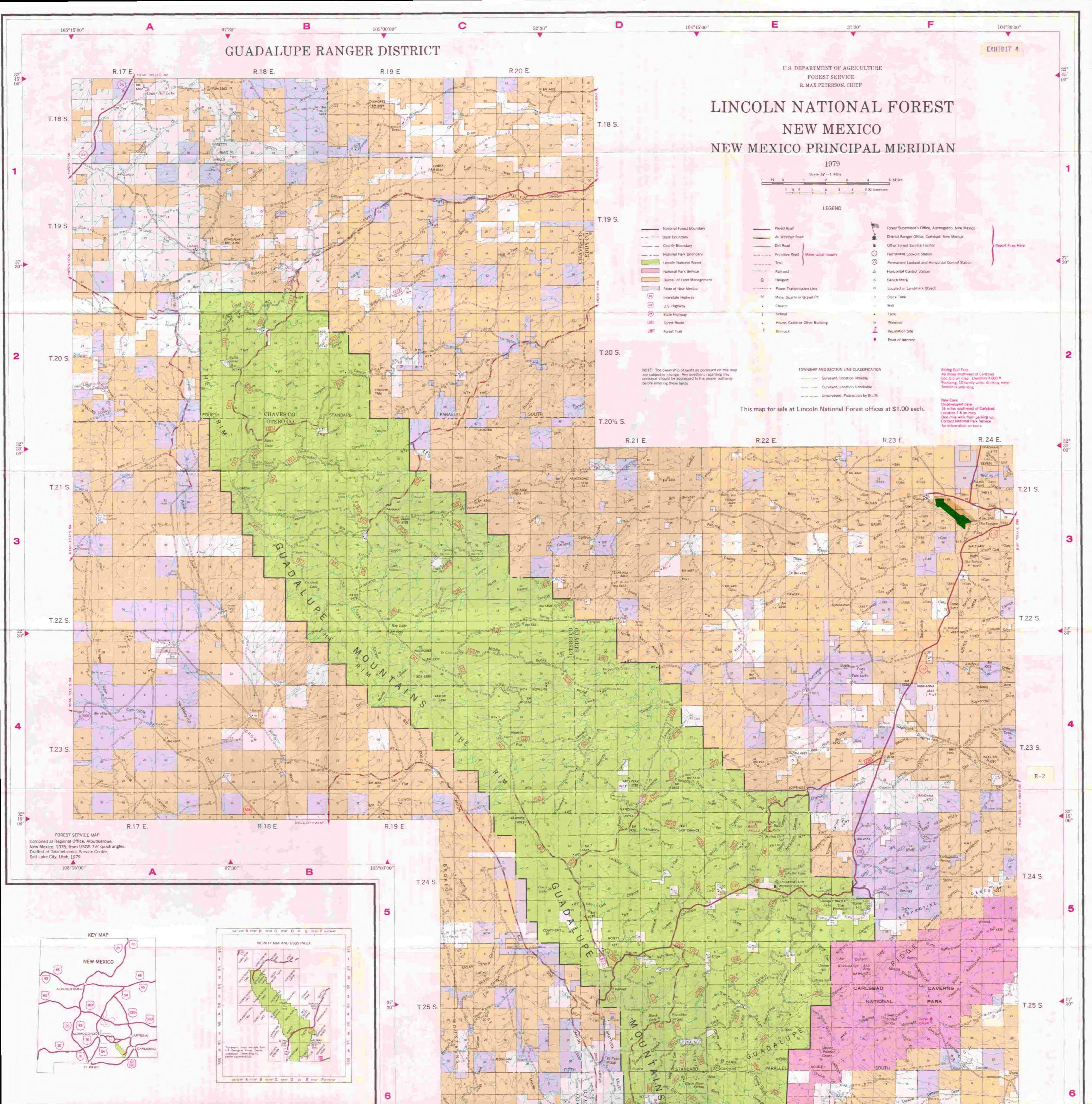
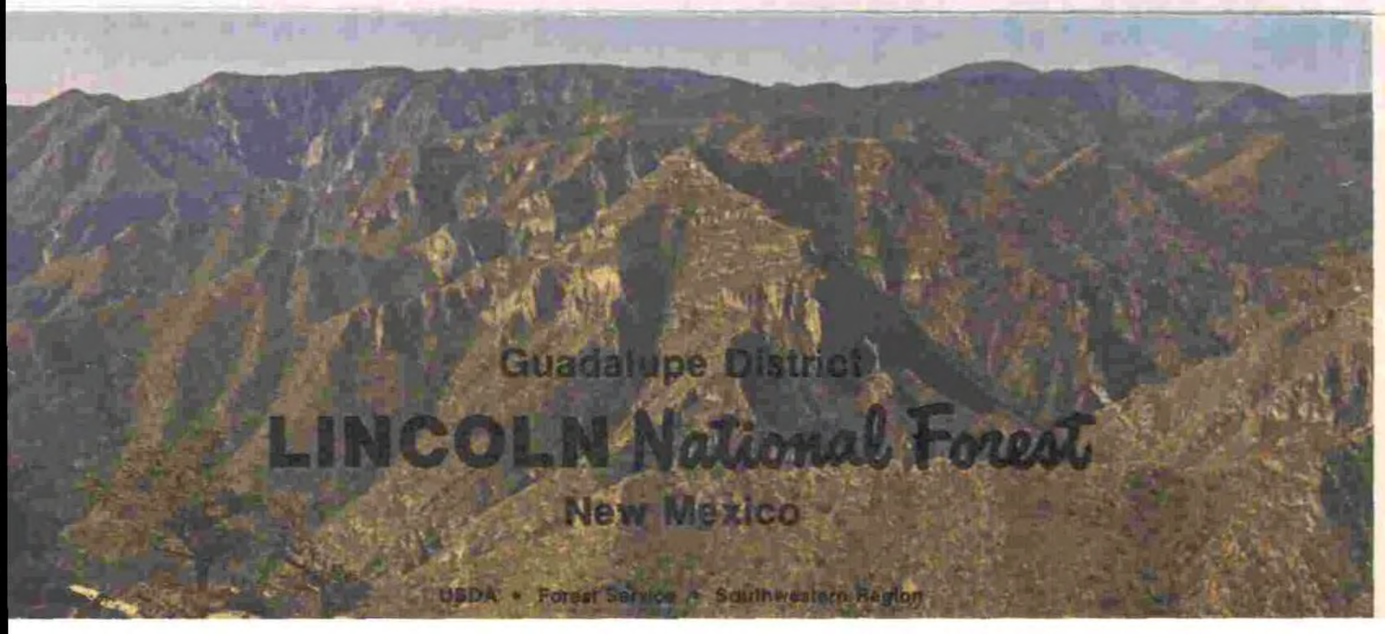


GUADALUPE RANGER DISTRICT
EXHIBIT 4
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
R. MAX PETERSON, CHIEF
LINCOLN NATIONAL FOREST
NEW MEXICO
NEW MEXICO PRINCIPAL MERIDIAN
1979
LEGEND
National Forest Boundary
State Boundary
County Boundary
National Park Boundary
Lincoln National Forest
National Park Service
Bureau of Land Management
State of New Mexico
Interstate Highway
U.S. Highway
State Highway
Forest Route
Forest Trail
Paved Road
All Weather Road
Dirt Road
Primitive Road
Trail
Railroad
Heliport
Power Transmission Line
Mine, Quarry or Gravel Pit
Church
School
House, Cabin or Other Building
Rimrock
This map for sale at Lincoln National Forest offices at $1.00 each.
THE RIM
GUADALUPE THE MOUNTAINS
GUADALUPE MOUNTAINS
CARLSBAD CAVERNS NATIONAL PARK
NEW MEXICO
TEXAS
FOREST SERVICE MAP
Compiled at Regional Office, Albuquerque, New Mexico, 1978, from USGS 7½' quadrangles.
Drafted at Geometronics Service Center, Salt Lake City, Utah, 1979
KEY MAP
NEW MEXICO
VICINITY MAP AND USGS INDEX
Longitude West from Greenwich
Polyconic Projection
1927 North American Datum



Guadalupe District
LINCOLN National Forest
New Mexico

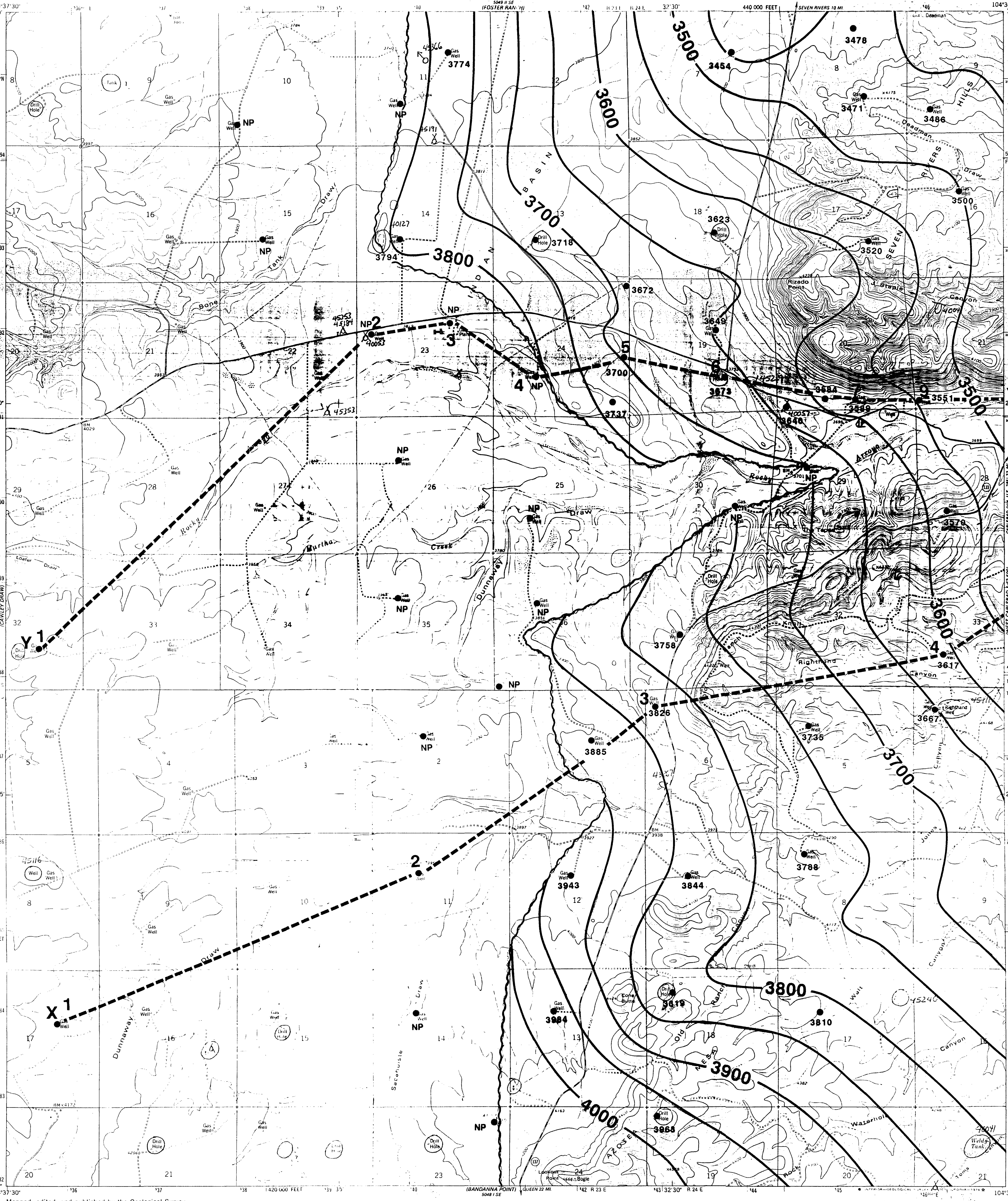
EXHIBIT 6 -

B/UPPER QUEEN AQUIFER

SCALE 1"= 2000'
C.I.=50'

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MARTHA CREEK QUADRANGLE
NEW MEXICO—EDDY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 BANDANNA POINT 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1972. Field checked 1974. Map edited 1978

Projection and 10,000-foot grid ticks: New Mexico coordinate system, east zone (transverse Mercator) 1000-meter Universal Transverse Mercator grid ticks, zone 13, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1978 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface — Light-duty road, hard or improved surface

Secondary highway, hard surface — Unimproved road

Interstate Route — U S Route — State Route

#'s are Corrilated file #'s at BLM office - Rm 118 - Federal Bldg
Tanks + Wells on Public Land only

D Dirt Tank
O Springs
X Windmill
⊙ Sink Hole

MARTHA CREEK, N. MEX.
NE/4 BANDANNA POINT 15' QUADRANGLE
N3222.5—W10430/7.5
1978
AMS 5048 I NE—SERIES V881

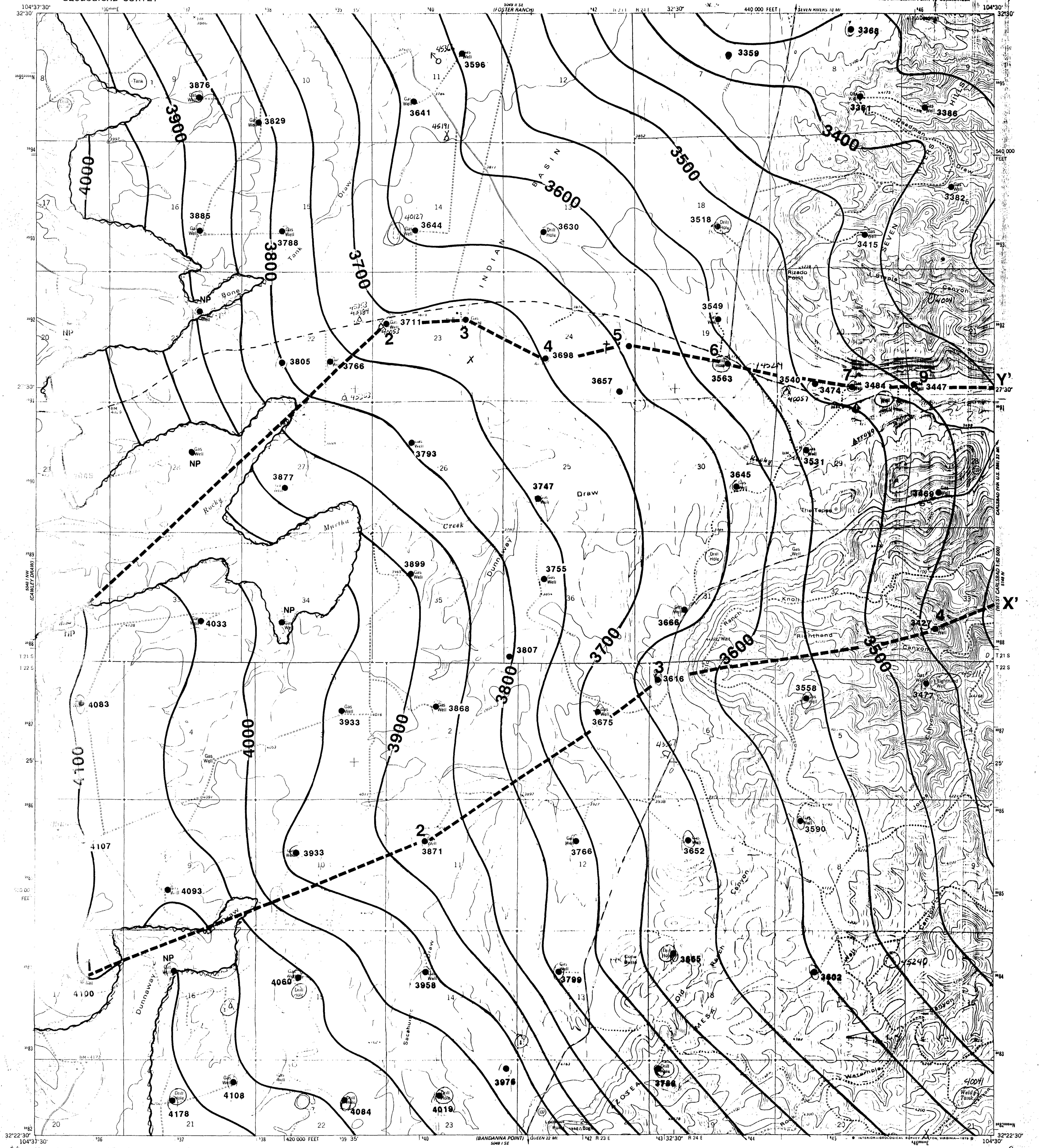
EXHIBIT 7

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

T/LOWER QUEEN AQUIFER

SCALE 1"=2000'
C.I.=50'

MARTHA CREEK QUADRANGLE
NEW MEXICO—EDDY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 BANDANNA POINT 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1972. Field checked 1974. Map edited 1978

Projection and 10,000-foot grid ticks: New Mexico coordinate system, east zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 13, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1978 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Primary highway, hard surface — Light-duty road, hard or improved surface

Secondary highway, hard surface — Unimproved road

Interstate Route — U. S. Route — State Route

NEW MEXICO

QUADRANGLE LOCATION

#'s are Carlsbad File #'s at BLM office - Rm 118 - Federal Bldg
Tanks + wells on public land only

Dirt tank
Springs
Windmill
Stock Hole

MARTHA CREEK, N. MEX.
NE/4 BANDANNA POINT 15' QUADRANGLE
N3222.5—W10430/7.5

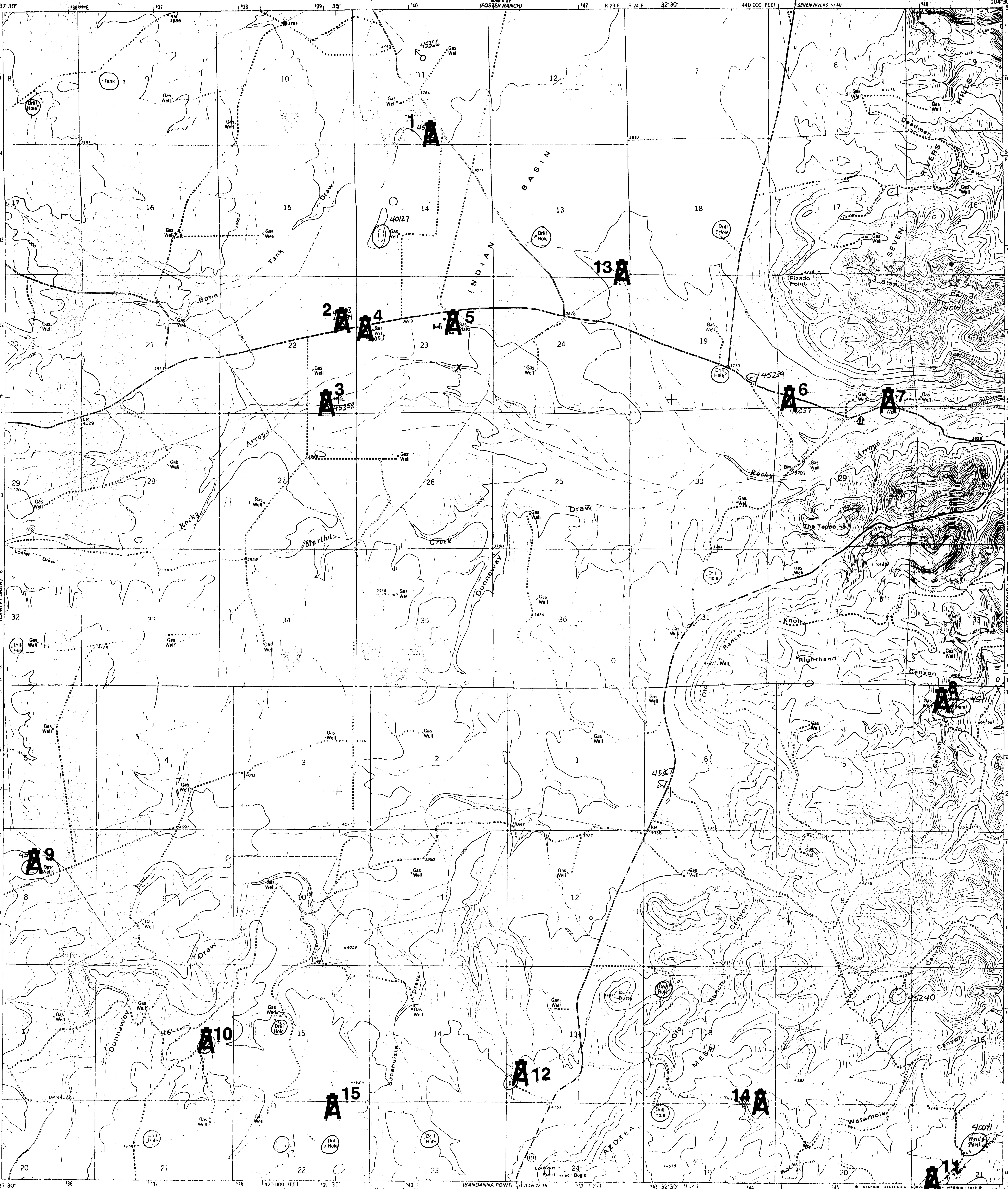
1978

AMS 5048 I NE—SERIES V881

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPROXIMATE LOCATION OF KNOWN WATER WELLS

MARTHA CREEK QUADRANGLE
NEW MEXICO—EDDY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 BANDANNA POINT 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1972. Field checked 1974. Map edited 1978

Projection and 10,000-foot grid ticks: New Mexico coordinate system, east zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 13, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1978 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

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NATIONAL GEODETIC VERTICAL DATUM OF 1929

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NEW MEXICO
QUADRANGLE LOCATION

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Tanks & wells on public land only
U Dirt tank
⇐ Springs
X Windmill
⊙ Steel tank

MARTHA CREEK, N. MEX.
NE/4 BANDANNA POINT 15' QUADRANGLE
N3222.5—W10430/7.5
1978
AMS 5048 I NE—SERIES V881

UNITED STATES
DEPARTMENT OF THE INTERIOR
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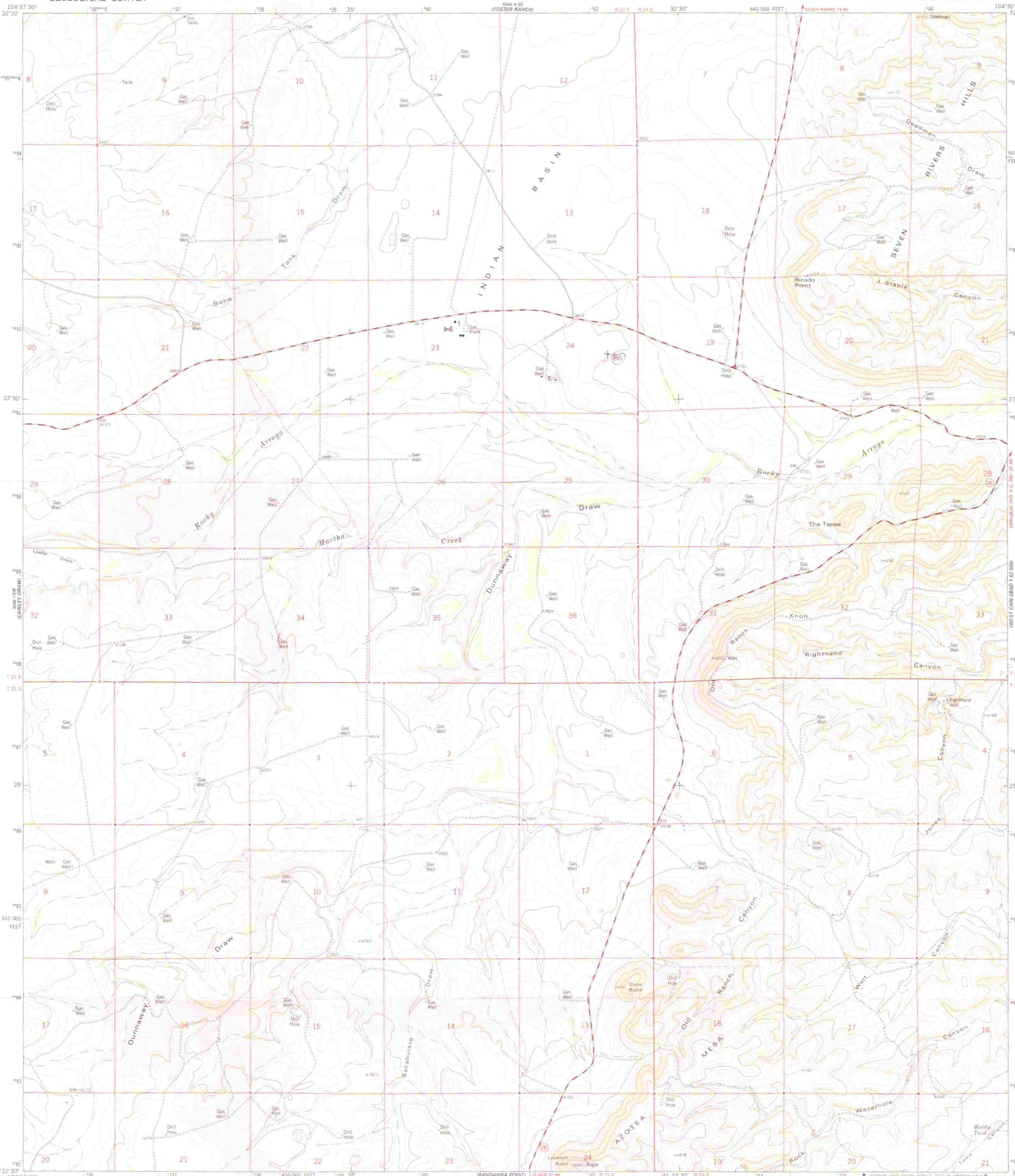
MARTHA CREEK QUADRANGLE
NEW MEXICO—EDDY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 BANDANNA POINT 15' QUADRANGLE



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MARTHA CREEK, N. MEX.
NE/4 BANDANNA POINT 15' QUADRANGLE
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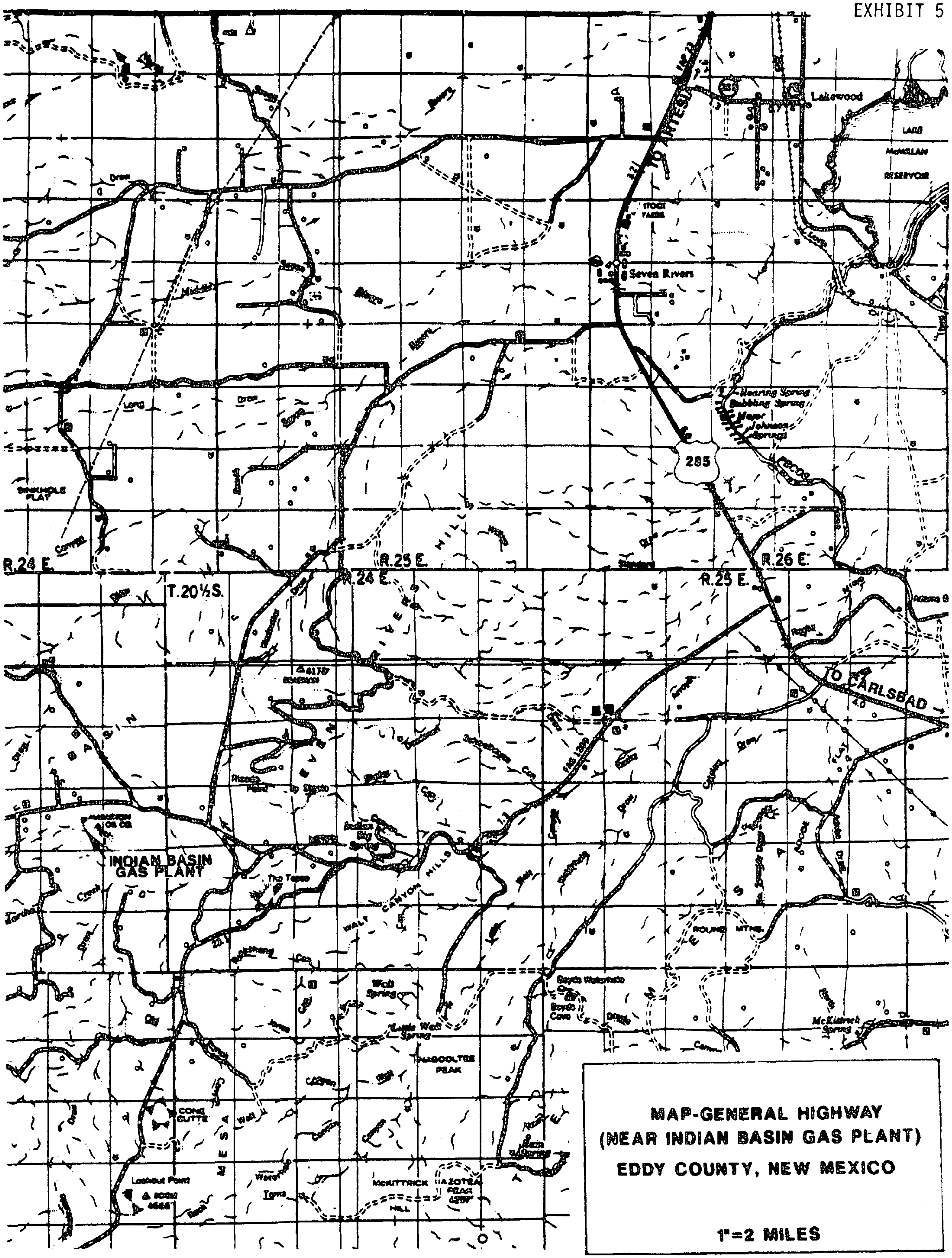


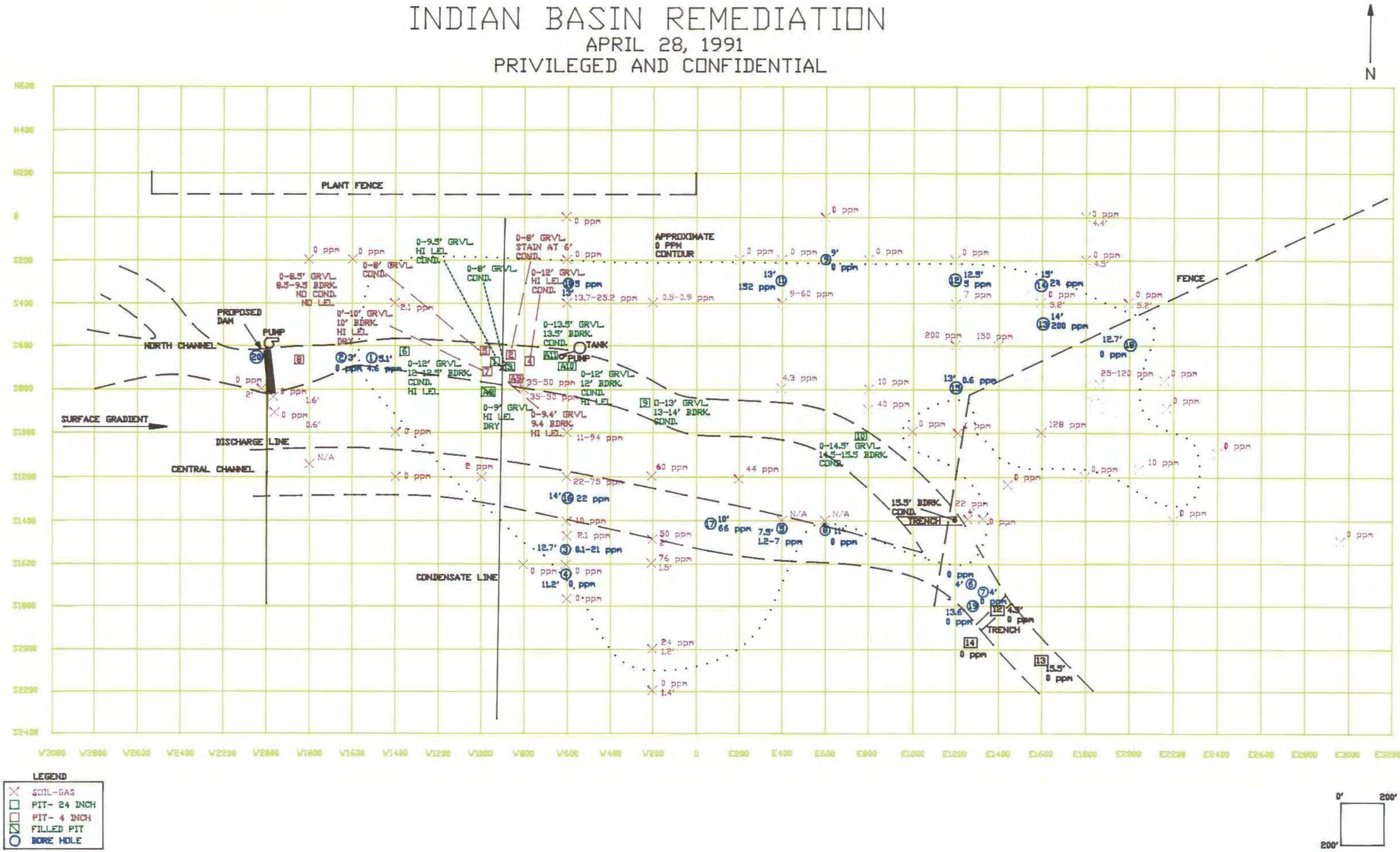
MAP-GENERAL HIGHWAY
(NEAR INDIAN BASIN GAS PLANT)
EDDY COUNTY, NEW MEXICO
1"=2 MILES
INDIAN BASIN
GAS PLANT
TO ARTESIA
TO CARLSBAD
Lakewood
Seven Rivers
LAKE
McMILLAN
RESERVOIR
285
R.24 E.
R.25 E.
R.26 E.
T.20½S.
SINKHOLE
FLAT
Roaring Spring
Bubbling Spring
Major
Johnson
Springs
McKittrick
Spring
ROUND MTNS.
WALT CANYON HILLS
Boyds Waterhole
Boyds
Cave
Little Wall
Spring
NAGOOLTEE
PEAK
McKITTRICK
HILL
AZOTEA
PEAK
Lookout Point

EXHIBIT 9

INDIAN BASIN REMEDIATION

APRIL 28, 1991

PRIVILEGED AND CONFIDENTIAL



SOIL BORING	SAMPLE INTERVAL, FT	*OVM HEADSPACE READING, PPM	COMMENTS
BH-17	0 - 1.0	NA	Background
	1.0 - 2.5	NA	Soil: PPM
	2.5 - 4.0	NA	Air: PPM
	4.0 - 4.3	NA	
	4.3 - 5.5	NA	
	5.5 - 9.0	NA	
	9.0 - 9.8	NA	
	9.8 - 10.0	NA	
BH-18	Log not yet available		

NS: No sample obtained, auger drilled

NR: No sample recovery, split spoon sample

*OVM Readings are in PPM of total ionizable hydrocarbon based upon a isobutylene standard.

Unstabilized Condensate

Distillation Data

Percent Over	Temperature, Deg/F
First Drop	90
5%	138
10%	160
20%	186
30%	194
40%	220
50%	234
60%	246
70%	264
80%	290
90%	338
95%	-
End Point	414

Recovery: 94.0%

Residue: 3.0%

Loss: 3.0%

API Gravity: 64.1 @ 60 degree F

Specific Gravity: 0.7230