CASE 4616: Appli. of MARATHON OIL CO. FOR A WATERFLOOD PROJECT, LEA COUNTY, NEW MEXICO.

Case Number

4610

Application

Trascripts

Small Exhibits

ETC.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

October 27, 1971
Examiner Hearing

---

IN THE MATTER OF:

Application of Marathon Oil Company for a unit agreement, Lea County, New Mexico. — Case No. 4615

and

Application of Marathon Oil Company for a waterflood project, Lea County, New Mexico. — Case No. 4616

---

BEFORE: ELVIS A. UTZ, EXAMINER

TRANSCRIPT OF HEARING

MR. UTZ: Case 4615.

MR. HATCH: Do you want to combine these cases for purposes of the testimony?

MR. MORRIS: Please.

MR. UTZ: We will call Case 4615 and 4616.

MR. HATCH: Case 4615. Application of Marathon Oil Company for a unit agreement, Lea County, New Mexico, and Case 4616, application of Marathon Oil Company for a waterflood project, Lea County, New Mexico.

(Whereupon, Applicant's Exhibits 1 through 7, 7A, 7B, 8A, 8B, 9A, 9B, 9C, 9D, 9E, 9F, 9G, 9H, and 10 were marked for identification.)

MR. MORRIS: Mr. Examiner, I am Richard Morris of Montgomery, Federeci, Andrews, Hannett and Morris, Santa Fe, and with me is Mr. Jack McAdams of Marathon Oil Company, Houston, Texas.

We appear for the Applicant. We will have two witnesses, and I ask that they both stand and be sworn at this time.

(Witnesses sworn)

MR. UTZ: Are there other appearances? You may proce .

ALVIN W. HANLEY

having been first duly sworn, according to law, upon his oath testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Hanley, please state your name, by whom you are employed and in what capacity and where you are located.

A My name is Alvin W. Hanley. I am employed by Marathon Oil Company as a land man in Midland, Texas.

Q Will you state briefly your education and your experience in the petroleum industry?

A I received a B. S. degree in mechanical engineering from Texas Technological College in 1947 before being employed by Gulf Oil Company as an engineer trainee.

In 1949 I joined Ohio Oil Company, now Marathon Oil Company, as a scout. Since 1954 I have served Marathon as a land man in Texas and New Mexico.

MR. MORRIS: Are the witness' qualifications acceptable?

MR. UTZ: Yes, they are.

Q What does Marathon seek by its application in Case 4615?

A Case 4615 is the application of Marathon Oil Company for approval of the unit agreement for the proposed Marathon South Eunice Seven Rivers Queen unit for authority to install a waterflood in the unit area.

Q Please refer to what has been marked as Exhibit No. 1, the unit agreement, identify it and discuss the agreement.

A Exhibit 1 is the proposed unit agreement for the Marathon

South Eunice Seven Rivers Queen unit. It has three exhibits attached.

Exhibit A is a plat of the unit area showing the tract numbers assigned to the various leases included in the unit area with the unit boundary being designated by a broken line.

The lessors, lessees and well designations are shown in the usual manner.

The unit area as shown on Exhibit A is as follows: all being in Township 22 South, Range 36 East, Lea County, New Mexico, southwest quarter, southwest quarter of Section 23, south half, southwest quarter of Section 24, west half northeast quarter, northwest quarter, west half southwest quarter and northeast quarter, southeast quarter of Section 25, all of Section 26, the east half of Section 35, west half northwest quarter, southeast quarter, northwest quarter, southwest quarter, west half southeast quarter and southeast quarter southeast quarter of Section 36, containing 1840 acres more or less.

Exhibit B is a tabulation of each lease showing unit tract number, acreage, lease information, royalty, overriding royalty and working interest ownership data.

Exhibit C shows initial and final tract participation factors.

Q What type of land is involved in this unit?

A The unit area is composed of -- comprised of two state tracts and five fee tracts with state acreage totaling 1360 acres for 73.9 percent of the unit area and 480 acres of fee acres or 26.1 percent of the unit area.

Q Is there any federal land involved in this unit?

A No federal land.

Q What formation is unitized?

A The unitized formation is defined in Article 2, Section 11 as that subsurface portion of the unit area commonly known and described as that certain stratographic interval occurring between one hundred feet above the base of the Seven Rivers formation and three hundred feet below sea level, the base of the Seven Rivers formation being identified as occurring at the location depth of 3686 feet, 214 feet below sea level.

On the gamma ray log run by Slummer Jay Well Surveying Corporation and the Marathon Oil Company, formerly the Ohio Oil Company, McDonald State Account 1B, Well No. 21, which well is situated 660 from the west line and the 1980 feet from the north line of Section 25, Township 22 South, Range 36 East, Lea County, New Mexico.

The Exhibit 2 which will be discussed by our engineering witness shows this in detail.

Q All right. That Exhibit 2 is the log section on the well that is the control well for purposes of defining the

unitized formation?

A Correct.

Q Okay. Under the unit agreement what is the base of tract participation?

A As detailed in Article 13, Paragraph 1, the initial tract participation is based on twenty-five percent of each tract's oil production from the unitized formation during the period from January 1, 1969, until October 1, 1969, and seventy-five percent on each tract estimated primary oil production from the unitized formation after October 1, 1969.

Gas is equated into equivalent oil for these calculations. The final tract participation is calculated one hundred percent on the basis of each tract's estimated ultimate primary oil reserve from the unit formation.

If no secondary recovery program is implemented, as stated above these participations for each tract are shown in Exhibit C of the unit agreement.

Q Would you point out some of the most important features of the unit agreement?

A Article 4 prescribes the procedure for expanding the unit area, although no expansion is now anticipated.

Article 6 designates Marathon Oil Company as unit operator, and Article 7 and 8 detail procedures for resignation or removal of operators and election of a

successor operator.

Article 14 provides the requirements for qualifying a tract for unit participation. Article 17 covers the settlement of royalties, and Article 23 provides the effective date and term, the effective date is the first day of the calendar month, next following one, the commitment of eighty-five percent of the unit's area by working interest owners, two, approval of the Commissioner of Public Lands and of the Oil Conservation Commission, and three, the filing of a counterpart of this agreement for records in the office of the County Clerk of Lea County, New Mexico.

Q Assuming that you get approval of your unit agreement when would you expect to make it effective?

A Approximately December 1 of 1971.

Q Have you obtained approval of the unit agreement as to form and content from the Commissioner of Public Lands?

A Yes, sir. Preliminary approval as to form and content was secured on May 5, 1971, from the office of the Commissioner and a copy of his letter granting that is entered as Exhibit 10.

Q Okay. Would you inform the examiner as to the extent to which this agreement has been approved and ratified by the various working interests and royalty interest owners in the unit area?

A Yes, sir. At this time one hundred percent of the working interest ownership has ratified the unit agreement, being Marathon, Continental Oil Company, Geddy Oil Company, Shell Oil Company, and Gulf Oil Corporation.

We have secured ratification by all of the royalty owners with the exception of Atlantic-Richfield.

There is one overriding royalty interest which is also owned by Atlantic-Richfield.

The Atlantic's district land man in Midland informed me last Friday that this unit agreement has received the approval of his company.

However, since the overriding royalty is subject to the Western natural gas production payment ratification requires three additional signatures of which they have received two, and they anticipate that the third should now have been received and we will be furnished their ratification very shortly.

Q So assuming that you have the sign-up of the interests that are according to your understanding are committed to your units you will have a hundred percent sign-up of all working interest and royalty interest and --

A And overriding royalty interests. I did fail to say that we -- all fee tracts have qualified under the provision of the unit agreement. The Atlantic-Richfield owns a minor royalty interest in four tracts, and an overriding one tract.

We do not have an approval by the Commissioner of Public Lands yet. Those are the only two tracts that have not qualified.

Q All right.

MR. MORRIS: At this time, Mr. Examiner, we would offer into evidence Exhibits 1, 2 and 10.

MR. UTZ: I was looking for 10 here.

MR. MORRIS: It is the very bottom of the pile.

THE WITNESS: Letter from the Commissioner.

MR. UTZ: Without objection Exhibits 1, 2 and 10 will be entered into the record of this case.

MR. MORRIS: That's all I have on direct examination.

MR. UTZ: Are there questions of the witness? He may be excused.

(Witness excused)

WAYNE R. MYER

having been first duly sworn, according to law, upon his oath testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Myer, please state your name, where you reside, by whom you are employed and in what capacity.

A Wayne R. Myer, employed by Marathon Oil Company as a petroleum engineer in Midland, Texas.

I am in charge of our waterflood engineering in that

office.

Q Will you state briefly your education and your experience in the petroleum industry?

A I graduated from Texas A & I University with a B. S. degree in natural gas and petroleum engineering in 1955.

I was employed in June 1955 as a petroleum engineer with the Ohio Oil Company, now the Marathon Oil Company.

I served over ten years in field reservoir and staff positions, engineering positions at various locations in Mississippi, Louisiana and east Texas.

I then served over five years in engineering capacities in Indiana and Illinois, including the last three years as an engineering supervisor of approximately 1000 waterflood wells.

I was transferred to Midland, Texas, on August 1, 1971 and have been serving in a position of coordinating Marathon's waterflood engineering activities in west Texas and New Mexico.

MR. MORRIS: Are the witness' qualifications acceptable?

MR. UTZ: Yes, they are.

Q Mr. Myer, are you familiar with the South Eunice Seven Rivers Queen pool and Marathon's application for instituting a waterflood project in this case?

A Yes, I am.

Q You have heard Mr. Hanley's testimony with respect to the unit agreement. What is the purpose of this unit?

A This unit is being formed for the purpose of conducting waterflood operations in the unit area.

Q Would you refer now to Exhibit No. 3, being the plat of the unit area and just point out the unit and some of the principal features as shown on this exhibit?

A Exhibit 3 is a plat of the South Eunice Seven Rivers Queen unit area and an area two miles in each direction from the unit boundary.

The lease ownership and location and identification of wells are shown on this plat. The formations from which each well is producing is shown by the appropriate symbol and a legend.

You will notice that all Seven Rivers Queen oil wells are shown by just a simple dark circle, blue.

The oil wells being proposed for conversion to injection are shown by the red colored-in circles.

Q Does this plat show the limits of the unit area?

A Yes, it does. The unit area as you see, it is bounded on the west side and on the southwest edges by adjacent unit there which is currently being formed by the Atlantic-Richfield Company.

The very northwest end of our unit, you will notice, is bounded by Continental's unit which is already active.

The north and east sides of the unit corresponds to the outer limits of the oil productivity of the Seven Rivers Queen interval.

There are several dry holes shown along the outside of the unit. These wells did not have sufficient permeability and oil saturation to make commercial wells.

There is one well, one producing well located on the outside of the unit area. This is the George W. King Ray Well No. 2 on a Christmas lease.

Q This is in Unit J of Section 25?

A That's right.

Q Okay.

A The King Ray interest was invited to join the unit but he elected to be excluded from unit participation.

The south end of the unit corresponds to the south end of the South Eunice Seven Rivers Queen oil pool.

The wells shown directly south of Section 36 are in the Langlie Mattix field but are producing from the same formation.

You will notice these wells on Skelly and Texas Pacific leases. Both these companies, Skelly and Texas Pacific who operate the lease in Section 1 were contacted regarding our proposed unit.

Each company stated they had no objection to our proposed unit or waterflood.

Q All right. Now, please refer back to Exhibit 2 that was referred to by Mr. Hanley in his testimony and point out the specific intervals shown on that log that will be flooded in this project.

A Exhibit 2 is a gamma ray sonic log on Marathon formerly Ohio Oil Company McDonald State Account 1B, Well No. 21, the base of the Seven Rivers formation which also is the top of the Queen formation is marked on a log with a solid red line and is shown at a depth of 3686 feet or sub-sea depth of minus 214 feet.

The top of the unitized interval is 100 feet above the base of the Seven Rivers formation and is shown on a log with a dashed red line at 3586 feet.

This depth also represents the top of the interval cover by the South Eunice Seven Rivers Queen pool field rules.

The bottom of the unitized interval is 350 feet below sea level and is shown on the log by a dashed red line at 3822 feet.

The field rules for the South Eunice Seven Rivers Queen pool covers the interval to the base of the Queen formation which is an estimated 150 feet below the base of the interval logged in this well.

The wells in a unit area are primarily completed in a top 100 feet of the Queen formation, and this will be the

interval that will be waterflooded.

Expansion of the waterflood along the west edge of the unit may also include part of the lower Seven Rivers interval.

Q All right. Will you refer to the Exhibit No. 4, being your structure map, and point out the information shown on that exhibit?

A Exhibit No. 4 is a structure map in the unit area contoured on the top of the Queen formation. The entire oil accumulation appears to be stratographically controlled.

Regionally the strata dips to the southwest, and the proximity of the unit area -- however, the structure becomes complicated by local features as a contour show.

Actually there is relatively little structural relief in the unit area. The structure would not be expected to have an effect on a waterflood operation.

Q Referring to Exhibit No. 5 would you give a brief history of the development and production that has been experienced in the unit area?

A Discovery of the South Eunice pool dates back to May 1930. However, development in the unit area began in February 1957.

Exhibit No. 5, showing the monthly oil production fairly well shows the history of the area. Development began in 1957 in the northwest section of the unit and

spread to the south half of the unit.

During 1958 twenty-eight oil wells were completed during these two years and corresponds to the production shown in late 1958.

There is no additional development until 1961 and the beginning of 1962, at which time most of the northeast section of the unit was drilled with an additional fifteen completions.

This accounted for forty-three of the forty-five wells in the unit. The other two wells were drilled in late 1963.

Other variations shown are due primarily to a small amount of recompletions and stimulation work. The decline in production since 1963 has been rather rapid, as you can see.

Q How were the wells in the unit area completed and what were their producing characteristics?

A Most of the wells were drilled about 100 feet into the Queen, casing set to total depth, then the same sections were selectively perforated, treatment normally consisted of 10,000 gallons of jelled lease crude with one pound per gallon of sand.

Some wells were treated with volumes up to about 40,000 gallons.

Initial flowing potential generally ranged from 100 to

500 barrels of oil per day with no water, and a g.o.r. of 400 to 1 to about 100 to 1.

One well which is perforated in the lower Seven Rivers and the Queen had a g.o.r. of 7700 to 1. Some wells were placed on gas left a pumping initial, but most wells flowed for three years or more before requiring artificial lift.

G.o.r.'s have generally averaged less than 5000 to 1 throughout the primary lift of the wells. Current g.o.r. is approximately 5200 to 1.

Most of the wells produced little or no water, generally about one barrel of water per day per well.

Q And what is the current status of the production from the wells in the unit area?

A Well, there are forty-five wells in the proposed unit, but only twenty-five of these wells were producing during the month of July 1971. Production for July 1971 averaged 78 barrels of oil per day or about 3.3 barrels of oil per day per well.

The maximum oil production from any well during this month was 8.7 barrels of oil per day.

The above production rates indicate the wells in the unit area are at or very near the economic limit of production.

Q What has been the cumulative production from the wells in the unit area?

A Production as of 8/1/71 for the unit area totaled 2,473,269 barrels of oil.

Q During the primary phase of operation in this area what was the producing mechanism?

A The reservoir drive mechanism for the unit area has been a solution gas drive.

Q Referring to the data sheet marked as Exhibit 6, point out the information shown on that exhibit.

A Exhibit No. 6 is a tabulation of data in regard to the reservoir rock and fluid characteristics and estimated waterflood performance.

You will notice the net feet porosity, permeability, water saturation, so forth is shown here.

Q All right. I observed the note that you have on this exhibit that the values given are for the Queen only and would not pertain to those wells in which some Seven Rivers flooding would occur.

A That's right. There would be some additional reserves which could be attributed to the lower Seven Rivers.

Q All right. Would you now refer to your Exhibit 7 and 7B, being the cross-sections, and point out the information shown on those exhibits?

A These are cross-sections showing log reductions of the Queen and lower Seven Rivers formation.

Exhibit A is a north-south cross-section. You will

notice on Exhibit A on the side where it shows what area this cross-section encompasses from A prime to A, Exhibit B is an east-west cross-section, a porous interval in the lower Seven Rivers formation, approximately fifty feet above the Queen has been correlated across the field.

The top of the Queen and two producing intervals within the Queen have also been correlated across the unit area.

Individual stringers cannot always correlated across the unit, but the general productive intervals can be correlated.

Q On the basis of this correlation and the other data shown, in your opinion, will your waterflood project or will waterflooding be feasible in this unit area?

A Yes. Yes. I have reviewed the available data in regard to porosity, permeability, oil saturation, lowered characteristics, a productive zone continuity and oil recovery under primary operations.

This data was used to calculate waterflood performance by accepted methods.

This calculation of waterflood performance is substantiated by generalized analogy of waterflood projects of similar projects currently being carried out in the Queen formation of the immediate area including the Skelly Penrose A and B units, Anadarko's Penrose unit, and Wood,

McShane State M lease waterflood.

My opinion is that the unit area can be successfully and economically waterflooded.

Q What degree of success would you expect to enjoy in your waterflood project?

A We anticipate a recovery of approximately 1.8 million barrels of oil from waterflooding which would not be recovered otherwise. I might point out that the State L Self A-1 eighth regular royalty or approximately seventy-six percent of this added recovery which amounts to about 17,000 barrels of oil.

Q Will you now refer to the schematic diagrams of your injection wells which have been marked as Exhibits 8A and 8B and point out how the injection wells would be equipped?

A Okay. Exhibits Nos. 8A and 8B show a schematic diagram of the proposed injection wells and a tabulation of well data for each of the eight wells being requested for conversion to injection service.

You will note that data on four wells tabulated on Exhibit No. 8A and data for the other four wells are tabulated on Exhibit No. 8B.

The size and setting depth of each casing string, the amount of cement used and the estimated cement tops, packer depths, formation depths, and the interval open to the formation is shown for each well.

Connections will be included at the surface whereby pressures on both the annulus and tubing can be obtained.

The annulus between the tubing and production casing will be loaded with corrosive resistant fluid.

The tubing will have an internal protective coating to combat corrosion.

Q Now, do you intend to actually install a gauge, a permanent gauge on the annulus for each of the injection wells?

A We will not have a permanent gauge installed. We will be taking pressures at least once a month.

Q In your opinion is that procedure preferable to having a permanent gauge on these wells?

A We feel it is since if you have individual gauges, leave gauges on individual wells they have a tendency to get off in time, and by using one gauge which has been calibrated it does give a better indication of true measures.

Q In your opinion will the manner of completing and operating these injection wells adequately protect the water zones and prevent the injection water from entering other formations?

A Yes, it will. Surface casing has been set to a depth of 203 feet to 442 feet, and in each case the cement was circulated to the surface. Fresh water in the area is obtained from the Ogalala which occurs within 100 feet from the surface.

The cemented surface casing should protect this fresh water zone. With regards to protecting other hydrocarbon zones please note that the top of the cement around the production casing as shown on the exhibits. The first well, the McDonald State No. 20 had cement up into the surface casing at 235 feet as determined from a temperature log.

The next five wells shown have cement circulated out the production surface casing annulus.

The last two wells had a calculated top of cement of over 850 feet above the perforated interval.

In cementing program in each of these wells will be sufficient to protect any other hydrocarbons known which may exist in the area.

Q All right. Will you refer to the group of exhibits marked as 9A through 9H and state what they are and why you are presenting them?

A Exhibits 9A through 9H are logs showing the unitized area in each of the wells which we propose to convert to injection service.

The top of the Queen is shown on each of these logs.

Q These are your eight injection wells?

A That's right.

Q All of the eight injections?

A That's right.

Q What type of waterflood pattern is proposed?

A I would like to have you refer back to Exhibit No. 3, the proposed eight injection wells are indicated with circles colored in red.

As you will note we will be using a basic five spot pattern on 40-acre spacing, three enclosed five spot elements will be developed initially.

A total of twenty-two proration units will be located within the project area initially.

Q What are your plans for expanding the waterflood beyond the initial phase?

A Our current plan is to develop the entire unit area with a total of twenty-two injection wells. We expect to convert all of these wells to injection service within two to three years after the unit becomes effective.

These wells will also be located on basic five spot patterns. We will be cooperating with the offset waterflood unit operators to take mutual advantage of cross-line injection wells and to protect the correlative rights.

We request that administrative procedure be set up whereby an approval but a conversion of additional wells to injection service can be obtained without having to show well response.

Q Would that administrative approval facilitate your conversion of the additional fourteen wells to injection

service?

A Yes, sir.

Q Would the standard type administrative procedure that has been adopted by the Commission for use in unitized areas be acceptable in this connection?

A Yes, it would be.

Q How much water do you expect to inject in connection with this project?

A We expect to inject approximately 2000 barrels of water per day into the eight injection wells, initially before fill-up and the pressure build-up the rate would probably approach about 500 barrels of water per day in some of these wells with the maximum injection pressure being 1400 to 1800 p.s.i.

Ultimately we anticipate injecting about 5500 barrels of water per day into the twenty-two wells.

Q What is the source of this water?

A Make-up water for injection will be from the Seven Rivers reef, water source wells located approximately five miles southwest of the unit, samples of water from this same source, approximately six miles southeast of the planium supply had properties which showed general compatibility with the reservoir rock and fluid in the unit area.

Water from this source is being used successfully in several Queen waterfloods in the area. Produced water when

it becomes of sufficient quantities will supplement the make-up water.

Q What allowables do you anticipate in connection with this project?

A There are forty-five wells which would be in operation during waterflood. Each on a 40-acre proration unit. This number multiplied by the October '71 basic normal unit allowable for southeast New Mexico have seventy barrels per unit per day, that gives a total maximum unit allowable of 3150 barrels per day.

Actual maximum oil production from the unit is anticipated to approach about 800 barrels per day after about four years.

Q Were the exhibits to which you have testified prepared by you or under your supervision?

A Yes, they were.

MR. MORRIS: At this time, Mr. Examiner, we offer into evidence Exhibits 3 through 9H.

MR. UTZ: Exhibits 3 through 9H will be entered into the record of this case.

MR. MORRIS: That's all we have on direct examination.

CROSS-EXAMINATION

BY MR. UTZ:

Q Mr. Myer, I believe you testified that surface casing on the -- on all the wells including the 200 foot surface

casing would protect all fresh water in the area.

A Yes, we feel it would.

Q Is there no fresh water flow --

A I am not acquainted with any fresh water that is being utilized in the area that is below that depth.

Q Now, have you noted these locations of your eight injection wells in the application that was submitted by Mr. Morris?

A Yes.

Q And are they correct?

A Yes, they are.

Q All these wells will have internally coated tubing with a packer?

A That's right, sir.

Q And you will be injecting into the packer?

A That's right.

Q And you will have facilities for taking annulus pressures on all these wells?

A Yes, we will.

MR. UTZ: Are there other questions of the witness?

MR. HATCH: What will the coating be on this tubing?

THE WITNESS: We haven't decided for sure what it will be. It will be some type of epoxy coated most likely. We have to take some bids and so forth on this yet.

MR. UTZ: Is epoxy considered to be a plastic?

THE WITNESS: Yes, it is.

MR. UTZ: Is that what all plastic-coated tubing is?

THE WITNESS: Well, I think there is different suppliers, different names to it, and it has different consistencies as far as what is in it, but it is a plastic type coating, yes, which is impermeable to water and oil. Some of it is impermeable to oil to a different degree. It depends on a particular type that is being utilized.

MR. MORRIS: Along that line if the Commission required plastic-coated tubing would that be a broad enough thing to take into account the different variations you might run in to in your bids?

THE WITNESS: Oh, yes, it would.

MR. UTZ: Are there other questions? May be excused.

(Witness excused)

MR. UTZ: Statements in the case?

MR. MORRIS: No, sir.

MR. UTZ: Cases will be taken under advisement, and the hearing is adjourned.

I N D E X



E X H I B I T S

STATE OF NEW MEXICO )
)
COUNTY OF BERNALILLO )

I, LINDA MALONE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Linda Malone
Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4615, heard by me on Oct. 27, 1971.

....., Examiner
New Mexico Oil Conservation Commission

# OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

GOVERNOR
BRUCE KING
CHAIRMAN

LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

November 4, 1971

Mr. Richard S. Morris
Montgomery, Federici, Andrews, Hannahs
& Morris
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Dear Mr. Morris:

Enclosed herewith is Commission Order No. R-4217, entered in Case No. 4616, approving the Marathon South Eunice Unit Waterflood Project.

Injection into each of the eight authorized water injection wells shall be through internally coated tubing set in a packer, which shall be located within 100 feet of the uppermost perforation. The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 924 barrels per day when the Southeast New Mexico normal unit allowable is 42 barrels per day or less.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of the wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Mr. Richard S. Morris
Montgomery, Federici, Andrews, Hannahs
& Morris
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

November 4, 1971

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/ir

cc: Oil Conservation Commission
Hobbs, New Mexico

Mr. D. E. Gray
State Engineer Office
Santa Fe, New Mexico

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 4616
Order No. R-4217

APPLICATION OF MARATHON OIL
COMPANY FOR A WATERFLOOD PROJECT,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 27, 1971, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 4th day of November, 1971, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Marathon Oil Company, seeks authority to institute a waterflood project in the South Eunice (Seven Rivers-Queen) Unit Area, South Eunice Seven Rivers-Queen Pool, by the injection of water into the Seven Rivers and Queen formations through eight injection wells in Sections 24, 25, and 26, Township 22 South, Range 36 East, NMPM, Lea County, New Mexico.

(3) That the applicant further seeks an administrative procedure whereby said project could be expanded to include additional injection wells in the area of the said project as may be necessary in order to complete an efficient injection pattern; that said administrative procedure should provide for administrative approval for conversion to water injection in exception to the well response requirements of Rule 701 E-5 of the Commission Rules and Regulations.

(4) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(5) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations; provided however, the showing of well response as required by Rule 701 E-5 should not be necessary before obtaining administrative approval for the conversion of additional wells to water injection.

IT IS THEREFORE ORDERED:

(1) That the applicant, Marathon Oil Company is hereby authorized to institute a waterflood project in the South Eunice (Seven Rivers-Queen) Unit Area, South Eunice Seven Rivers-Queen Pool, by the injection of water into the Seven Rivers and Queen formations through the following-described wells in Township 22 South, Range 36 East, NMPM, Lea County, New Mexico:

| Company | Lease and Well No. | Location |
|---|---|---|
| Marathon | McDonald State A/C "1-B" No. 20 | Unit I - Sec. 26 |
| Marathon | McDonald State A/C "1-B" No. 21 | Unit E - Sec. 25 |
| Marathon | McDonald State A/C "1-B" No. 25 | Unit G - Sec. 26 |
| Marathon | McDonald State A/C "1-B" No. 26 | Unit A - Sec. 26 |
| Marathon | McDonald State A/C "1-B" No. 27 | Unit C - Sec. 25 |
| Marathon | McDonald State A/C "1-B" No. 28 | Unit M - Sec. 24 |
| Shell | A. L. Christmas "B" No. 2 | Unit M - Sec. 25 |
| | A. L. Christmas "B" No. 5 | Unit K - Sec. 25 |

(2) That the subject waterflood project is hereby designated the Marathon South Eunice Unit Waterflood Project and shall be

governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

PROVIDED HOWEVER, that the Secretary-Director of the Commission may approve expansion of the above-described waterflood project to include such additional injection wells in the area of said project as may be necessary to complete an efficient water injection pattern; that the showing of well response as required by Rule 701 E-5 shall not be necessary before obtaining administrative approval for the conversion of additional wells to water injection.

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

BRUCE KING, Chairman

ALEX J. ARMIJO, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

dr/

Case 4614
Heard 10-27-71
Rec. 10-28-71

Grant Marathon permission to
convert 8 wells to water injection
wells for their So. Eunice
- Seven Rivers-Queen water flood.
The 8 wells are listed in the applica-
tion considered.
Grant Adm. procedure for approving
new injection or producing well
locations or changes in locations.

Docket No. 23-71

DOCKET: EXAMINER HEARING - WEDNESDAY - OCTOBER 27, 1971

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING - SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 4613: Application of Scoggins Petroleum Corporation for creation of a new gas pool and special rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Morrow gas pool for its State BI Well No. 1 located in Unit F of Section 33, Township 18 South, Range 25 East, Eddy County, New Mexico, and the promulgation of special rules therefor, including a provision for 640-acre spacing units.

CASE 4614: Application of Cities Service Oil Company for an unorthodox well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill an oil well as an infill well in its Southeast Maljamar Grayburg-San Andres Unit Area at an unorthodox location 1395 feet from the South line and 2615 feet from the East line of Section 29, Township 17 South, Range 33 East, Maljamar Pool, Lea County, New Mexico.

CASE 4612: Application of Meadco Properties for creation of a new pool and special rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new pool for the production of oil from the Bough "C" zone of the Pennsylvanian formation for its well located 2130 feet from the West line and 660 feet from the South line of Section 25, Township 10 South, Range 32 East, Lea County, New Mexico, and for the promulgation of special rules therefor, including a provision for 160-acre spacing units.

CASE 4615: Application of Marathon Oil Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the South Eunice (Seven Rivers, Queen) Unit Area comprising 1840 acres, more or less, of state and fee lands in Sections 23, 24, 25, 26, 35, and 36, Township 22 South, Range 36 East, South Eunice Seven Rivers-Queen Pool, Lea County, New Mexico.

CASE 4616: Application of Marathon Oil Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled

(Case 4616 continued)

cause, seeks authority to institute a waterflood project in the South Eunice Seven Rivers-Queen Pool, by the injection of water through eight wells located in Sections 24, 25, and 26, Township 22 South, Range 36 East, Lea County, New Mexico.

CASE 4563: Continued from the September 29, 1971, Examiner Hearing

Application of Corinne Grace for special gas-oil ratio limitation and pressure maintenance project, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to produce her State Well No. 1 located in Unit A of Section 1, Township 15 South, Range 29 East, Double L-Queen Pool, Chaves County, New Mexico, with no gas-oil ratio limitation, strip the liquids, and institute a pressure maintenance project by the injection of all said gas back into the producing formation through her State Well No. 2 located in Unit B of said Section 1. Applicant further seeks to transfer an oil allowable from said Well No. 2 to said Well No. 1.

ROUGH DRAFT FOR WATERFLOOD LETTERS

Mr. Richard S. Morris
Montgomery, Federici, Andrews, Hannahs
& Morris
Attorneys at Law - Post Office Box 2307
Santa Fe, New Mexico
Dear Sir:

Enclosed herewith Commission Order No. R-4217, entered in Case No. 4616, approving the Marathon South Eunice Unit Waterflood Project. ~~Waterflood Project~~ Injection into each of the eight authorized water injection wells shall be through internally coated tubing set in a packer which shall be located within 100 feet of the uppermost perforation. The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge at the surface.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 424 barrels per day when the Southeast New Mexico normal unit allowable is 42 barrels per day or less.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

cc: OCC: Hobbs x
Artesia
Aztec
USGS
~~Mr. Frank Irby~~, State Engineer Office, Santa Fe, New Mexico
Mr. D. E. Gray,

EXHIBITS FOR MARATHON SOUTH EUNICE
(SEVEN RIVERS, QUEEN) UNIT HEARING

| | |
|---|---|
| Exhibit No. 1 | Unit Agreement<br>Includes the following exhibits attached to Unit Agreement.<br>Exhibit A - Plat of the unit area showing tract numbers.<br>Exhibit B - Description of the tracts and the royalty and working interest ownership.<br>Exhibit C - Table giving tract participation. |
| Exhibit No. 2 | Sonic-Gamma Ray log showing unitized formation. |
| Exhibit No. 3 | Plat of South Eunice Unit Area. |
| Exhibit No. 4 | Structure Map |
| Exhibit No. 5 | Production History Graph |
| Exhibit No. 6 | Reservoir Rock & Fluid Characteristics and Estimated Waterflood Performance |
| Exhibit No. 7-A | North-South Cross Section |
| Exhibit No. 7-B | East-West Cross Section |
| Exhibit No. 8-A and No. 8-B | Injection Well Diagram and Data |
| Exhibit No. 9-A through No. 9-H | Logs on Proposed Injection Wells |

SCHLUMBERGER

SONIC LOG

COMPANY TEXAS OIL
COMPANY
WELL STATE MC DONALD
ACCT. I-C - 21
FIELD SOUTH EUNICE
LOCATION SEC. 25-22S-36E

COUNTY LEA
STATE NEW MEXICO

Other Surveys

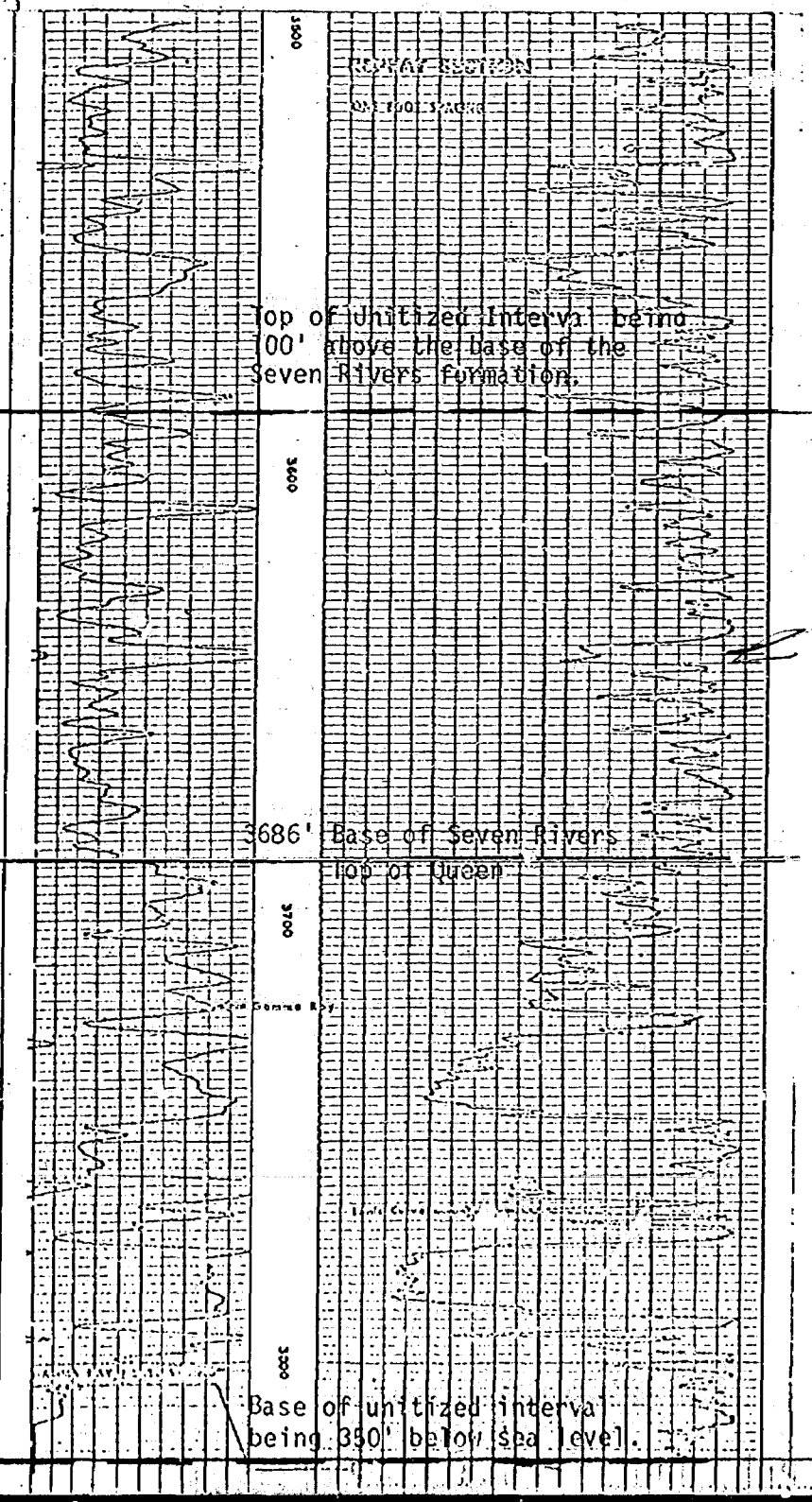
Location of Well
660' FROM N/L
1980' FROM N/L

*JOHN WEST ELEV.
Elevation: K.B. 3472
D.F. 3471
or G.L. 3461

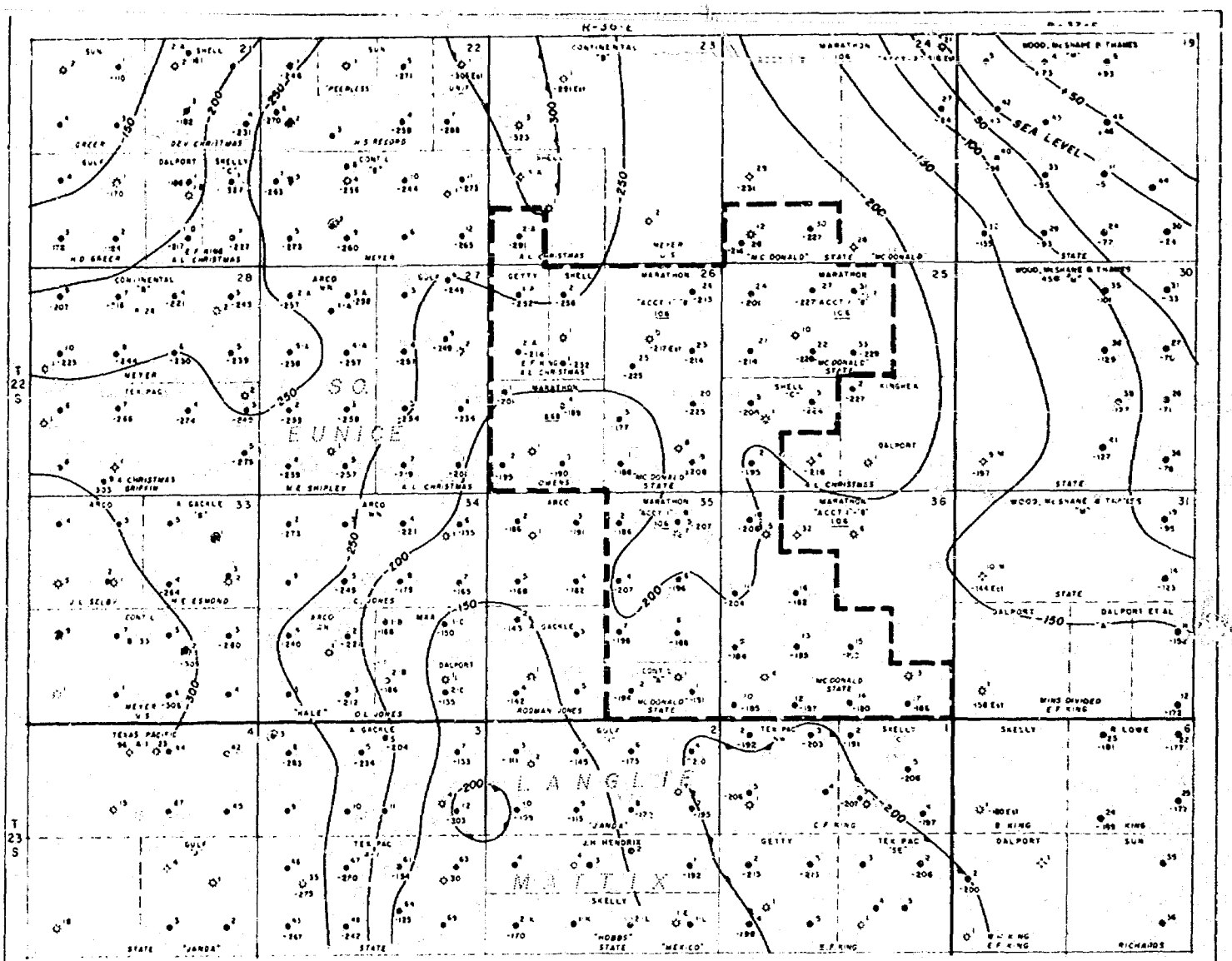
Log Depths Measured from KB 10 Ft. above G.L. or D.F.

| | | | | |
|---|---|---|---|---|
| Run No. | ONE | | | |
| Date | 9-7-61 | | | |
| First Reading | 3825 | | | |
| Last Reading | 0 | | | |
| Feet Recorded | 3825 | | | |
| Csg. Schlum. | - | | | |
| Csg. Driller | 432 | | | |
| Depth Reached | 3829 | | | |
| Bottom Driller | 3222 | | | |
| Mud Pit | SALT | | | |
| Dens. / Visc. | 10.2 / 34 | / | / | |
| Mud Resist. | .045 @ 85 °F | @ °F | @ °F | |
| " Res. BHT | @ °F | @ °F | @ °F | |
| " pH | 7 @ °F | @ °F | @ °F | |
| " Wtr. Loss | 10.8 CC 30 min | CC 30 min | CC 30 min | |
| " Rmf | @ °F | @ °F | @ °F | |
| Bit Size | 6" | | | |
| Spacing | | | | |
| T3 R.3 R. | Csg To TD | To | To | |
| T3 R.1 R. | 3500 To TD | To | To | |
| Opr. Rig Time | 5 HOURS | | | |
| Truck No. | 2526-HOBBS | | | |
| Recorded By | NELSON | | | |
| Witness | KENNEDY | | | |

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Pantlon EXHIBIT NO. 2
CASE NO. 4615



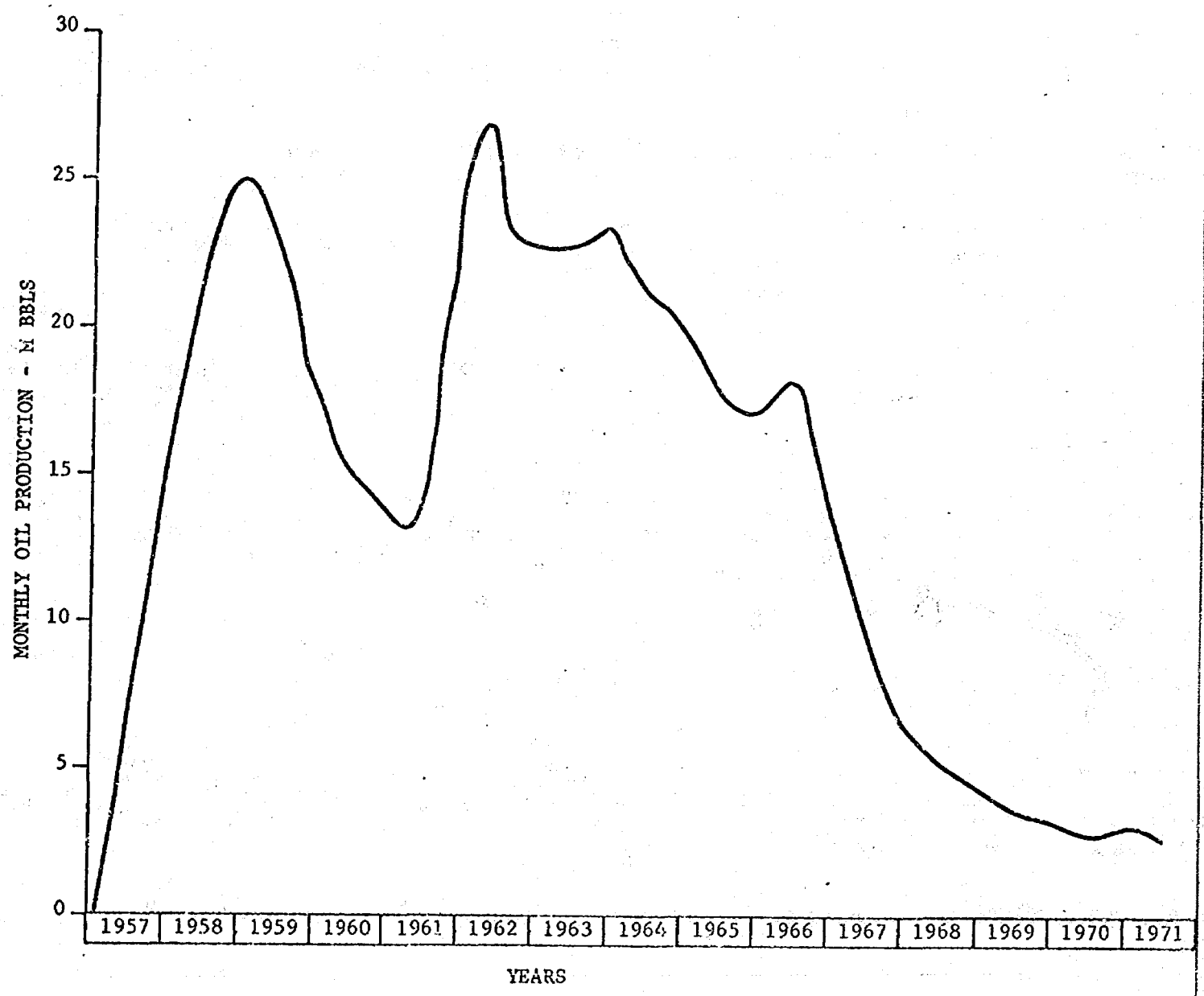

B 5 46 90 61




BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 4
CASE NO. 4615

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 5
CASE NO. 4615

MARATHON SOUTH EUNICE
(SEVEN RIVERS, QUEEN) UNIT
LEA COUNTY, NEW MEXICO



## RESERVOIR ROCK & FLUID CHARACTERISTICS AND ESTIMATED WATERFLOOD PERFORMANCE

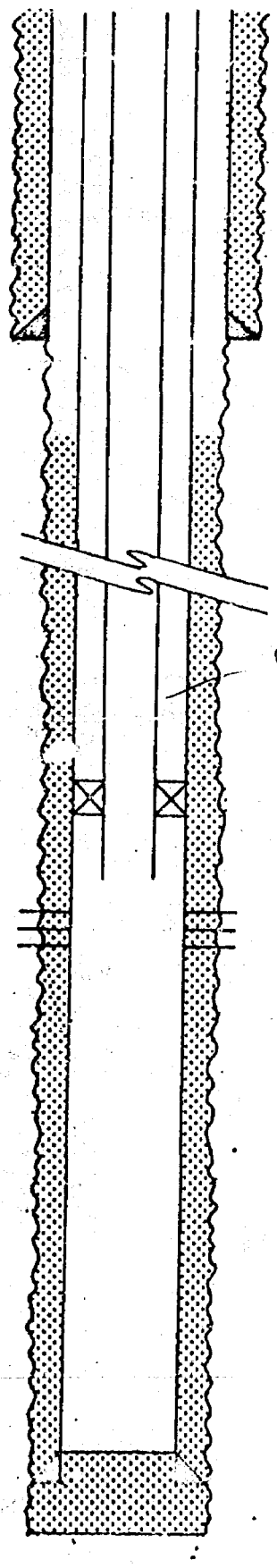
| | |
|---|---|
| Average net pay thickness, feet | 31 |
| Average porosity, percent | 15 |
| Average permeability from pressure buildup, md | 27 |
| Average water saturation, percent | 35 |
| Original FVF | 1.2 |
| Oil Viscosity, cp | .8 |
| Oil gravity, degrees API | 37 |
| Original pressure at -250 ft. subsea, psi | 1,440 |
| Current pressure at -250 ft. subsea, psi (est.) | 200 |
| Cumulative primary recovery, bbls. 8-1-71 | 2,473,269 |
| Ultimate primary recovery, bbls. (est.) | 2,498,552 |
| Estimated waterflood recovery, bbls. | 1,800,000 |

Note: All above values are for the Queen pay section only. Waterflooding of the Lower Seven Rivers section in a portion of the unit would increase the waterflood recovery slightly.

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 6
CASE NO. 4615

SCHEMATIC INJECTION WELL COMPLETION
MARATHON SOUTH EUNICE (SEVEN RIVERS, QUEEN) UNIT
LEA COUNTY, NEW MEXICO

BEFORE EXAMINER UTZ
OIL CONSERVATION DIVISION
Marathon EXHIBIT NO. 8-A
CASE NO. 4615

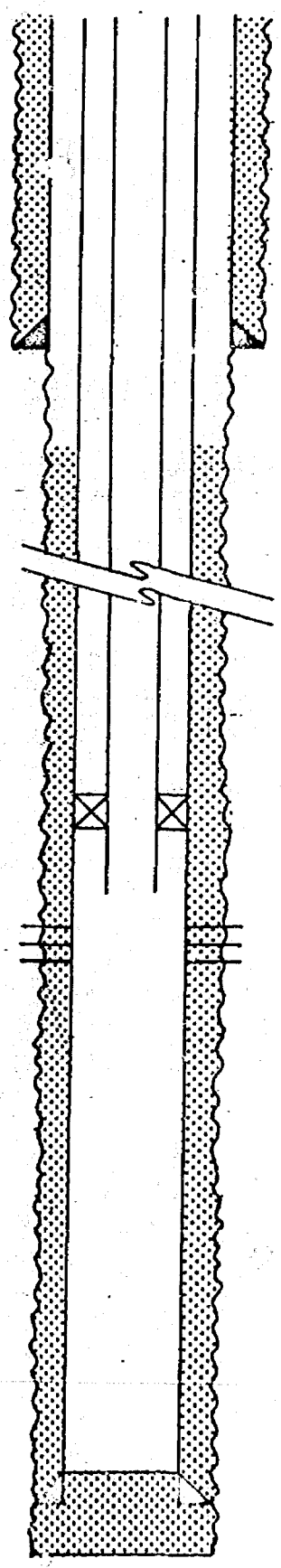


| | PROPOSED INJECTION WELLS | | | |
|---|---|---|---|---|
| | MARATHON McDONALD ST. A/C "1-3" | | | |
| | #20 | #21 | #25 | #26 |
| SURFACE CASING | | | | |
| Size O.D., inches | 8 5/8 | 8 5/8 | 8 5/8 | 8 5/8 |
| Depth set, ft. | 429 | 442 | 434 | 432 |
| Cement volume, sks. | 225 | 225 | 225 | 250 |
| Top of Cement | Circ. | Circ. | Circ. | Circ. |
| TUBING | | | | |
| Size, O.D., inches | 2 3/8 | 2 3/8 | 2 3/8 | 2 3/8 |
| CEMENT, PRODUCTION CSG | | | | |
| Volume, sks. | 900 | 1000 | 1050 | 1050 |
| Top of Cement, ft. | 235 | Circ. | Circ. | Circ. |
| TOP OF QUEEN, ft. | 3689 | 3686 | 3695 | 3703 |
| PACKER | | | | |
| Type | Tension | Tension | Tension | Tension |
| Depth set, approx. ft. | 3700 | 3650 | 3650 | 3650 |
| PERFORATIONS | | | | |
| Depth | 3730-31 | 3705-06 | 3709-10 | 3710-11 |
| | 40-41 | 18-19 | 20-21 | 22-23 |
| | 47-48 | 28-29 | 26-27 | 37-38 |
| | 54-55 | 38-39 | 32-33 | 51-52 |
| | 58-59 | 60-61 | 46-47 | 66-67 |
| | 64-65 | 78-79 | 54-55 | 75-76 |
| | | | 65-66 | |
| | | | 71-72 | |
| | | | 78-79 | |
| PRODUCTION CASING | | | | |
| Size, inches | 4 1/2 | 4 1/2 | 4 1/2 | 4 1/2 |
| Depth set, ft. | 3813 | 3821 | 3833 | 3838 |
| PLUG BACK TD, ft. | 3771 | 3781 | 3799 | 3802 |
| ORIGINAL TD, ft. | 3814 | 3822 | 3834 | 3839 |

Injection Interval
Gross Coating

SCHEMATIC INJECTION WELL COMPLETION
MARATHON SOUTH EUNICE (SEVEN RIVERS, QUEEN) UNIT
LEA COUNTY, NEW MEXICO

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 6-E
CASE NO. 4665



| | PROPOSED INJECTION WELLS | | | |
|---|---|---|---|---|
| | Marathon McDonald St. A/C "1-B" | | Shell A. L. Christmas "B" | |
| | #27 | #28 | #2 | #5 |
| SURFACE CASING | | | | |
| Size O.D., inches | 8 5/8 | 8 5/8 | 7 5/8 | 7 5/8 |
| Depth set, ft. | 432 | 435 | 203 | 204 |
| Cement volume sks. | 225 | 250 | 150 | 130 |
| Top of Cement | Circ. | Circ. | Circ. | Circ. |
| TUBING | | | | |
| Size, O.D., inches | 2 3/8 | 2 3/8 | 2 3/8 | 2 3/8 |
| CEMENT, PRODUCTION CSG | | | | |
| Volume, sks. | 1050 | 1050 | 200 | 200 |
| Top of Cement, ft. | Circ. | Circ. | est 2800 | est 2900 |
| TOP OF QUEEN, ft. | 3688 | 3690 | 3658 | 3676 |
| PACKER | | | | |
| Type | Tension | Tension | Tension | Tension |
| Depth set, approx. ft. | 3700 | 3650 | 3650 | 3700 |
| PERFORATIONS | | | | |
| Depth | 3774-78 | 3700-01 | 3698 | 3755 |
| | | 28-29 | 3704 | 3762 |
| | | 46-47 | 3735 | 3772 |
| | | 56-57 | 3750 | |
| | | 70-72 | | |
| PRODUCTION CASING | | | | |
| Size, inches | 4 1/2 | 4 1/2 | 4 1/2 | 4 1/2 |
| Depth set, ft. | 3809 | 3825 | 3798 | 3897 |
| PLUG BACK TD, ft. | 3784 | 3787 | 3782 | 3888 |
| ORIGINAL TD, ft. | 3810 | 3826 | 3800 | 3900 |

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Exhibit No. 2
Case No. 3015

WELEX
ACOUSTIC VELOCITY LOG

COMPANY SHELL OIL COMPANY
WELL SHELL-GULF CHRISTMAS "B" # 2
FIELD SOUTH EUNICE
COUNTY LEA STATE NEW MEXICO
Location: 660'FSL 660'FWL SEC 25 TWP 22-S RGE 36-E
Other Logs: GUARD FORXO
Sec Twp Rge
Elevation: DF 3462, G 3153

Permanent Datum: GROUND LEVEL Elev. 3153
Log Measured From: DERRICK FLOOR
Drilling Measured From: DERRICK FLOOR

| | | | | |
|---|---|---|---|---|
| Run No. | 1 | | | |
| Date | 1-27-61 | | | |
| Total Depth Driller | 3800 | | | |
| Total Depth Welex | 3800 | | | |
| Csg. Shoe Driller | 191 | | | |
| Csg. Shoe Welex | | | | |
| Survey Begins | 3799 | | | |
| Survey Ends | 200 (GUR-SURF.) | | | |
| Csg. Size | 7-5/8" | | | |
| Bit Size | 6-3/4" | | | |
| Mud Data – Type | WATER BASE | | | |
| Weight | 10.6 | | | |
| Viscosity | 36 | | | |
| Ph | @ | @ | @ | @ |
| Wtr. Loss cc/30 min | 31 @ | @ | @ | @ |
| Rm @ Surface Temp | .056@ 61 | @ | @ | @ |
| Rm @ Meas. Hole Temp | .01 @ 96 | @ | @ | @ |
| Rmf | .031@ 96 | @ | @ | @ |
| Rmc | .091@ 96 | @ | @ | @ |
| Source Mud Sample | FLOW LINE | | | |
| Recorded By | MIDDLER | | | |
| Witnessed By | MR. TIDDERLAKE | | | |
| Logging Tool No. | 10730 | | | |




REPEAT SECTION
1" SPACING

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 9-B
CASE NO. 4615

SCHLUMBERGER

COMPANY [illegible]

Other Surveys

Location of Well
660' FROM W/L
1980' FROM N/L

WELL STATE JC DOMLD ACCT. 1-F-21

FIELD SOUTH EUNICE

LOCATION SEC. 25 T-22S R-36E

COMPANY

COUNTY LEA

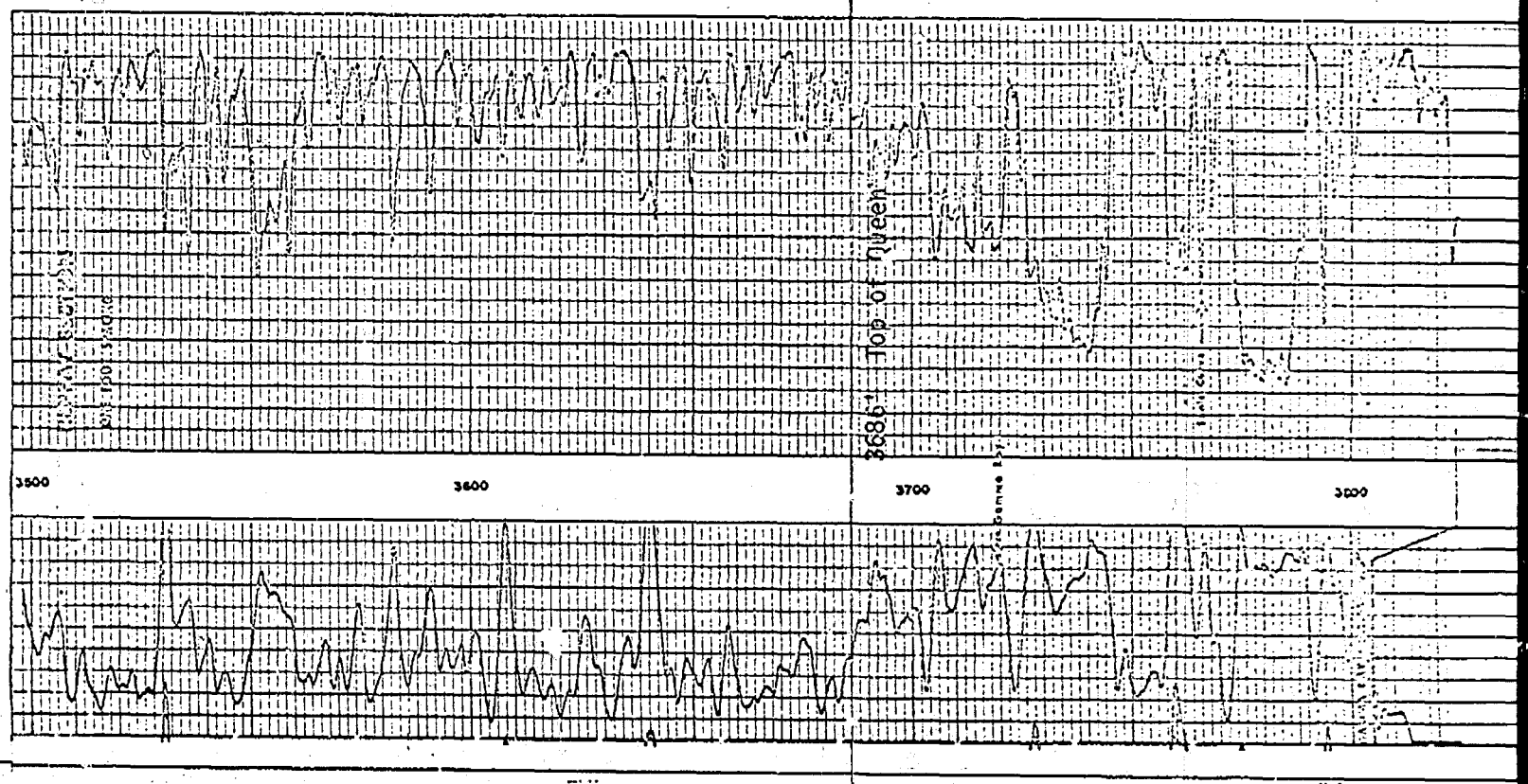
STATE NEW MEXICO

Elevations: K.B. 3422
D.F. 3421
or G.L. 3411

• JOHN WEST ELEV.

Log Depths Measured from KB 10 Ft. above P.D.

| | | | |
|---|---|---|---|
| Run No. | One | | |
| Date | 9-7-61 | | |
| First Reading | 3315 | | |
| Last Reading | 0 | | |
| Feet Recovered | 3825 | | |
| Cas. Schlum. | 4112 | | |
| Cas. Driller | 4112 | | |
| Depth Reached | 3382 | | |
| Bottom Driller | 3382 | | |
| Mud Kind | SAL | | |
| Dens. / Visc. | 10.2 | @ 34 | @ |
| Mud Resist. | .045 | @ 85 | @ |
| Res. Bkt | | @ | @ |
| pH | 7 | @ | @ |
| Wtr. Loss | 10.8 | @ CC 30 min | @ |
| Mud Cake | 2/32 | @ | @ |
| Bit Size | 7 7/8 | | |
| Spacing | | To | To |
| T. E. L. R. | Csg | 10 30 | |
| T. B. L. R. | 3500 | 10 10 | |
| Opr. Rig Time | 5 Hours | | |
| Truck No. | 2526-HOBBS | | |
| Recorded | MILSON | | |
| Witness | KENNEDY | | |



SCHLUMBERGER

COMPANY THE HILTON OIL COMPANY

WELL STATE NO. 9 NMLD ACCT. 1-R 25

FIELD SOUTH EUNICE

LOCATION SEC. 36-22S-36E

COUNTY LEA

STATE NEW MEXICO

Other Services: NONE

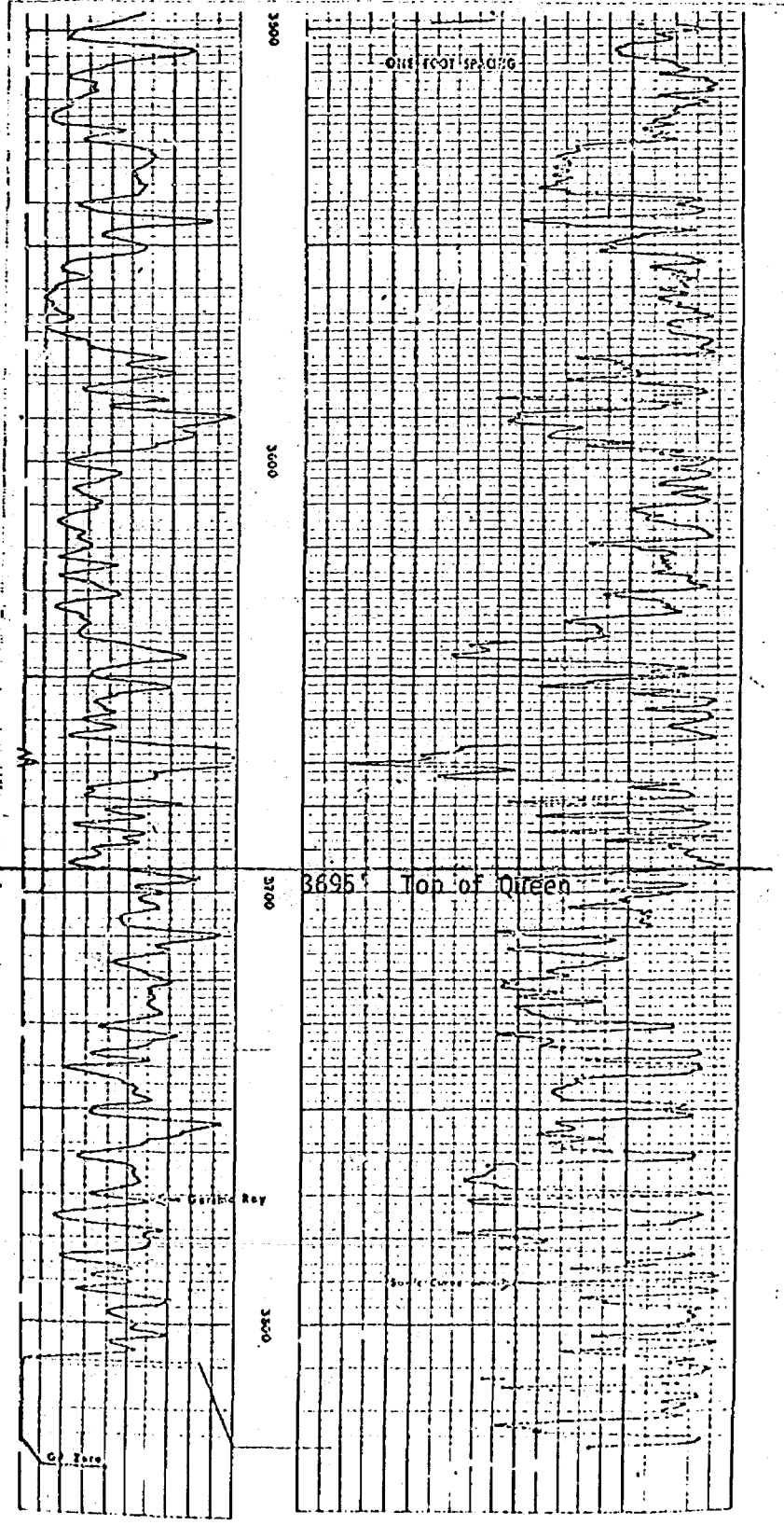
Location of Well: 2310' FROM N/L, 1980' FROM E/L

Elevation: K.B. 3691, D.F. 3691, or G.L. 3677

Log Depths Measured From K.B. Ft. above

| | | | | |
|---|---|---|---|---|
| Run No. | ONE | | | |
| Date | 11-17-61 | | | |
| Last Reading | 0 | | | |
| Feet Measured | 3829 | | | |
| Csg. Schlum. | | | | |
| Csg. Driller | 440 | | | |
| Depth Reached | 3831 | | | |
| Bottom Driller | 3826 | | | |
| Mud Nat. | SALT | | | |
| Dens. / Visc. | 10.4 / 40 | | | |
| Mud Resist. | .055 @ 70 °F | @ °F | @ °F | |
| " Res. BHT | @ °F | @ °F | @ °F | |
| " pH | 7 @ °F | @ °F | @ °F | |
| " Wtr. Loss | 6.8 CC 30 min | CC 30 min | CC 30 min | |
| " Rmf | @ °F | @ °F | @ °F | |
| Bit Size | 6" | | | |
| Spacing: | | | | |
| T.J. R. L.R. | 3500 To 3828 | To | To | |
| T.J. R. J.R. | 440 To 3829 | To | To | |
| Opr. Rig Time | 3 HOURS | | | |
| Truck No. | 2626 HOURS | | | |
| Recorded By | WILSON | | | |
| Witness | KENNEDY | | | |

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Mexico EXHIBIT NO. 9-C
CASE NO. 4615



BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 9-D
CASE NO. 4615

COUNTY LEA
FIELD & LOCATION
WELL
COMPANY

COMPANY THE OHIO OIL COMPANY
WELL STATE McDONALD ACCT. 1-B 26
FIELD SOUTH EUNICE
LOCATION SEC. 26 22S-36E
COUNTY LEA
STATE NEW MEXICO

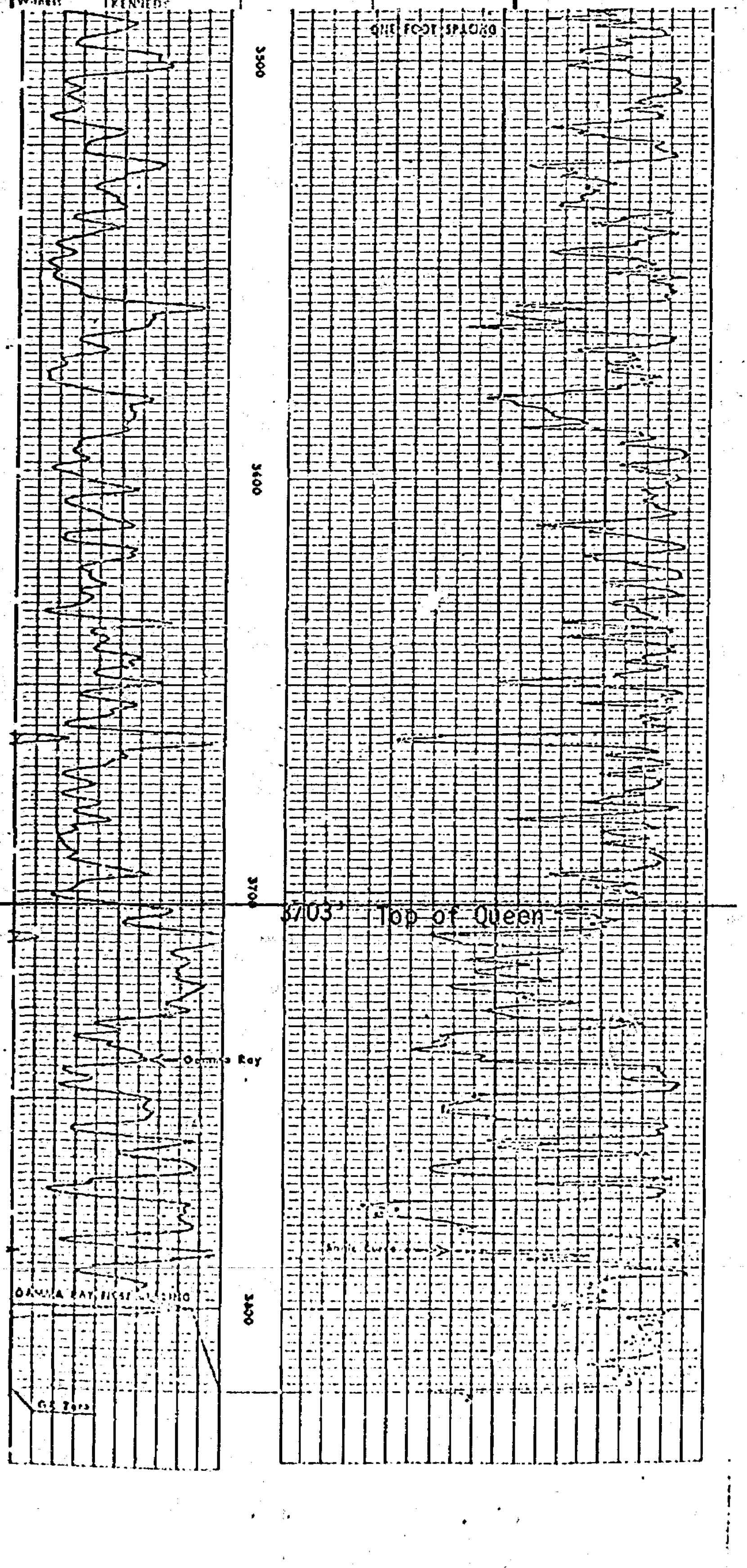
Other Surveys

Location of Well
660' FROM N/L
660' FROM E/L

Elevation: K.B.: 3480
D.F.: 3522
or G.L.: 3478

Log Depths Measured From KB 10 Ft. above 8 5/8" BH

| | | | |
|---|---|---|---|
| Run No. | ONE | | |
| Date | 11-26-61 | | |
| First Reading | 3820 | | |
| Last Reading | 0 | | |
| Feet Measured | 3820 | | |
| Csg. Schlum. | - | | |
| Csg. Driller | 8 5/8" @ 438 | | |
| Depth Reached | 3822 | | |
| Bottom Driller | 3839 | | |
| Mud Nat. | SALT GEL | | |
| Dens. \| Visc. | 10.2 \| 37 | \| | \| |
| Mud Resist. | @ °F | @ °F | @ °F |
| " Res. BHT | @ °F | @ °F | @ °F |
| " pH | 7.0 @ °F | @ °F | @ °F |
| " Wtr. Loss | 4.8 CC 30 min | CC 30 min | CC 30 min |
| " Rmf | @ °F | @ °F | @ °F |
| Bit Size | 7⅞" | | |
| Spacing | | | |
| T. 2 R. 2R. | CSG To 10 | To | To |
| T. 2 R. 1R. | 3500 To 10 | To | To |
| Opr. Rig Time | 3 HOURS | | |
| Truck No. | 2527-HOBBS | | |
| Recorded By | DAVIS | | |
| Witness | KENNEDY | | |



St. McDonald A/C 1-B #27 FIELD
Lea County, New Mex. 26-22-36 (C)

SCHLUMBERGER

SURFACE LOG

COMPANY THE OHIO OIL COMPANY
COMPANY
WELL STATE McDONALD A/C 1-B #27
FIELD SOUTH EUNICE
LOCATION 660' FSL & 1980' FEL
COUNTY LEA
STATE NEW MEXICO

Other Surveys

Location of Well
660' FROM N/L &
1980' FROM W/L

Elevation: K.B. 3460
D.F. 3459
or G.L. 3452

Log Depths Measured From KDB 10 Ft. above 8 5/8" Csg.

| | | | | |
|---|---|---|---|---|
| Run No. | ONE | | | |
| Date | 1-23-62 | | | |
| First Reading | 3864 | | | |
| Last Reading | 10 | | | |
| Feet Measured | 3810 | | | |
| Csg. Schlum. | - | | | |
| Csg. Driller | 432 | | | |
| Depth Reached | 3810 | | | |
| Bottom Driller | 3810 | | | |
| Mud Nat. | SAN | | | |
| Dens. \| Visc. | 10.8 | \| | \| | \| |
| Mud Resist. | .059 @ 68 °F | @ °F | @ °F | |
| " Res. BHT | .038 @ 95 °F | @ °F | @ °F | |
| " pH | @ °F | @ °F | @ °F | |
| " Wtr. Loss | 9.8 CC 30 min | CC 30 min | CC 30 min | |
| " Rmf | .058 @ 70 °F | @ °F | @ °F | |
| Bit Size | 6 3/4" | | | |
| Spacing: | | | | |
| T R. 1 R. | 3502 To 1803 | To | To | |
| T R. 3 R. | 650 To 10 | To | To | |
| Opr. Rig Time | 3 HOURS | | | |
| Truck No. | 2526-HOBBS | | | |
| Recorded By | WILSON | | | |
| Witnessed By | KENNEDY | | | |

REPEAT SECTION
ONE FOOT SPACING

3800
3700
3600

3688' Top of Queen

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 4145

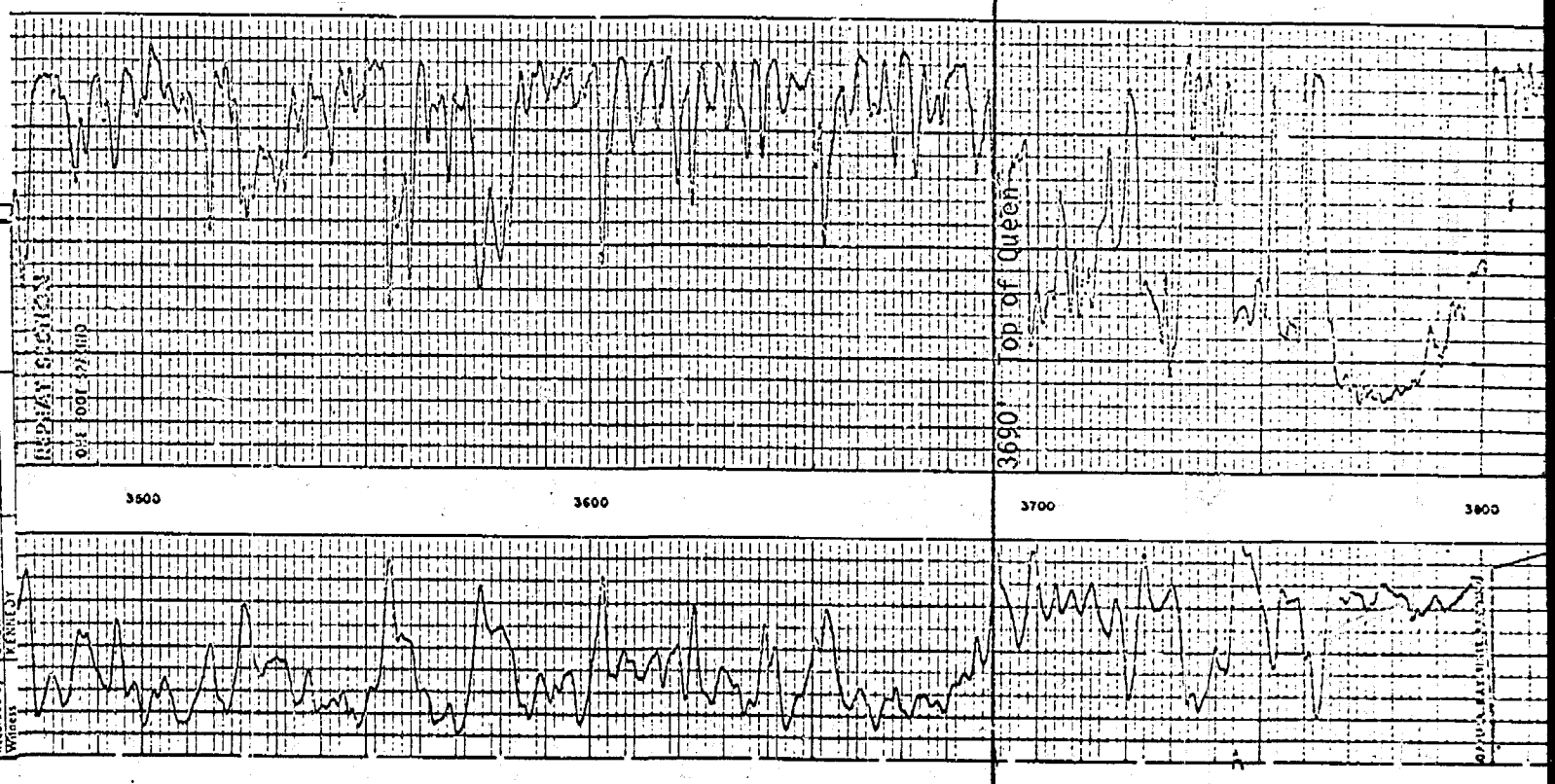
BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 9-F
CASE NO. 4615

SCHLUMBERGER

COMPANY THE OHIO OIL COMPANY
WELL STATE BC (FORMERLY STATE "AC") NO. 38
FIELD SOUTH EUNICE
COUNTY LEA STATE NEW MEXICO
Location of Well: 467' FROM S/L, 467' FROM W/L
Other Surveys

Elevation: K.B. 3476, D.F., G.L. 3465
10 Ft. above K.B.

Log Depth Measured From: KB
RUN No. One
Date 7-16-62
First Reading 3932
Last Reading 0
Feet Measured 3932
Csg. Schlum. 432
Csg. Driller 432
Depth Reached 3937
Bottom Driller 3936
Mud Nat. SALT GEL
Dens. | Visc. 10.3 | 0
Mud Resist. | @ °F
Res. Bhft | @ °F
pH | 7
Wtr. Loss | 10.4 cc 30 min
Rmf | @ °F
Rm @ Bht | @ °F
Source | 4"
Spacing | CSG 10 | 10
T | 10
R | 10
Opr. Rig Time | 2 HOURS
Truck No. | 2526 HOBBS
Recorded By | OWEN
Witness | KENNEDY



SCHLUMBERGER

SONIC LOG

COMPANY TID MUD OIL
COMPANY
WELL STATE RONALD
ACCT. R-1 - 20
FIELD SOUTH EUNICE
LOCATION SEC. 26, 22S-36E
COUNTY LEA
STATE NEW MEXICO

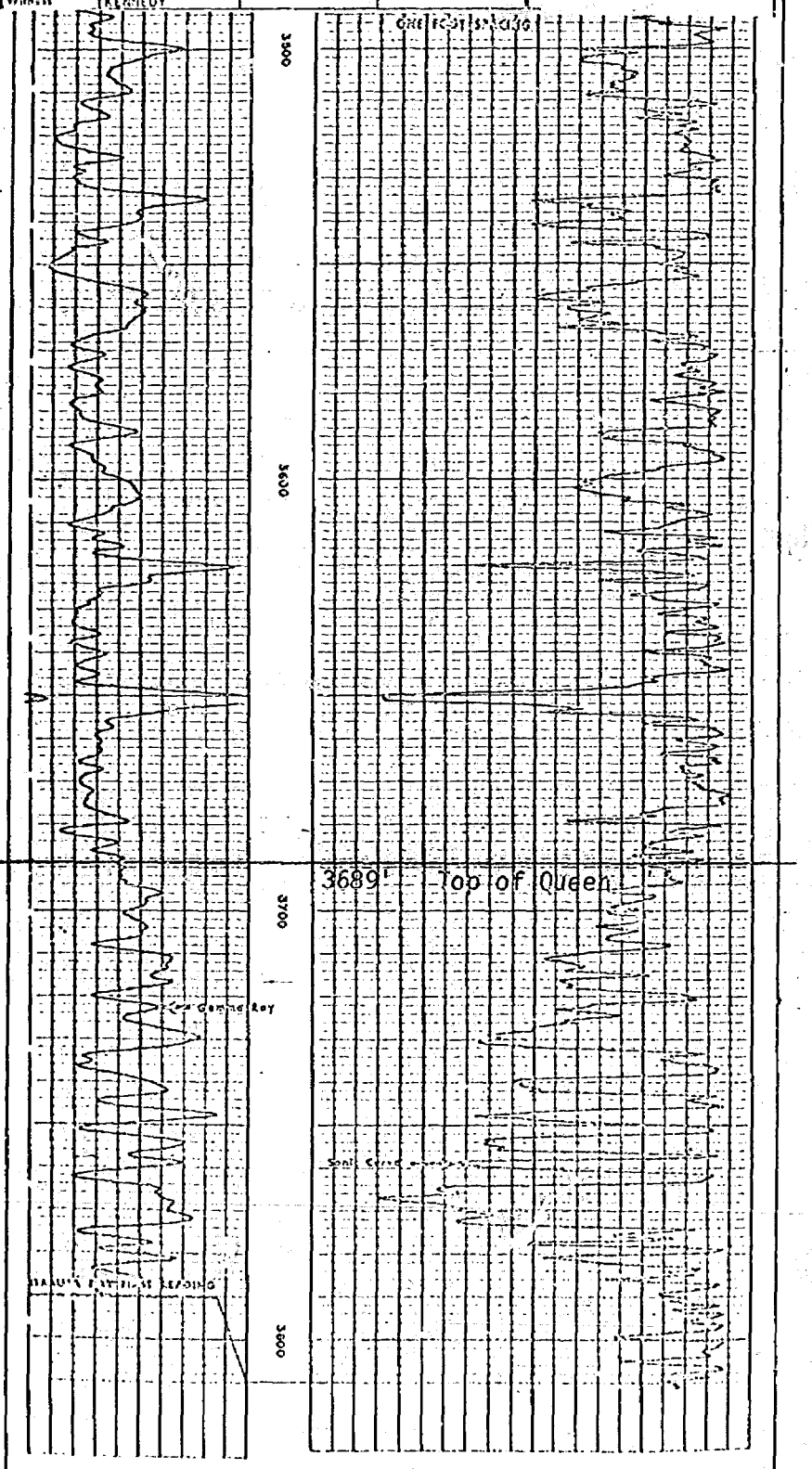
Other Surveys

Location of Well
1980' FROM S/L
660' FROM E/L

Elevation: K.B. 3469
D.F. 3468
or G.L. 3458

Log Depths Measured from KB 10 Ft. above DHF

| | | | |
|---|---|---|---|
| Run No. | ONE | | |
| Date | 6-24-61 | | |
| First Reading | 3810 | | |
| Last Reading | 0 | | |
| Feet Measured | 3810 | | |
| Csg. Schlum. | - | | |
| Csg. Driller | 433 | | |
| Depth Reached | 3816 | | |
| Bottom Driller | 3816 | | |
| Mud Net. | SALT GEL STARCH | | |
| Dens. / Visc. | 10 / 36 | / | / |
| Mud Resist. | .6 @ 73 °F | @ °F | @ °F |
| " Res. BHT | .64 @ 90 °F | @ °F | @ °F |
| " pH | 7 @ | @ °F | @ °F |
| " Wtr. Loss | 11.6 cc 30 min | cc 30 min | cc 30 min |
| " Rmf (Ht) | .038 @ 79 °F | @ °F | @ °F |
| Bit Size | 6 7/8" | | |
| Spacing: | | | |
| T.T. R. 3 ft. | SURF To FR | To | To |
| T.T. R. 1 ft. | 3500 To FR | To | To |
| Opr. Rig Time | 3 HOURS | | |
| Truck No. | 2524-HODGES | | |
| Recorded By | SCHAEFFER | | |
| Witness | KENNEDY | | |




BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 5

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 2-H
CASE NO. 4615

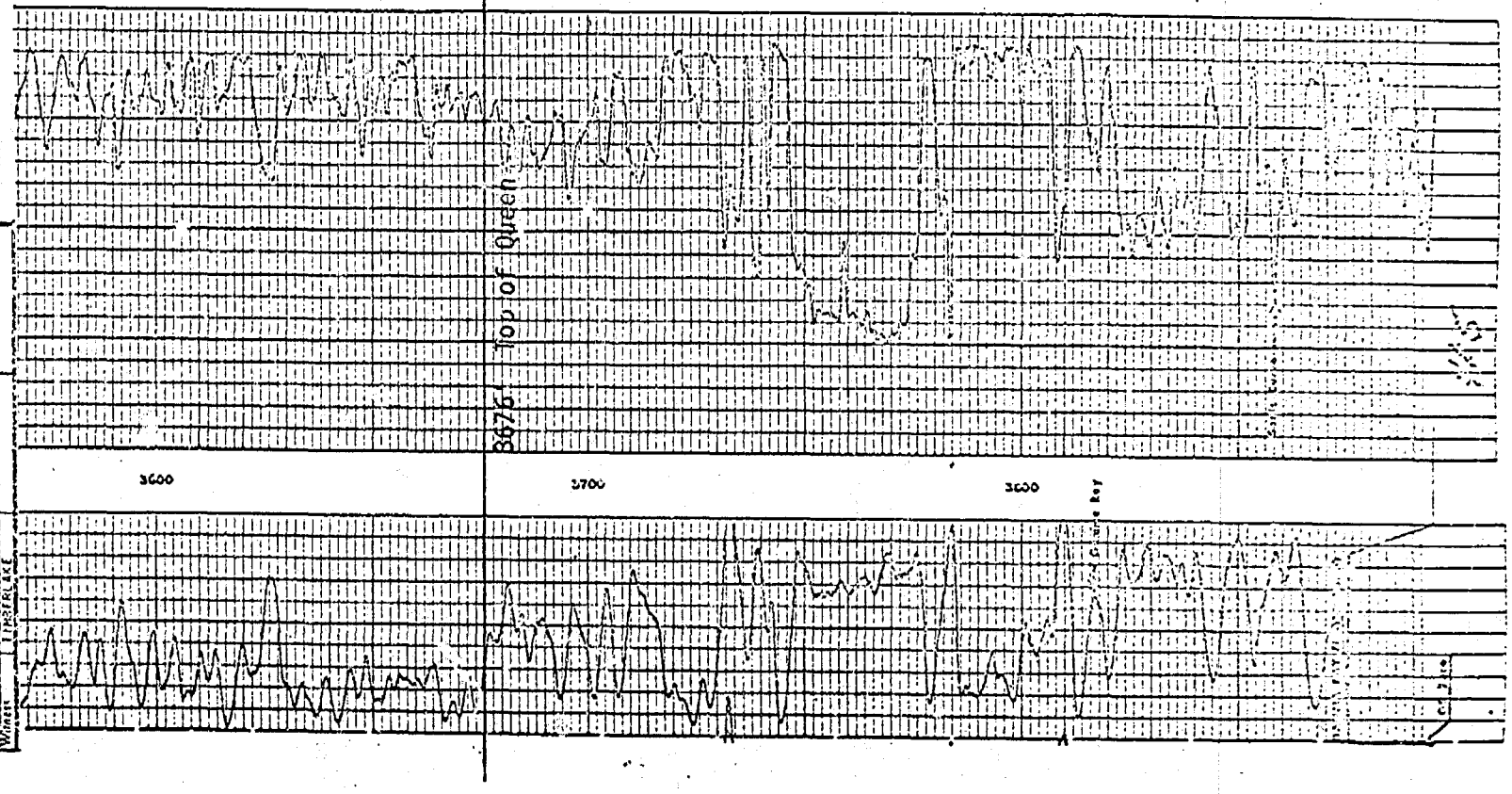
SCHLUMBERGER

COMPANY SHELL OIL COMPANY
WELL COMANCHE "B" - 5
FIELD SOUTH CUYLER
LOCATION SEC. 32, T-22S, R-37E
COUNTY LEA
STATE NEW MEXICO

Other Services: LL, MLL
Location of Well: 1550' FROM S/L, 1980' FROM W/L
Elevation: K.B. 3496, D.F. 3495, G.L. 3484

Log Depths Measured from: KB
10 ft. above G.L.

| | | | | | |
|---|---|---|---|---|---|
| Run No. | One | | | | |
| Date | 7-24-61 | | | | |
| First Reading | 7397 | | | | |
| Last Reading | 1932 | | | | |
| Csg. Recorded | 1932 | | | | |
| Csg. Size | 13⅜" | | | | |
| Csg. Driller | 1932 | | | | |
| Depth Reached | 1932 | | | | |
| Bottom Driller | 1900 | | | | |
| Mud Base | Salt Gel | | | | |
| Dens. \| Visc. | 10.4 \| 45 | @ | | @ | |
| Mud Resist. (Rm) | .063 | @ | 73 °F | @ | °F |
| Res. Bit | .015 | @ | 90 °F | @ | °F |
| pH | 9.5 | @ | CC 30 °F | @ | CC 30 °F |
| Wtr. Loss | 5 | @ | CC 30 °F | @ | CC 30 °F |
| Rmf (M) | .038 | @ | 76 °F | @ | °F |
| Rm Src | Mf. | | | | |
| Spacing | | | | | |
| Top Log Int. | 6700 | To | 1897 | To | |
| Btm. Log Int. | 2900 | To | 1900 | To | |
| Opr. Rig Time | 4½ hours | | | | |
| Truck No. | 2537 | Hobbs | | | |
| Recorded By | Fousse | | | | |
| Witness | Timberlake | | | | |



RECEIVED
OCT - 7 1971
OIL CONSERVATION COMM.
SANTA FE

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF MARATHON OIL COMPANY FOR APPROVAL OF THE SOUTH EUNICE (SEVEN RIVERS, QUEEN) UNIT AGREEMENT AND WATERFLOOD PROJECT, LEA COUNTY, NEW MEXICO.

Case No. 4616

APPLICATION

Comes now the MARATHON OIL COMPANY, by its attorneys, and applies to the New Mexico Oil Conservation Commission for approval of the South Eunice (Seven Rivers, Queen) Unit Agreement and Waterflood Project, and in support of its application states:

1. Applicant seeks approval of the South Eunice (Seven Rivers, Queen) Unit Agreement covering 1840 acres of state and fee lands located in Sections 23, 24, 25, 26, 35 and 36, Township 22 South, Range 36 East, Lea County, New Mexico, as more fully described and depicted on Exhibits A, B, and C attached to the said Unit Agreement, copy of which is attached to this application. The unitized formation is as defined in paragraph 2.11 of the said Unit Agreement.

2. Applicant proposes to conduct a waterflood project within the unit area by injecting water into the unitized formation through eight (8) injection wells designated and located as follows:

Marathon McDonald State A/C "1-B" Well No. 20 in I unit. Location: 1980' from the south line and 660' from the east line of Section 26, T-22-S, R-36-E, Lea County New Mexico.

Marathon McDonald State A/C "1-B" Well No. 21 in E unit. Location: 1980' from the north line and 660' from the west line of Section 25, T-22-S, R-36-E, Lea County, New Mexico.

Marathon McDonald State A/C "1-B" Well No. 25 in G unit. Location: 2310' from the north line and 1980' from the east line of Section 26, T-22-S, R-36-E, Lea County, New Mexico.



DOCKET MAILED
Date 10-14-71

Marathon McDonald State A/C "1-B" Well No. 26 in (A) unit. Location: 660' from the north line and 660' from the east line of Section 26, T-22-S, R-36-E, Lea County New Mexico.

Marathon McDonald State A/C "1-B" Well No. 27 in (C) unit. Location: 660' from the north line and 1980' from the west line of Section 25, T-22-S, R-36-E, Lea County, New Mexico.

Marathon McDonald State A/C "1-B" Well No. 28 in (M) unit. Location: 467' from the south line and 467' from the west line of Section 24, T-22-S, R-36-E, Lea County New Mexico.

Shell A. L. Christmas "B" Well No. 2 in (N) unit. Location: 660' from the south line and 660' from the west line of Section 25, T-22-S, R-36-E, Lea County, New Mexico.

Shell A. L. Christmas "B" Well No. 5 in (K) unit. Location: 1980' from the south line and 1980' from the west line of Section 25, T-22-S, R-36-E, Lea County, New Mexico.

3. The wells in the unit area are in an advanced stage of depletion and should properly be classified as "stripper" wells. The proposed waterflood project is reasonably expected to recover oil that would otherwise not be recovered, thereby preventing waste.

4. In addition to the eight (8) injection wells referred to above, applicant intends to place an additional fourteen (14) wells on injection during the years 1972 and 1973. Applicant seeks the establishment of an administrative procedure for obtaining approval of these additional injection wells without meeting the well response requirements of Rule 701 E (5).

WHEREFORE, the applicant requests this application be set for hearing before one of the Commission Examiners on October 27, 1971, and that the Commission enter its order approving this application.

MONTGOMERY, FEDERICI, ANDREWS,
HANNAHS & MORRIS

By Richard S. Morris
P.O. Box 2307
Santa Fe, N.M. 87501
Attorneys for Marathon Oil Company.

DRAFT

GMH/dr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 4616

Order No. R- 4217

APPLICATION OF MARATHON OIL COMPANY
FOR A WATERFLOOD PROJECT, LEA COUNTY,
NEW MEXICO.

10-27-71

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 27, 1971, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this _____ day of November, 1971, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, MARATHON OIL COMPANY,

seeks authority to institute a waterflood project in the South Eunice Queen (Seven Rivers-Queen) Unit Area, South Eunice Seven Rivers-/Pool,

by the injection of water into the Seven Rivers and Queen formations through eight injection wells in Sections 24, 25, and 26,

Township 22 ~~XXXX~~ North, South, Range 36 ~~XXXX~~, East,

NMPM, Lea County, New Mexico.

(3) That the applicant further seeks an administrative procedure whereby said project could be expanded to include additional injection wells in the area of the said project as may be necessary in order to complete an efficient injection pattern; that said administrative procedure should provide for administrative approval for conversion to water injection in exception to the well response requirements of Rule 701 E-5 of the Commission Rules and Regulations.

(under)

DRAFT

GMH/dr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 4616

Order No. R- 4217

APPLICATION OF MARATHON OIL COMPANY
FOR A WATERFLOOD PROJECT, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 27, 1971, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this _____ day of November, 1971, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(14/15) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(15/16) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(6) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations, provided however, the showing of well response as required by Rule 701 E-5 should not be necessary before obtaining administrative approval for the conversion of additional wells to water injection.

IT IS THEREFORE ORDERED:

(1) That the applicant, Marathon Oil Company, is hereby authorized to institute a waterflood project in the South Eunice (Seven Rivers-Queen) Unit Area, South Eunice Seven Rivers-Queen Pool, by the injection of water into the Seven Rivers and Queen formations through the following-described wells in Township 22 South, Range 36 East, NMPM, Lea County, New Mexico:

| Company | Lease and Well No. | Location |
|---|---|---|
| Marathon | McDonald State A/C "1-B" No. 20 | Unit I - Section 26 |
| Marathon | McDonald State A/C "1-B" No. 21 | Unit E - Section 25 |
| Marathon | McDonald State A/C "1-B" No. 25 | Unit G - Section 26 |
| Marathon | McDonald State A/C "1-B" No. 26 | Unit A - Section 26 |
| Marathon | McDonald State A/C "1-B" No. 27 | Unit C - Section 25 |
| Marathon | McDonald State A/C "1-B" No. 28 | Unit M - Section 24 |
| Shell | A. L. Christmas "B" No. 2 | Unit M - Section 25 |
| Shell | A. L. Christmas "B" No. 5 | Unit K - Section 25 |

(2) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

PROVIDED HOWEVER, that the Secretary-Director of the Commission may approve expansion of the above-described waterflood project to include such additional injection wells in the area of said project as may be necessary to complete an efficient water injection pattern; that the showing of well response as required by Rule 701 E-5 shall not be necessary before obtaining administrative approval for the conversion of additional wells to water injection.

(6) That the subject application should be approved and the project should be governed by the

(2) That the subject waterflood project is hereby designated the Marathon South Ennis Unit Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations.

PROVIDED HOWEVER, that the Secretary-Director of the Commission may approve expansion of the above-described waterflood project to include such additional injection wells in the area of said project as may be necessary to complete an efficient water injection pattern; that the showing of well response as required by Rule 701 E-5 shall not be necessary before obtaining administrative approval for the conversion of additional wells to water injection.

(6) That the subject application should be approved and the project should be governed by the

(3) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.