

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 27, 1965

EXAMINER HEARING

IN THE MATTER OF:

APPLICATION OF INTERNATIONAL OIL & GAS
CORPORATION FOR A WATERFLOOD PROJECT,
EDDY COUNTY, NEW MEXICO

Case No. 3202

BEFORE:

ELVIS A. UTZ

TRANSCRIPT OF HEARING

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MR. UTZ: Case Number 3202.

MR. DURRETT: Application of International Oil & Gas Corporation for a waterflood project, Eddy County, New Mexico.

MR. LOSEE: A. J. Losee, appearing on behalf of International Oil & Gas Corporation. I have one witness, Mr. Appledorn.

MR. DURRETT: Let the record show that Mr. Appledorn was sworn in Case Number 3193, and is still under oath in this case.

MR. UTZ: Are there other appearances in this case?
... You may proceed.

* * *

C O N R A D A P P L E D O R N, the witness, having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. LOSEE:

Q State your name, please.

A Conrad Appledorn.

Q You are the Conrad Appledorn who is production superintendent for International Oil & Gas Corporation in Artesia, New Mexico, and you testified in two previous cases and had your qualifications accepted?

A Yes.

MR. LOSEE: Are the witness's qualifications accept-

able, Mr. Examiner?

MR. UTZ: Yes, sir.

MR. LOSEE: Are you famillar with the Artesia Pool area and specifically the proposed project that is to be included in this Dunn B waterflood project?

A Yes.

Q Please refer to Exhibit 1, which is a map of the area, and explain its significance.

A Exhibit 1 is a map of the proposed project in Sections 10 and 11. The area includes 720 acres which the north one-half and the north-half of the southeast quarter of Section 10 and the northwest quarter of the north half of the southwest quarter and west half of the northeast quarter of Section 11, Township 18 South, Range 28 East, Eddy County.

Q Will you give us a brief history of this area.

A The first wells in this project area were drilled in 1925. These were the Dunn B Number 1 and Dunn B Number 2; one in Section 10 and one in Section 11, shown on the map. The present producing wells were drilled in 1956 and 1957, except for the Number 29, which is the last well drilled in the area--it was completed in March of last year. There are 14 producing wells and one dry hole in the project area that we propose to use. One additional well will be drilled--this will be Number 30 in the northeast quarter of the southeast quarter of Section

of Section 11. No information is available on the dry holes shown in the northwest quarter of the southeast quarter of Section 11, and it is thought that these wells were drilled in 1925; some of the earliest wells in the area. Of the 14 producing wells, nine have casing set just above the Lovington sand, which is the lowest producing sand in the area. The Lovington is produced through open hole and other zones through perforations. The five latest wells have casing set to total depth and the producing zones perforated and treated selectively. Completion practice included fracture treatments of individual producing zones, using either oil or water in volumes from 10,000 to 30,000 gallons. Reported potentials ranged from 45 to 100 barrels of oil per day.

Q I believe you stated you were going to drill a new well in the northeast of the southeast of Section 11. Isn't that actually northeast of the southwest quarter?

A Yes, northeast of the southwest.

Q What is the present cumulative production from the project area?

A The cumulative production from the project area as of 1/1/65 is 195,778 barrels.

Q What is the daily average production?

A At this time they are kicking about 55 barrels of oil per day, which is a rate of about four barrels of oil per

producing well per day. Exhibit 2 shows the producing history of the project area. It indicates that in 1964 the increase due to completion of Well Number 29. The area is now producing 40 to 50 barrels of water per day. This has remained constant for the last several years and most of it is believed to be coming from the Lovington sand. Gas-oil ratio is relatively low; less than 2,000 cubic feet of gas per barrel of oil.

Q In your opinion have all wells in this project area reached a stripper state?

A All except perhaps Well Number 29, which is at this time making about 12 barrels of oil per day.

Q And that is a recently completed well?

A Yes, the well was completed last year.

Q What are the producing intervals in these wells in this project area?

A The main producing zone is the Premier sand, which is of the Grayburg formation. This is the basal sand of the Grayburg, and is shown on Exhibit 3A, which is the Welex radioactivity log of the Dunn B Well Number 24, between the depths of 2,482 and 2,558. It is at the base of the Grayburg formation. The top of the San Andres is shown immediately below it. Secondary sands that are developed in the area are the Loco Hills and Metax zones, which extend--the various sands you see between the top of the Grayburg and the top of the

Premier. These are secondarily important but we are looking to them as if they have porosity and permeability they are subject to waterflood. The Lovington sand shown at the top of the Lovington at 2702 is open in 10 wells in the project area, and we intend to inject water in this zone where it has sufficient porosity and permeability.

Q Do you intend to actually inject water in all those zones where they are capable of taking it?

A Yes, we're going to try it.

Q Please refer to Exhibit 4 and explain what that is to the Commission.

A Exhibit 4 is a structure map which is contoured on the top of the San Andres. It indicates the structure on the top of the San Andres and reflects generally the structure of the Grayburg formation and to a lesser extent perhaps, that of the underlying Lovington sand. As shown, the structure has a southeasterly dip at about 150 feet per mile. It flattens somewhat at the eastern side of the project area. Oil accumulation throughout the area is universal. The Artesia Pool is continuous for a distance of probably eight miles but producibility of the various sands is erratic and depends on porosity and permeability.

Q Is waterflooding feasible and practical in the Dunn B area?

A Yes, we feel it is, because in the immediate area the Premier is being flooded; somewhat to the west the Loco Hills zone is being flooded, and Metex zones have been flooded in the area. The Lovington has not been waterflooded to date-- I think this will be probably the first project.

Q In your opinion will the waterflood project tend to prevent waste and protect correlative rights?

A Yes, we believe we can produce significant quantities of oil which we would otherwise not get out.

Q What is the ratio of secondary oil to primary oil that you anticipate?

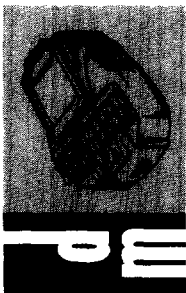
A We are estimating a secondary to primary ratio of 1-1. We think this is somewhat conservative, in that floods in other areas are being estimated at a ratio of one and a quarter to one, and higher. In our opinion the flood will recover about 258,000 barrels of oil, based on predicted recovery from this area.

Q What is the predicted life for this project?

A About six years.

Q What type of injection pattern do you propose to follow?

A As shown on Exhibit 1, in which the injection wells are marked, we are looking at an 80-acre five-spot pattern. A total of nine wells will be used for injection in this area.



Q Is there any fresh water present in this area?

A There is some ground water present. The depth from surface varies from 220 to about 380. Generally there are small quantities, and not present in every well.

Q Will there be adequate protection of ground water sources from contamination by your injected water?

A Yes. Surface casing has been set in all wells, and in the one well that is to be drilled we will set surface casing and cement it.

Q Please refer to your Exhibits 5A through I, and explain what they portray.

A Exhibits 5A through I are schematic diagrams of the proposed injection wells. All wells have or will have adequate surface and production casing, cemented to cover all known sources of fresh water. We also propose to pressure test production casing from 1500 to 2000 PSI in those areas. On wells where the seal is questionable we will inject down 2-3/8 inch tubing and isolate the casing with a tension packer.

Q These diagrams reflect that you initially propose, if your wells withstand this 2,000 PSI test, to inject through the casing?

A Yes.

Q But in those wells that if you find any that are not going to stand the pressure, you would then inject through

tubing with the aid of a packer?

A Yes.

Q Please refer to these exhibits and tell us how you calculated the tops of the cement.

A The tops of the cement are calculated, based on experience. We used the type of cement--all these wells were cemented with Incor Pozmix, and the volume behind the pipe, taking into account any changes in hole diameter, and we calculated the tops based on volume of cement used to cement the casing.

Q How were these holes drilled--with what type of equipment?

A Most of the wells--let's say all the wells were drilled with cable tools.

Q Actually the cement tops are calculated, and not by the use of any temperature survey, as shown on Exhibits 5A through I?

A That's right.

Q Please refer to what has been marked as Exhibit 6, and explain the information set forth there.

A Exhibit 6 is a tabulation of the proposed injection wells which are currently producing wells--in other words, these are wells which will be converted to injection. It shows surface casing and cement, the production casing, the grade of

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the casing, and weight, and the cement, and whether the casing was new or used when installed. In all cases it was new casing. It also shows completion date of the well and the total depth of the well.

Q What is the anticipated water injection rate for flooding?

A We are looking at 350 barrels per day per well, at a pressure of about 1500 PSI.

Q Will pressure, in your opinion, reach 2,000 PSI?

A No, I don't believe so. We haven't reached that pressure in any of our wells in the area to date.

Q What will be the source of injected water?

A We will purchase the water from Caprock Water Company.

Q Do you know where they will obtain the water?

A At the present time the water is from an East Red Lake source. They are now looking at the possibility of connecting to their Caprock system, I believe, to supplement the water supply.

Q Will you treat the water, or have to treat it, before you inject it?

A Yes, we will go to an oxygen and bacterial type treatment on this water.

Q In this flood, do you propose to re-inject produced water at a future date?

A Yes.

Q Will that water also be treated?

A Yes, that water will be treated for corrosion.

Q In conducting this flood do you propose to comply with the allowable provision of Rule 701E of the Oil Conservation Commission?

A Yes. We request 701E waterflood. We have a total of 14 wells now and will add two, which will give us a daily allowable of 672 barrels of oil a day--maximum daily allowable

Q Were Exhibits 1 through 6 prepared by you or under your supervision?

A Yes, they were.

MR. LOSEE: We offer Exhibits 1 through 6 in evidence, Mr. Examiner.

MR. UTZ: Without objection, Exhibits 1 through 6 will be entered into the record of this case.

MR. LOSEE: I have no further questions at this time.

MR. UTZ: Mr. Appledorn, I'd like you to explain the nature of the casing test you will conduct on these wells, if you will.

A We close the top of the casing, we load it with water and then put pump pressure on it to the pressure we

desire to test, which in this case would be 2,000 PSI.

Q At the surface?

A Yes.

Q Will you set a packer at the bottom of the casing?

A Yes, we will have to isolate the perforations.

Q So that actually the bottom of the casing will be subjected to surface pressure plus hydrostatic?

A Yes.

MR. IRBY: Frank Irby, State Engineer's Office. On this water treatment, you will use coupons to determine the effectiveness of it, as in the other cases?

A Yes, we have a regular coupon program which we follow continuously, on both producing wells and injection wells, and then we supplement that with visual inspection for tubercular development and bacterial development.

Q On your first response to a question concerning the testing of the casing, you said it would be tested to 1500 to 2000 PSI, and then later you answered the question with 2000 only.

A We will test at 2000. We have tested all of them at that.

MR. IRBY: That's all the questions I have.

MR. UTZ: Are there any further questions? ... Are there any other appearances in this case? ... The witness may

be excused. The case will be taken under advisement. We will take a 15-minute recess.

* * *

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ELIZABETH K. HALE, Court Reporter and Notary Public, do certify that the foregoing transcript in Case Number 3202, taken by me in shorthand, is a true and accurate record of proceedings to the best of my knowledge, skill and ability.

Witness my hand and seal of office this 10th day of February, 1965.

Elizabeth K. Hale

Notary Public

My commission expires
May 23, 1968.

I do hereby certify that the foregoing is a complete record of the proceedings in the Exemptor hearing of Case No 3202, heard by me on Jan 7, 1965.

[Signature]

Examiner
New Mexico Oil Conservation Commission

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