BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 27, 1960

EXAMINER HEARING

IN THE MATTER OF: Application of Continental Oil Company for an oil-oil dual completion. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of the Jicarilla Well No. 28-1, located in the NW/4 SE/4 of Section 28, Township 25 North, Range 4 West, Rio Arriba County, New Mexico, in such a manner as to permit the production of oil from the Gallup formation and the production of oil from the Dakota formation through parallel strings of tubing.	Case 1942

BEFORE:

Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 1942.

MR. PAYNE: Case 1942, application of Continental Oil Company for an oil-oil dual completion.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, Santa Fe, representing the applicant, and associated with Mr. William Griffith who is a member of the Colorado, Illinois and Michigan bars. Mr. Griffith will present the case.

MR. GRIFFITH: Our application is for an oil-oil dual completion of our Jicarilla-Apache Well No. 28-1. We would like to call three witnesses: a land man, Ken Kirtland; a geologist,

Bill Hare; and a petroleum engineer, Ralph Vertrees. At this time I would like to ask that these three witnesses be sworn.

(Witnesses sworn.)

MR. GRIFFITH: Ken Kirtland will be our first witness.

MR. UTZ: Witness will take the stand.

KENNETH KIRTLAND

called as a witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. GRIFFITH:

Q Would you please state your full name and place of residence?

A Kenneth Kirtland, Durango, Colorado.

Q Are you an employee of Continental Oil Company, and if so, in what capacity are you employed?

A I am employed as Land Superintendent, Durango Division.

Q I hand you what has been marked as Exhibit 1 and ask you what that is?

A This is an exhibit showing our acreage in the Jicarilla-Apache Reservation, Rio Arriba County, New Mexico.

Q Was this prepared by you or under your supervision?

A It was prepared under my supervision.

Q Will you testify to the accuracy of the shaded area on that exhibit?

A Yes, sir. This shows our leases in the west land plat.

Q And would you identify the location of the proposed dual completion?

A The proposed dual completion is in Township 25 North, Range 4 West, Section 28; the northwest of the southeast quarter.

Q At this location are there any interests other than Continental?

A Yes; El Paso owns the rights down to the base of the Pictured Cliff formation.

Q I would like to offer Exhibit 1 into evidence.

MR. UTZ: Do you want to offer them one at a time, or offer them when you finish your testimony?

MR. GRIFFITH: Either way.

MR. UTZ: Ordinarily we introduce them all at once.

MR. GRIFFITH: Do the Examiners have any questions of this witness?

MR. UTZ: Are there questions of the witness?

CROSS EXAMINATION

BY MR. PAYNE:

Q Do you know where the nearest well dual completion completed in the same formation is in respect to your proposed dual?

A No.

MR. PAYNE: No further questions.

MR. UTZ: Do you have a witness who can answer that question?

MR. GRIFFITH: Yes, sir.

MR. UTZ: You may be excused.

MR. GRIFFITH: Our next witness is Bill Hare.

WILLIAM G. HARE

called as a witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. GRIFFITH:

Q Would you please state your name?

A William G. Hare.

Q Are you employed by Continental Oil Company, and if so, in what capacity?

A I am employed in the capacity of a geologist.

Q Have you ever testified before the New Mexico Conservation Commission before?

A No, sir.

Q Would you briefly outline your background and your qualifications as a geologist?

A I received a Bachelor of Scienee degree in geology from the University of Houston in 1951; year and a half of graduate work, University of Colorado, and for the past five and a half years have been in the employment of Continental as a surface and and subsurface geologist. The past three years have been devoted to the San Juan Basin exclusively.

MR. GRIFFITH: I ask that Mr. Hare's qualifications as an expert witness as a geologist be accepted by the examiners.

MR. UTZ: They will be approved.

Q I hand you what has been marked Exhibit 2 and ask you to identify this.

A This is an induction electric log; I should say a partial portion of the induction electric log which was run by Continental Oil Company on this Jicarilla 28-1. I might state that the location as given on the log is in error. The location should be 1980 feet from the south and east lines of Section 28 instead of the southwest of the southeast quarter.

MR. UTZ: 1980 from what?

A From the south and east lines.

Q What is the deepest formation that well has penetrated?

A The Dakota.

Q From the electric log and the information received from drilling this well, can you describe this formation?

A Yes. I would describe this formation as a sequence of irregular thicknesses of interbedded, fractured sandstones, shales, with minor constituents of coal.

Q What is the thickness of the formation?

A Approximately 330 feet.

Q What is the average thickness of this formation in the surrounding area?

A Approximately 350 feet.

Q At what depth was the Dakota formation encountered?

A 7,395 feet.

Q Have you fully penetrated the Dakota formation?

A No, sir. The well T.D.'d approximately 80 feet from the top of the Jurassic-Morrison formation.

Q Have you encountered oil-producing sands in the Dakota formation?

A Yes.

Q In evaluating these oil-producing sands, what information did you have at your disposal?

A We had five-foot ditch samples and core data, and the core data was obtained from cores that were cut from 7,436 to 7,484, and from 7,595 to 7,643.

Q From this information were you able to determine the character of these producing sands?

A Yes. The sands may be characterized as fine to medium-grained, well-sorted, calcareously cemented sediments that exhibit good fluorescence, odor, and were bleeding both oil and gas. The section also, the sands, I should say, exhibited hairline fractures and the average porosity was approximately 6.2 percent. The permeability averaged 0.08 millidarcies.

Q Have you formed an opinion as to whether these producing sands have a common source of supply?

A Yes, sir. I think they do have, and that is based on their environment of deposition, being that the sand bodies are both underlain and overlain by black marine shales, and, in my opinion, the shales would be the source of hydrocarbons within the sands.

Q What formation overlies the Dakota formation?

A Directly overlying the Dakota is a sequence of 465 feet of impervious fine-grained clastics of slits and shale, and in an ascending order it may be broken down as follows: There is, directly over the Dakota, 20 feet of black-green argillaceous shale; 60 feet of calcareous shales, and argillaceous limes, Greenhorn; 165 feet of black mica shale; 120 feet of silts and shales, and approximately 80 feet of black mica shale, that comprises the Sanastee.

Q In your opinion, would this 465 feet of impervious clastics form a satisfactory barrier between the Dakota and the Gallup formations?

A Yes, sir, I think it would.

Q And what is the next overlying formation?

A Gallup.

Q What is the thickness of the Gallup?

A In this well the Gallup zone was topped at 6,428, bottomed at 6,860, giving it an over-all thickness of 432 feet, and included in this Gallup member would be zones of sand that would be interbedded in a matrix of marine shales and silts.

Q Have you encountered oil-producing zones in the Gallup?

A Yes, sir.

Q In evaluating these sands, what information did you have at your disposal?

A Again we had the five-foot ditch samples and core data, the cores being cut from 6,572 to 6,588 at which time low circulation was encountered and two feet was drilled, and then we cored from 6,590 through 6,641.

Q What is the character of these producing sands?

A They are very fine-grained sands of low porosity averaging 4.6 percent, and permeabilities of 0.19 millidarcies. These sands also exhibited good fluorescence, odor, staining, and were highly fractured.

Q Have you formed an opinion as to whether these producing sands have a common source of supply?

A Yes, sir. I think that, again, the environment of deposition here, these sand bodies being deposited in a matrix of marine shales, the shales would be considered the source of supply for the sands.

Q I hand you what has been marked Exhibit 3 and ask you if you can identify that?

A This is a complete reproduction of the induction electric log that Continental ran on their Jicarilla 28-1. Again I might state that the location is in error; the location should be 1980

from both the south and east lines of Section 28.

MR. UTZ: Is that a different log from your Exhibit 2?

MR. GRIFFITH: Yes, sir. This is a complete log.

MR. UTZ: You only have one copy?

MR. GRIFFITH: I think this log was submitted to the Commission before.

Q Any other producing formation in this well?

A Yes, sir. The Pictured Cliff is considered productive in this well, and the top of the Pictured Cliff was encountered at 3213, the base of the Pictured Cliff is considered at 3275.

MR. UTZ: This is marked on the Exhibit?

A Yes, sir.

Q In your experience can you geologically compare that area with any other?

A I firmly believe the area around the Jicarilla is very similar geologically. In the area, approximately two miles to the south, which would be in 24 North, 4 West, Northwest Production has established production in both the Gallup and Dakota formations.

Q MR. GRIFFITH: Do the Examiners have any questions to ask this witness?

MR. UTZ: Your engineer will be more familiar with your cementing, et cetera, will he not? Yes, I have a question to ask of this witness.

CROSS EXAMINATION

BY MR. UTZ:

Q Do you have the Mesaverde tops marked on this log?

A Yes, sir, they are marked.

Q And was is their interval?

A The top of the Mesaverde on the log is marked as Cliff House at 4868; top of the Menefee, 4903; the top of Point Lookout, 5333; Crevitt Canyon, 5512.

Q I believe you said the top of the Pictured Cliff was -- I didn't take it down; what was it?

A The Pictured Cliff would be at 3213.

Q The base?

A The base would be 3275.

Q Did you have occasion to examine the samples in the Mesaverde section?

A Yes, sir.

Q Were they productive of gas or oil?

A From the samples they were void of hydrocarbon.

Q Did you test the Mesaverde section of this well?

A No, sir.

Q How does the log look insofar as the Mesaverde section is concerned? Does it look as though it were capable of production?

A In my opinion it doesn't look as if it was capable of production.

Q Is that what you are looking at there?

A Yes, sir.

Q You don't know whether you had any gas shows or not?

A No, sir. There was no log reading on there.

Q There could be some gas in the Mesaverde?

A The gas wouldn't show in the samples; that is true.

Q And you didn't DST it?

A No, sir.

Q Were there any other shows in the well from the base of Point Lookout down to the Gallup?

A No shows from the base of Point Lookout to the Gallup; no, sir.

Q Were there any shows from the top of the Pictured Cliff to the surface?

A No, sir.

MR. UTZ: Are there any other questions of the witness? If not, the witness may be excused.

MR. GRIFFITH: Our next witness is Ralph Vertrees.

RALPH W. VERTREES

called as a witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. GRIFFITH:

Q Would you please state your name?

A Ralph W. Vertrees.

Q And are you employed by Continental Oil Company, and if so, in what capacity?

A Yes, sir, I am employed in the capacity of Division Engineer of the Denver Division, headquarters in Denver, Colorado.

Q Have you ever testified in the capacity of an engineer before the New Mexico Commission before?

A No, sir; I have not.

Q Would you briefly state your educational background and qualifications as a petroleum engineer?

A I was graduated from the University of Texas in January of 1951 with a B.S. degree in petroleum engineering. I was employed by Continental during that same year, and have been in their employ continuously since that time with the exception of two years from October of '51 to October of '53, during which time I had been recalled to the armed services. Upon my release from the army I was assigned to Ville Platte, Louisiana, in the capacity of production engineer. I was transferred to Eunice, Louisiana, in the same capacity the following year, and in 1956 was transferred and promoted to district engineer in Kilgore, Texas. In 1957 I was returned to Eunice, Louisiana in the capacity of district engineer. In January, '59, I was transferred to our headquarters in Houston in the capacity of staff engineer in our Reserves and Evaluations section. In September of '59 I was promoted to my present position.

MR. GRIFFITH: May Mr. Vertrees' qualifications as an

expert petroleum engineer be accepted by the Examiner?

MR. UTZ: Yes, that's right.

Q I hand you what has been marked as Exhibit 4 and ask you to identify that exhibit.

Q It is a sketch of the mechanical installation of Continental Oil Company's Jicarilla Well No. 28-1, including the equipment for the proposed dual completion.

Q Was this exhibit prepared by you or under your supervision?

A It was prepared under my supervision.

Q Can you testify as to the accuracy of the material contained in the exhibit?

A Yes, sir; I can.

Q Would you please give a brief history of this well?

A Yes. If the Examiner would follow his diagram it might assist in the explanation. The well was spudded August 19, 1959; surface casing 10-3/4 inch size set and cemented at 221 feet. Cement returns were circulated to the surface. After reaching a total depth of 7,650 feet, 7-inch, 23 pound, N-80 was set and cemented in the following manner: Using the pump and plug method 300 sacks of cement and 300 cubic feet of Stratocrete were pumped around the base of the shoe and extended to a calculated top of 5,670. The 7-inch was also cemented through a stage collar at 3,338 feet, utilizing 150 sacks of cement and 150 sacks of Stratocrete. I might add, the purpose of these cement columns above the stage collar was to cement off the Pictured Cliff formation.

After setting this string the 7-inch was tested satisfactorily and report of this test is submitted to the Commission.

Q What was the completion procedure used?

A We perforated the Dakota between the intervals 7,598, 7,617 feet and hydraulically fractured it, utilizing 42,000 pounds of sand and 25,200 gallons of crude. We perforated an additional section in the Dakota between intervals of 7,396 and 7,450 feet. These perforations also were hydraulically fractured, utilizing 656,000 pounds of sand and 45,000 gallons of crude. The well was then brought in and potentialed on December 11, 1959 for 117 barrels of oil per day to a one-inch choke. The gravity of the crude 2,430 to 1 recorded. Bottomhole pressure of 2,530 pounds and bottomhole temperature of 204 degrees Fahrenheit were recorded. All this information has been reported to the Conservation Commission.

Q Would you please describe the manner of proposed dual completion of this well?

A Yes, sir. We propose to seat a Model D packer at approximately 7,325 feet. A temporary plug will be placed in this packer and the interval between 6,690 feet and 6,860 feet will be perforated and hydraulically fractured. We propose, then, to place a retrievable plug above these seats of perforations and perforate the entire 6,520 feet and 6,640 feet and hydraulically fracture the well, then remove the retrievable bridge plug, remove the temporary plug in the packer, run a string of 2 3/8 O.D. tubing, seat it in the packer at approximately 7,325 feet. This particular

string will serve the Dakota production. We will then run another string of 2 3/8 O.D. tubing at 6,505 feet or immediately above the Gallup perforations to serve the production from the Gallup formation.

Q Will this provide for separation of production in the well?

A Yes, sir, it will. Each zone will have its own tubing string through which production will be obtained.

Q What provision have you made at the surface?

A We propose to install a dual head and Christmas tree at the surface and the necessary surface facilities for each zone separately, consisting of separators, heater treaters and tanks and gas measurement facilities. Each zone will have its own separate facilities on the surface.

Q Will this manner of completion allow for separate reservoir pressure testing?

A Yes, the procedure will allow standard subsurface pressure gauge to be lowered through the tubing and measure each zone's bottomhole pressure separately.

Q Will there be separate packing leakage tests?

A Yes, sir. After seating the packer we will submit a packer leakage test and report the results to the State.

Q Does your contemplated completion make allowance for the determination of the gas-oil ratio from each zone?

A Yes, sir, the surface equipment that will be installed for each zone will allow measurement of the oil, water and gas produced

from each zone as separate from the other zones.

Q In your opinion, would oil produced from the Gallup zone be from a common source of supply, separate from the Dakota?

A Yes, sir, I believe this is the case. Geological information and core analysis indicates the Gallup to be a fractured formation and, therefore, would consist of a single -- all of the Gallup zones or sands within the Gallup zone, I should say, are connected to a single hydraulic source. This source is separate from the Dakota hydraulic source.

Q Why does Continental Oil Company desire to dually complete this well?

A For economic reasons, primarily. The reserve of the two zones is not believed sufficient to support a separate well for each zone.

Q Will this dual completion benefit the State of New Mexico?

A Yes, sir, it will in that it will allow immediate production of additional oil in the manner that will prevent the waste of resources of the State of New Mexico, and this oil may or may not be produced in the future due to poor economics of a separate well to each zone.

Q Are the correlative rights of the land owners protected?

A Yes, sir.

Q Do the Examiners have any questions of this witness?

CROSS EXAMINATION

BY MR. UTZ:

Q What is the gravity of the Dakota oil?

A We do not have that measurement, sir, in this well. In offsetting well, Jicarilla 20-2 located in Section 20 it is measured as 40.0 degrees A.P.I.

Q Did you DST the Gallup in this completion?

A Yes, sir. The records indicate it was.

Q Do you have any information from the DST as to gravity pressures and so forth?

A I do not have them here. Our geologist has that information. If I may be allowed to discuss it.

Q Certainly.

Q We drillstem tested the interval from 6,579 to 6,641 feet, shutin one hour, opened two hours, and recovered 1,000 feet of heavy oil and gas cut mud. Do you desire the pressures?

Q Yes.

A The initial shut, 2,740 pounds, final, 2,590 pounds; initial flow 375, final flow was 420; initial hydrostatic 3,155 pounds, final hydrostatic, 3,140 pounds.

Q Did you measure the gas?

A No, sir.

Q You have no idea what the GOR is?

A No, sir; not in this well.

Q You didn't take the gravity of the liquids?

A No, sir.

Q Do you happen to know what the gravity of liquids is in

the nearest offset well, nearest to this well?

A The nearest well I have any knowledge of, sir, is Section 20, Jicarilla; 40 degrees A.P.I.

Q Same as the Dakota?

A No, sir; Dakota measured 45.0.

Q Do you have any idea what the GOR's are? They are going to be pretty low on this well.

A No, sir, I would assume the gas-oil ratio, this is an assumption, however, I assume that the gas-oil ratio of the Gallup will be in the neighborhood of 1500 to 2,000 to one. That is an assumption, however. I do not know what it will be.

Q I believe your geologist testified you did not test the Mesaverde section on this well?

A That is correct, sir.

Q Do you have any knowledge of any gas shows in this zone?

A No, sir, I do not.

Q You think there is a possibility that it does contain some gas?

A There is always a possibility when it wasn't tested. However, I don't consider it a real possibility in this case.

Q Mesaverde zone is left open behind the casing?

A A portion of it is, yes, sir. The top of the Mesaverde, as I believe Mr. Hare testified, is 4,868; the calculated top of the interval is 5,670 feet. Between that top and the base of the cement job we left 10.2 pound drilling mud behind the pipe.

Q The base of Point Lookout is 5,333, isn't it?

A I am not prepared to testify to that.

Q Your geologist testified to that. The top of the cement circulated, 5,670?

A Yes, sir.

Q So the base of Point Lookout would be above the cement?

A Yes, sir.

Q The top of the Cliff House, 4,868, would also be below your section actually left open and only protected by mud?

A Yes, sir. I was considering that the Gallup was a portion of the Mesaverde series. That nomenclature, perhaps, is not correct.

Q Would there be any zones between 3,336 to 5,670 to your knowledge that would take any of the gas that might be in the Mesaverde section?

A No, sir, not with the 10.2 pound mud. I do not believe so. We had no indication of gas migration during drilling, no indication of pressures that would cause the displacement of the mud during drilling operations.

Q You are not testifying here, are you, that mud will actually prevent communication?

A No, sir; it tends to prevent it.

Q For a certain period of time.

A Yes, sir. It would take a mud considerably heavier than that, more the consistency of cement, to do it.

Q The Pictured Cliff is protected with cement?

A Yes, sir.

Q Do you have knowledge of any shows above the Pictured Cliff?

A No, sir; I do not.

Q That is between 1,448 and 220 feet?

A No, sir.

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

BY MR. PAYNE:

Q Is a packer Model D a permanent type packer?

A Yes, sir.

Q Why do you use this type packer? Do you think they are better?

A They are easier to get in and out of, in our opinion. Whether they are better or not is a matter of opinion. I think once a permanent packer is set there is less chance of its leaking.

Q Easier to get in and out? Easier to retrieve tubing from?

A Yes, sir.

MR. UTZ: Are there any other questions? If not, the witness may be excused.

Do you wish to enter your exhibits?

MR. GRIFFITH: I would like to offer Exhibits 1, 2, 3 and 4 into evidence.

MR. UTZ: Without objection Exhibits 1, 2, 3 and 4 will be entered in the record. Do you have anything further?

MR. GRIFFITH: No, sir, except we feel this application

is in the interests of conservation and will not promote waste, and pray that it be given favorable consideration.

MR. UTZ: Any other statements to be made in this case? If not, the case will be taken under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, the Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

Jane Paige
Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1942, heard by me on April 27, 1960.

Examiner
New Mexico Oil Conservation Commission