

CASE NO. 27

BEFORE THE OIL CONSERVATION COMMISSION OF
THE STATE OF NEW MEXICO

IN THE MATTER OF THE PETITION OF CULBERTSON & IRWIN,
INC., FOR AN ORDER OF THE COMMISSION REGARDING A PRESSURE
MAINTENANCE PROJECT, OR OTHER CONSERVATION MEASURE AS TO
THAT PORTION OF THE NE PART OF THE LANGLEY POOL, LEA
COUNTY, DESCRIBED AS THE WEST ONE-HALF OF THE WEST ONE-
HALF OF SECTION 3-25S-37E, TO INCREASE THE ULTIMATE RE-
COVERY THEREFROM, TO PERMIT THE USE OF LIBERTY ROYALTY WELL
NO. 3 THEREON AS AN INPUT WELL AND TO PERMIT THE PRODUCTION
OF THE WELL ALLOWABLE FOR THAT WELL FROM LIBERTY ROYALTY
WELLS NOS. 1 AND 2, UPON SAID TRACT.

TRANSCRIPT OF PROCEEDINGS AT HEARING
STATE CAPITOL BUILDING
SANTA FE, NEW MEXICO
JULY 25, 1941

Pursuant to order of the Commission setting July 25, 1941, at
two o'clock in the afternoon, for hearing in the above entitled matter,
said hearing was convened at said hour in the hall of the House of
Representatives, Capitol Building, Santa Fe, New Mexico, the Commission
sitting as follows;

HON. JOHN M. KELLY, Secretary, State Geologist
HON. H. R. ROGERS, Member, Commissioner of Public Lands
HON. CARL B. LIVINGSTON, Chief Clerk and Legal Advisor.

APPEARANCES:

Wallace W. Irwin	Culbertson & Irwin, Inc.	Midland, Texas
E. A. Culbertson	" " " "	" "
W. W. LaForee	Montecito Corp	" "
Ira VanTuyt	Gulf Oil Corp.	Hobbs, N. M.
Glenn Staley	Proration Office	" " "
W. K. Davis	El Paso Natural Gas Co.	Jal, N. M.
Keith F. Quail	Sallee & Yates	Artesia, N. M.
R. M. Sallee	" " "	" " "
S. P. Hannifin	Magnolia Pet. Co.	Roswell, N. M.
J. S. Griffith	Humble O. & R. Co.	" " "
Leo R. Manning	Land Office	Santa Fe, N. M.
Harry Leonard	Leonard Oil Co.	Roswell, N. M.
D. R. McKeithan	Phillips Pet. Co.	Bartlesville, Okla.
C. A. Daniels	" " "	Amarillo, Texas
Edgar Kraus	Atlantic Rfg. Co.	Carlsbad, N. M.

The hearing was called to order by Mr. Kelly, who requested Mr.
Livingston to read the notice of hearing, as follows:

BY MR. LIVINGSTON:

"The Oil Conservation Commission, by law invested with jurisdiction
as the oil and gas regulatory body of the State of New Mexico, hereby gives
notice of the following public hearing to be held at the Capitol, Santa Fe,
New Mexico:

Case No. 27

The petition of Culbertson & Irwin, Inc., for an order of the Commission regarding a pressure maintenance project or other conservation measure as to that portion of the NE part of the Langlie Pool, Lea County, described as the West One-half of the West One-half (W/2 of W/2) of Section 3-25S-37E, to increase the ultimate recovery therefrom, to permit the use of Liberty Royalty Well No. 3 thereon as an input well and to permit the production of the allowable for that well from Liberty Royalty Wells Nos. 1 and 2, upon said tract. This case is set for 2 o'clock P. M., July 25, 1941.

Any person having any interest in the subject of the said hearing shall be entitled to be heard.

The foregoing Notice for Publication was made pursuant to the direction of the Commission at its Executive Meeting July 10, 1941.

Given under the seal of said Commission at Santa Fe, New Mexico, on July 10, 1941.

OIL CONSERVATION COMMISSION

(SEAL)

By (Sgd) John M. Kelly
John M. Kelly
Secretary"

E. A. CULBERTSON,

being first duly sworn to tell the truth, the whole truth, and nothing but the truth, testified as follows:

DIRECT TESTIMONY

My name is E. A. Culbertson, President of Culbertson & Irwin, Inc., a New Mexico Corporation, with its principal office at Midland, Texas. We are the operators, for oil and gas, known as the Liberty Royalty Corporation, on the west half of the west half of Sec. 3, T. 25 S., R. 37 E., Lea County. On this property there are three producing oil wells, designated, respectively, as Liberty Royalty Corporation Wells 1, 2 and 3.

We have heretofore filed with the Commission a formal petition requesting an order authorizing us, first, to set up a pressure maintenance project covering that particular tract of land. In that petition we are asking permission to use Liberty No. 3 as a gas input well. This well is 660 feet east of the west line, and 2310 feet north of the south line of Sec. 3. It is our request that we be permitted to inject compressed dry gas through this well No. 3 into the

formation from which the wells on this tract are produced. To inject that gas in such quantity, and under such pressure as may seem advisable, or as later determined, to accomplish our purpose of maintaining the reservoir pressure in this oil zone.

We are asking that the Commission allocate to this Well No. 3, for so long a time as it is being used as an input well, the allowable production as determined by tests, supervised by the Proration Office, which test was completed within the last few days. We are asking for permission to produce, for proration purposes, from Wells 1 and 2, or from either one of them, of a quantity of oil in addition to their respective allotments, which would be equivalent to the allowable credited to Well No. 3, while it is being used as an input well.

In support of this request and petition, we would respectfully point out and show that the gas from the three wells on this lease, which is now being produced in conjunction with the oil, is being delivered to the property of the El Paso Natural Gas into their casinghead gas plant, located in the Mattox Pool. This gas taken from this lease is metered as it is taken into the El Paso gas line and co-mingled with other casinghead gas from wells in this same area. All of this gas is run through the gas extraction plant for casinghead gas, the gasoline and other products extracted from the gas, and the reduced dry gas is then either sold and delivered into El Paso Gas Company line or is blown into the air. At the present time the greater part of this dry gas is being blown into the air and wasted.

We would show, in support of this project, it will accomplish conservation in several ways. In the first place, the gas now being blown into the air will be injected into the formation under pressure. So long as the project is in effect, this gas will be held in the reservoir, and the reservoir pressure will be kept up, so that, theoretically, at the end of the life of the pool, after taking out the available oil, we will still have a gas reservoir. I would not claim that is true in practice because probably the gas will be released with the oil.

We point out also that by the use of this injected compressed gas, we believe the level of cost of production of this property will be smaller -- smaller than by any other known means -- known at the present time, at least. The flow life of these wells, if the project is successful, will undoubtedly be lengthened by having this compressed gas as a lifting force. The flow life of the wells will be dependent upon the economic factors, which will be the cost of the input gas in relation to the amount of oil taken out. Principally, however, we maintain -- believe -- at least hope that the ultimate recovery of oil from this well will be increased. If possible, we would like to increase the pressure, but if we can maintain the pressure, - the bottom hole pressure of the oil zone, we believe results have indicated the ultimate recovery of oil will be greater by reason of this pressure maintenance project.

We do not know now, or are unable to say the amount of gas that will be injected, or the pressure at which it will be injected, but it will be our intention to inject gas at a uniform rate of pressure somewhat greater than the present bottom hole pressure, or formation pressure. It will also be our intention, and we will take regular tests of the gas-oil ratio on Wells Nos. 1 and 2. We will take bottom hole pressure tests on these wells, and we believe the operators of adjoining leases have verbally indicated their approval of this plan, and will cooperate in permitting the taking of gas-oil and bottom hole pressure tests at frequent and regular intervals. All of this information will, of course, be made available to the Commission or the Proration Office.

BY MR. LIVINGSTON:

Q This is merely for the record: Please qualify yourself. I believe you are an experienced oil man within this particular area?

A I could say I have been president of the corporation operating in this particular area for the past six years. We have been operating twenty-five wells in this particular area -- we and our associates -- and for this reason we feel we are well informed and fairly well versed in the conditions prevailing there.

BY MR. LIVINGSTON: Anyone who wishes, may interrogate this witness.

BY MR. CULBERTSON: If the Commission would care to hear him, we would be glad to have Mr. Irwin, Vice-President and Geologist, who has prepared a geological report, present it to the Commission in connection with this petition.

BY MR. KELLY: In this connection, would your company be willing to furnish the Commission with monthly reports as to the amount of input gas used and the pressure at which you put it in?

A Certainly, we intend to do that, and any other pertinent tests we make.

BY MR. KELLY: We are more particularly interested in the input gas, monthly, and gas-oil ratio tests on the other two wells.

Witness dismissed.

WALLACE W. IRWIN,

being first duly sworn to tell the truth, the whole truth, and nothing but the truth, testified as follows:

DIRECT TESTIMONY

My name is Wallace W. Irwin, Vice-President and Geologist of Culbertson & Irwin, Inc. I have received a degree in geology from the University of Oklahoma; have had twelve years experience in southeastern New Mexico and west Texas.

I have prepared a geologic report to show why I believe this well we propose to use -- the gas injections into that particular well can be controlled. I want to submit this to the Commission as evidence in this case. (Marked "Petitioners' Exhibit No. 1")

There are three maps, the first map is the sub-surface contour on top of the Yates sand. It shows the location of the Liberty Royalty wells to be located well down the west flank of the Langlie-Mattix anticline.

The second, which is felt to be the most important to this report, is the extent, -- is a map showing the extent of the productive area of this particular field -- this particular sand that is producing in the Liberty Royalty lease, and what controls the production on the south,

east and west sides. This particular sand pinches out east, forming a closure; on the south it piles up, - dry holes. Immediately south of the Liberty. The structure dips to the west, and is controlled on the west by the structure. This sand strikes on to the northwest. It is too high to produce oil at that point (indicating) and is engaged in the gas cap field.

The third map is a cross section, - an east-west cross section across this lease. It shows the Liberty Royalty producing sand pinches out to the east, and the wells to the west shows it becomes too low to carry oil, and carries water.

We feel that gas put into this No. 3 well can be controlled on all three sides as shown. It is open to the north and northwest, but those will be our output wells, and we hope this may be controlled by them. We wish to present this as Exhibit No. 1.

Witness dismissed.

BY MR. KELLY: The Commission would like to have Mr. Staley introduce the result of the tests on the No. 3 well.

GLENN STALEY,

being first duly sworn to tell the truth, the whole truth, and nothing but the truth, testified as follows:

DIRECT TESTIMONY

These are the charts taken by the representative of the Commission of the well in question, Well No. 3, Liberty Royalty, of Culbertson & Irwin. The test shows the gas-oil ratio of 865 cubic feet of gas per barrel of oil, with 12.80 barrels per day.

(Marked "Petitioners' Exhibit No. 2)

Witness dismissed.

BY MR. LIVINGSTON: The Commission authorizes me to state that the Commission will take the present case under advisement.

PETITIONERS' EXHIBIT NO. 1

"A REPORT ON A PROPOSED REPRESSURING PROJECT IN THE LANGLEIE POOL, LEA COUNTY, NEW MEXICO.

The area to be discussed in this Report surrounds and includes the Culbertson & Irwin, Inc., Liberty Royalties lease located in the Northeast part of the Langlie Pool, Lea County, New Mexico. This lease is described as the West One-half of the West One-half (W/2 of W/2) of Section No. 3, Township 25-South, Range 37-East, Lea County, New Mexico, and is shown on Figure 1 of this Report.

There are three producing wells on this lease. The #1 well is located 330' from the North line and 990' fr. the West line of the lease. This well was completed on March 25, 1938, at a total depth of 3396' for initial production of 322 barrels daily. Later this well was deepened to 3470' and completed as a natural producer, however, production declined and on April 13, 1941, the well was shot with 120 qts. of solidified glycerin from 3400-3460'.

The #2 well is located 1650' from the North line and 660' from the West line of the lease. This well was drilled to a total depth of 3467' and completed on May 19, 1938, for a natural production of 370 barrels daily. This well was later shot with 150 qts. of solidified glycerin from 3385-3461'.

The #3 well is located 2310' from the South line and 660' from the West line of the lease. This well was drilled to a total depth of 3468' and was completed on July 1, 1938, for 166 barrels daily after shooting with 160 qts. of glycerin from 3400-3467'.

The Langlie and Mattix Pools are located on the West flank of a sub-surface structure which has a Northwest-Southeast strike. The producing zones are sandstone members of the Queen formation. There are several individual sand zones producing in this field. The gas-oil contact is encountered at approximately -190' and the oil water contact at approximately -330'. The accumulation in the individual sands is controlled by structure, gradation and pinch-out of the sand members.

Figure #2 of this Report shows the approximate outline of the productive limits of the sand which is producing in the three wells on the

Liberty Royalties lease. Referring to Figure #3, it can be readily seen that the productive area of this sand is controlled on the West by the structural dip of the formation and on the East by the pinch-out of the pay section.

The pay section apparently grades into shale and becomes contaminated and non-porous on the South end of the Liberty Royalties lease. This conclusion is based on the type of section encountered in the Culbertson & Irwin, Inc. #1 Humphrey dry hole located 1980' from the West line and 660' from the South line of Section 3, Township 25-South, Range 37-East, and the two dry holes drilled in the Southeast One-fourth of the Southeast One-fourth (SE/4 of SE/4) of Section No. 4, Township 25-South, Range 37-East. As shown on the structural map, Figure #1, these tests were well located structurally and would have made producers if the pay section had not been contaminated with shale and silt. This pay section, however, becomes a clean sand again to the Southeast and as is shown on Figure #2, is the producing zone in the wells located on the West One-half (W/2) of Section No. 10, Township 25-South, Range 37-East.

The sand producing in the Liberty Royalties wells produces to the Northwest of and on strike with these wells for a distance of approximately two miles. At this point the axis of the structure takes more of a Northwest-Southeast strike and the Eastern limits of the Liberty Royalties sand zone becomes too high to produce oil and is included in the gas cap area, and becomes bentonitic and non-porous down dip.

It is our opinion that a repressuring or pressure maintenance program covering all or a portion of a sand zone of this nature would greatly increase the ultimate recovery, and lower the lifting cost over a period of years.

As shown on Figure #2, the Liberty Royalties lease is located on the South end of the North lens of this particular sand zone. It is our opinion that if a well on the South end of this lens is used as an input well, the input gas would be controlled in every direction except in the direction of the producing wells. Thus an increase in pressure and production should be noted in wells nearest the input well.

Referring to Figure #2 and using the Culbertson & Irwin, Inc. #3 Liberty Royalties well as the input well, it will be seen that the wells

that would be expected to be first effected would be the Culbertson & Irwin, Inc. #1 and #2 Liberty Royalties and the Weiner #1, #2 and #3 Smith wells. Inasmuch as these are similar wells and, as shown on Figure #3, are producing from the same sand, it would appear that the unitization of these two leases would be the ideal manner in which to operate such a project. However, due to the fact that this is an experiment we do not wish to unitize until we are satisfied that the project will be successful. However, the owners of the Weiner-Smith lease are willing to cooperate with us on this project and have given us permission to check these wells from time to time with reference to production, bottom hole pressure and gas-oil ratio change.

By a periodic check of Weiner-Smith wells and Culbertson & Irwin, Inc. Liberty Royalties wells, we should be able to ascertain the results of the input gas on the production and operation of the various wells, and whether it will be practical to operate the leases separately or as a unit.

In submitting this Report we beg that the Oil Conservation Commission of New Mexico:

- (1) Authorize Culbertson & Irwin, Inc., to convert their #3 Liberty Royalties well from a producing oil well to an input gas well for the purpose of maintaining or repressuring the sand zone which is producing on this lease.
- (2) That the monthly allowable be allocated to the lease as a whole, instead of to the 40-acre units, with authority to produce the same in the most efficient manner.

Yours very truly,

CULBERTSON & IRWIN, INC.

By (Sgd) Wallace W. Irwin
Wallace W. Irwin."

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C E R T I F I C A T E

I hereby certify that the attached and foregoing eight and a fraction pages of typewritten matter are a true correct and complete transcript of the shorthand notes taken by me on the date of the hearing, and copy of the text of Petitioners' Exhibit No. 1, and by me extended into typewriting.

Witness my hand this 5th day of August, 1941.

Ether Barton