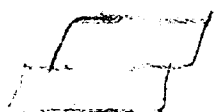


CASE 1961: Application of GULF for
permission to commingle from all
wells located on its C. L. HARDY



Casa No.

1961

Application, Transcript,
Small Exhibits, Etc.

1961
OIL CONSERVATION COMMISSION

P. O. BOX 2088

SANTA FE, NEW MEXICO 87501

August 7, 1968

C Gulf Oil Corporation
P. O. Box 670
Hobbs, New Mexico 88240

Attention: Mr. C. D. Borland

Administrative Order PC-357

O Gentlemen:

P Reference is made to your application dated June 4, 1968, for an amendment to Commission Order No. R-1678 which authorized the commingling of Blinbry, Drinkard, Paddock, and Penrose Skelly production from your C. L. Hardy Lease in Section 20, Township 21 South, Range 37 East, Lea County, New Mexico, after separately metering the production from each pool. We are now in receipt of the 60-day production record supporting your request to delete the metering requirement of the subject order inasmuch as all production going into this battery is of marginal nature.

Y An R- order of the Commission cannot be amended without a hearing. However, this installation is eligible for administrative approval and you are hereby authorized to commingle the aforesaid production as before except that the allocation to each well and to each pool shall be on the basis of periodic well tests. Please notify the Commission at such time as any well connected to the subject battery is capable of top allowable production.

That portion of Commission Order No. R-1678, dated May 19, 1960, relating to commingling is hereby put in abeyance.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/esr

cc: Oil Conservation Commission - Hobbs
Oil & Gas Engineering Committee - Hobbs

OIL CONSERVATION COMMISSION

P. O. BOX 871

SANTA FE, NEW MEXICO

March 31, 1962

COPY
Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico

Attention: Mr. J. M. Russell

Gentlemen:

Reference is made to your recent inquiry as to whether Order No. R-1678 authorizes the commingling of Blinebry production from your C. L. Hardy Well No. 2 with Drinkard, Paddock and Penrose Skelly production from the same lease.

Although Order No. R-1678 which permitted commingling of Blinebry production with the other production on this lease was based on Blinebry No. 5 being classified as an oil well and being produced into the same battery as the other well, we see no reason that it cannot be interpreted to include production from the No. 2 Well also. This is, of course, based on the continuation of the current procedure of measuring and storing Blinebry liquids from the No. 5 Well in separate tankage and metering the production from the No. 2 well prior to commingling.

Very truly yours,

A. L. PORTER, Jr.,
Secretary-Director

ALP/DSN/og

cc: Mr. J. D. Ramey
Hobbs, New Mexico



PETROLEUM AND ITS PRODUCTS

MAIN OFFICE OCC

1962 MAR 7 AM 8

GULF OIL CORPORATION

P. O. Box 2167
Hobbs, New Mexico

FORT WORTH
PRODUCTION DIVISION

March 6, 1962

Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. Daniel S. Nutter

Gentlemen:

In reply to your letter of March 1, 1962, in which you requested a brief summary of current production from each well on Gulf's C. L. Hardy Lease, we are supplying the latest well test data on each well, as follows:

Well No.	Pool	Method Produced	Date of Test	Daily Production Oil	Water
1	Eumont Gas	SI			
2	Paddock	Pump	1-20-62	9	2
	Blinebry Oil	Flow	2-27-62	73	3
3	Penrose-Skelly	Pump	1-22-62	16	14
4	Paddock	Pump	1-21-62	10	2
	Penrose-Skelly	Pump	1-25-62	7	30
5	Drinkard	Flow	1-24-62	11	1
	Blinebry Gas	(Condensate production dependent on gas production)			

The C. L. Hardy Well No. 5 is currently classified as a Blinebry gas well. At the request of the purchaser the condensate from Well No. 5 is now being produced into a separate battery and is not being commingled with production from the other pays as originally authorized.

Yours very truly,

J. M. RUSSELL
Area Production Manager

DGB:ptg

cc: Oil Conservation Commission
Hobbs, New Mexico

*hold pending to
reply to
letter of 3-1-62*



PETROLEUM AND ITS PRODUCTS OFFICE OCC

GULF OIL CORPORATION

P. O. Box 2167
Hobbs, New Mexico

February 23, 1962

*OK to include
Blinbry production
from the #2
w/ the Blinbry*

FEB 25 AM 8:21
FORT WORTH
PRODUCTION DIVISION

Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Gentlemen:

Effective February 16, 1962 on Oil Conservation Commission Administrative Order No. MC-1156 authorizes Gulf to produce oil from the Paddock Pool and the Blinbry formation adjacent to the Blinbry Pool on its C. L. Hardy Well No. 2 located in the SE/4 SW/4 Section 20-21S-37E, Lea County, New Mexico.

Gulf proposes to commingle Blinbry oil production from its Hardy No. 2, after metering, with the production from the Drinkard, Paddock and Penrose Skelly Pools on the same lease. Shell Pipeline is the gatherer of the oil from this lease and has given verbal approval to Gulf permitting commingling of this production.

Gulf is of the opinion that Commission Order No. R-1678 granted May 19, 1960 gave permission to commingle production from the Blinbry, Drinkard, Paddock and Penrose Skelly Pools on the C. L. Hardy Lease; however, Gulf would appreciate a Commission opinion on this matter. Should the Commission find that Order No. R-1678 does not permit commingling of the Blinbry oil produced from C. L. Hardy No. 2 with production from the Drinkard, Paddock and Penrose Skelly Pools on the same lease, please accept this as a request for administrative approval to permit commingling.

The present combined corrected gravities from the production obtained from the commingled production from the Drinkard, Paddock and Penrose Skelly Pools is 36.3 degrees API at 60 degrees F. The corrected gravity of the Blinbry oil production from Gulf's C. L. Hardy Well No. 2 is 36.4 degrees API at 60 degrees F. If permission is granted to commingle the Blinbry production with the production from the other pools on this lease, the combined gravities will be 36.4 degrees API at 60 degrees F.

Should additional information be required, please advise.

Yours very truly,

BY: *J. C. Ballinger*
J. C. RUSSELL
Area Production Manager

ZCB:ptg

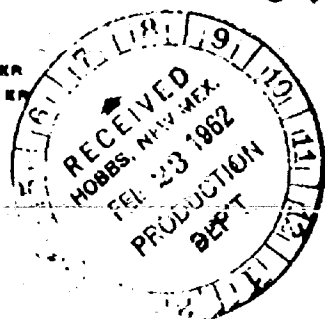
GOVERNOR
EDWIN L. MECHEM
CHAIRMAN

State of New Mexico
Oil Conservation Commission

MAIN OFFICE OCC

FEB 26 AM 8:22

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER



P. O. BOX 871
SANTA FE

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

February 16, 1962

Gulf Oil Corporation
Box 2167
Hobbs, New Mexico

Gentlemen:

Enclosed herewith please find Administrative Order No. MC-1156 for your C. L. Hardy Well No. 2 located in the SE/4 SW/4 of Section 20, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico, to permit the production of oil from the Paddock Pool and the production of oil from the Blinbry formation adjacent to the Blinbry Pool.

Very truly yours,

A. L. Porter, Jr.
A. L. PORTER, Jr.,
Secretary-Director

ALP/JEK/og

cc: Oil Conservation Commission - Hobbs
Oil & Gas Engineering Committee - Hobbs

said commingled production."

MR. KASTLER: Bill Kastler appearing on behalf of Gulf Oil Corporation. Our only witness is Mr. John Hoover.

JOHN HOOVER

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

DIRECT EXAMINATION

BY MR. KASTLER:

Q Will you please state your name, your employer?

A John Hoover, employed by Gulf Oil Corporation, Roswell, New Mexico as a production engineer.

Q Have you previously appeared before the Oil Conservation Commission and qualified as an expert witness?

A Yes, I have.

Q As a production engineer? A Yes, sir.

Q Are you familiar with Gulf's application in Case 1961?

A Yes, sir.

Q Will you briefly outline what Gulf is seeking in this application?

A We're asking for approval for an automatic custody transfer system and a request for permission to commingle from the Blinebry, Drinkard, Paddock, and Penrose-Skelly Pools underlying our C. L. Hardy Lease comprising the SW/4 of Section 20, Township 21 South, Range 37 East, Lea County, New Mexico.



Q Do you have a lease plat which has been prepared for introduction here as Exhibit No. 1?

A Yes, I do.

(Whereupon, Gulf's Exhibit No. 1 was marked for identification.)

Q Referring to Gulf's Exhibit No. 1, would you please describe the boundaries of the lease, or describe the lease?

A Yes, on this plat which we have marked Exhibit 1, the C. L. Hardy lease is outlined with hashed marks and outlined in red and as previously described it's the Southwest Quarter of Section 20, Township 21 South, Range 37 East of Lea County.

Q Is this State, Federal or fee lease?

A This is a fee lease.

Q Is the royalty ownership common through the 320 acres of the lease?

A Yes, it is.

Q What wells does Gulf have on this lease?

A At the present time we have three Drinkard wells, two Paddock wells, two Penrose-Skelly wells and one Blinebry oil well.

Q A total of eight wells?

A A total of eight wells. The Blinebry oil well has been a gas well, but on the recent GOR test it will be classified as an oil well.

Q Will you kindly identify the wells beginning with Well



No. 1 as shown on Exhibit No. 1?

A Yes.

Q And state what pay or pays they are completed in.

A Well No. 1 is completed in the Penrose-Skelly, Well No. 2 is completed in the Drinkard and Paddock, Well No. 3 is a Drinkard well, Well No. 4 is a Penrose-Skelly Paddock, and Well No. 5 is the Blinebry-Drinkard well.

Q What present facilities does Gulf have on this lease for handling its production?

A At the present time we have one low 500 barrel tank with a separator for the Penrose-Skelly Pool production. We have two low 500's with a heater treater, and production and test separator for the Drinkard production. We have two 210 barrel tanks for the Blinebry production and we have one test tank for the Paddock production with the oil being trucked to the pipeline.

Q As I understand it then, you have four separate tank facilities for each of the four pays?

A Yes.

Q Are the present facilities satisfactory?

A No. They aren't. We need additional tankage. To go to a conventional battery to handle this production adequately, we would need two low 500's for the Penrose-Skelly with a heater treater, that makes one more 500 barrel tank plus a heater treater that we need on Penrose-Skelly. On the Drinkard, we are

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all right there. We have the two low 500's and the heater treater and the separator on the Blinebry production. We need two 250 barrel tanks in place of the 210 barrel tanks which we propose to use on Tubb gas production at a later date, which is not involved in this commingling. On the Paddock we need two 500's with a heater treater in place of the test tank.

Q What would be the approximate cost of a conventional battery setup as you have outlined here for a conventional battery now?

A A conventional battery of the size that I've mentioned there that we need would cost about \$23,000 dollars to install.

Q Could lease operations be improved and would the operation as well be made more economical by installing the proposed system as you have shown on Exhibit No. 2?

A Yes, we believe it would.

Q I wish to call your attention to Exhibit No. 2 at this time. Would you please explain what the facilities for producing the four pays are as shown on Exhibit 2?

A Exhibit 2 is a production and test flow diagram of the proposed battery, central battery that we will have. I would like to make a correction on that where I do not designate the size of tank, that is a low 500 on the storage tank.

Q Common surge tank is a low 500?

A Common surge tank, yes, sir. We will have production



facilities which will include a production separator, atmospheric production heater treater with a B.S. and W. monitor and a recirculating pump that would be for all four pays. For the Drinkard, Paddock and Penrose-Skelly pays we will come into a header at the tank battery to a test pressure operated heater treater which will have a dump type meter for measuring the oil, a water meter for measuring any water and a gas meter for measuring the gas.

Our Blinebry, we propose to come in through a low pressure metering separator, which will meter the Blinebry oil. The production from the Blinebry will be commingled with the Drinkard, Paddock and Penrose-Skelly production ahead of the atmospheric production heater treater and then all four pays will go through this heater treater and a B.S. and W. monitor and facilities.

Q In other words, briefly, you would propose the installation of lease automatic custody transfer apparatus to facilitate installing a low 500 barrel surge tank where all pays would be commingled and the oil would proceed directly into the pipeline?

A Yes, and the automatic custody transfer meter run will be of the conventional type that we have used on our other automatic custody transfer batteries which have been approved and it meets the specification of the pipeline, the purchaser in that it has a pump strainer, deaerator, P. D. meter and the necessary connections for testing the meters. It's the standard automatic custody

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transfer equipment.

Q Would this equipment also contain fail safe provisions, proper shut on and shut off valves and safety switches?

A Yes, it would. Of course it would have a high and low level switch on the low 500 barrel storage tank which would start and stop, and stop the pipeline pump and then there would be a high level switch above those switches which would shut in the lease in the event that there was a high level in that tank. Also a high level in the production separators, the heater treaters would also shut in the valve.

This lease valve is shown on this drawing as a little square which is on the production and test lines for the various pays. The shut in valve for that Blinbry pay would be at the well. The reason for that is since the high pressure gas is going to a pipeline through a high pressure separator and then the oil in the case now, or distillate as it was before, would come to the low pressure separator, so failing safe on that particular pay would be at the well. On the others it would close a valve at the header which would in turn accuate the shut in valve at the well to shut the well in and shut the pumps down.

Q Is it a fact then that Gulf's application, if approved, would provide for the installation of a single production heater treater and a single test heater treater to process all of the oil produced on this lease?

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A Yes.

Q So, therefore, the point of commingling would actually be before the heater treater, is that correct?

A That's correct.

Q And insofar as the test heater treater facilities are concerned, the Drinkard, Paddock and Penrose-Skelly pays would pass through a header for separate testing operation, is that correct?

A Yes, for individual well testing in the various pays.

Q At what intervals do you propose that well tests be taken?

A We propose at least monthly, monthly well tests.

Q Is there any testing facility installed or proposed to be installed in connection with the Blinebry pay?

A The Blinebry production, we only have one well in the Blinebry and it will be in effect on test all the time in that we'll be metering that production.

Q What is the status of production as to the production of your full allowable or less than the allowable of the various wells involved?

A Based on the May, 1960 unit allowable of 33 barrels of oil per day, and correcting this figure to the depth range of our various pays, the Blinebry Pool would have a top unit allowable of 44 barrels, the Drinkard would have a top unit allowable of 58 barrels, the Paddock a top unit allowable of 44 barrels, and the



Penrose-Skelly would have 33 barrels.

The only well that we have that is capable of producing in excess of its top unit allowable was the Blinebry gas well or Blinebry oil well now, or Hardy No. 5. On the recent test, it produced 83 barrels of oil, 1922 MCF of gas, which gave it a GOR of 3,157, which according to the regulation, would classify it as an oil well. This would be penalized to approximately 11 barrels. The Drinkard, the three wells in the Drinkard Pool being the Hardy No. 2, No. 3 and No. 5, the No. 2 on the most recent gas-oil ratio test produced five barrels of oil. The No. 3, five barrels of oil, that's by pump, both of those by pump. The No. 5, 16 barrels of oil.

Q That production in the three wells completed to the Drinkard zone is approximately five barrels against an allowable of 58 barrels?

A Yes, sir, the Drinkard top unit allowable is 58.

Q So the wells are very marginal?

A They are marginal. In the Paddock Pool we have the Hardy No. 2 and 4, the Hardy No. 2 produced 18 barrels of oil by pump. The No. 4, 24 barrels of oil by pump as compared to the Paddock allowable of 44 barrels. In the Penrose-Skelly Pool we have two wells, the Hardy No. 1 and No. 4. The No. 1 pumped five barrels, the No. 4 pumped 22 barrels. So the only well we have that is capable of producing in excess of top allowable is our

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Hardy No. 5, the Blinebry oil which we propose to meter.

Q That is the reason you propose to separately meter the Blinebry pay, is it not, to insure that that well will not be overproduced?

A Yes, sir, that is correct.

Q The metering will be carried on at the separator?

A Yes, sir, at the metering separator.

Q The other pay zones are to be commingled, proposed to be commingled without separate metering, is that correct?

A That is correct.

Q But nevertheless, after they are commingled they will be jointly heater treated?

A Yes.

Q And passed into the surge tank?

A That's correct.

Q What is the cost of the proposed installation?

A We estimate that we can install this for about \$13,000 as compared to \$23,000 for the conventional battery as previously mentioned.

Q If required to install separate metering facilities and separation facilities for each pay zone, what would be your approximate cost?

A We estimate it would be approximately \$24,000.

Q Is the oil from all of these four pays of such quality



that it can be commingled, it's compatible? You wouldn't be commingling sweet oil with sour oil, would you?

A Yes. Some of this is classified as sour and some sweet. However, in this particular area there is no differential between sweet and sour, it all goes into the same line. It all gets the same price.

Q Would there be any material loss by the commingled gravity over separate gravities?

A No, their wouldn't. In fact, there would be a gain. Based on our March, 1960 runs, we have found that the average gravity in the Paddock is about 35.2 degrees. The Penrose-Skelly, 34.7 degrees; the Blinebry, 47.4 degrees; and the Drinkard 37.1. Using these gravities and the price for that gravity and using our March runs individually, we estimate, now this was a gross figure which does not take out royalty owner taxes or anything like that, a gross figure. It comes out to a gross value of about \$8857.00. If we commingle this gravity we would have a weighted gravity of approximately 39.7 degrees. Using this price for this gravity and our total runs for March we come up with a gross value of about \$9,120.00.

Q Who is the pipeline purchaser of this lease?

A Shell Oil Company.

Q Has Shell considered this application and entered any objection?

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A To my knowledge they have not.

Q Mr. Hoover, is it true by the placing of a single tank with the installation of lease automatic custody apparatus there would be less loss of oil from weathering or evaporation loss?

A Yes, there would be.

Q And, in your opinion, would this amount to a definite economic improvement?

A In my opinion it definitely would.

Q Would it operate in the prevention of waste?

A Yes, sir.

Q Would there be any material improvement in the basic sediment and water situation?

A I believe that it would be a better control in that on a conventional battery. Of course, as we now have it, we don't have the heater treater, so it requires a certain amount of treating in the tank and rolling and so forth, but if we went to a conventional battery where you had heater treaters, you have no, nothing on them that controls the B.S. and W. coming out of them. So, if your B.S. and W. in your tank climbs, you have to go treat it again by either, in most cases you run it back through your heater treater, but on the ACT equipment where you are running it to the pipeline continuously as you produce it, we install, I believe it's standard practice that we have a B.S. and W. monitor that sets it at a predetermined point, and if the B.S. and W. is



below that point it is pipeline oil and it runs right on to the pipeline.

If the B.S. and W. gets above that point it closes the valve, starts a recirculating pump, goes back to the heater treater, when it gets to the preset B.S. and W., then it opens the valve and goes on to the pipeline run. In my opinion that's much better control than any kind of manual treating.

Q In your opinion, since you have only one well and one pay that is now producing, its top allowable, would there be any necessity to make a calculation by subtraction if this commingling were allowed to insure against overproduction in any of the other pays?

A Yes, there would be a difference there. However, we are allocating the production from the other wells on the basis of well tests which are made monthly. We should have a very accurate estimate of that production without even subtracting. However, it would be a pipeline run volume against the Blinebry meter volume, would be the volume of the Drinkard, Paddock and Penrose-Skelly pays.

Q Isn't it true that you could not possibly exceed the total allowables for all the wells or for any well due to their marginal character, other than the Blinebry well that is presently being metered or proposed to be metered?

A We could not, because none of the wells are anywhere capable of producing top allowable.

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Q So, then, this application isn't one in which you would try to make the calculation against total production by subtraction, but it's merely to allow the total production you now have for the Drinkard, Paddock and Penrose-Skelly pays to be commingled and sold to the pipeline without separate metering?

A Yes, sir.

Q Is that correct?

A That's correct, yes.

Q There is no danger, in your opinion, of there being any excess of allowables produced, is that correct?

A That's correct.

Q I believe you have already testified that the royalty ownership was common throughout?

A Yes, it is.

Q Have the offset operators been notified?

A Yes, they have.

Q Have any objections been received?

A To my knowledge, none have been received.

Q If granted, would Gulf comply with all testing and operating requirements of the Oil Conservation Commission?

A Yes, they would.

Q In your opinion does the granting of this application intend to impair correlative rights in any way?

A No, it does not impair correlative rights.

Q Were Exhibits No. 1 and 2 prepared by you or at your



direction and under your supervision?

A Yes, they were.

MR. KASTLER: This concludes the questions I have on direct testimony at this time.

MR. NUTTER: Does anyone have any questions of the witness?

MR. PAYNE: Yes, sir.

MR. NUTTER: Mr. Payne.

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Hoover, as I understand it, you propose to commingle the Penrose-Skelly, Paddock and Drinkard without separate metering inasmuch as all of the wells producing from those pays on the subject lease are marginal, low marginal wells?

A That's right.

Q And you do propose to separately meter the Blinebry production inasmuch as that well is a top allowable well?

A Yes, sir, it's capable of producing in excess of top allowable.

Q Now, how do you determine how much shrinkage you are going to charge against the Blinebry zone?

A We believe that in this installation that we won't have the shrinkage.

Q In that case you would be willing to take the allowable

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as determined by the meter reading from the Blinetry?

A Yes, sir, that should be very close.

Q Gulf would be willing to install separate meters for any of these zones if the wells from that zone become capable of making top unit allowable?

A Yes, sir. We would be willing to set the meter on any top allowable well.

Q I believe you testified that taking a weighted gravity would actually increase the value of the oil by the process of commingling?

A Yes.

Q Will the pipeline pay on this weighted gravity?

A Yes, that's on the weighted gravity as the gravity of the commingled oil. What I mean by weighted, it's given the weight to the volume of oil so that would be about the gravity of the oil that would be run to the pipeline when they're commingled and they pay on that gravity.

Q Mr. Hoover, you don't have a schematic diagram of your automatic custody installation?

A No, sir, I don't, Mr. Payne.

Q But you will have adequate safeguards to prevent the overflow or undue waste of oil in the event of malfunction or flow line break?

A Yes, sir, it has all the safety features to protect it.

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on the pipeline. We do not plan on putting in valves at the wells to protect against flow line breaks in this particular installation because the wells are all on pump and we're expecting very low pressure on the flow lines.

Q Will there be a man on this lease?

A Yes. He will be in the vicinity and will inspect the lease. His time spent on the lease will be reduced, that's one of the purposes of ACT is to utilize his time over maybe a wider area, but there will be inspection on the lease.

Q And you do have a high level switch which will shut in the wells at the header?

A Yes, sir, except on the Blinebry, it's not at the header, it's right at the well.

Q Yes.

MR. PAYNE: That's all.

MR. NUTTER: Any further questions of the witness?

BY MR. NUTTER:

Q Mr. Hoover, you stated that Gulf takes monthly tests on its wells. Is it your intention, and you will take tests monthly, on these wells?

A Yes, sir, we will. In fact, we plan on this installation to put an automatic programmer which will program the wells for testing. We will get at least one test a month.

Q As I recall, in your testimony you said on the Penrose-



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Skelly you now have one 500 barrel tank and you need two 500's, is that correct?

A Yes, sir, that's correct.

Q On the Drinkard you have two 500's so you are all right on that zone?

A Yes.

Q On the Blinebry you have two 110's?

A Two 210's.

Q Two 210's?

A Yes, sir.

Q You need two 250's?

A Yes.

Q At the present time you have one test tank on the Paddock and what size is that tank?

A I believe it's, let me see if I have got that. No, sir, it would be a 500.

Q You have one 500 barrel tank on there?

A Yes.

Q And you need two 500's?

A Yes, sir.

Q Well, now, just going into this matter, you said it would cost \$23,000 to equip the lease the way you feel it should be equipped. Why do you need two 500 barrel tanks on the Penrose-Skelly, for instance, which has much less allowable than the Blinebry, when you have two 250's on the Blinebry?

A You would have to have two tanks.



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Q You would have two tanks on each installation? The Blinebry has more allowable and you need only two 250's and you do need two 500's on the Penrose-Skelly?

A Yes, but I believe when I mentioned the GOR of 13,055, the well would be penalized to 11 barrels a day.

Q Oh, I see, the Blinebry doesn't have a top allowable 44, but it can make 88 barrels a day of liquids?

A Yes. We will be penalized and that will put it back and the two 250 barrels, We have to have at least two tanks on each pay, while we are producing into the one we run into the other. If we do not, if we have one tank we have to close in the production and on marginal wells you never get it back.

Q You would have to shut in your production while you are running a tank of oil?

A Yes, sir.

Q So assume that you need \$23,000 to fully equip, now your proposed installation costs \$13,000?

A Yes, sir.

Q If you had to install separate meters and separators and separate heater treaters you would run this cost up to \$34,000, or just what would it take to run it up to \$34,000?

A Yes, this \$34,000 is the cost that we would have to spend. It is the money we would have to spend to put this same installation of a heater treater and a separator on each of the



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PHONE CH 3-6691

ALBUQUERQUE, NEW MEXICO

four pays plus.

Q A heater treater and a metering separator?

A No, sir, I mean a heater treater, a production separator and a dump type meter and a B.S.W. monitor and recirculating pump on each one of the pays.

Q How many of the pays must pass through a heater treater?

A At the present time, three. The Blinebry does not necessarily need it, but we anticipate that it will.

Q I see.

A But the other three definitely have to have it.

Q Now, would you go into some detail as to how the common surge tank, this low 500 is turned on and turned off, as far as production into the automatic custody transfer system is concerned?

A It has a high and low level switch which starts and stops the pump; on our ACT installation we have a pump, a strainer, a deaerator and then the meter, and the high and low level switch start and stop the pump.

Q What are the levels of those two switches?

A I don't have actually the footage, but it's, as I recall, on other installations it was shut off around three feet and started about maybe six.

Q How high is the low 500?

A I believe it's eight feet. I'm not sure on that.

Q Assuming that you had a working level of three to six



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feet. Then you would have eight feet of available storage, but you wouldn't plan to use that storage at all if the fluid level built up to the six-foot level, is that where you'll shut in your lease or is there another high level emergency switch above that?

A No, sir, there's another one above that, just where they are, whether it's three, six and seven, I'm not sure. But there's another switch above the normal high level switch that starts and stops the pump. The top switch, if something goes wrong on delivering it to the pipeline, or not being taken fast enough, and it builds up to this high level switch, then that accuates the lease shut in valves.

Q Those are valves at the header?

A Yes, on the Drinkard, Paddock and Penrose-Skelly. But the Blinebry, that will accuate a switch at the well.

Q The three are pumping wells?

A Yes, with the exception of one well on the Drinkard, and it's a flowing well.

Q What happens to the wells themselves when you shut them in at the header, does the pump unit keep on pump?

A No, the shut in valve shuts the well in and accuates a switch to turn the power of the pumping unit.

Q Is there a pressure build up in the lead line which accuates a switch over at the engine?

A Yes, there is.



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Q Or the motor on the well?

A It would be low pressure. We would be operating these at say 25 pounds on flow lines and the shut in valves would probably be set maybe 10, 15, 20 pounds above that, I think roughly would be that figure. Any time it closed the valve at the well on the pumping well it would shut in the pump.

Q The Blinebry is a flowing well?

A The Blinebry is a flowing well.

Q When your high level emergency switch and your surge tank shuts in the header, it shuts in a valve at the header on the Blinebry?

A No, it shuts in the valve at the well.

Q There's no valve there at the header that's shut in first?

A No, sir, because on that particular well, since it's been a gas well, it goes through a high pressure separator at the well in which the liquids are separated and the gas goes on to the pipeline and then from the high pressure separator the liquids are dumped through a dump float valve to this low pressure separator, so if we closed in the valve at the header then we would be building up a high pressure on that line and we don't want to shut in downstream from the high pressure separator. We have to go back to the well because if we shut in downstream the high pressure separator, then all we do, the liquids would go on down to the gas line.

Q Now, how is the valve there at the well actually



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activated?

A From the high level switch.

Q This is an electric control?

A Well, haven't, I believe it's a solnoid operated valve and it will have a cable running along the flow line back to the well.

Q So it's actually electrically controlled right back to the well head?

A It's actually controlled at the well head.

Q So actually all four of the zones will be shut in at the well if you considered shutting in the pump wells?

A Yes, shut in at the well.

Q Now, in response to a question by Mr. Payne I believe you stated that you didn't expect any loss of liquids due to shrinkage from the Blinebry zone, so that you would accept the meter reading as being the allowable reading for the Blinebry, is that correct?

A Yes, sir, at the time being that well is, could get by without a heater treater, but we think it might and we would like to put it in ahead of the heater treater, and at such time that it would indicate that the B.S. and W. was coming up, then we would probably want to connect that low pressure metering separator back around through the test heater treater separator.

Q Well, in the event that your Blinebry production needed



treating, then you would route it through the test heater treater?

A Only for testing, but it would be, still be tied in through the regular production heater treater.

Q I see. What kind of a meter is that on that metering separator, Mr. Hoover?

A I believe that they have different types. I think they have either dump type or P. D. meters. You can get them either way, but it would be either a dump type or P. D. meter.

Q Do you know if that is a meter that gives you a cumulative total of all the production that has gone through there or one that's turned back to zero each month?

A I am not positive on that, I couldn't say. I could find out.

MR. PAYNE: Would Gulf be willing to install one that does keep a cumulative total and is one that can not be run back to zero?

A On the Blinebry?

MR. PAYNE: Yes.

A Yes, sir, I believe we would.

MR. PAYNE: That's all.

MR. NUTTER: Does anyone have any further questions of Mr. Hoover? He may be excused.

(Witness excused.)

MR. NUTTER: Do you have anything further, Mr. Kastler?

MR. KASTLER: Other than to request that Exhibits 1 and

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ALBUQUERQUE, NEW MEXICO



2 be made a part of the record.

MR. NUTTER: Gulf's Exhibits 1 and 2 will be entered.
Does anyone have anything further for Case 1961? We'll take the
case under advisement and take next Case 1963.

DEARNLEY-MEIER REPORTING SERVICE, Inc.

PHONE CH 3-6631

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) SS

I, ADA DEARNLEY, 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.

IN WITNESS WHEREOF I have affixed my hand and notarial seal
this day of May, 1960.

Ada Dearnley
Notary Public-Court Reporter

My commission expires:
June 19, 1963.

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 1961
heard by me on 5/11, 1960.
[Signature], Examiner
New Mexico Oil Conservation Commission

ALBUQUERQUE, NEW MEXICO



OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

Case file 1961

October 17, 1961

Gulf Oil Corporation
P. O. Box 2167
Hobbs, New Mexico

Attention: Mr. J. M. Russell

Gentlemen:

Reference is made to your letter of October 5, 1961, addressed to Mr. Joe Ramey of the Commission's Hobbs office, requesting authority to remove the meter from the Penrose-Skelly leg of the commingling facility authorized by Commission Order No. R-1678.

Inasmuch as not only the Penrose Skelly but also the Drinkard and Paddock Pools are all marginal, you are hereby authorized to remove the meter which is currently in use.

You are reminded, however, of the provisions of Order R-1678 which require that meters shall be installed on all zones if and when any well becomes capable of producing top allowable for its zone.

Very truly yours,

A. L. PORTER, Jr.,
Secretary-Director

ALP/DSN/og

cc: Mr. Joe Ramey
Oil Conservation Commission
Hobbs, N. Mex.

C
O
P
Y

Memo

From

Joe D. Ramey

Supervisor & Proration Manager

To Dan Nutter:

This is addressed
to me but I'll forward
the request for you to
handle.

JDR



PETROLEUM AND ITS PRODUCTS

GULF OIL CORPORATION

MAIL STOP 9 AMP 60.2 Box 2167
Hobbs, New Mexico

FORT WORTH
PRODUCTION DIVISION

October 5, 1961

Mr. Joe Ramey
Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico

Subject: Case No. 1961
Order No. R-1678

Dear Sir:

Order No. R-1678 granted Gulf Oil Corporation permission to commingle its production from the Blinebry, Drinkard, Paddock and Penrose-Skelly Pools underlying the C. L. Hardy Lease after separately metering the production from the Blinebry Pool only. Upon request of Shell Pipeline Corporation on May 23, 1961, Gulf installed a separate tank battery for the liquid production from the C. L. Hardy Well No. 5, producing from the Blinebry as a gas well. Therefore, Well No. 5 is no longer being commingled.

At the time of the hearing before the Oil Conservation Commission at Santa Fe, no wells on the C. L. Hardy Lease producing from the Drinkard, Paddock or Penrose-Skelly Pools had top allowables; however, since the hearing, a top allowable well, C. L. Hardy No. 3, was completed in the Penrose-Skelly Pool and facilities were installed whereby the production from this well would be metered prior to commingling with the unmetered production from the Drinkard and Paddock Pools. At the present time, Well No. 3 is not capable of producing top allowable. Listed below are the latest production figures showing the producing capabilities of the two wells presently completed in the Penrose-Skelly Pool:

No. 3	8-8-61	17 bopd	40 bwpd
No. 4	8-9-61	10 bopd	55 bwpd

From the above evidence, it is respectfully requested that Gulf Oil Corporation be granted permission to remove the metering separator presently installed on the Penrose-Skelly Pool and to commingle the three marginal pools without prior metering as set forth in Order No. R-1678.

Yours very truly,

J. M. RUSSELL
Area Production Manager

ZCB:ptg
cc: Oil Conservation Commission - Santa Fe
M. I. Taylor - Roswell

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

May 19, 1960

Mr. Bill Kastler
Gulf Oil Corporation
Box 669
Roswell, New Mexico

Dear Mr. Kastler:

We enclose two copies of Order No. R-1678 in Case 1961
issued by the Oil Conservation Commission this date.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ir/

Enclosures: (2)

C
O
P
Y

**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. 1961
Order No. R-1678**

**APPLICATION OF GULF OIL CORPORATION
FOR PERMISSION TO COMMINGLE THE
PRODUCTION FROM FOUR SEPARATE POOLS
AFTER SEPARATELY METERING THE PRODUCTION
FROM ONE POOL AND FOR PERMISSION
TO INSTALL AN AUTOMATIC CUSTODY TRANSFER
SYSTEM, LEA COUNTY, NEW MEXICO.**

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on May 11, 1960, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 19th day of May, 1960, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, 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, Gulf Oil Corporation, is the owner and operator of the C. L. Hardy lease comprising the SW/4 of Section 20, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico.
- (3) That the applicant proposes to commingle the production from the Blinebry, Drinkard, Paddock, and Penrose-Skelly Pools from all wells presently completed on the said C. L. Hardy lease after separately metering the production from the Blinebry Pool only, utilizing an automatic custody transfer system to handle said commingled production.
- (4) That all of the wells presently completed on the C. L. Hardy lease in the Drinkard, Paddock, and Penrose-Skelly Pools are low marginal wells.
- (5) That because of the said low marginal character of the

-2-

CASE No. 1961
Order No. R-1678

Drinkard, Paddock, and Penrose-Skelly wells completed on the said C. L. Hardy lease, the applicant's request to commingle the production from the Blinebry, Drinkard, Paddock, and Penrose-Skelly Pools, after separately metering the production from the Blinebry Pool only, should be granted, provided that a monthly test is conducted on each of the subject wells to determine the individual production from each such well.

(6) That the ownership of the C. L. Hardy lease is common at all depths.

(7) That the previous use of automatic custody transfer equipment, similar to that proposed by the applicant, has shown that such equipment is a reliable and economic means of transferring the custody of oil, and that the use of such equipment should be permitted, provided that adequate safety features are incorporated therein.

(8) That approval of the subject application will neither cause waste nor impair correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Gulf Oil Corporation, be and the same is hereby authorized to commingle the production from the Blinebry, Drinkard, Paddock, and Penrose-Skelly Pools from all wells presently completed on the C. L. Hardy lease comprising the SW/4 of Section 20, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico, after separately metering the production from the Blinebry Pool.

PROVIDED HOWEVER, That if any well on the said C. L. Hardy lease completed in the Drinkard, Paddock, or Penrose-Skelly Pools shall at any time in the future become capable of producing considerably in excess of the present level of liquid hydrocarbon production, the authority granted by this order shall terminate unless the production from each of said pools is separately metered prior to commingling.

PROVIDED FURTHER, That the applicant shall conduct monthly tests of all wells presently completed in the subject pools on the said C. L. Hardy lease to determine the individual production from each well.

(2) That the applicant be and the same is hereby authorized to install automatic custody transfer equipment to handle the said commingled production from all wells located on the above-described C. L. Hardy lease.

PROVIDED HOWEVER, That the meter used to determine the Blinebry production shall be of a type which incorporates a

-3-
CASE No. 1961
Order No. R-1678

non-reset totalizer indicating cumulative production, and the production as reflected by the meter shall not exceed the allowable assigned to the well.

IT IS FURTHER ORDERED:

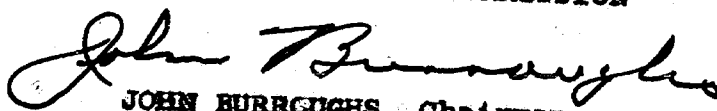
That all meters used in the above-described automatic custody transfer system shall be operated and maintained in such a manner as to ensure an accurate measurement of the liquid hydrocarbon production at all times.

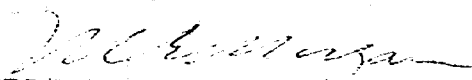
That all meters shall be checked for accuracy at least once each month until further direction by the Secretary-Director.


Meters shall be calibrated against a master meter or against a test tank of measured volume and the results of such calibration filed with the Commission on the Commission form entitled "Meter Test Report."

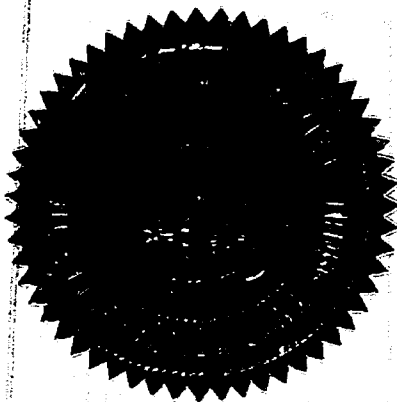
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


JOHN BURROUGHS, Chairman


MURRAY E. MORGAN, Member


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



ear/



PETROLEUM AND ITS PRODUCTS

GULF OIL CORPORATION

P. O. DRAWER 1290 · FORT WORTH 1, TEXAS

H. P. REARDON
DIVISION
PETROLEUM ENGINEER

FORT WORTH
PRODUCTION DIVISION

April 6, 1960

Oil Conservation Commission
State of New Mexico
P. O. Box 871
Santa Fe, New Mexico

Re: Application for Approval of ACT System and Request for
Permission to Commingle Oil Produced from the Blinebry,
Drinkard, Paddock, and Penrose-Skelly Pools Underlying
Gulf's C. L. Hardy Lease, SW/4 Section 20, T-21-S,
R-37-E, Lea County, New Mexico

Gentlemen:

Gulf Oil Corporation herewith makes application for exception to
the applicable Rules and Regulations of the New Mexico Oil Conservation
Commission to install and operate automatic custody transfer equipment on
subject lease and commingle crude produced from the Blinebry, Drinkard,
Paddock, and Penrose-Skelly Pools underlying such lease.

Gulf will request exceptions to:

- (1) NMOCC's Rule 309(a) which requires measurement of
oil in tanks before such oil is transported from
the lease.
- (2) NMOCC's Rule 303 which prohibits the commingling
of oil between pools.

In support of this application Gulf Oil Corporation states the
following:

- (a) Applicant is the owner and operator of the C. L.
Hardy Lease which consists of the SW/4 of Sec-
tion 20, T-21-S, R-37-E, Lea County, New Mexico.
- (b) There is no diversity of royalty ownership under-
lying the above described lease.
- (c) Applicant proposes to commingle the Drinkard, Pad-
dock, and Penrose-Skelly crudes without prior
measurement and allocate production on the basis

May allowable

top allowable
58

2 Drinkard - 44
2 Paddock - 33
2 Penrose-Skelly - 44
1 Blinebry oil well
top allowable

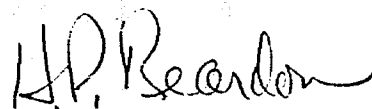
April 6, 1960

of monthly individual well tests. Blinebry production will be metered separately before commingling with the other crudes.

- (d) The proposed ACT installation will have adequate facilities for all required tests and will result in efficient accounting of crude oil transferred to the pipe line gathering system.
- (e) The granting of this application is in the interest of conservation and will protect correlative rights.
- (f) By copy of this letter all offset operators and the pipeline concerned are notified of this application.

Gulf Oil Corporation respectfully requests that this matter be set for hearing at an early date.

Yours very truly,



H. P. REARDON ~

FWM,Jr:lw

cc: Oil Conservation Commission
P. O. Box 2045
Hobbs, New Mexico

Amerada Petroleum Corporation
P. O. Box 2040
Tulsa, Oklahoma

J. W. Peery
P. O. Box 655
Odessa, Texas

Socony-Mobil Oil Company, Inc.
P. O. Box 2406
Hobbs, New Mexico

Sunray Mid-Continent Oil Company
1101 Wilco Building
Midland, Texas

Shell Pipe Line Corporation
P. O. Box 1509
Midland, Texas

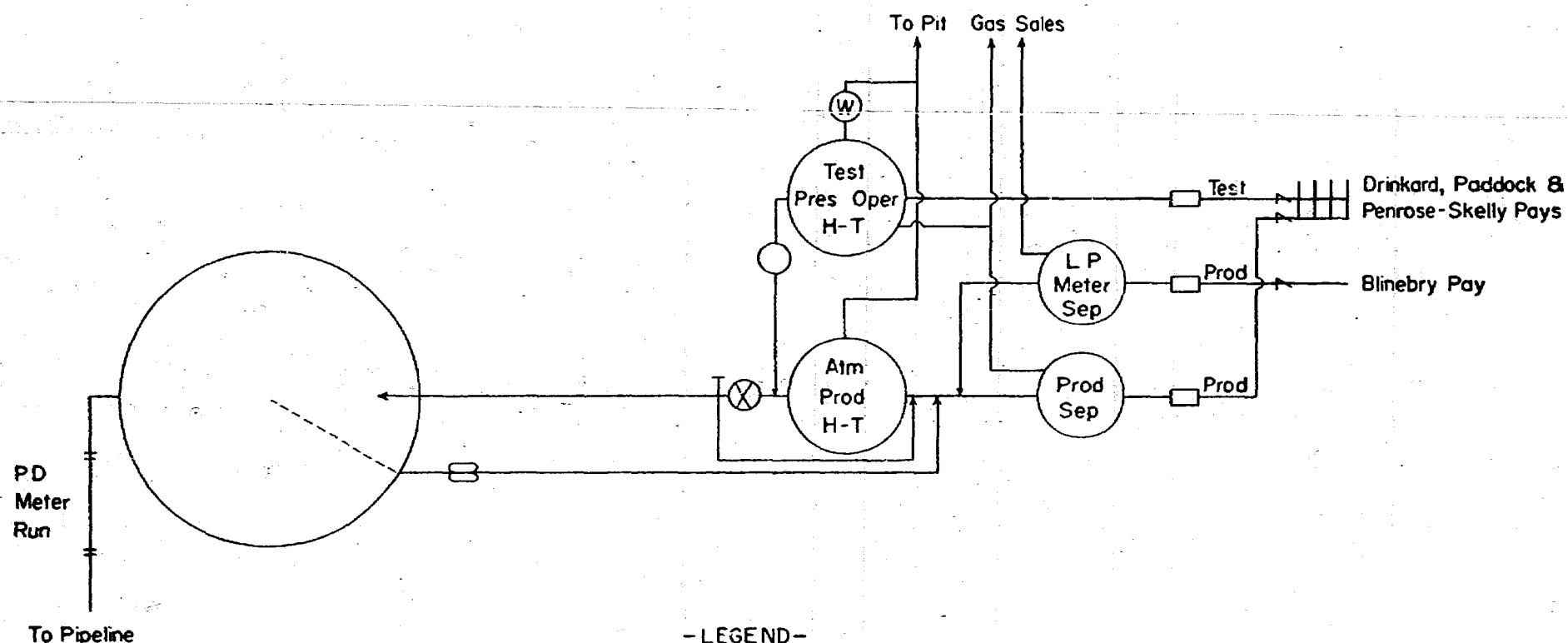
Texaco, Inc.
P. O. Box 3109
Midland, Texas

The Ohio Oil Company
P. O. Box 552
Midland, Texas

Tidewater Oil Corporation
P. O. Box 547
Hobbs, New Mexico

215





-LEGEND-

- Lease Shut-in Valve
- ⊗ BS&W Monitor
- T Automatic diverter valve & pump
- Dump Meter
- ⊞ Tank Bottom Pump
- ⌋ Check Valve

PRODUCTION AND TEST FLOW DIAGRAM
C. L. HARDY LEASE

Gulf Oil Corporation

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 5/13/60

CASE 1961

Hearing Date 9 am 5/11/60
DSN @ SF

My recommendations for an order in the above numbered cases are as follows:

Enter an order approving
the commingling as requested
by Gulf in this case.

Normally, we probably should
not permit commingling
between pools without separate
measurement. However these
zones are all marginal and
no overproduction can occur
from any single pool except
the Blinkey (this zone has a penalized
allowance for high GOR and can make
an excessive amount of liquids); however
the Blinkey will be metered separately.
Specify that the meter runs on the Blinkey
shall be used for production control.

San Juan
Member

DOCKET: EXAMINER HEARING MAY 11, 1960

Oil Conservation Commission - 9 a.m., Mabry Hall, State Capitol, Santa Fe.

The following cases will be heard before Daniel S. Nutter, Examiner, or Oliver E. Payne, Attorney, as alternate examiner:

- CASE 1958: Application of Texaco Inc., for approval of an automatic custody transfer system. Applicant, in the above-styled cause, seeks an order authorizing the installation of an automatic custody transfer system to handle the production from the Echol-Devonian Pool from all wells on its State "AR" Lease, consisting of the N/2 SW/4 and Lots 3 and 4 of Section 2, Township 11 South, Range 37 East, Lea County, New Mexico.
- CASE 1959: Application of Sinclair Oil & Gas Company for approval of an automatic custody transfer system. Applicant, in the above-styled cause, seeks an order authorizing the installation of an automatic custody transfer system to handle the production from the Empire-Abo Pool from all wells presently completed or hereafter drilled on its M. Yates "B" Lease, consisting of the S/2, NE/4, S/2 NW/4, and NE/4 NW/4 of Section 33, Township 17 South, Range 28 East, Eddy County, New Mexico.
- CASE 1960: Application of Gulf Oil Corporation for approval of a unit agreement. Applicant, in the above-styled cause, seeks approval of its North Caverns Unit Agreement, which unit will embrace approximately 6,303 acres of Federal and State land in Townships 22 and 23 South, Range 24 East, Eddy County, New Mexico.
- CASE 1961: Application of Gulf Oil Corporation for permission to commingle the production from four separate pools and for approval of an automatic custody transfer system to handle said commingled production. Applicant, in the above-styled cause, seeks permission to commingle the production from the Blinebry, Drinkard, Paddock, and Penrose-Skelly Pools from all wells located on its C. L. Hardy lease comprising the SW/4 of Section 20, Township 21 South, Range 37 East, Lea County, New Mexico, after separately metering only the production from the Blinebry Pool and to allocate the Drinkard Paddock and Penrose-Skelly Pool production without prior metering or measurement but on the basis of monthly individual well tests. Applicant further seeks approval of an automatic custody transfer system to handle the said commingled production from all wells on the said C. L. Hardy lease.

- CASE 1962: Application of McGrath and Smith for a special allowable for one well in the Caprock-Queen Pool, Lea and Chaves Counties, New Mexico. Applicant, in the above-styled cause, seeks a special allowable for one well offsetting a capacity water-flood project in the Caprock-Queen Pool, Lea and Chaves Counties, New Mexico. Said well is the Tidewater-State Well No. 1, located in the NW/4 SE/4 of Section 18, Township 13 South, Range 32 East, Lea County, New Mexico.
- CASE 1963: Application of Aztec Oil & Gas Company for an unorthodox gas well location and for approval of two non-standard units. Applicant, in the above-styled cause, seeks approval of an unorthodox gas well location in the Blanco-Mesaverde Gas Pool for its Richardson Well No. 6, to be located in the SE/4 of Section 22, Township 31 North, Range 12 West, San Juan County, New Mexico. Applicant further seeks establishment of a 297-acre non-standard gas proration unit in the Blanco-Mesaverde Gas Pool and a 297-acre non-standard unit in the Dakota Producing Interval, each consisting of the E/2 of said Section 22 and to be dedicated to the said Richardson Well No. 6.
- CASE 1964: Application of Aztec Oil & Gas Company for an unorthodox gas well location and for approval of two non-standard units. Applicant, in the above-styled cause, seeks approval of an unorthodox gas well location in the Blanco-Mesaverde Gas Pool for its Richardson Well No. 7, to be located in the SE/4 of Section 15, Township 31 North, Range 12 West, San Juan County, New Mexico. Applicant further seeks establishment of a 309.55-acre non-standard gas proration unit in the Blanco-Mesaverde Gas Pool and a 309.55-acre non-standard unit in the Dakota Producing Interval, each consisting of the E/2 of said Section 15, and to be dedicated to said Richardson Well No. 7.
- CASE 1965: Application of Aztec Oil & Gas Company for approval of an unorthodox gas well location. Applicant, in the above-styled cause, seeks approval of an unorthodox location in the Blanco-Mesaverde Gas Pool for its Thompson Well No. 6, to be located in the SE/4 of Section 28, Township 31 North, Range 12 West, San Juan County, New Mexico.
- CASE 1966: Application of Texas National Petroleum Company for an oil-gas dual completion utilizing parallel strings of casing cemented in a common well bore and for an unorthodox gas well location. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of a well to be located at an unorthodox location 660 feet from the North and West

-3-

Docket No. 13-60

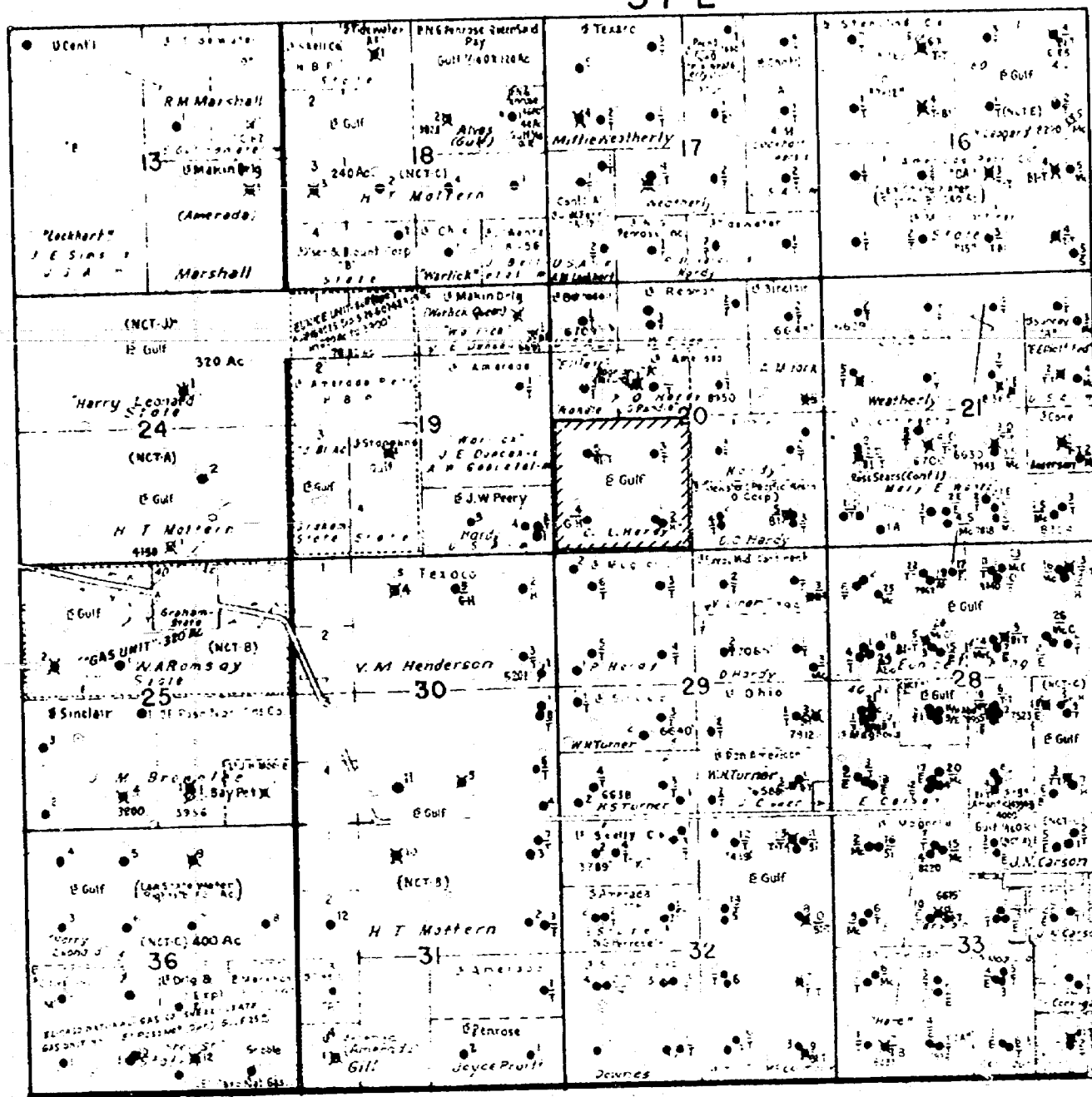
CASE 1966:

(Cont.)

lines of Section 1, Township 25 North, Range 9 West, San Juan County, New Mexico, in such a manner as to permit the production of oil from the Gallup formation and the production of gas from the Dakota Producing Interval through 2 7/8-inch casing and through 2-inch tubing set in 4 1/2-inch casing respectively with the casing being cemented in a common well bore.

ig/

37 E



21 S

LEASE PLAT
C. L. HARDY
LEA COUNTY, NEW MEXICO

-LEGEND-

☐ Pertinent Gulf Lease

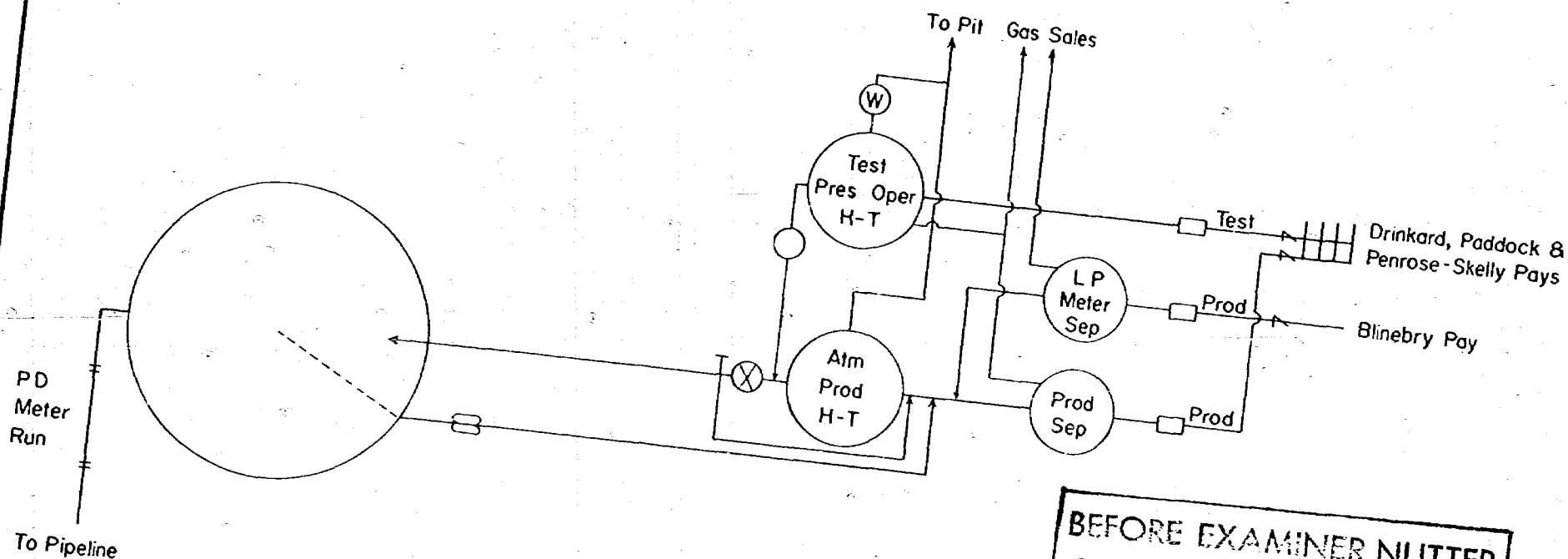
BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 1961
CASE NO. 1961

Gulf Oil Corp.
Pet. Eng.

Ft. Worth Prod. Div.
May 11, 1960

Case No. 1961

Exhibit No. 1



-LEGEND-

- Lease Shut-in Valve
- ⊗ BS&W Monitor
- T Automatic diverter valve & pump
- Dump Meter
- ⊞ Tank Bottom Pump
- ∇ Check Valve

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
C. L. Hardy EXHIBIT NO. 2
CASE NO. 1961

Case No 1961
Exhibit No 2
PRODUCTION AND TEST FLOW DIAGRAM
C. L. HARDY LEASE

Gulf Oil Corporation

May 11, 1960