CASE 7341: THE SUPERIOR OIL COMPANY FOR DOWNHOLE COMMINGLING, EDDY COUNTY, NEW MEXICO

Case No.

7341

Application

Transcripts.

Small Exhibits

ETC

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

October 1, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Re: CASE NO. 7341
ORDER NO. R-6782

Mr. Conrad E. Coffield
Hinkle, Cox, Eaton, Coffield
& Hensley
Attorneysaat Law
Post Office Box 3580
Midland, Texas 79702

Applicant:

Superior Oil Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7341
Order No. R-6782

APPLICATION OF SUPERIOR OIL COMPANY
FOR DOWNHOLE COMMINGLING, EDDY
COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on September 9, 1981, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 30th day of September, 1981, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Superior Oil Company, is the owner and operator of the Collatt Estate Com Well No. 1, located in Unit J of Section 1, Township 23 South, Range 26 East, NMPM, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle South Carlsbad-Strawn and Morrow production within the wellbore of the above-described well.

(4) That from the South Carlsbad-Strawn zone, the subject well is capable of low marginal production only.

(5) That from the Morrow zone, the subject well is expected to be capable of low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(9) That in order to allocate the commingled production to each of the commingled zones in the subject well, production should be allocated to the South Carlsbad-Strawn zone based on the production decline curve presented at the hearing and extrapolated to a total ultimate recovery of 3.8 billion cubic feet from the Strawn zone, with the remainder of the production allocated to the Morrow zone.

(10) That should applicant encounter a bottom hole pressure in excess of 1500 psi in the Morrow formation, it should consult with the Division Director prior to commingling the Strawn and Morrow zones, and the Division Director may require the zones to be isolated from each other if, in his opinion, waste would result from the proposed commingling.

IT IS THEREFORE ORDERED:

(1) That the applicant, Superior Oil Company, is hereby authorized to commingle South Carlsbad-Strawn and Morrow production within the wellbore of the Collatt Estate Com Well No. 1, located in Unit J of Section 1, Township 23 South, Range 26 East, NMPM, Eddy County, New Mexico.

(2) That the applicant shall allocate the commingled production to the South Carlsbad-Strawn zone based on the production decline curves submitted at the hearing until a total ultimate production of 3.8 billion cubic feet has been credited to the Strawn, and the remaining production shall be credited to the Morrow zone.

(3) That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(4) That the applicant upon perforating the Morrow zone, shall determine the bottom hole pressure in the Morrow; that if said pressure is in excess of 1500 psi, applicant shall consult with the Division Director prior to commingling the Strawn and Morrow zones in the subject well, and the Division Director may require that the zones be isolated from each other.

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

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

SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

fd/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
9 September 1981

EXAMINER HEARING

IN THE MATTER OF:

Application of Superior Oil Company for downhole commingling, Eddy County, New Mexico. CASE 7341

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Conrad E. Coffield, Esq.
HINKLE, COX, EATON, COFFIELD & HENSLEY
P. O. BOX 3580
Midland, Texas 79701

I N D E X

L. H. BOHOT

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E X H I B I T S

Applicant Exhibit One, Plat 5

Applicant Exhibit Two, Diagrammatic Sketch 7

Applicant Exhibit Three, Curve 7

Applicant Exhibit Four, Curve 8

Applicant Exhibit Five, Curve 7

Applicant Exhibit Six, Graph 8

Applicant Exhibit Seven, Table 9

Applicant Exhibit Eight, Gas Analysis 10

Applicant Exhibit Eight A, Gas Analysis 10

Applicant Exhibit Nine, Order 11

Applicant Exhibit Ten, Memo 11

MR. NUTTER: The hearing will come to order, please.

We'll call first Case Number 7341.

MR. PEARCE: Application of Superior Oil Company for downhole commingling, Eddy County, New Mexico.

MR. COFFIELD: I'm Conrad Coffield with the Hinkle law firm in Midland, Texas, appearing on behalf of the applicant, and I have one witness to be sworn.

(Witness sworn.)

L. H. BOHOT

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Bohot, for the record would you please state your name, address, occupation, and employer?

A. My name is Larry Bohot. I'm from Houston, Texas, and my occupation is a Senior Engineering Supervisor for The Superior Oil Company.

MR. NUTTER: Spell your last name, please.

A. B-O-H-O-T.

MR. NUTTER: Thank you.

Q. Have you previously testified before the Division as a petroleum engineer?

A. No, I have not.

Q. For the Examiner, would you please give a resume of your educational background and work experience as an engineer?

A. I have a BS in petroleum engineering from Texas A&M. I graduated in May of 1973.

I worked for Shell Oil Company for four years as a reservoir engineer and production engineer in the west Texas area.

I worked two years for an independent in Houston as a production engineer in the Gulf Coast area, and I've been employed by Superior Oil Company as a production engineer and engineering supervisor for two years in the west Texas area.

I'm a member of the SP.

Q. Are you familiar with Superior's application in this case?

A. Yes, I am.

Q. And are you familiar with the property involved and the well which is the subject of the application?

A. Yes, I am.

MR. COFFIELD: Is the witness considered qualified?

MR. NUTTER: Yes, he is. Please proceed.

Q. Mr. Bohot, would you please state what it is Superior seeks in this application?

A. Superior seeks approval for the downhole commingling of the South Carlsbad Strawn and Morrow production in the wellbore of this Collatt Estate Com Well No. 1, which is located in Unit J of Section 1, Township 23 South, Range 26 East.

MR. COFFIELD: Mr. Examiner, I'd like to point out to you what appears to be a typographical error in the description of the name of the -- of the well. It says Collatt State in the docket and it's Collatt Estate.

MR. NUTTER: Okay, it's not a critical error, I don't think, so we'll just proceed.

MR. COFFIELD: All right.

Q. Now, Mr. Bohot, would you please refer to this booklet we have, which has been marked Exhibits -- Superior's Exhibits One through Ten, and go first to Exhibit One and explain that exhibit to the examiner.

A. Exhibit One is a land plat showing the location of the subject well, which is colored in yellow. The cross hatched area on the map indicates Superior acreage.

The red dots indicate Morrow producers and the blue triangle is a Strawn producer.

MR. NUTTER: Is this the only Strawn producer in the area?

A. The well offsetting this well is a Strawn-Morrow, and Morrow dual.

MR. NUTTER: Which one is it?

A. It's the Pennzoil Gulf Federal No. 2.

Q. Mr. Bohot, for the Examiner's orientation on this particular well and what problems that you face with it, would you please give him a brief history of the well?

A. This well was drilled and completed as a single Strawn producer in November of 1969 from perforations 10,453 feet to 493 feet. It went on production in early 1970 and has produced approximately 3.4 Bcf. Water production began in this well in mid-71. The well was able to sustain its production until early 1977 at which time the gas and water production began dropping, indicating that the well was loading up.

The well is currently a marginal producer.

Q. And do you feel it's -- your problems with this well are related to the introduction of the water into the -- into the well? This is causing the difficulty?

A. Yes, we do.

Q. All right, go to what is marked here in this pamphlet as Exhibit Two and describe that exhibit for the Examiner, please.

A. Exhibit Two is a diagrammatic sketch of the wellbore in its current condition. It is completed through three sets of perforations in the Strawn formation with a permanent production packer set at 10,350 feet with 2-3/8ths tubing to the surface.

Q. Okay, go on now with what you've marked as Exhibit Three and discuss that exhibit, for the examiner.

A. Exhibit Three is a rate versus cumulative production curve, which indicates the well is producing at its capacity until a cumulative production of approximately 3.1 Bcf, at which time the data points diverged from a straight line that it had been on. This indicates that the well was loading up and could not overcome the pressures created by the water column.

This, along with Exhibit Five, which is a plot of the water and oil producing rates, indicate that the water was increasing and in '77 the water production began decreasing showing that the well could not unload the water, did not have a sufficient gas rate to unload the water.

Extrapolation of this rate versus cumulative curve indicates an ultimate recovery of 3.8 Bcf, which is approximately 400-million cubic feet more than the well is capable of producing in its current state.

Q. Mr. Bohot, you've made reference to Exhibit Five. That's somewhat out of order relative to the booklet, but was there anything further that you need to describe in the -- connection with that exhibit?

A. I don't think so. It just -- the point of the exhibit is to show that as of mid 1977 the well was unable to unload the water.

Q. All right, then go to Exhibit Four and please describe that to the Examiner.

A. Exhibit Four is a rate versus time curve, which indicates the gas was decreasing rapidly in 1976, as the well loaded up. The gas rate diverged from the straight line it had been on.

Q. Okay, next we'll go to Exhibit -- Exhibit Six. Would you please describe that?

A. Exhibit Six is a bottom hole pressure over Z versus cumulative production plot. The extrapolation of this plot ties with our cumulative or ultimate production from the rate versus cum curve for approximately 3.8 Bcf and an abandonment pressure of 280 psi bottom hole pressure.

Q. Okay, we're ready now for Exhibit --

MR. NUTTER: What was that abandonment pressure again?

A. 280.

MR. NUTTER: Go ahead.

Q. We're ready now for Exhibit Seven, Mr. Bohot, would you explain that?

A. Exhibit Seven is a table of estimated bottom hole pressures from the subject well and surrounding oil wells. These estimates were made from the P/Z plots and the cumulative at that time; the low pressures we're looking at, the Z factor is approximately one.

The purpose of this exhibit is to show that there is a very small bottom hole pressure differential which we believe would not lead to cross flowing if the two wells were commingled downhole.

Q. And, Mr. Bohot, in your expert opinion would you also be able to state that it's your opinion that data shown on this exhibit, Seven, would also support the conclusion that drainage is occurring as far as Superior's acreage is concerned?

A. I believe it would, based on the fact that the wells are very close to our lease and I believe that we are being drained. The bottom hole pressure under our

lease approximates the bottom hole pressure in these wellbores.

Q. Okay, next we've got Exhibits Eight and Eight-A. Considering those together, would you please describe those exhibits?

A. Exhibit Eight is a gas analysis from the Superior Ryan Com No. 1, a Strawn gas analysis.

Exhibit Eight-A is a Morrow gas analysis from the same well.

These analyses indicate that the gas is compatible and would cause no problem with being commingled. Also the gas is taken by a common purchaser.

MR. NUTTER: Where is that Ryan Well, Mr. Bohot?

A. The Ryan Well is approximately two miles to the east of the subject well.

MR. NUTTER: Is that the well in the northwest quarter of Section 5 there?

A. Yes, sir.

MR. COFFIELD: It's in Unit D.

MR. NUTTER: Of 5?

A. Yes, sir.

MR. COFFIELD: Yes, sir.

Q. All right, Mr. Bohot, the next Exhibit

is Number Nine. Would you explain that exhibit?

A. Exhibit Number Nine is a copy of the order issued granting us, Superior Oil Company, permission to commingle the Ryan Com in February of 1979.

Q. And in your opinion are the formations involved in the Ryan No. 1 Well and the situation downhole with respect to that well, basically similar to the situation in this well, the subject of this application?

A. Yes, they are the same reservoirs and we believe that they are common.

Q. And so it would be your opinion that for the same reasons as were justifiable in connection with the Ryan No. 1, that they would apply here, as well, to authorize downhole commingling?

A. Yes, I do.

Q. The next exhibit is Exhibit Number Ten, Mr. Bohot. Would you please just briefly describe what that is?

A. Exhibit Ten is a memo indicating the royalty ownership of the Morrow and Strawn formations in the wellbore is common. Also, the working interest is the same in both zones; therefor, payments would not be a problem.

Q. If commingling is authorized by the Division and the application of Superior is granted in this

case, how would you propose to allocate the production between the zones involved?

A. The production from the Strawn formation would be allocated based on our rate versus cum curve until a cumulative of 3.8 Bcf had been reached, at which time all the production would be allocated to the Morrow.

Q. Is it your opinion that if this application is denied and the downhole commingling is not authorized, that there would be hydrocarbons that would not be recovered?

A. Yes, it is.

Q. Did you have anything further that you wanted to add?

A. Nothing.

Q. Were these Exhibits One through Nine either prepared by you, Mr. Bohot, or prepared under your supervision?

A. They were prepared under my supervision.

Q. And in your opinion will the approval of the application be in the interest of conservation, the prevention of waste, and protection of correlative rights?

A. Yes, it would.

MR. COFFIELD: Mr. Examiner, I move the admission of Exhibits One through Ten.

MR. NUTTER: Exhibits One through Ten

will be admitted in evidence.

MR. COFFIELD: And I have no other questions of Mr. Bohot on direct examination.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Bohot, this well has never produced from the Morrow, is that correct?

A. No, sir.

Q. So you would plan to make perforations, I see by Exhibit Number Two that the top ofthe Morrow is given as 11,152 and the plugged back depth is 11,009, so you've got approximately 850 -- 750 feet of casing there opposite the Morrow.

A. Yes, sir.

Q. Which you would perforate in the Morrow.

A. Right, we have selected four intervals, or three intervals in the Morrow which we would perforate.

Q. What would those intervals be?

A. They are 11,476 to 86; 11,542 to 549; 11,552 to 68.

Q. Now you mentioned that the Pennzoil Gulf Well was a Strawn Well and was a dual completion in the Strawn and the Morrow. I don't see it color coded like in

blue on this Exhibit Number One in my portfolio. Which well is that?

A. It's the well to the right of our yellow crossed acreage.

Q. Okay, that's the well in the southwest quarter of Section 6, then.

A. Right.

Q. And that's --

A. It does have a triangle and it is not colored in blue. That's an oversight.

Q. But it is a Strawn-Morrow dual?

A. Yes, sir.

Q. So you do have Morrow production to the immediate west, to the south, and two locations to the east of the subject well.

A. Yes.

Q. Well now, Mr. Bohot, the Morrow formation in the South Carlsbad Field is notorious for the presence of small stringers that don't extend laterally very far. While these three wells are productive from the Morrow, it would be possible, I believe, that your well could encounter a stringer that has not yet been penetrated by a Morrow well, and that you'd come up with greater pressures than the pressures that you have anticipated by your comparative calculation.

A. That is possible; however, the intervals that we have selected we feel we can correlate to the wells --

Q. They are correlative to the offsetting wells?

A. We feel they are.

Q. Uh-huh.

A. Yes, sir.

Q. Well now, in the event that you should encounter high pressures in the Morrow, and that the Strawn zone could act as a thief zone to the Morrow, would it be possible for you when you complete the well to run this packer down below the Strawn perforations and isolate the Strawn from the Morrow?

A. Yes, sir. Well, that's a permanent packer. We would have to drill it out and --

Q. Well, you're going to have to drill it out to perforate, anyway, aren't you?

A. We would perforate through tubing.

Q. You're going to perforate through tubing?

A. Right. If we do see the higher pressures we want to work with the Commission any way that we need to, if we have to isolate the Strawn.

Q. In order to isolate a high pressure zone if you should encounter it.

A. Right.

Q. Okay.

MR. NUTTER: Are there any further questions of Mr. Bohot? He may be excused.

Do you have anything further, Mr. Coffield?

MR. COFFIELD: No, Mr. Examiner, I do not.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 7341?

We'll take the case under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7341, heard by me on 9/9 1981.

Oil Conservation Division, Examiner

Page

NEW MEXICO OIL CONSERVATION COMMISSION

, NEW MEXICO

Hearing Date September 9, 1981 Time: 9:00 AM

NAME	REPRESENTING	LOCATION
[illegible]	[illegible]	Midland, TX
Jerry Bohart	Superior Oil Co.	Houston, TX
Jeffrey J. Hewitt	Superior Oil Co.	Houston, Tx.
R. R. Kendrick	El Paso Natural Gas Co	El Paso, TX
JIM LAW	NEW MEXICO STATE LAND OFFICE	SANTA FE
Huan Pham	ARCO	Midland Tx
Robert Craig	ARCO	Midland, Tx
Greg [illegible]	ARCO	Midland, Tx
RC Maynard	U.S. Geological Survey	Albuquerque NM.
[illegible]	Montgomery & Andrews	Santa Fe
W T Kellahin	Kellahin & Kellahin	Santa Fe
Bob Huber	Byram	Santa Fe
[illegible]	Conoco	Hobbs
Allen R. [illegible]	CONOCO INC.	Hobbs.
Michael G. [illegible]	Tenneco Oil Co.	[illegible], Tx
[illegible]	The El Paso Co	Santa Fe

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
9 September 1981

EXAMINER HEARING

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Application of Superior Oil Company for downhole commingling, Eddy County, New Mexico. CASE **7341**

BEFORE: **Daniel S. Nutter**

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Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: **Conrad E. Coffield, Esq.**
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P. O. BOX 3580
Midland, Texas 79701

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MR. COFFIELD: I'm Conrad Coffield with the Hinkle law firm in Midland, Texas, appearing on behalf of the applicant, and I have one witness to be sworn.

(Witness sworn.)

L. H. BOHOT

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BY MR. COFFIELD:

Q. Mr. Bohot, for the record would you please state your name, address, occupation, and employer?

A. My name is Larry Bohot. I'm from Houston, Texas, and my occupation is a Senior Engineering Supervisor for The Superior Oil Company.

MR. NUTTER: Spell your last name, please.

A. B-O-H-O-T.

MR. NUTTER: Thank you.

Q. Have you previously testified before the Division as a petroleum engineer?

A. No, I have not.

Q. For the Examiner, would you please give a resume of your educational background and work experience as an engineer?

A. I have a BS in petroleum engineering from Texas A&M. I graduated in May of 1973.

I worked for Shell Oil Company for four years as a reservoir engineer and production engineer in the west Texas area.

I worked two years for an independent in Houston as a production engineer in the Gulf Coast area, and I've been employed by Superior Oil Company as a production engineer and engineering supervisor for two years in the west Texas area.

I'm a member of the SP.

Q. Are you familiar with Superior's application in this case?

A. Yes, I am.

Q. And are you familiar with the property involved and the well which is the subject of the application?

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MR. COFFIELD: Mr. Examiner, I'd like to point out to you what appears to be a typographical error in the description of the name of the -- of the well. It says Collatt State in the docket and it's Collatt Estate.

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A. Exhibit One is a land plat showing the location of the subject well, which is colored in yellow. The cross hatched area on the map indicates Superior acreage.

The red dots indicate Morrow producers and the blue triangle is a Strawn producer.

MR. NUTTER: Is this the only Strawn producer in the area?

A. The well offsetting this well is a Strawn-Morrow, and Morrow dual.

MR. NUTTER: Which one is it?

A. It's the Pennzoil Gulf Federal No. 2.

Q. Mr. Bohot, for the Examiner's orientation on this particular well and what problems that you face with it, would you please give him a brief history of the well?

A. This well was drilled and completed as a single Strawn producer in November of 1969 from perforations 10,453 feet to 493 feet. It went on production in early 1970 and has produced approximately 3.4 Bcf. Water production began in this well in mid-71. The well was able to sustain its production until early 1977 at which time the gas and water production began dropping, indicating that the well was loading up.

The well is currently a marginal producer.

Q. And do you feel it's -- your problems with this well are related to the introduction of the water into the -- into the well? This is causing the difficulty?

A. Yes, we do.

Q. All right, go to what is marked here in this pamphlet as Exhibit Two and describe that exhibit for the Examiner, please.

A. Exhibit Two is a diagrammatic sketch of the wellbore in its current condition. It is completed through three sets of perforations in the Strawn formation with a permanent production packer set at 10,350 feet with 2-3/8ths tubing to the surface.

Q. Okay, go on now with what you've marked as Exhibit Three and discuss that exhibit, for the examiner.

A. Exhibit Three is a rate versus cumulative production curve, which indicates the well is producing at its capacity until a cumulative production of approximately 3.1 Bcf, at which time the data points diverged from a straight line that it had been on. This indicates that the well was loading up and could not overcome the pressures created by the water column.

This, along with Exhibit Five, which is a plot of the water and oil producing rates, indicate that the water was increasing and in '77 the water production began decreasing showing that the well could not unload the water, did not have a sufficient gas rate to unload the water.

Extrapolation of this rate versus cumulative curve indicates an ultimate recovery of 3.8 Bcf, which is approximately 400-million cubic feet more than the well is capable of producing in its current state.

Q. Mr. Bohot, you've made reference to Exhibit Five. That's somewhat out of order relative to the booklet, but was there anything further that you need to describe in the -- connection with that exhibit?

A. I don't think so. It just -- the point of the exhibit is to show that as of mid 1977 the well was unable to unload the water.

Q. All right, then go to Exhibit Four and please describe that to the Examiner.

A. Exhibit Four is a rate versus time curve, which indicates the gas was decreasing rapidly in 1976, as the well loaded up. The gas rate diverged from the straight line it had been on.

Q. Okay, next we'll go to Exhibit -- Exhibit six. Would you please describe that?

A. Exhibit Six is a bottom hole pressure over Z versus cumulative production plot. The extrapolation of this plot ties with our cumulative or ultimate production from the rate versus cum curve for approximately 3.8 Bcf and an abandonment pressure of 280 psi bottom hole pressure.

Q. Okay, we're ready now for Exhibit --

MR. NUTTER: What was that abandonment pressure again?

A. 280.

MR. NUTTER: Go ahead.

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A. Exhibit Seven is a table of estimated bottom hole pressures from the subject well and surrounding oil wells. These estimates were made from the P/Z plots and the cumulative at that time; the low pressures we're looking at, the Z factor is approximately one.

The purpose of this exhibit is to show that there is a very small bottom hole pressure differential which we believe would not lead to cross flowing if the two wells were commingled downhole.

Q. And, Mr. Bohot, in your expert opinion would you also be able to state that it's your opinion that data shown on this exhibit, Seven, would also support the conclusion that drainage is occurring as far as Superior's acreage is concerned?

A. I believe it would, based on the fact that the wells are very close to our lease and I believe that we are being drained. The bottom hole pressure under our

lease approximates the bottom hole pressure in these wellbores.

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Exhibit Eight-A is a Morrow gas analysis from the same well.

These analyses indicate that the gas is compatible and would cause no problem with being commingled. Also the gas is taken by a common purchaser.

MR. NUTTER: Where is that Ryan Well, Mr. Bohot?

A. The Ryan Well is approximately two miles to the east of the subject well.

MR. NUTTER: Is that the well in the northwest quarter of Section 5 there?

A. Yes, sir.

MR. COFFIELD: It's in Unit D.

MR. NUTTER: Of 5?

A. Yes, sir.

MR. COFFIELD: Yes, sir.

Q. All right, Mr. Bohot, the next Exhibit

is Number Nine. Would you explain that exhibit?

A. Exhibit Number Nine is a copy of the order issued granting us, Superior Oil Company, permission to commingle the Ryan Com in February of 1979.

Q. And in your opinion are the formations involved in the Ryan No. 1 Well and the situation downhole with respect to that well, basically similar to the situation in this well, the subject of this application?

A. Yes, they are the same reservoirs and we believe that they are common.

Q. And so it would be your opinion that for the same reasons as were justifiable in connection with the Ryan No. 1, that they would apply here, as well, to authorize downhole commingling?

A. Yes, I do.

Q. The next exhibit is Exhibit Number Ten, Mr. Bohot. Would you please just briefly describe what that is?

A. Exhibit Ten is a memo indicating the royalty ownership of the Morrow and Strawn formations in the wellbore is common. Also, the working interest is the same in both zones; therefor, payments would not be a problem.

Q. If commingling is authorized by the Division and the application of Superior is granted in this

case, how would you propose to allocate the production between the zones involved?

A. The production from the Strawn formation would be allocated based on our rate versus cum curve until a cumulative of 3.8 Bcf had been reached, at which time all the production would be allocated to the Morrow.

Q. Is it your opinion that if this application is denied and the downhole commingling is not authorized, that there would be hydrocarbons that would not be recovered?

A. Yes, it is.

Q. Did you have anything further that you wanted to add?

A. Nothing.

Q. Were these Exhibits One through Nine either prepared by you, Mr. Bohot, or prepared under your supervision?

A. They were prepared under my supervision.

Q. And in your opinion will the approval of the application be in the interest of conservation, the prevention of waste, and protection of correlative rights?

A. Yes, it would.

MR. COFFIELD: Mr. Examiner, I move the admission of Exhibits One through Ten.

MR. NUTTER: Exhibits One through Ten

will be admitted in evidence.

MR. COFFIELD: And I have no other questions of Mr. Bohot on direct examination.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Bohot, this well has never produced from the Morrow, is that correct?

A. No, sir.

Q. So you would plan to make perforations, I see by Exhibit Number Two that the top ofthe Morrow is given as 11,152 and the plugged back depth is 11,009, so you've got approximately 850 -- 750 feet of casing there opposite the Morrow.

A. Yes, sir.

Q. Which you would perforate in the Morrow.

A. Right, we have selected four intervals, or three intervals in the Morrow which we would perforate.

Q. What would those intervals be?

A. They are 11,476 to 86; 11,542 to 549; 11,552 to 68.

Q. Now you mentioned that the Pennzoil Gulf Well was a Strawn Well and was a dual completion in the Strawn and the Morrow. I don't see it color coded like in

blue on this Exhibit Number One in my portfolio. Which well is that?

A. It's the well to the right of our yellow crossed acreage.

Q. Okay, that's the well in the southwest quarter of Section 6, then.

A. Right.

Q. And that's --

A. It does have a triangle and it is not colored in blue. That's an oversight.

Q. But it is a Strawn-Morrow dual?

A. Yes, sir.

Q. So you do have Morrow production to the immediate west, to the south, and two locations to the east of the subject well.

A. Yes.

Q. Well now, Mr. Bohot, the Morrow formation in the South Carlsbad Field is notorious for the presence of small stringers that don't extend laterally very far. While these three wells are productive from the Morrow, it would be possible, I believe, that your well could encounter a stringer that has not yet been penetrated by a Morrow well, and that you'd come up with greater pressures than the pressures that you have anticipated by your comparative calculation.

A. That is possible; however, the intervals that we have selected we feel we can correlate to the wells --

Q. They are correlative to the offsetting wells?

A. We feel they are.

Q. Uh-huh.

A. Yes, sir.

Q. Well now, in the event that you should encounter high pressures in the Morrow, and that the Strawn zone could act as a thief zone to the Morrow, would it be possible for you when you complete the well to run this packer down below the Strawn perforations and isolate the Strawn from the Morrow?

A. Yes, sir. Well, that's a permanent packer. We would have to drill it out and --

Q. Well, you're going to have to drill it out to perforate, anyway, aren't you?

A. We would perforate through tubing.

Q. You're going to perforate through tubing?

A. Right. If we do see the higher pressures we want to work with the Commission any way that we need to, if we have to isolate the Strawn.

Q. In order to isolate a high pressure zone if you should encounter it.

A. Right.

Q. Okay.

MR. NUTTER: Are there any further questions of Mr. Bohot? He may be excused.

Do you have anything further, Mr. Coffield?

MR. COFFIELD: No, Mr. Examiner, I do not.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 7341?

We'll take the case under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7341 heard by me on 9/9 1981.

, Examiner
Oil Conservation Division

APPLICATION TO DOWNHOLE COMMINGLE PRODUCTION FROM THE STRAWN AND MORROW ZONES

THE SUPERIOR OIL COMPANY
COLLATT ESTATE COM. NO. 1
SECTION 1, T23S, R27E
SOUTH CARLSBAD FIELD AREA
EDDY COUNTY, NEW MEXICO

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EXHIBIT 7	BOTTOMHOLE PRESSURE COMPARISON - SOUTH CARLSBAD FIELD
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EXHIBIT 8A	GAS SAMPLE ANALYSIS REPORT - MORROW ZONE
EXHIBIT 9	APPLICATION FOR DOWNHOLE COMMINGLING
EXHIBIT 10	LEASE OWNERSHIP RESPONSE

DISCUSSION

The Superior Oil Company respectfully requests approval to commingle the Strawn and Morrow formations in our Collatt Estate Com. #1 well. By commingling the two zones, an additional 400 MMCF of gas can be recovered from the Strawn that would otherwise be lost.

Exhibit I is a land plat of the South Carlsbad field area. The subject well is identified, as are the surrounding completions. The producing formations along with current producing rates are listed. All wells have produced for a number of years, and their producing rates are quite low.

All the surrounding wells have produced from the Morrow except the Collatt Est. Com. #1, which is a Strawn single completion.

Exhibit II is a diagrammatic sketch of the present equipment in the wellbore. Commingling of the Strawn and the Morrow would be accomplished by perforating select Morrow intervals with a through tubing perforating gun. Potential Morrow intervals are at depths from 11,500' to 11,800'.

Exhibit III is a rate vs. cumulative production plot for the Strawn formation. Note that the data points occur in a straight line until a cumulative production of 3.1 BCF is reached. At this point, the points diverge from a straight line. This is due to fluid loading and results in a cumulative production less than the formation is capable of producing if there was no fluid production or if the well could remain unloaded. An extrapolation of the straight line indicates that a cumulative production of 3.8 BCF is possible from this formation. An additional 400 MMCF of gas could therefore be recovered if the produced gas volume was increased to keep the well unloaded.

Exhibit IV is a plot of rate vs. time and shows that the rate diverged from a straight line after 1976.

Exhibit V is a plot of oil and water production vs. time. Note that the water production increased in 1976. The water production decline occuring later is due to the inability of the well to keep unloaded.

Exhibit VI is a plot of bottom hole pressure/Z vs. cumulative production. Note that a straight line fit of the data points agrees fairly well with the rate vs. cumulative plot. An extrapolation of the straight line results at a cumulative production of 3.8 BCF at an abandonment BHP of 280 psig.

Exhibit VII is a table of estimated bottom hole pressures for the Morrow completions in the area and a comparison of the Strawn in the subject well. It is believed that the Morrow has already been drained underlying the Collatt Est. Com. #1 acreage due to the close proximity of offset wells. Therefore, the Morrow in the Collatt #1 should have a pressure similar to offset wells. The pressures of the Strawn and Morrow are close enough that there would be no problem of cross-flow.

Exhibit VIII & VIIIA are gas analyses of the Strawn and Morrow formations in the Superior's Ryan #1. The formations are the same in both the Ryan and the Collatt,and the gas analyses indicate that they are compatible if commingled. Both zones have a common purchaser.

Exhibit IX is a permit to commingle the Strawn and Morrow in the Ryan #1, issued to Superior in February, 1979.

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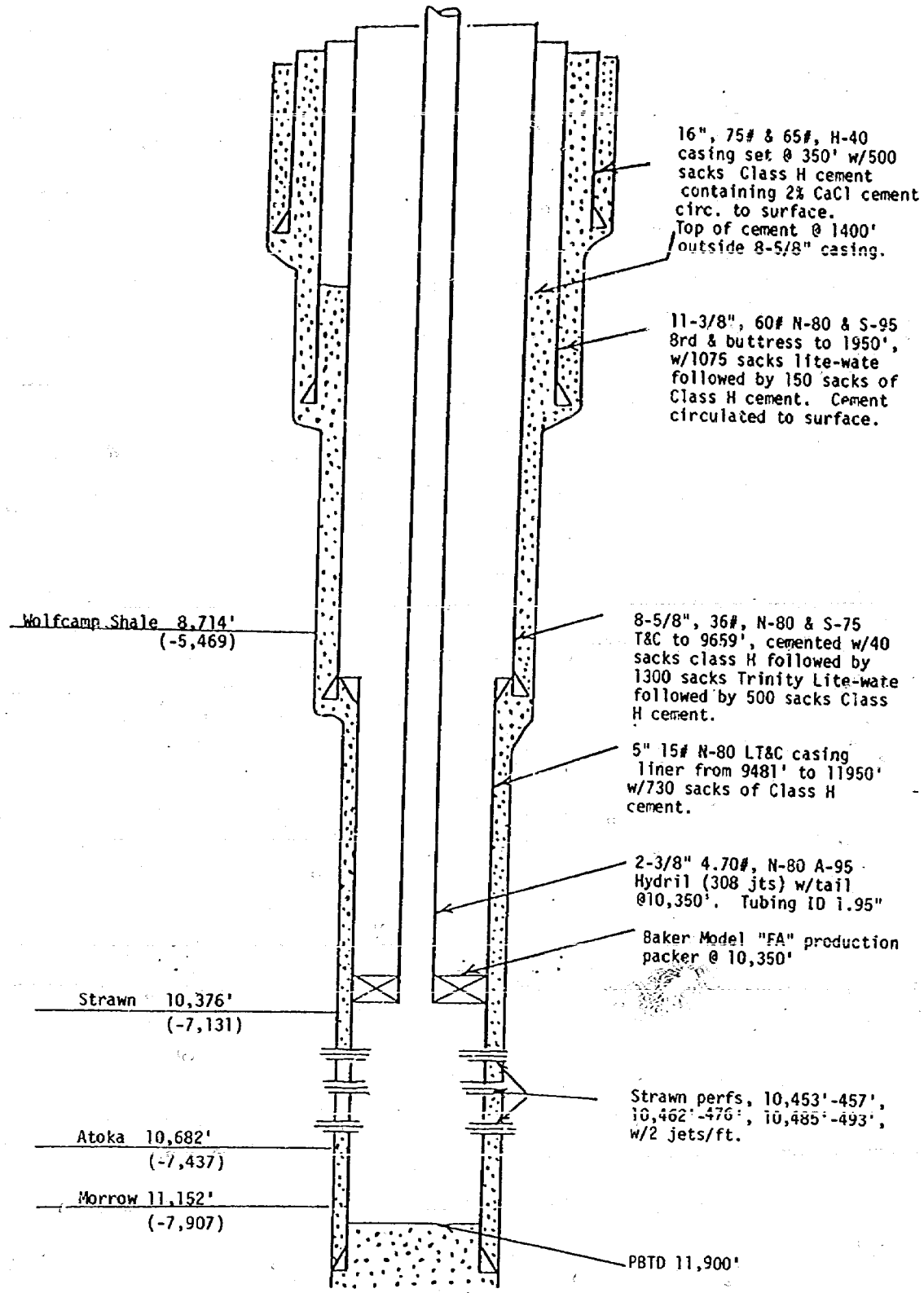
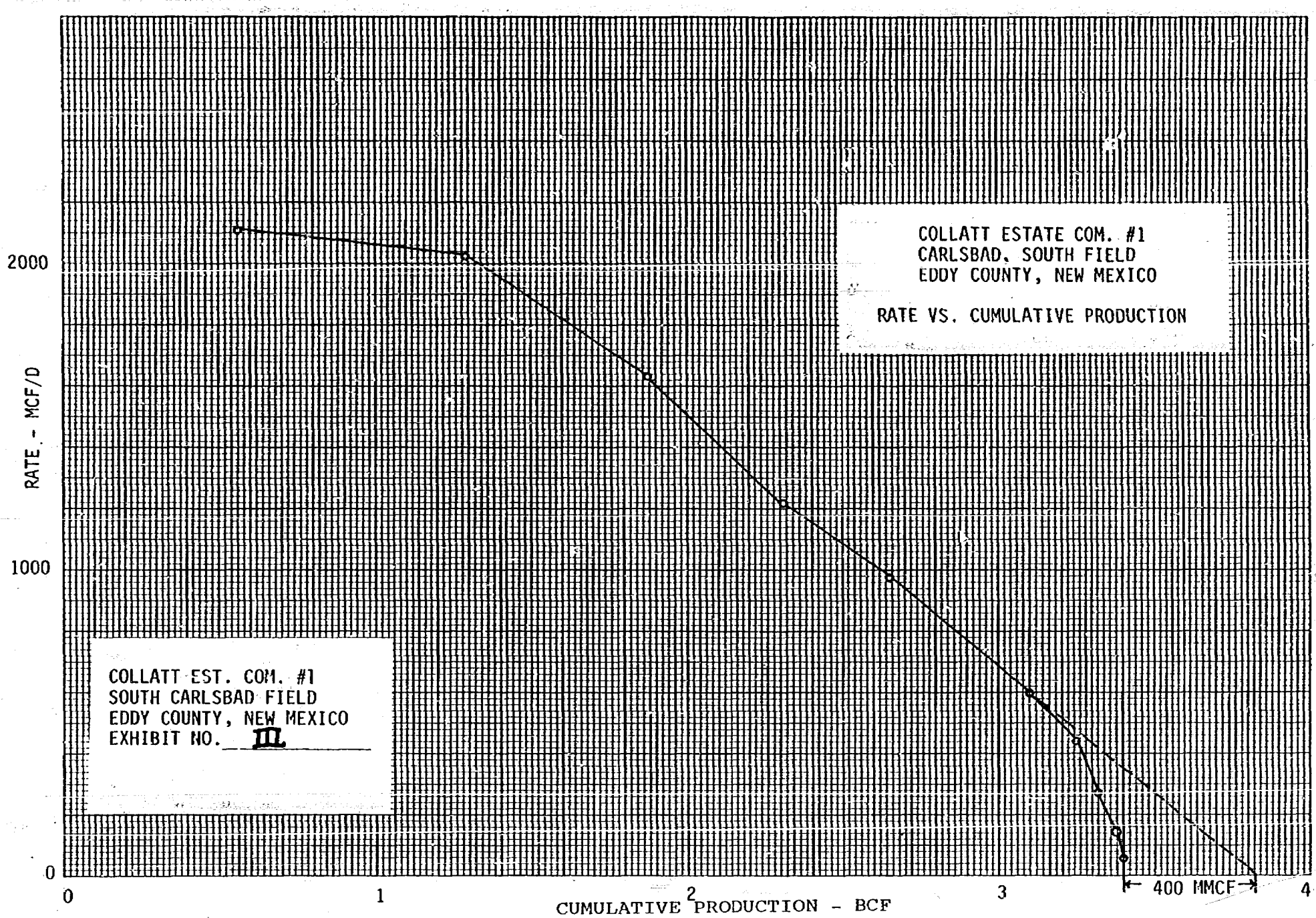
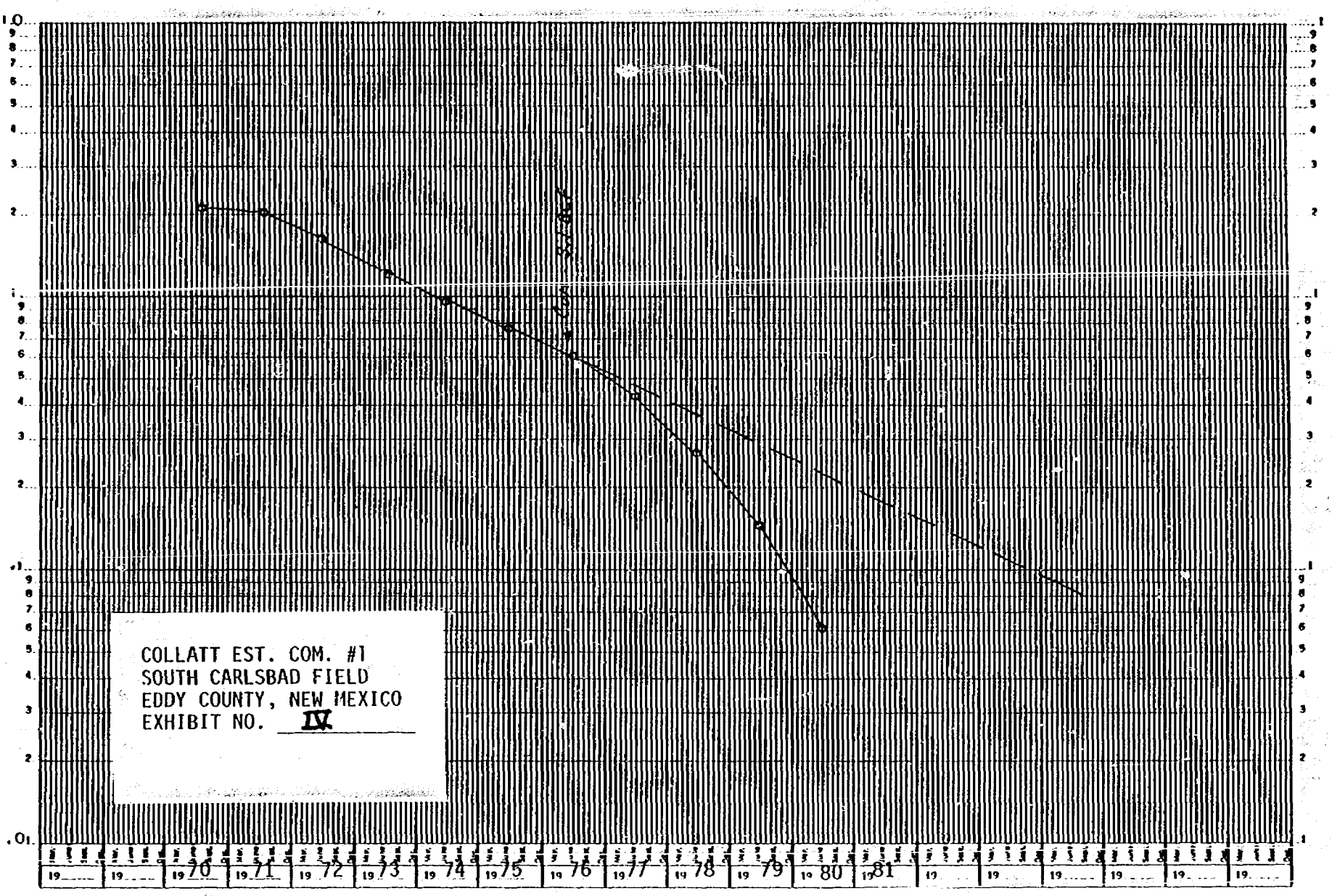


DIAGRAMMATIC SKETCH OF SINGLE COMPLETION INSTALLATION

COLLATT EST. COM #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. II

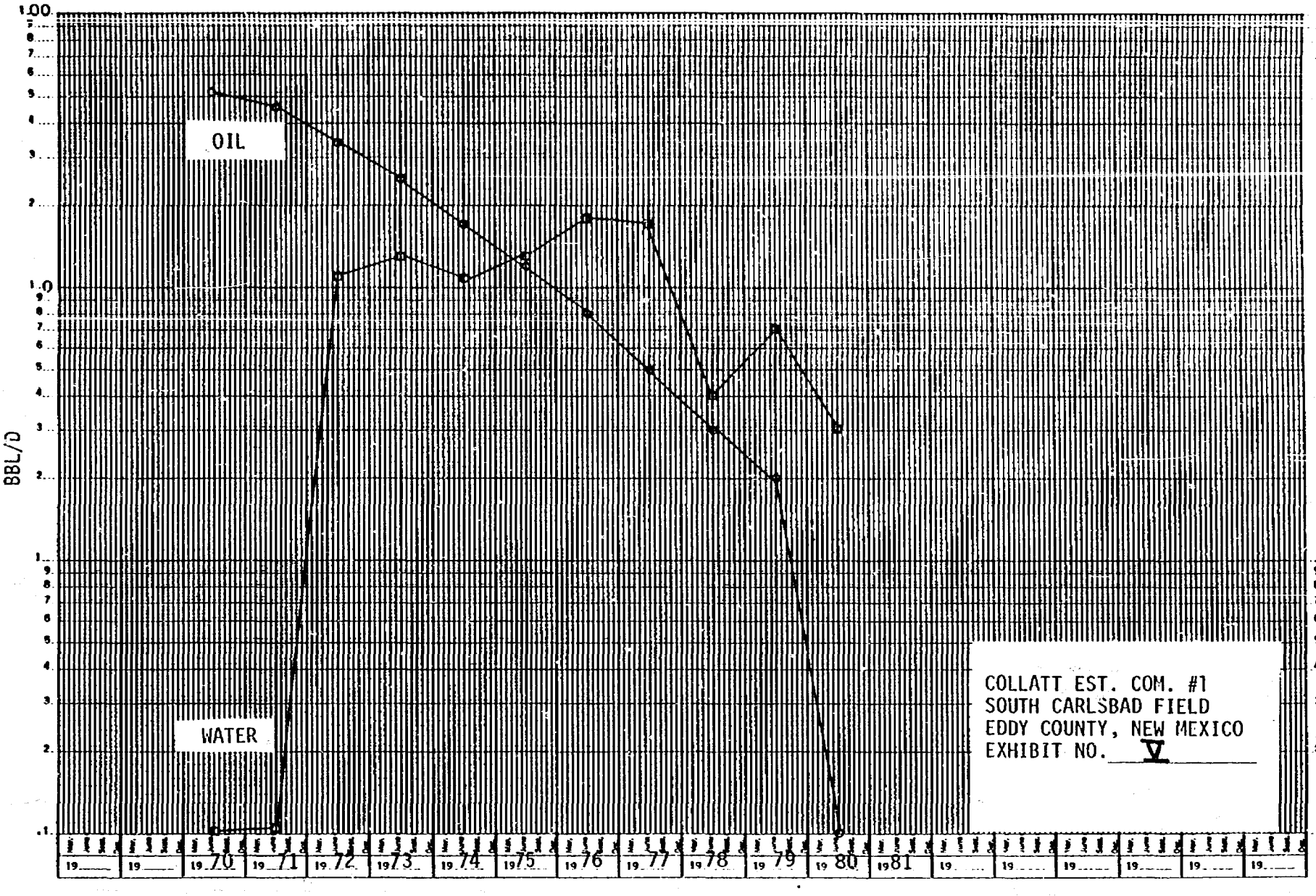
THE SUPERIOR OIL COMPANY
COLLATT ESTATE COM #1
Section 1, 23-S, 27-E
South Carlsbad Field Area
Eddy County, New Mexico


COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO
RATE VS. CUMULATIVE PRODUCTION
COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. III
RATE - MCF/D
2000
1000
0
0
1
2
3
4
400 MMCF
CUMULATIVE PRODUCTION - BCF



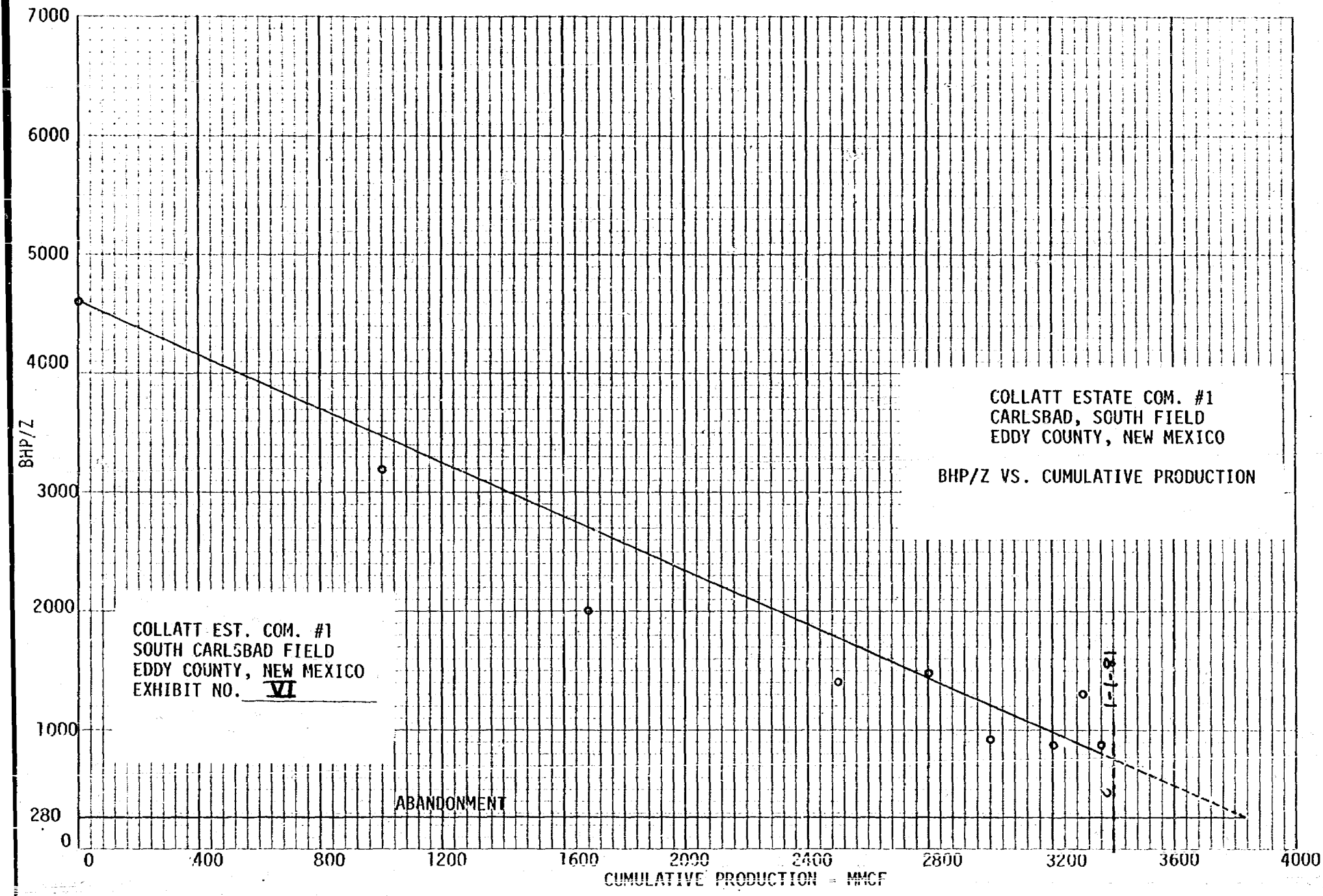
COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO

GAS PRODUCTION DECLINE CURVE



COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO

WATER AND OIL PRODUCTION RATE VS. TIME



BOTTOM HOLE PRESSURE COMPARISON
SOUTH CARLSBAD FIELD

WELL	ZONE	TEST DATE	BHP	PRESSURE DIFFERENCE
Collatt Est. Com. #1	Strawn	8/80	750	-
Mobil 12 Federal #1	Morrow	6/80	1060	310
Gulf Federal Com. #1	Morrow	7/80	850	100
Gulf Federal Com. #2	Morrow	7/80	890	140

Average Pressure Difference - 184 PSI

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. VII

(Unless otherwise noted.)

SAMPLE REPORT

File No. [illegible]

District	Midland	Sample of	Sales Gas
Field	Carlsbad South	Separator Pressure	355 PSI
Plant		Separator Temperature	42 °
Lease	Ryan	Atmospheric Temperature	
Operator	The Superior Oil Company	Shipped From	
Well Number	1-UT	Shipped	
Producing Zone	Strawn	Date Shipped	
Perforated		Shipped Via	

LABORATORY REPORT

Fractional Analysis				BTU and SP. GR. computed by A.G.A. method. Gas Measurement Committee Report NO.3, 1969	
Component	Mol. %	L. V. %	G. P. M.	Miscellaneous Tests	
CO_2	.42			Specific Gravity @ 60° F. calc. (air=1)	0.59
O_2				Spec. Gravity @ 60° F. deter.	0.59
N_2	.80			B. T. U./cu.ft.@14.73#A.60°F calc.sat	1041
Total Inert				" " " " " "	
H_2S				C6+(as gas) Sp.Gr. Ideal. (air = 1)	3.33
Methane	93.70			C6+ BTU/cu.ft.@14.73#A.60°F Ideal Dry	5318
Ethane	3.63				
Propane	.83		.2272		
Isobutane	.19		.0618	Sulphur	
N. Butane	.18		.0564	Hexane Plus, G. P. M. Factor	41.[illegible]
Isopentane	.08		.0291	Hexane Plus, Spec. Gr. @ 60° F.	.72
N. Pentane	.04		.0144	Hexane Plus, Mol. Weight	96.[illegible]
Hexanes Plus	.13		.0544	Hexane Plus, Cu. Ft. Vap./Gal.	23.[illegible]
TOTAL	100.00		.4433	Sep. Liq. - Cu. Ft. Vap./Gal.	

REMARKS Date of sample: January 20, 1977

*Llano Refinery.

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. VIII

J. K. Williams

THE SUPERIOR OIL COMPANY

GAS DEPARTMENT

Base Conditions:
14.65 P.S.I.A., 60°F.
(Unless otherwise noted.)

Lake Creek Lab. No. 8057

SAMPLE REPORT

File No. 30-026-2-10

District	Midland	Sample of	Sales Gas
Field	Carlsbad South	Separator Pressure	356 PSI
Plant		Separator Temperature	66 °
Lease	Ryan	Atmospheric Temperature	
Operator	The Superior Oil Company	Shipped From	
Well Number	1-27	Shipped	
Producing Zone	Morrow	Date Shipped	
Perforated		Shipped Via	

LABORATORY REPORT

Fractional Analysis				BTU and SP. GR. computed by A.G.A. method, Gas Measurment Committee Report NO.3, 1969 Miscellaneous Tests	
Component	Mol. %	Lq. V. %	G. P. M.		
CO_2	1.06			Specific Gravity @ 60° F. calc. (air=1)	0.590
O_2				Spec. Gravity @ 60° F. deter.	0.587
N_2	.21			B. T. U./cu.ft.@14.73#A.60°F calc. sat.	1026
Total Inert				" " 14. " " "	
H_2S				C6+(as gas) Sp.Gr. Ideal. (air = 1)	3.353
Methane	95.54			C6+ BTU/cu.ft.@14.73#A.60°F Ideal Dry	5350
Ethane	2.46				
Propane	.33		.0903		
Isobutane	.09		.0293	Sulphur	
N. Butane	.06		.0188	Hexane Plus, G. P. M. Factor	41.9
Isopentane	.05		.0182	Hexane Plus, Spec. Gr. @ 60° F.	.750
N. Pentane	.02		.0072	Hexane Plus, Mol. Weight	97.2
Hexanes Plus	.18		.0755	Hexane. Plus, Cu. Ft. Vap./Gal.	23.8
TOTAL	100.00		.2543	Sep. Liq. - Cu. Ft. Vap./Gal.	

REMARKS Date of sample: January 20, 1977

* Llano Ranarey.

H_2S: 2ppm by Superior Oil Drager Test.

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY NEW MEXICO
EXHIBIT NO. VIII A

J. B. Williams

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6449
Order No. R-5934

APPLICATION OF THE SUPERIOR OIL COMPANY
FOR DOWNHOLE COMMINGLING, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 14, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 28th day of February, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, The Superior Oil Company, is the owner and operator of the Ryan Com. Well No. 1, located in Unit D of Section 5, Township 23 South, Range 27 East, NMPM, South Carlsbad Field, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle Strawn and Morrow production within the wellbore of the above-described well.

(4) That from the Strawn zone, the subject well is capable of low marginal production only.

(5) That from the Morrow zone, the subject well is capable of low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. IX

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(9) That in order to allocate the commingled production to each of the commingled zones in the subject well, 6 percent of the commingled gas production and 2 percent of the condensate production should be allocated to the Strawn zone, and 94 percent of the commingled gas production and 98 percent of the condensate production to the Morrow zone.

(10) That Division Order MC-2013, which approved the dual completion of the subject well, should be rescinded.

IT IS THEREFORE ORDERED:

(1) That the applicant, The Superior Oil Company, is hereby authorized to commingle Strawn and Morrow production within the wellbore of the Ryan Com Well No. 1, located in Unit D of Section 5, Township 23 South, Range 27 East, NMPM, South Carlsbad Field, Eddy County, New Mexico.

(2) That 6 percent of the commingled gas production and 2 percent of the condensate production shall be allocated to the Strawn zone and 94 percent of the commingled gas production and 98 percent of the condensate production shall be allocated to the Morrow zone.

(3) That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(4) That Division Order MC-2013 is hereby rescinded.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

SUPERIOR OIL

INTER-OFFICE CORRESPONDENCE

DATE JULY 1, 1981

TO BERT MC JIMSEY

LOCATION THE WOODLANDS

FROM ANDY ANDERSON

LOCATION " "

SUBJECT NM-798 - M. O. COLLATT
COLLAT ESTATE COM #1
EDDY COUNTY, NEW MEXICO

COPIES

Regarding your inquiry as to the royalty ownership in the Strawn & Morrow formations underlying the subject lease, our records indicate that the ownership is common within all the formations of Pennsylvanian age as to the subject lease.

Andy Anderson

AA/jf

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. X

APPLICATION TO DOWNHOLE
COMMINGLE PRODUCTION FROM
THE STRAWN AND MORROW ZONES

THE SUPERIOR OIL COMPANY
COLLATT ESTATE COM. NO. 1
SECTION 1, T23S, R27E
SOUTH CARLSBAD FIELD AREA
EDDY COUNTY, NEW MEXICO

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EXHIBIT 4	GAS PRODUCTION DECLINE CURVE
EXHIBIT 5	WATER AND OIL PRODUCTION RATE VERSUS TIME CURVE
EXHIBIT 6	BHP/Z VERSUS CUMULATIVE PRODUCTION CURVE
EXHIBIT 7	BOTTOMHOLE PRESSURE COMPARISON - SOUTH CARLSBAD FIELD
EXHIBIT 8	GAS SAMPLE ANALYSIS REPORT - STRAWN ZONE
EXHIBIT 8A	GAS SAMPLE ANALYSIS REPORT - MORROW ZONE
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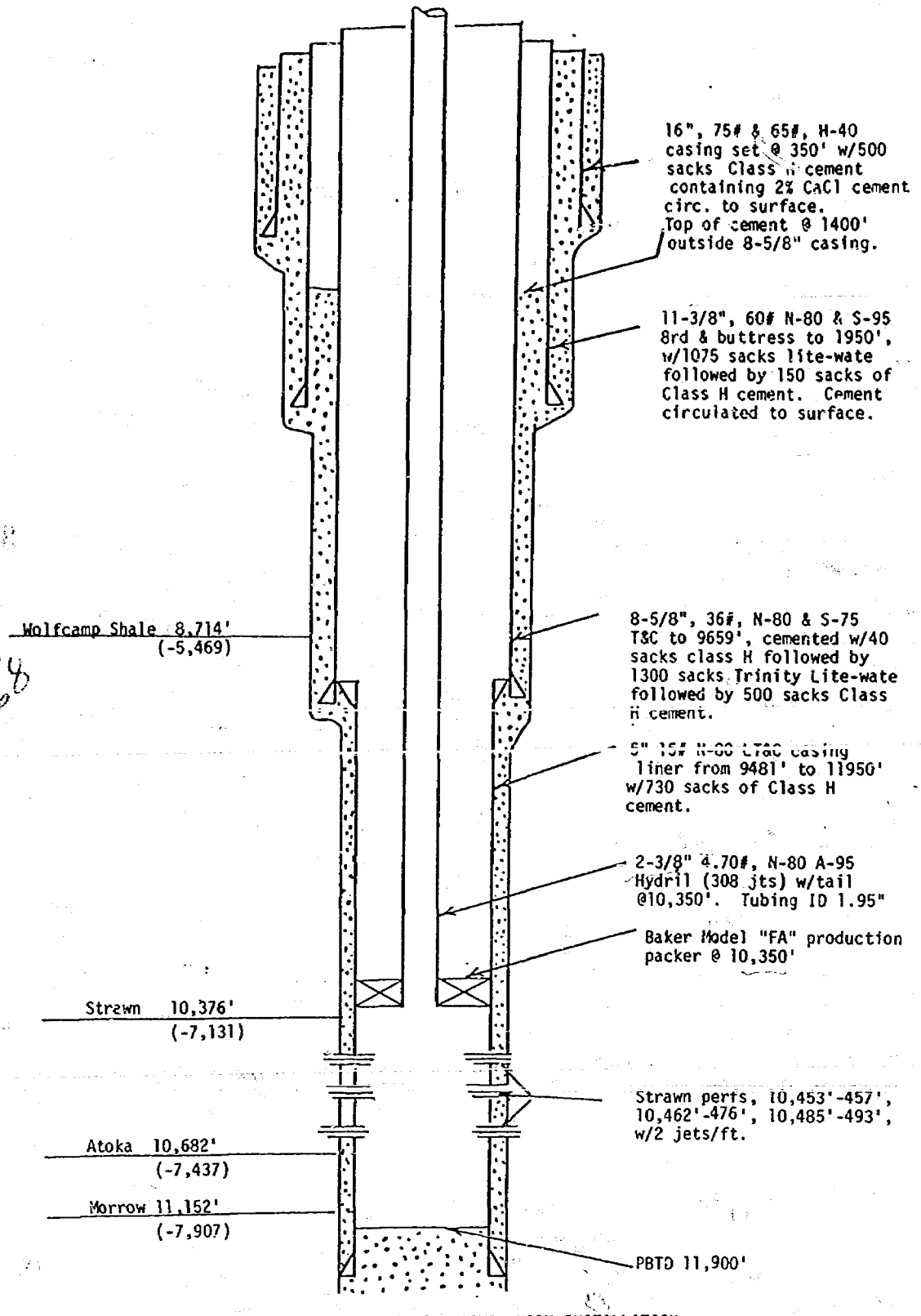
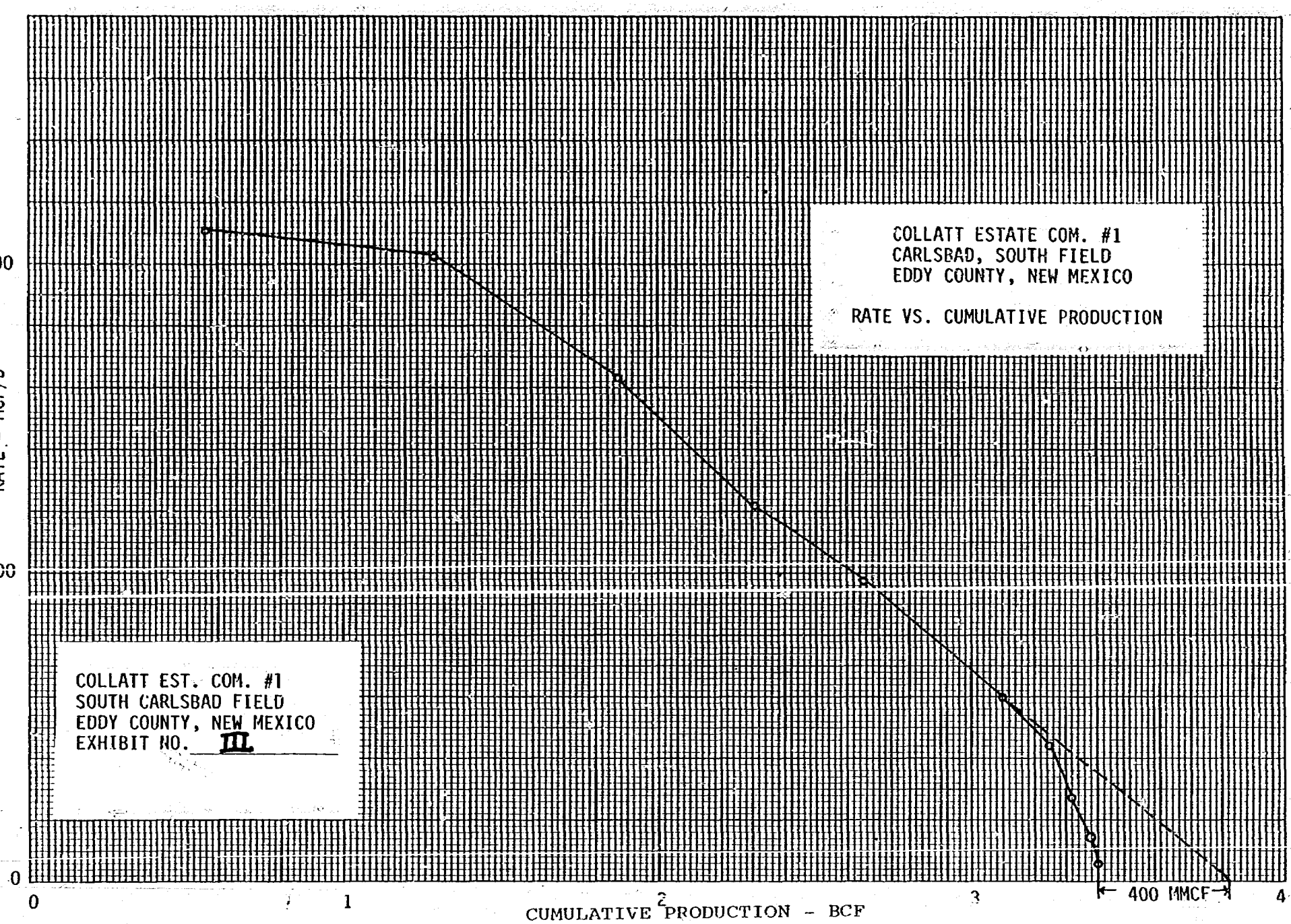


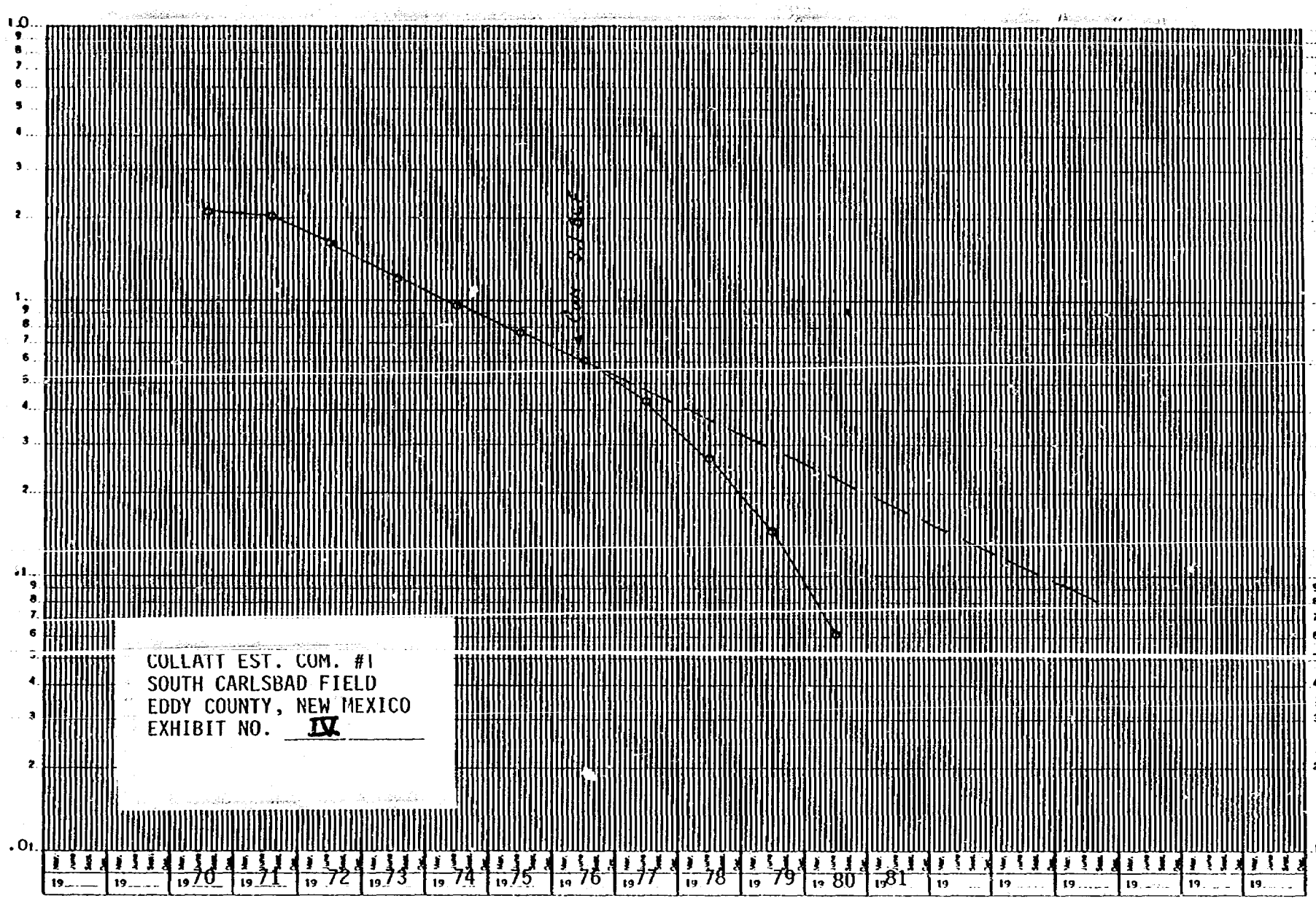
11476-8k
542-49
552-68

DIAGRAMMATIC SKETCH OF SINGLE COMPLETION INSTALLATION

COLLATT EST. COM #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. II

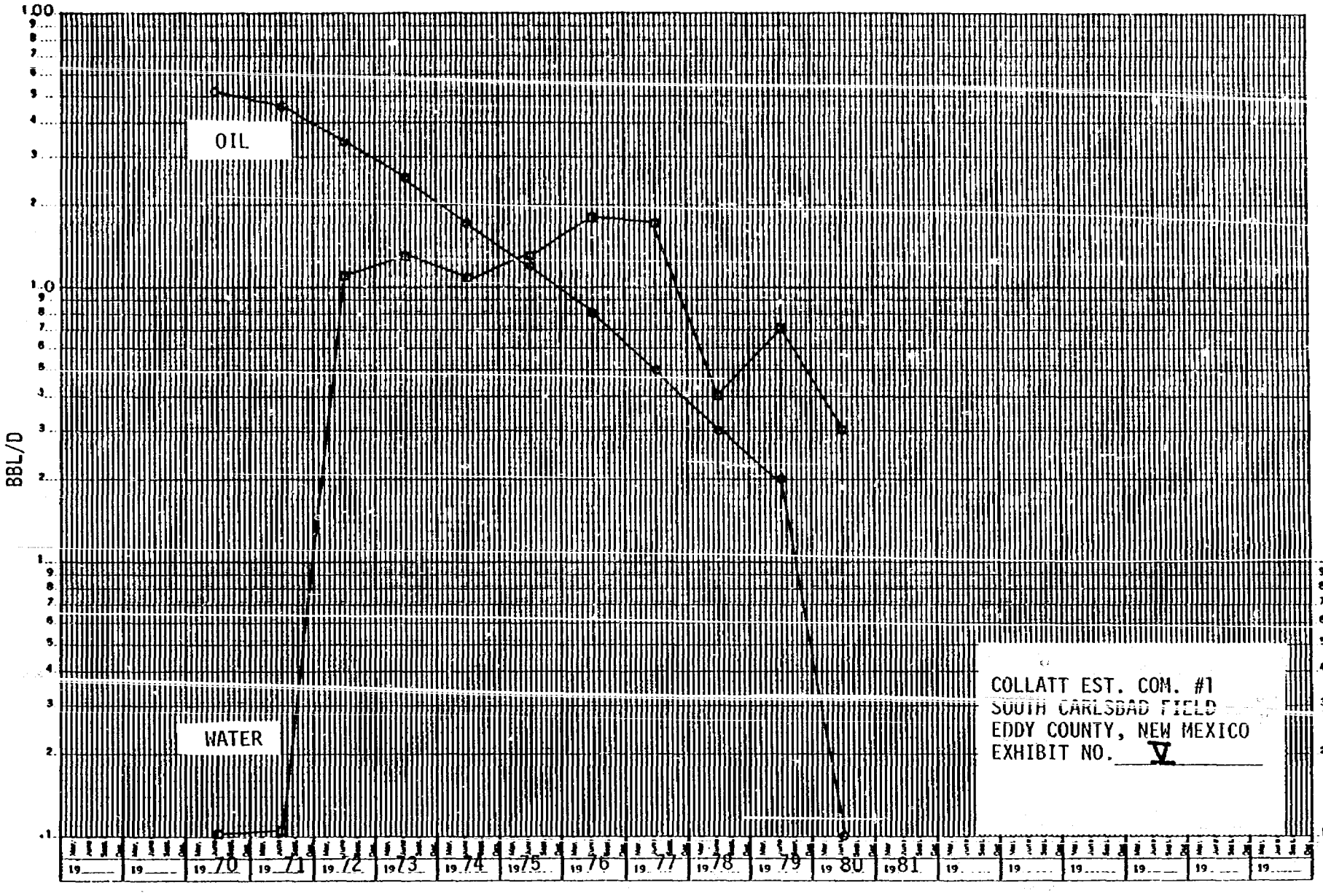
THE SUPERIOR OIL COMPANY
COLLATT ESTATE COM #1
Section 1, 23-S, 27-E
South Carlsbad Field Area
Eddy County, New Mexico


COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO
RATE VS. CUMULATIVE PRODUCTION
COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. III
RATE - MCF/D
2000
1000
0
0
1
2
3
4
400 MMCF
CUMULATIVE PRODUCTION - BCF



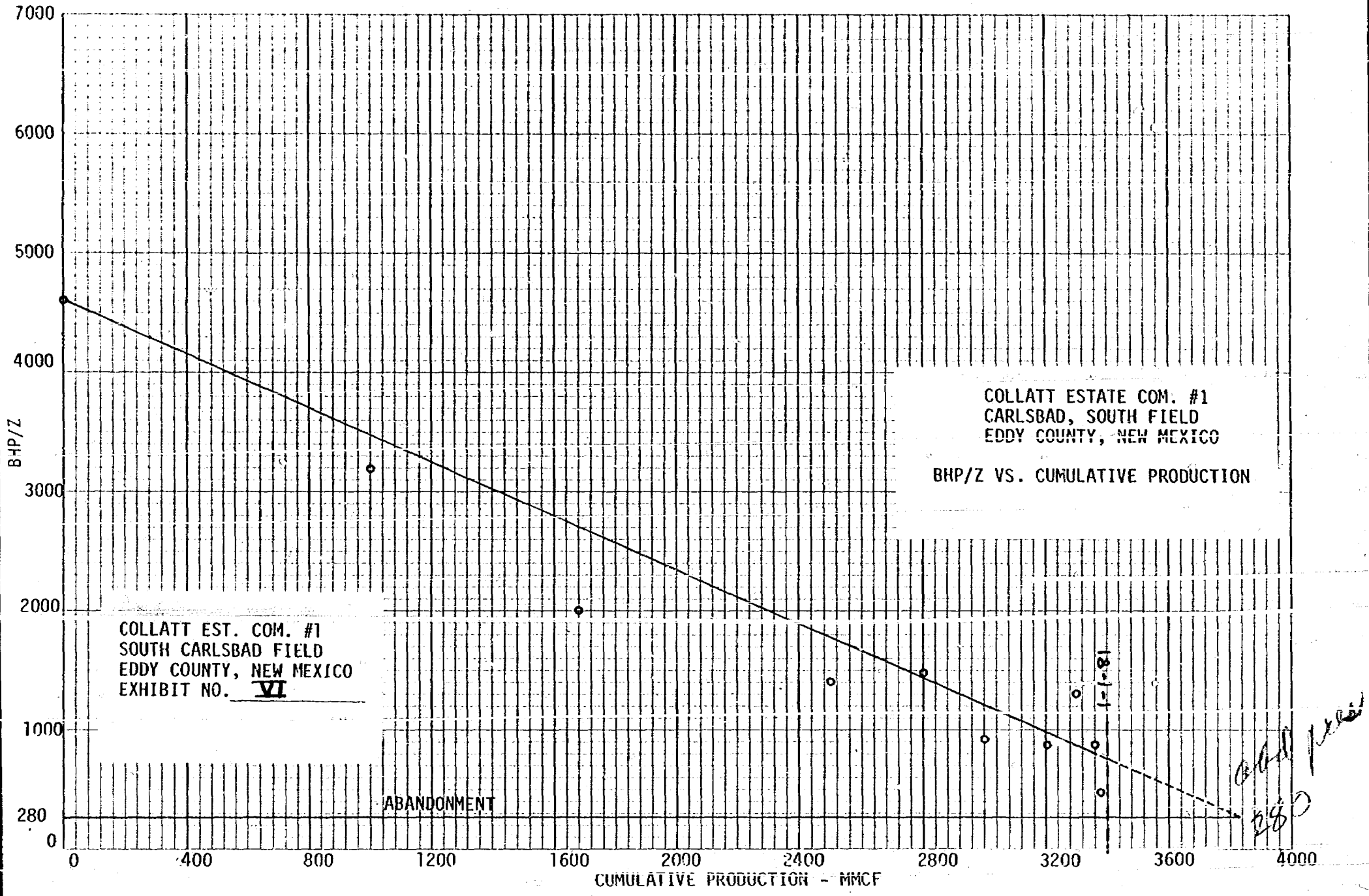
COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO

GAS PRODUCTION DECLINE CURVE



COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO

WATER AND OIL PRODUCTION RATE VS. TIME


7000
6000
5000
4000
3000
2000
1000
280
0
BHP/Z
0
400
800
1200
1600
2000
2400
2800
3200
3600
4000
CUMULATIVE PRODUCTION - MMCF
ABANDONMENT
COLLATT ESTATE COM. #1
CARLSBAD, SOUTH FIELD
EDDY COUNTY, NEW MEXICO
BHP/Z VS. CUMULATIVE PRODUCTION
COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. VI

BOTTOM HOLE PRESSURE COMPARISON
SOUTH CARLSBAD FIELD

WELL	ZONE	TEST DATE	BHP	PRESSURE DIFFERENCE
Collatt Est. Com. #1	Strawn	8/80	750	-
Mobil 12 Federal #1	Morrow	6/80	1060	310
Gulf Federal Com. #1	Morrow	7/80	850	100
Gulf Federal Com. #2	Morrow	7/80	890	140

Average Pressure Difference - 184 PSI

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. VII

[illegible] (Unless otherwise noted.)

SAMPLE REPORT

File No. 50-0262-108

District	Midland	Sample of	Sales Gas
Field	Carlsbad South	Separator Pressure	355 PSI
Plant		Separator Temperature	42
Lease	Ryan	Atmospheric Temperature	
Operator	The Superior Oil Company	Shipped From	
Well Number	1-UT	Shipped	
Producing Zone	Strawn	Date Shipped	
Perforated		Shipped Via	

LABORATORY REPORT

Fractional Analysis

Component	Mol. %	L. V. %	G. P. M.
CO_2	.42		
O_2			
N_2	.80		
Total Inert			
H_2S			
Methane	93.70		
Ethane	3.63		
Propane	.83		.2272
Isobutane	.19		.0618
N. Butane	.18		.0564
Isopentane	.08		.0291
N. Pentane	.04		.0144
Hexanes Plus	.13		.0544
TOTAL	100.00		.4433

BTU and SP. GR. computed by A.G.A. method. Gas Measurement Committee Report NO.3, 1969

Miscellaneous Tests

Test	Value
Specific Gravity @ 60° F. calc. (air=1)	0.59
Spec. Gravity @ 60° F. deter.	0.59
B. T. U./cu.ft.@14.73#A.60°F calc.sat.	104
" " " " " " "	
C5+(as gas) Sp.Gr. Ideal. (air = 1)	3.33
C6+ BTU/cu.ft.@14.73#A.60°F Ideal Dry	531
Sulphur	
Hexane Plus, G. P. M. Factor	41.
Hexane Plus, Spec. Gr. @ 60° F.	.72
Hexane Plus, Mol. Weight	96.
Hexane Plus, Cu. Ft. Vap./Gal.	23.
Sep. Liq. - Cu. Ft. Vap./Gal.	

REMARKS Date of sample: January 20, 1977

*Llano Recovery.

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. VIII

J. K. Williams

THE SUPERIOR OIL COMPANY

GAS DEPARTMENT

Base Conditions:
14.65 P.S.I.A., 60°F.
(Unless otherwise noted.)

Lake Creek Lab. No. 8057

SAMPLE REPORT

File No. 30-026Z-10

District	Midland	Sample of	Sales Gas
Field	Carlsbad South	Separator Pressure	356 PSI
Plant		Separator Temperature	66 °
Lease	Ryan	Atmospheric Temperature	
Operator	The Superior Oil Company	Shipped From	
Well Number	1-27	Shipped	
Producing Zone	Morrow	Date Shipped	
Perforated		Shipped Via	

LABORATORY REPORT

Fractional Analysis				BTU and SP. GR. computed by A.G.A. method, Gas Measurment Committee Report NO.3, 1969 Miscellaneous Tests	
Component	Mol. %	Lq. V. %	G. P. M.		
CO_2	1.06			Specific Gravity @ 60° F. calc. (air=1)	0.590
O_2				Spec. Gravity @ 60° F. deter.	0.58?
N_2	.21			B. T. U./cu.ft.@14.73#A.60°F calc. sat.	1022
Total Inert				" " Lq. " " "	
H_2S				C6+(as gas) Sp.Gr. Ideal. (air = 1)	3.35
Methane	95.54			C6+ BTU/cu.ft.@14.73#A.60°F Ideal Dry	5350
Ethane	2.46				
Propane	.33		.0903		
Isobutane	.09		.0293	Sulphur	
N. Butane	.06		.0188	Hexane Plus, G. P. M. Factor	41.9
Isopentane	.05		.0182	Hexane Plus, Spec. Gr. @ 60° F.	.730
N. Pentane	.02		.0072	Hexane Plus, Mol. Weight	97.2
Hexanes Plus	.18		.0755	Hexane Plus, Cu. Ft. Vap./Gal.	23.8
TOTAL	100.00		.2593	Sep. Liq. - Cu. Ft. Vap./Gal.	

EMARKS Date of sample: January 20, 1977

* Linno Ranney.

H_2S: 2ppm by Superior Oil Drager Test.

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY NEW MEXICO
EXHIBIT NO. VIII A

J. B. Williams

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6449
Order No. R-5934

APPLICATION OF THE SUPERIOR OIL COMPANY FOR DOWNHOLE COMMINGLING, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on February 14, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 28th day of February, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, The Superior Oil Company, is the owner and operator of the Ryan Com. Well No. 1, located in Unit D of Section 5, Township 23 South, Range 27 East, NMPM, South Carlsbad Field, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle Strawn and Morrow production within the wellbore of the above-described well.

(4) That from the Strawn zone, the subject well is capable of low marginal production only.

(5) That from the Morrow zone, the subject well is capable of low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. IX

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(9) That in order to allocate the commingled production to each of the commingled zones in the subject well, 6 percent of the commingled gas production and 2 percent of the condensate production should be allocated to the Strawn zone, and 94 percent of the commingled gas production and 98 percent of the condensate production to the Morrow zone.

(10) That Division Order MC-2013, which approved the dual completion of the subject well, should be rescinded.

IT IS THEREFORE ORDERED:

(1) That the applicant, The Superior Oil Company, is hereby authorized to commingle Strawn and Morrow production within the wellbore of the Ryan Com Well No. 1, located in Unit D of Section 5, Township 23 South, Range 27 East, NMPM, South Carlsbad Field, Eddy County, New Mexico.

(2) That 6 percent of the commingled gas production and 2 percent of the condensate production shall be allocated to the Strawn zone and 94 percent of the commingled gas production and 98 percent of the condensate production shall be allocated to the Morrow zone.

(3) That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

(4) That Division Order MC-2013 is hereby rescinded.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

SUPERIOR OIL

INTER-OFFICE CORRESPONDENCE

DATE JULY 1, 1981

TO BERT MC JIMSEY

LOCATION THE WOODLANDS

FROM ANDY ANDERSON

LOCATION " "

SUBJECT NM-798 - M. O. COLLATT
COLLAT ESTATE COM #1
EDDY COUNTY, NEW MEXICO

COPIES

Regarding your inquiry as to the royalty ownership in the Strawn & Morrow formations underlying the subject lease, our records indicate that the ownership is common within all the formations of Pennsylvanian age as to the subject lease.

Andy Anderson

AA/jf

COLLATT EST. COM. #1
SOUTH CARLSBAD FIELD
EDDY COUNTY, NEW MEXICO
EXHIBIT NO. X

Dockets Nos. 29-81 and 30-81 are tentatively set for September 23 and October 7, 1981. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - SEPTEMBER 9, 1981

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

The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner:

CASE 7341: Application of Superior Oil Company for downhole commingling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of South Carlsbad Strawn and Morrow production in the wellbore of its Collatt State Com Well No. 1 located in Unit J of Section 1, Township 23 South, Range 26 East.

CASE 7342: Application of Arco Oil and Gas Company for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Blinebry and Drinkard production in the wellbore of its State 367 Well No. 2 located in Unit L of Section 36 and its Roy Barton Well No. 2 located in Unit B of Section 23, both in Township 21 South, Range 37 East.

CASE 7343: Application of Caribou Four Corners, Inc. for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Cha Cha Gallup - Oil Pool underlying the E/2 NW/4 of Section 18, Township 29 North, Range 14 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7344: Application of Read & Stevens, Inc. for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying the W/2 of Section 19, Township 23 South, Range 28 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7345: Application of Bass Enterprises Production Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Lovington Penn Pool underlying the N/2 NE/4 of Section 13, Township 16 South, Range 36 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7346: Application of Cibola Energy Corporation for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Devonian formations underlying the W/2 of Section 19, Township 10 South, Range 29 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7347: Application of Tenneco Oil Company for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 660 feet from the South Line and 860 feet from the West Line of Section 20, Township 16 South, Range 34 East, Kemnitz-Morrow Gas Pool, the W/2 of said Section 20 to be dedicated to the well.

W. E. BONDURANT, JR.
(1914-1973)

OF COUNSEL
CLARENCE E. HINKLE*
ROBERT A. STONE

LEWIS C. COX, JR.*
PAUL W. EATON, JR.
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.*
STUART D. SHANOR*
C. D. MARTIN
PAUL J. KELLY, JR.*
JAMES H. BOZARTH
DOUGLAS L. LUNSFORD*
PAUL M. BOHANNON
ERNEST R. FINNEY, JR.
J. DOUGLAS FOSTER

K. DOUGLAS PERRIN*
C. RAY ALLEN
T. CALDER EZZELL, JR.*
WILLIAM B. BURFORD
JOHN S. NELSON*
RICHARD E. OLSON*
ANDERSON CARTER, II
STEVEN D. ARNOLD
JEFFREY L. BOWMAN
JOHN C. HARRISON*

LAW OFFICES
HINKLE, COX, EATON, COFFIELD & HENSLEY
1000 FIRST NATIONAL BANK TOWER
POST OFFICE BOX 3580
MIDLAND, TEXAS 79702
(915) 683-4691

ROSWELL, NEW MEXICO OFFICE
600 HINKLE BUILDING
(505) 622-6510

AMARILLO, TEXAS OFFICE
1701 AMERICAN NATIONAL BANK BUILDING
(806) 372-5569

*NOT LICENSED IN TEXAS

August 19, 1981

Case 7341

Mr. Dan Nutter
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: The Superior Oil Company
Application for Downhole
Commingling, Eddy County,
New Mexico

Dear Dan:

I am transmitting herewith, executed in triplicate, copies of an Application for The Superior Oil Company for approval of downhole commingling of the Strawn and Morrow formations in their Collatt Estate Com. #1 Well in Unit J of Section 1, Township 23 South, Range ~~27~~ 26 East, South Carlsbad Field, Eddy County, New Mexico.

Per our conversation of August 14, it is our understanding that this matter has already been placed on the docket for September 9, 1981.

If any additional materials or information is required, please advise.

Very truly yours,

HINKLE, COX, EATON,
COFFIELD & HENSLEY

Conrad E. Coffield

CEC:rh
Enclosures
xc: Mr. G. Bannantine
xc: Mr. Larry Bohot

BEFORE THE OIL CONSERVATION DIVISION OF

THE DEPARTMENT OF ENERGY AND MINERALS

STATE OF NEW MEXICO

APPLICATION OF THE SUPERIOR)
OIL COMPANY FOR DOWNHOLE)
COMMINGLING, EDDY COUNTY,)
NEW MEXICO)

Case 7341

APPLICATION

The Superior Oil Company, by its undersigned attorneys, hereby makes application for approval of downhole commingling of the Strawn and Morrow formations, and in support thereof would show:

1. Applicant has heretofore drilled its Collatt Estate Com. #1 Well in Unit J of Section 1, Township 23 South, Range ~~27~~ 26 East, South Carlsbad Field, Eddy County, New Mexico.

2. The Collatt Estate Com #1 Well was initially completed in the Strawn formation in 1970. Production from the Strawn formation is on the decline which is believed to be caused by fluid loading resulting in cumulative production less than the formation is capable of producing if there was no fluid production or if the well could remain unloaded. It is believed that by commingling the Morrow and Strawn formations an estimated additional 400 MMCF of gas could be recovered by increased gas volume to keep the well unloaded.

3. Commingling of the Strawn and Morrow formations would be accomplished by perforating select Morrow intervals with a through-tubing perforating gun. Potential Morrow intervals are at depths from 11,500' to 11,800'.

4. It is believed that the Morrow formation underlying the Collatt Estate Com. #1 has already been drained due to the close proximity of offset wells. Therefore, the Morrow in the Collatt #1 should have a pressure similar to the offset wells and the pressures of the Strawn and Morrow are close enough that there would be no problem of crossflow. Both zones have a common purchaser, and the ownership of both zones is common.

5. Approval of the downhole commingling will be in the

interest of conservation, prevention of waste and protection of correlative rights.

6. Applicant respectfully requests that this application be set on the September 9, 1981 docket.

Dated this 19th day of August, 1981.

Respectfully submitted,

HINKLE, COX, EATON,
COFFIELD & HENSLEY

By: 
Conrad E. Coffield
Attorney for The Superior
Oil Company

BEFORE THE OIL CONSERVATION DIVISION

THE DEPARTMENT OF ENERGY AND MINERALS

STATE OF NEW MEXICO

APPLICATION OF THE SUPERIOR)
OIL COMPANY FOR DOWNHOLE)
COMMINGLING, EDDY COUNTY,)
NEW MEXICO)

Case 7341

APPLICATION

The Superior Oil Company, by its undersigned attorneys, hereby makes application for approval of downhole commingling of the Strawn and Morrow formations, and in support thereof would show:

1. Applicant has heretofore drilled its Collatt Estate Com. #1 Well in Unit J of Section 1, Township 23 South, Range ~~27~~ 26 East, South Carlsbad Field, Eddy County, New Mexico.

2. The Collatt Estate Com #1 Well was initially completed in the Strawn formation in 1970. Production from the Strawn formation is on the decline which is believed to be caused by fluid loading resulting in cumulative production less than the formation is capable of producing if there was no fluid production or if the well could remain unloaded. It is believed that by commingling the Morrow and Strawn formations an estimated additional 400 MMCF of gas could be recovered by increased gas volume to keep the well unloaded.

3. Commingling of the Strawn and Morrow formations would be accomplished by perforating select Morrow intervals with a through-tubing perforating gun. Potential Morrow intervals are at depths from 11,500' to 11,800'.

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5. Approval of the downhole commingling will be in the

interest of conservation, prevention of waste and protection of correlative rights.

6. Applicant respectfully requests that this application be set on the September 9, 1981 docket.

Dated this 19th day of August, 1981.

Respectfully submitted,

HINKLE, COX, EATON,
COFFIELD & HENSLEY

By: _____
Conrad E. Coffield
Attorney for The Superior
Oil Company

BEFORE THE OIL CONSERVATION DIVISION OF THE DEPARTMENT OF ENERGY AND MINERALS

STATE OF NEW MEXICO

APPLICATION OF THE SUPERIOR OIL COMPANY FOR DOWNHOLE COMMINGLING, EDDY COUNTY, NEW MEXICO)

Case 7341

APPLICATION

The Superior Oil Company, by its undersigned attorneys, hereby makes application for approval of downhole commingling of the Strawn and Morrow formations, and in support thereof would show:

1. Applicant has heretofore drilled its Collatt Estate Com. #1 Well in Unit J of Section 1, Township 23 South, Range ~~27~~ 26 East, South Carlsbad Field, Eddy County, New Mexico.

2. The Collatt Estate Com #1 Well was initially completed in the Strawn formation in 1970. Production from the Strawn formation is on the decline which is believed to be caused by fluid loading resulting in cumulative production less than the formation is capable of producing if there was no fluid production or if the well could remain unloaded. It is believed that by commingling the Morrow and Strawn formations an estimated additional 400 MMCF of gas could be recovered by increased gas volume to keep the well unloaded.

3. Commingling of the Strawn and Morrow formations would be accomplished by perforating select Morrow intervals with a through-tubing perforating gun. Potential Morrow intervals are at depths from 11,500' to 11,800'.

4. It is believed that the Morrow formation underlying the Collatt Estate Com. #1 has already been drained due to the close proximity of offset wells. Therefore, the Morrow in the Collatt #1 should have a pressure similar to the offset wells and the pressures of the Strawn and Morrow are close enough that there would be no problem of crossflow. Both zones have a common purchaser, and the ownership of both zones is common.

5. Approval of the downhole commingling will be in the

interest of conservation, prevention of waste and protection of correlative rights.

6. Applicant respectfully requests that this application be set on the September 9, 1981 docket.

Dated this 19th day of August, 1981.

Respectfully submitted,

HINKLE, COX, EATON,
COFFIELD & HENSLEY

By: _____
Conrad E. Coffield
Attorney for The Superior
Oil Company

for Sept 9.

The Superior Oil Co

Downhole commingling

Strawn & Morrow

Collatt St Com # 1 (E/2 ded)
J Sec 1 23S 26E Eddy Co.
5. Carlsbad

called in by Conrad Caffield ~~2-7-~~ 2.40 P 8/14
written appl to follow.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7341

Order No. R-6782

APPLICATION OF SUPERIOR OIL COMPANY

FOR DOWNHOLE COMMINGLING, EDDY

COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on September 9, 19 81, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of September, 19 81, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Superior Oil Company, is the owner and operator of the ~~Collett~~ Collatt Estate ~~State~~ Com Well No. 1, located in Unit J of Section ~~Collett~~ 1, Township 23 South, Range 26 East, NMPM, Eddy County, New Mexico.

(3) That the applicant seeks authority to commingle South Carlsbad Strawn and Morrow production within the wellbore of the above-described well.

(4) That from the South Carlsbad Strawn zone, the subject well is capable of low marginal production only.

(5) That from the Morrow zone, the subject well is expected to be capable of low marginal production only.

(6) That the proposed commingling may result in the recovery of additional hydrocarbons from each of the subject pools, thereby preventing waste, and will not violate correlative rights.

(7) That the reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed commingling provided that the well is not shut-in for an extended period.

(8) That to afford the Division the opportunity to assess the potential for waste and to expeditiously order appropriate remedial action, the operator should notify the Artesia district office of the Division any time the subject well is shut-in for 7 consecutive days.

(9) That in order to allocate the commingled production to each of the commingled zones in the subject well, ~~percent of the commingled production should be~~ allocated to the South Carlsbad Strawn zone and ~~percent of the commingled production to the Morrow zone.~~

(~~ALTERNATE~~)

~~(9) That in order to allocate the commingled production to each of the commingled zones in the wells, applicant should consult with the supervisor of the Artesia district office of the Division and determine an allocation formula for each of the production zones.~~

based on the production decline curve presented at the hearing and extrapolated to a total ultimate recovery of 3.8 billion cubic feet from the Strawn zone, with the remainder of the production allocated to the Morrow zone.

(10) That should applicant encounter a bottom hole pressure in excess of 1500 psi in the Morrow formation, it should consult with the Division Director prior to commingling the Strawn and Morrow zones, and the Division Director may require the zones to be isolated from each other if, in his opinion, waste would result from the proposed commingling.

IT IS THEREFORE ORDERED:

(1) That the applicant, Superior Oil Company, is hereby authorized to commingle South Carlsbad Strawn and Morrow production within the wellbore of the Collatt "E" State Com Well No. 1, located in Unit J of Section 1, Township 23 South, Range 26 East, NMPM, Eddy County, New Mexico.

~~(2) That the applicant shall consult with the Supervisor of the Artesia district office of the Division and determine an allocation formula for the allocation of production to each zone in each of the subject wells.~~

~~(ALTERNATE)~~

(2) That the applicant shall allocate the ~~percent of~~ the commingled _____ production ~~shall be allocated~~ to the South Carlsbad Strawn zone based on the production decline curves submitted at the hearing until a total ultimate production of 3.8 billion and ~~percent of the commingled~~ production shall be allocated to the Morrow zone. cubic feet has been credited to the Strawn, and the remaining production shall be credited to the Morrow zone.

(3) That the operator of the subject well shall immediately notify the Division's Artesia district office any time the well has been shut-in for 7 consecutive days and shall concurrently present, to the Division, a plan for remedial action.

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

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

(4) That the applicant upon perforating the Morrow zone, shall determine the bottom-hace pressure in the Morrow; that if said pressure is in excess of 1500 psi applicant shall consult with the Division Director prior to commingling the Strawn and Morrow zones in the wellbore; and the Division Director may require that the zones be isolated from each other.