CASE 6646: BELCO PETROLEUM CORPORATION FOR APPROVAL OF INFILL DRILLING AND SIMULTANEOUS DEDICATION, EDDY COUNTY, N.M.

Case Number

6646

Application

Transcripts.

Small Exhibits

ETC.

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. 6646
Order No. R-6130

APPLICATION OF BELCO PETROLEUM
CORPORATION FOR APPROVAL OF INFILL
DRILLING AND SIMULTANEOUS DEDICATION,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on September 5, 1979, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 10th day of October, 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, Belco Petroleum Corporation, seeks a finding that the drilling of a well to be located in Unit H of Section 1, Township 23 South, Range 30 East, NMPM, Los Medanos-Morrow Gas Pool, Eddy County, New Mexico, is necessary to effectively and efficiently drain a portion of the reservoir covered by the proration unit which cannot be so drained by the existing well.

(3) That the applicant further seeks approval of a waiver of existing well-spacing requirements and simultaneous dedication.

(4) That the standard spacing unit in the Los Medanos-Morrow Gas Pool is 320 acres.

(5) That Belco Petroleum Corporation is the operator of a 320-acre standard proration unit consisting of the E/2 of said Section 1 in the Los Medanos-Morrow Gas Pool.

(6) That said 320-acre proration unit is dedicated to applicant's James Ranch Unit Well No. 3 located in Unit J of said Section 1.

(7) That the evidence presented demonstrated that said James Ranch Unit Well No. 3 cannot effectively and efficiently drain said 320-acre proration unit.

(8) That the evidence presented further demonstrated that the drilling and completion of applicant's said new well should result in production in excess of 1 billion additional cubic feet of gas from said proration unit which would not otherwise be recovered from the proration unit.

(9) That such additional recovery will result in said unit being more efficiently and economically drained.

(10) That said new well is to be drilled as an "infill" well on the existing 320-acre standard proration unit.

(11) That in order to permit the drainage of a portion of the reservoir covered by said 320-acre standard proration unit which cannot be effectively and efficiently drained by the existing well thereon, the subject application for infill drilling and simultaneous dedication should be approved as an exception to the standard well spacing requirements for said Los Medanos-Morrow Gas Pool.

IT IS THEREFORE ORDERED:

(1) That the applicant, Belco Petroleum Corporation, is hereby authorized to drill a well to be located in Unit H of Section 1, Township 23 South, Range 30 East, NMPM, as an infill well on an existing 320-acre standard proration unit being the E/2 of said Section 1, Los Medanos-Morrow Gas Pool, Eddy County, New Mexico. The authorization for infill drilling granted by this order is an exception to applicable well spacing requirements and is necessary to permit the drainage of a portion of the reservoir covered by the existing 320-acre proration unit which cannot efficiently and economically be drained by any existing well thereon.

(2) That said proration unit shall be simultaneously dedicated to applicant's proposed new well and to its James Ranch Unit Well No. 3 located in Unit J of said Section 1.

(3) 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/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

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

October 11, 1979

Mr. Thomas Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Re: CASE NO. 6646
ORDER NO. R-6130

Applicant:

Belco Petroleum Corporation

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
State Land Office Building
Santa Fe, New Mexico
5 September 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of Belco Petroleum Corporation for approval of infill drilling and simultaneous dedication, Eddy County, New Mexico.

CASE 6646

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel for the Division
State Land Office Bldg.
Santa Fe, New Mexico 87503

For the Applicant: W. Thomas Kellahin, Esq.
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SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. STAMETS: We'll call next Case 6646.

MR. PADILLA: Application of Belco Petroleum Corporation for approval of infill drilling and simultaneous dedication, Eddy County, New Mexico.

MR. STAMETS: Call for appearances in this case.

MR. KELLAHIN: I'm Tom Kellahin, Santa Fe, New Mexico, appearing on behalf of the applicant and I have one witness.

(Witness sworn.)

LEE G. NERING

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name, by whom you're employed, and in what capacity?

A. My name is Lee Nering. I'm employed by Belco Petroleum Corporation in the capacity of Administrative Geologist, located in Houston, Texas.

Q. Mr. Nering, have you previously testified before the Oil Conservation Division and had your qualifi-

cations as an expert geologist accepted and made a matter of record?

A. Yes, I have.

MR. KELLAHIN: We tender Mr. Nering as an expert geologist.

MR. STAMETS: The witness is considered qualified.

Q. (Mr. Kellahin continuing.) Mr. Nering, would you identify what we've marked as Exhibit Number One and summarize what Belco Petroleum Corporation is seeking to accomplish by this application?

A. Exhibit Number One is an area plat map of the subject area, which is generally known as the James Ranch area of Eddy County, New Mexico. It involves the Los Medanos Strawn, Atoka, and Morrow Pools.

Belco is seeking by this application for infill drilling and simultaneous dedication in this case, seeking a waiver of existing well spacing requirements and a finding that the drilling of the proposed James Ranch Unit No. 10 Well is necessary to effectively and efficiently drain that portion of the proration unit which cannot so be effectively drained by the present and existing well on the same proration unit.

Q. Would you identify for us the proration unit to which the existing well is dedicated, and also identify

the location for the proposed new well?

A. The existing proration unit is the east half of Section 1, Township 23 South, Range 30 East, Eddy County, New Mexico. The proposed James Ranch Unit No. 10 Well is to be located 1980 feet from the north line and 660 feet from the east line, as shown by the area plat map. This location has been staked. No other action has been taken at this time regarding this well.

The map also shows the existing wells in the James Ranch area. Within this area there are three Morrow completions, two Atoka completions, and one Atoka location, as identified within the legend for completions and for purposes of identification, the one James Ranch No. 9 location is shown in the northwest quarter of Section 1 of 23 South and 31 East.

This well is just a location at this time.

Q. Would you refer to Exhibit Number Two and identify that?

A. Exhibit Number Two is the same base as used by the area plat map and on this is conoured a structure map and superimposed an Isopach map, which is labeled in the title block as a "net effective sand" which probably is a misnomer. Might possibly be more identified as a porosity availability map. As is well known, the Morrow sands are subject to changes in permeability and permeability

probably has a greater effect on effectiveness than basic porosity of the Morrow sands, and this map attempts to show by what is labeled as a Morrow sands pinchout-type line, shown by a light brown color, trending more or less north/south through the east half of the central portion of Section 1.

The effectiveness of the Morrow sands in this area deteriorates apparently very rapidly from east to west with one exception, in which based upon cumulative effects, as can be noted from a later exhibit, the effectiveness of cumulative production decreases not only in a westerly direction but also in an easterly direction.

The map does attempt to show that proceeding to the west the capability, the productive capability of the Morrow sands in this area, seriously declines, which we will show by figures dealing with the James Ranch No. 3 Well, which is the existing well on the proration unit that is the subject of this hearing.

Q. Of the three wells depicted in the Morrow formation on this plat, which is the best of the three?

A. By far the best of the three Morrow wells shown from the legend, is the James Ranch Belco -- is the James Ranch No. 4 Well, located in the southwest quarter of Section 6 of 23 South, 31 East. As shown by a later exhibit, this well has a present cumulative dated to 6-1-79

of over 5-billion cubic feet.

Q. The next best well is which one, Mr. Nering?

A. The next best well is the Continental Oil Company James Ranch No. 7 Well, located in the northeast quarter of Section 6 of this same township mentioned.

Q. Why is the James Ranch No. 4 Well a more productive well than the No. 7 Well, despite the fact that it only has 27 net effective feet of sand compared to 41 feet?

A. As I mentioned, the title block implies this is net effective sand, which again I say it's a misnomer. What that really means is available porosity rather than net effective, and this permeability is a very difficult thing to depict on a map, a geological map, particularly by Isopaching, since it's very difficult to determine degrees of permeability from existing tools and conventional logging.

The only way I think we can come up with a satisfactory effective -- showing where the most effective sands might lie is from normal monthly production or from cumulative production, which are, of course, slow in coming and it appears from our knowledge to date that if anything, there's going to be some form of, eventually with continued time, a generally north/south trending closed area of truly

effective capability of the Morrow sands in this area. As such, we feel that the -- the strike lines as shown by the Isopachs of the "net effective sands" do illustrate the trend of the, in fact, effective sand areas, so that we will expect by the northerly direction and move from the James Ranch No. 4, and in particular from the James Ranch No. 3, we will gain a much more advantageous postion in gaining effectiveness from the Morrow sands in the area.

Q. Would you refer to Exhibit Number Three and identify it?

A. Tom, before I move on to Exhibit Number Three, may I explain that in connection with the two Atoka wells that I've shown on the map, both of these wells were attempted Morrow completions, neither one of which was successful.

Belco made an especially detailed attempt to complete a Morrow Well in the Hudson Federal No. 1 Well located in Section 1, which is shown by the orange.

Shell Oil Company also made attempts at completing in the Morrow in the James Ranch No. Unit Well. Both attempts were failures in terms of Morrow recoverability in practical terms.

Turning to Exhibit Number Three, Exhibit Number Three is a comparison by decline curves comparing Morrow production, and Morrow production only, between James

Ranch No. 4, which has already been described as the much more significant well to the rather insignificant Morrow production from the James Ranch No. 3 Well, and these decline curves show that the James Ranch No. 3 Well had only a few months of production during the years of 1972 and 1973, at that time recovering only 235-plus Mcf, and the well subsequently became a Strawn producer during the years of 1973, '74, and '75, during which time figure approximately 1.7 Bcf was recovered from the Strawn.

And it should be noted that on Exhibit Number One there is a Strawn Federal participating area shown for that Strawn area. The Strawn at the moment in this well has been depleted. The well is no longer productive from the Strawn. In 19 -- it was depleted and depleted by reason of not from water encroachment but from lack of further gas production during 1975, specifically July.

In March of 1976 extensive workovers were attempted on the James Ranch No. 3, attempting to recover some of the production, particularly of the Morrow. These attempts were unsuccessful.

It shows -- this decline curve also shows that the James Ranch 3 again resumed Morrow production in February of 1979. The reason for this, of course, was the enactment of the Natural Gas Policy Act of 1978 and since

it was apparent from our knowledge of the James Ranch 3 Morrow production that this well would qualify for stripper gas production and a latter exhibit will show that Belco has indeed filed James Ranch No. 3 as a category 108 stripper gas production, which means, of course, less than 60 Mcf a day for the James Ranch No. 3.

Q. Your plat shows for the James Ranch No. 3 a 20 percent rate of decline. Upon what is that based?

A. The 20 percent decline is based upon the somewhat limited decline as shown between February and June of 1979; however, it compares reasonably favorably with the overall decline, as shown by the James Ranch No. 4. It's within reason and a figure that we think is within keeping.

Q. Would you identify Exhibit Number Four?

A. Exhibit Number Four is a tabulation of the Morrow gas production from the wells that are being compared, which are in adjacent half sections: James Ranch No. 3 in the east half of 1; James Ranch No. 4 in the west half of Section 6; a straightforward simple month-by-month tabulation of the production from these wells.

Q. Refer to Exhibit Number Five.

A. Exhibit Number Five is -- assuming the 20 percent annual decline rate projected into the future of the James Ranch No. 3, and projecting it through a low of 10 Mcf a day, which admittedly is a rather low figure, and

assuming that at that time the well would be capable of overcoming the line pressure, this is a means by which I have attempted to calculate the amount of gas that will be recovered from James Ranch No. 3 in addition to that gas that was recovered, as shown by Exhibit Number Three, in the years of 1972 and '73.

Q. Would you turn to Exhibit Number Six and describe that?

A. Exhibit Number Six is a means by which I have, with the aid of the Belco reservoir engineers, come to some conclusions regarding the amount of gas that could ultimately be recovered from the east half of Section 1, with the understanding that Section -- the east half of Section 1 does require an additional well on that proration unit to the James Ranch No. 3.

First of all, there's a calculation using a standard procedure, the figures for which the parameters are shown by item A, capital A. The calculation of the Morrow gas in place for the east half of Section 1, using again standard parameters for porosity, the water saturation, the thickness of the available porosity, a reservoir conversion factor, which is a figure which relates to the gas that is in place in the reservoir in terms of standard cubic feet, a figure that I can provide backup calculations for should they be necessary. They are a reservoir calculation

based upon the parameters of the gas at reservoir condition, and if the Examiner desires, I can -- I don't have them with me, but I can provide the calculation for arriving at what is described as a BGIA standard figure for calculating gas in place, the reservoir conversion factor.

A simple multiplication from that point forward, indicating that although these figures are carried out to seven places, practically speaking, we're dealing in terms of something in the order of 1-1/2 billion cubic feet.

Item B in the calculation sheet shows an ultimate recovery of the Morrow gas from the James Ranch No. 3, the existing well. Adding together the cumulative to June 1st of '79, taken from the decline curve or the statistical tabulation of the production, adding to that the future anticipated production derived from the decline function, getting an ultimate recovery of only 307 -- call it 308,000 Mcf, less than -- well, call it .4 Bcf from the James Ranch No. 3.

And Item C in the calculation is, of course, the subtraction of the gas that has been recovered and is anticipated to be recovered from future operations of the James Ranch No. 3 from the east half of Section -- east half of Section 1, the subtraction of the calculated, the theoretical calculation of the gas, recoverable gas in place, yielding a total of approximately 1.2 Bcf in gas remaining

that without a second well will undoubtedly lead to waste.

Item D is an attempt to show that the drainage of the James Ranch 3 is simply a mathematical or ratio relationship between the amount of gas that James Ranch No. 3 will recover from that portion of the 320-acre proration unit, dividing 307 plus 1000 Mcf divided by 1.5 Bcf, yielding about 21 percent of the total area, or 67 acres only of 320.

I think illustrating that this is considerable acreage that remains undrained and could lead to waste of that gas without another well on the east half of Section 1.

Q. I believe you've testified that there's nothing else that Belco can do to the James Ranch No. 3 Well.

A. Yes.

Q. To improve its production.

A. No, the well is in -- has always been in a severe mechanical condition. The well underwent rather extensive workover conditions and I think I can state that workover in Morrow gas, particularly in Eddy County, is not often successful. We've had this experience, unfortunately, a number of times. It's not surprising to see that we were never able to recover this, plus the James Ranch No. 3 is in a poorer permeability position than the anticipated, the

proposed James Ranch No. 10.

Q. Would you turn to Exhibit Number Seven and identify that?

A. Exhibit Number Seven is a verification that Belco has indeed filed the James Ranch No. 3 with the U. S. Geological Survey under the NGPA as a category 108, which of course, is a stripper gas well classification, meaning less than 60 Mcf a day anticipated for the remainder of the life of the well.

Q. Were Exhibits One through Seven prepared by you or compiled under your direction and supervision?

A. That is correct.

Q. And in your opinion, Mr. Nering, will approval of this application be in the best interests of conservation, the prevention of waste, and protection of correlative rights?

A. Absolutely.

Q. In your opinion is the proposed infill well necessary in order to effectively and efficiently drain that portion of the Morrow reservoir underlying this proration unit that is not now or in the future be effectively and efficiently drained by the existing well?

A. That is correct.

MR. KELLAHIN: We move the introduction of Exhibits One through Seven.

MR. STAMETS: These exhibits will be admitted.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Nering, what type of a Morrow sand deposit are we dealing with in this area?

A. Well, I've examined the -- I've made several cross sections. Cross sections I had intended, I think, to prepare a cross section as an exhibit, but none of them really yield anything in terms of the effectiveness to show that by an east to west approach, they don't really illustrate that the sands, even though correlative, do not exhibit the loss of permeability, which undoubtedly has to be the factor. The sands do correlate.

There is one sand, a rather significant looking sand, in the James Ranch No. 4 Well, the significant well, which undoubtedly is the source of the major amount of gas that is -- that has been, will be recovered in James Ranch No. 4. That sand does not appear in any of the other wells and I venture --

Q. To make my question more clear, are we looking at the deltaic deposit, channel sands, beach sands, bar sands, or a combination thereof?

A. I would guess -- I would say you're dealing

with some type of channel, that with the better sands being located somewhat near the center of the area of control wells, I would venture to say it is in the form of a channel and it is trending north, as I indicated from earlier testimony.

Q. Do you have any logs or sections, log sections that you could send us that would show where you derive these figures of -- on your Exhibit Number Two, as to the formation top, structure, the net effective sand?

For example, you've shown 14 feet at the No. 3 Well, 27 feet --

A. Uh-huh.

Q. I'd like to see some logs or a cross section that would show where those came from.

A. I do have a cross section with me. It isn't labeled in those terms. It is a cross section. To gain those figures I'd have to prepare -- the calculations come from the detail logs and are an examination of the type of logs that were prepared. There are some guesses being made as in the examples of the -- some of the older logs, as to what the prospective pay might be. Logs differ; they're not all of the same type of log. I don't know that there would be any problem in this.

Q. You might submit that after the hearing with any appropriate notations.

A. Yeah.

Q. We would appreciate it.

A. Fine. It would take --

Q. This is primarily for the Federal Energy Regulatory Commission and so I don't believe we need to have direct testimony on it in this case.

A. I see, yes.

Q. And we also would like to have the additional information you were talking about relative to your BGI calculations.

A. All right.

Q. Then you talked about the workover, or the extensive workover on the Morrow sands in Well No. 3, what types of workovers are you talking about there? Could you --

A. Reperforating and acidizing, primarily. Reperforating essentially the same zone, adding a few perforations here and there, that type of thing.

Q. So you did perforate some additional sands? Do you see any other sands in the Morrow formation in that well that might be productive?

A. Normally it's Belco's procedure to perforate anything that looks productive.

Q. Okay, I presume your answer then is basically no.

A. The perforations that were added were simply extensions of the existing sands, either above or below, a few feet here and there.

MR. STAMETS: Are there any other questions of the witness? He may be excused.

Anything further in this case?

The case will be taken under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
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Santa Fe, New Mexico 87501

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8010 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached 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, from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
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. 6646 heard by me on 9-5 1979.

Richard L. Stamets, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
Oil Conservation Division
State Land Office Building
Santa Fe, New Mexico
5 September 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of Belco Petroleum Corporation for approval of infill drilling and simultaneous dedication, Eddy County, New Mexico. CASE 6646

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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Legal Counsel for the Division
State Land Office Bldg.
Santa Fe, New Mexico 87503

For the Applicant: W. Thomas Kellahin, Esq.
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(Witness sworn.)

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Belco made an especially detailed attempt to complete a Morrow Well in the Hudson Federal No. 1 Well located in Section 1, which is shown by the orange.

Shell Oil Company also made attempts at completing in the Morrow in the James Ranch No. Unit Well. Both attempts were failures in terms of Morrow recoverability in practical terms.

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In March of 1976 extensive workovers were attempted on the James Ranch No. 3, attempting to recover some of the production, particularly of the Morrow. These attempts were unsuccessful.

It shows -- this decline curve also shows that the James Ranch 3 again resumed Morrow production in February of 1979. The reason for this, of course, was the enactment of the Natural Gas Policy Act of 1978 and since

it was apparent from our knowledge of the James Ranch 3 Morrow production that this well would qualify for stripper gas production and a latter exhibit will show that Belco has indeed filed James Ranch No. 3 as a category 108 stripper gas production, which means, of course, less than 60 Mcf a day for the James Ranch No. 3.

Q. Your plat shows for the James Ranch No. 3 a 20 percent rate of decline. Upon what is that based?

A. The 20 percent decline is based upon the somewhat limited decline as shown between February and June of 1979; however, it compares reasonably favorably with the overall decline, as shown by the James Ranch No. 4. It's within reason and a figure that we think is within keeping.

Q. Would you identify Exhibit Number Four?

A. Exhibit Number Four is a tabulation of the Morrow gas production from the wells that are being compared, which are in adjacent half sections: James Ranch No. 3 in the east half of 1; James Ranch No. 4 in the west half of Section 6; a straightforward simple month-by-month tabulation of the production from these wells.

Q. Refer to Exhibit Number Five.

A. Exhibit Number Five is -- assuming the 20 percent annual decline rate projected into the future of the James Ranch No. 3, and projecting it through a low of 10 Mcf a day, which admittedly is a rather low figure, and

assuming that at that time the well would be capable of overcoming the line pressure, this is a means by which I have attempted to calculate the amount of gas that will be recovered from James Ranch No. 3 in addition to that gas that was recovered, as shown by Exhibit Number Three, in the years of 1972 and '73.

Q Would you turn to Exhibit Number Six and describe that?

A Exhibit Number Six is a means by which I have, with the aid of the Belco reservoir engineers, come to some conclusions regarding the amount of gas that could ultimately be recovered from the east half of Section 1, with the understanding that Section -- the east half of Section 1 does require an additional well on that proration unit to the James Ranch No. 3.

First of all, there's a calculation using a standard procedure, the figures for which the parameters are shown by item A, capital A. The calculation of the Morrow gas in place for the east half of Section 1, using again standard parameters for porosity, the water saturation, the thickness of the available porosity, a reservoir conversion factor, which is a figure which relates to the gas that is in place in the reservoir in terms of standard cubic feet, a figure that I can provide backup calculations for should they be necessary. They are a reservoir calculation

based upon the parameters of the gas at reservoir condition, and if the Examiner desires, I can -- I don't have them with me, but I can provide the calculation for arriving at what is described as a BCIA standard figure for calculating gas in place, the reservoir conversion factor.

A simple multiplication from that point forward, indicating that although these figures are carried out to seven places, practically speaking, we're dealing in terms of something in the order of 1-1/2 billion cubic feet.

Item B in the calculation sheet shows an ultimate recovery of the Morrow gas from the James Ranch No. 3, the existing well. Adding together the cumulative to June 1st of '79, taken from the decline curve or the statistical tabulation of the production, adding to that the future anticipated production derived from the decline function, getting an ultimate recovery of only 307 -- call it 308,000 Mcf, less than -- well, call it .4 Bcf from the James Ranch No. 3.

And Item C in the calculation is, of course the subtraction of the gas that has been recovered and is anticipated to be recovered from future operations of the James Ranch No. 3 from the east half of Section -- east half of Section 1, the subtraction of the calculated, the theoretical calculation of the gas, recoverable gas in place, yielding a total of approximately 1.2 Bcf in gas remaining

that without a second well will undoubtedly lead to waste.

Item D is an attempt to show that the drainage of the James Ranch 3 is simply a mathematical or ratio relationship between the amount of gas that James Ranch No. 3 will recover from that portion of the 320-acre proration unit, dividing 307 plus 1000 Mcf divided by 1.5 Bcf, yielding about 21 percent of the total area, or 67 acres only of 320.

I think illustrating that this is considerable acreage that remains undrained and could lead to waste of that gas without another well on the east half of Section 1.

Q. I believe you've testified that there's nothing else that Belco can do to the James Ranch No. 3 Well.

A. Yes.

Q. To improve its production.

A. No, the well is in -- has always been in a severe mechanical condition. The well underwent rather extensive workover conditions and I think I can state that workover in Morrow gas, particularly in Eddy County, is not often successful. We've had this experience, unfortunately, a number of times. It's not surprising to see that we were never able to recover this, plus the James Ranch No. 3 is in a poorer permeability position than the anticipated, the

proposed James Ranch No. 10.

Q. Would you turn to Exhibit Number Seven and identify that?

A. Exhibit Number Seven is a verification that Belco has indeed filed the James Ranch No. 3 with the U. S. Geological Survey under the NGPA as a category 108, which of course, is a stripper gas well classification, meaning less than 60 Mcf a day anticipated for the remainder of the life of the well.

Q. Were Exhibits One through Seven prepared by you or compiled under your direction and supervision?

A. That is correct.

Q. And in your opinion, Mr. Nering, will approval of this application be in the best interests of conservation, the prevention of waste, and protection of correlative rights?

A. Absolutely.

Q. In your opinion is the proposed infill well necessary in order to effectively and efficiently drain that portion of the Morrow reservoir underlying this proration unit that is not now or in the future be effectively and efficiently drained by the existing well?

A. That is correct.

MR. KELLAHIN: We move the introduction of Exhibits One through Seven.

MR. STAMETS: These exhibits will be admitted.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Nering, what type of a Morrow sand deposit are we dealing with in this area?

A. Well, I've examined the -- I've made several cross sections. Cross sections I had intended, I think, to prepare a cross section as an exhibit, but none of them really yield anything in terms of the effectiveness to show that by an east to west approach, they don't really illustrate that the sands, even though correlative, do not exhibit the loss of permeability, which undoubtedly has to be the factor. The sands do correlate.

There is one sand, a rather significant looking sand, in the James Ranch No. 4 Well, the significant well, which undoubtedly is the source of the major amount of gas that is -- that has been, will be recovered in James Ranch No. 4. That sand does not appear in any of the other wells and I venture --

Q. To make my question more clear, are we looking at the deltaic deposit, channel sands, beach sands, bar sands, or a combination thereof?

A. I would guess -- I would say you're dealing

with some type of channel, that with the better sands being located somewhat near the center of the area of control wells, I would venture to say it is in the form of a channel and it is trending north, as I indicated from earlier testimony.

Q. Do you have any logs or sections, log sections that you could send us that would show where you derive these figures of -- on your Exhibit Number Two, as to the formation top, structure, the net effective sand?

For example, you've shown 14 feet at the No. 3 Well, 27 feet --

A. Uh-huh.

Q. I'd like to see some logs or a cross section that would show where those came from.

A. I do have a cross section with me. It isn't labeled in those terms. It is a cross section. To gain those figures I'd have to prepare -- the calculations come from the detail logs and are an examination of the type of logs that were prepared. There are some guesses being made as in the examples of the -- some of the older logs, as to what the prospective pay might be. Logs differ; they're not all of the same type of log. I don't know that there would be any problem in this.

Q. You might submit that after the hearing with any appropriate notations.

A. Yeah.

Q. We would appreciate it.

A. Fine. It would take --

Q. This is primarily for the Federal Energy Regulatory Commission and so I don't believe we need to have direct testimony on it in this case.

A. I see, yes.

Q. And we also would like to have the additional information you were talking about relative to your BGI calculations.

A. All right.

Q. Then you talked about the workover, or the extensive workover on the Morrow sands in Well No. 3, what types of workovers are you talking about there? Could you --

A. Reperforating and acidizing, primarily. Reperforating essentially the same zone, adding a few perforations here and there, that type of thing.

Q. So you did perforate some additional sands? Do you see any other sands in the Morrow formation in that well that might be productive?

A. Normally it's Belco's procedure to perforate anything that looks productive.

Q. Okay, I presume your answer then is basically no.

A. The perforations that were added were simply extensions of the existing sands, either above or below, a few feet here and there.

MR. STAMETS: Are there any other questions of the witness? He may be excused.

Anything further in this case?

The case will be taken under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached 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, from my notes taken at the time of the hearing.

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. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3020 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

MORROW GAS PRODUCTION
(MCF)

Year	Month	JR-3	JR-4
1972	Aug.	29,589	
	Sept.	85,646	
	Oct.	68,176	
	Nov.	33,269	
	Dec.	0	
1973	Jan.	15,118	
	Feb.	1,429	
	Mar.	2,558	
	April		
	May		
	June		
	July		
	Aug.		
	Sept.		127,590
	Oct.		174,758
	Nov.		135,256
	Dec.		140,854
1974	Jan.		120,449
	Feb.		97,889
	Mar.		94,836
	April		82,611
	May		128,790
	June		119,263
	July		143,392
	Aug.		173,793
	Sept.		154,177
	Oct.		157,377
	Nov.		109,611
	Dec.		152,369
1975	Jan.		164,685
	Feb.		132,788
	Mar.		137,368
	April		105,967
	May		92,289
	June		106,212
	July		101,724
	Aug.		100,519
	Sept.		95,770
	Oct.		84,962
	Nov.		79,347
	Dec.		77,357

Year	Month	JR-3	JR-4
1976	Jan.		72,684
	Feb.		69,508
	Mar.		73,070
	April		4,505
	May		5,818
	June		10,335
	July		10,371
	Aug.		9,356
	Sept.		12,328
	Oct.		12,106
	Nov.		12,578
	Dec.		14,770
1977	Jan.		15,102
	Feb.		12,196
	Mar.		15,540
	April		15,528
	May		15,462
	June		15,204
	July		19,935
	Aug.		33,788
	Sept.		50,401
	Oct.		74,220
	Nov.		76,824
	Dec.		77,096
1978	Jan.		73,018
	Feb.		64,787
	Mar.		72,778
	April		68,591
	May		67,086
	June		58,085
	July		66,772
	Aug.		42,897
	Sept.		46,337
	Oct.		65,247
	Nov.		32,342
	Dec.		53,532
1979	Jan.	0	51,652
	Feb.	2,612	45,626
	Mar.	1,642	64,353
	April	1,469	55,393
	May	1,472	59,250
	June	1,456	56,052

JR-3 DECLINE AT CONSTANT RATE OF 20%/ANNUM
TO 10 MCF/DAY
ASSUMING SUFFICIENT WELL PRESSURE TO OVERCOME LINE PRESSURE

Year		Production
2nd half, 1979	est.	8,700 MCF
1980	"	13,881 MCF
1981	"	11,104 MCF
1982	"	8,883 MCF
1983	"	7,106 MCF
1984	"	5,684 MCF
1985	"	4,547 MCF
1986	"	3,673 MCF
	"	63,542 MCF

A. **Calculation of Morrow gas in place**
E/2 Section 1, T23S, R30E

ϕ = ±6% (Logs)
S_w = 35% (Logs)
h = 14' (JR-3 Log + Avg. of Isopach)
Bgi = 256 Reservoir Conversion Factor
A = 320 Acres
.06 x $1-S_w$(.65) x 14 x 256 x 43560 x 320 =
1,998,323 MCF x 75% (Estimated Recovery Factor) =
1,498,742 MCF Minimum Recoverable

B. Ultimate Recovery of Morrow Gas from JR-3

Cum.to 6-1-79	244,436
Future Production, derived from 20%/annum decline	63,542
JR-3 Ultimate Recovery	307,978

C. **Remaining Recoverable Gas** A. 1,498,742 MCF
E/2 Sec. 1 (Proposed JR-10) B. 307,978
1,190,764 MCF

D. Drainage of JR-3 (Existing well on 320 Ac. proration Unit)

$$\frac{\text{Est. Ultimate Recovery}}{\text{Theoretical Recovery}}$$

$$\frac{307,978}{1,498,742} \times 320 = \text{or}$$

21%
67 Acres

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 6
CASE NO. 6646
Submitted by Belco
Hearing Date 9-5-79

FERC-121

1.0 API well number: (If not available, leave blank. 14 digits.)	30-015-20232
2.0 Type of determination being sought: (Use the codes found on the front of this form.)	108 (Section of NGPA) ____ (Category Code)
3.0 Depth of the deepest completion location: (Only needed if sections 103 or 107 in 2.0 above.)	____ feet
4.0 Name, address and code number of applicant: (35 letters per line maximum. If code number not available, leave blank.)	Belco Petroleum Corporation (Name) 001490 (Seller Code) 10,000 Old Katy Road - Suite 100 (Street) Houston (City) Texas (State) 77055 (Zip Code)
5.0 Location of this well: (Complete (a) or (b).) (a) For onshore wells (35 letters maximum for field name.)	Los Medanos Morrow (Field Name) Eddy (County) New Mexico (State)
(b) For OCS wells:	____ (Area Name) ____ (Block Number) Date of Lease: ____ (Mo. Day Yr.) ____ (OCS Lease Number)
(c) Name and identification number of this well: (35 letters and digits maximum.)	James Ranch #3 20232
(d) If code 4 or 5 in 2.0 above, name of the reservoir: (35 letters maximum.)	
6.0 (a) Name and code number of the purchaser: (35 letters and digits maximum. If code number not available, leave blank.)	Natural Gas Pipeline Company (Name) 013302 (Buyer Code)
(b) Date of the contract:	06 02 72 (Mo. Day Yr.)
(c) Estimated annual production:	1.85 MMcf.

RECEIVED
U.S. Geological Survey
Conservation Division
AUG 06 1979
Albuquerque, New Mexico

DOCKET NO. 04502-79

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 7
CASE NO. 6646
Submitted by Belco
Hearing Date 9-5-79

	(a) Base Price ($/MMBTU)	(b) Tax	(c) All Other Prices [Indicate (+) or (-).]	(d) Total of (a), (b) and (c)
7.0 Contract price: (As of filing date. Complete to 3 decimal places.)	.360	._____	._____	.360
8.0 Maximum lawful rate: (As of filing date. Complete to 3 decimal places.)	2.375	.001	._____	2.376

9.0 Person responsible for this application:

Agency Use Only
Date Received by Juris. Agency
Date Received by FERC

James Patrick Miller (Name) Attorney (Title)

(Signature)

July 31, 1979 (Date Application is Completed) (713) 9 2-4700 (Phone Number)

FT7900806/2-2

Addition To:

CASE NO. 6646 BELCO EXHIBIT NO. 6 9-5-79

Derivation of
Reservoir Conversion Factor "(Bgi)"
of 256 scf/cf used in
A. Calculation of Morrow gas
in place E/2, Sec. 1, T23S, R30E

Gg (Gas Gravity) = 0.58 (Measured)
T (Temperature) = 227° F or 687° R (Measured)
Pcr, Critical Pressure = 672 (Calif. Natural Gasoline Assoc. Bulletin No. TS-461)
Tcr, Critical Temperature = 350
Ppr, Pseudo Reduced Pressure = $\frac{5185.2}{672}$ (measured pressure) = 7.72 (calculation)

Tpr, Pseudo Reduced Temperature = $\frac{687}{350}$ = 1.96 (Calculation)

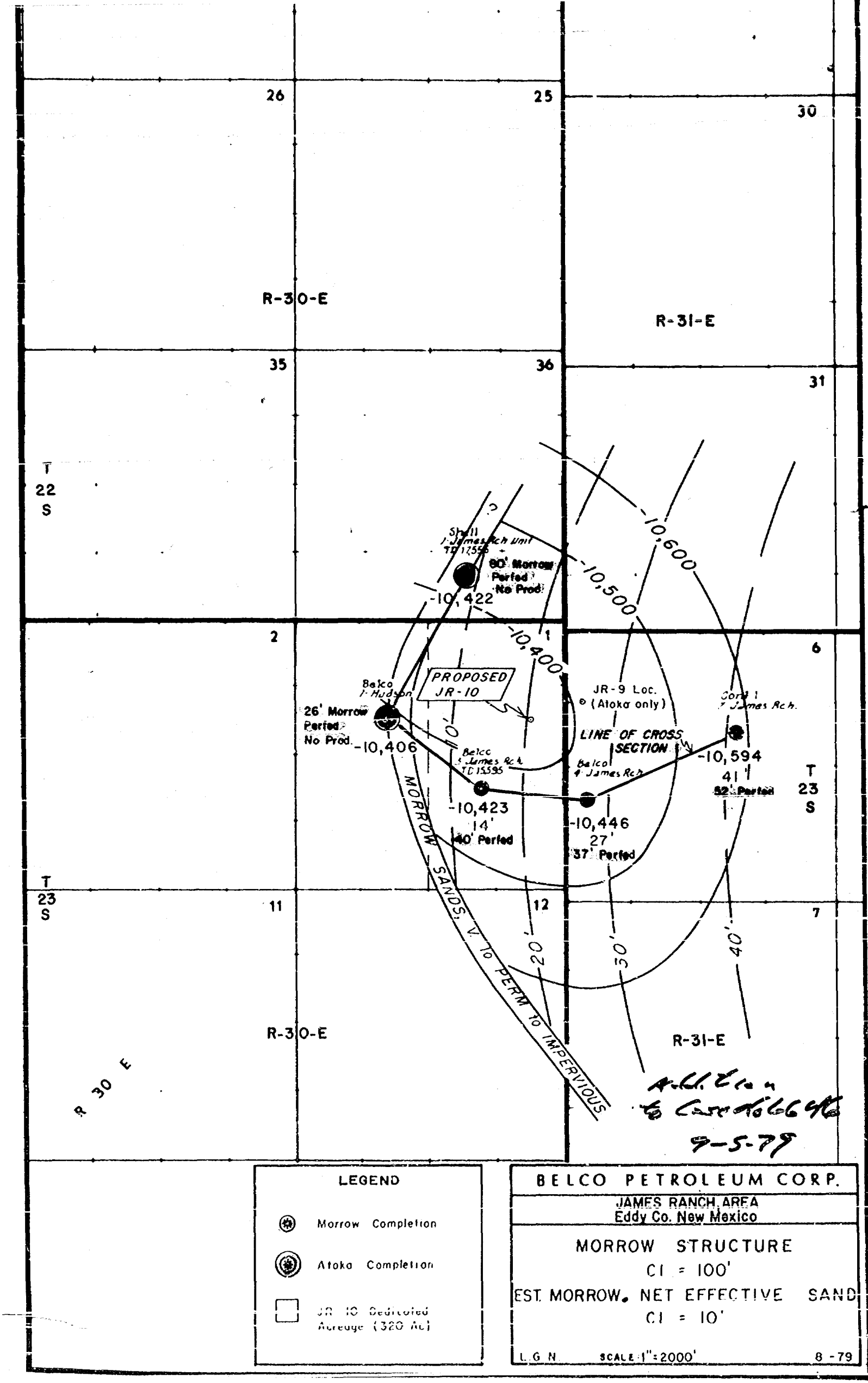
Z, Compressibility Factor = 1.04 (Standing and Katz Chart, Trans, AIME, 1942)

"(Bgi)" gas initial Reservoir volume factor =
Equation (1.7) from Applied Petroleum Reservoir Engineering Craft and Hawkins = Prentice Hall 1959 p. 24

$\frac{35.35^{*}\ P}{Z\ T}$ standard cubic feet per cubic foot

$\frac{(35.35)\ (5185.2)}{(1.04)\ \ (687)}$ = 256 scf/cf

*35.35 = scf/cf at Standard Conditions of 14.7 psi and 60° F (520°R) and Z = 1.0



A.C.L. Exh
to Case 6666
9-5-79

LEGEND

- Morrow Completion
- Atoka Completion
- JR 10 Dedicated Acreage (320 Ac)

BELCO PETROLEUM CORP.

JAMES RANCH AREA
Eddy Co. New Mexico

MORROW STRUCTURE
CI = 100'
EST. MORROW, NET EFFECTIVE SAND
CI = 10'

L. G. N. SCALE 1" = 2000' 8-79

MORROW GAS PRODUCTION
(MCF)

Year	Month	JR-3	JR-4
1972	Aug.	29,589	
	Sept.	85,646	
	Oct.	68,176	
	Nov.	33,269	
	Dec.	0	
1973	Jan.	15,118	
	Feb.	1,429	
	Mar.	2,558	
	April		
	May		
	June		
	July		
	Aug.		
	Sept.		127,590
	Oct.		174,758
	Nov.		135,256
	Dec.		140,854
1974	Jan.		120,449
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	Mar.		94,836
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	Dec.		152,369
1975	Jan.		164,685
	Feb.		132,788
	Mar.		137,368
	April		105,967
	May		92,289
	June		106,212
	July		101,724
	Aug.		100,519
	Sept.		95,770
	Oct.		84,962
	Nov.		79,347
	Dec.		77,357

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

EXHIBIT NO. 4
CASE NO. 6646
Submitted by BCCo
Hearing Date 9-5-79

Year	Month	JR-3	JR-4
1976	Jan.		72,684
	Feb.		69,508
	Mar.		73,070
	April		4,505
	May		5,818
	June		10,335
	July		10,371
	Aug.		9,356
	Sept.		12,328
	Oct.		12,106
	Nov.		12,578
	Dec.		14,770
1977	Jan.		15,102
	Feb.		12,196
	Mar.		15,540
	April		15,528
	May		15,462
	June		15,204
	July		19,935
	Aug.		33,788
	Sept.		50,401
	Oct.		74,220
	Nov.		76,824
	Dec.		77,096
1978	Jan.		73,018
	Feb.		64,787
	Mar.		72,778
	April		68,591
	May		67,086
	June		58,085
	July		66,772
	Aug.		42,897
	Sept.		46,337
	Oct.		65,247
	Nov.		32,342
	Dec.		53,532
1979	Jan.	0	51,652
	Feb.	2,612	45,626
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	April	1,469	55,393
	May	1,472	59,250
	June	1,456	56,052

JR-3 DECLINE AT CONSTANT RATE OF 20%/ANNUM
TO 10 MCF/DAY
ASSUMING SUFFICIENT WELL PRESSURE TO OVERCOME LINE PRESSURE

Year		Production	
2nd half,	1979	est.	8,700 MCF
	1980	"	13,881 MCF
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	1982	"	8,883 MCF
	1983	"	7,106 MCF
	1984	"	5,684 MCF
	1985	"	4,547 MCF
	1986	"	3,673 MCF
		"	63,542 MCF

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 5
CASE NO. 6646
Submitted by RCKO
Hearing Date 9-5-79

A. **Calculation of Morrow gas in place**
E/2 Section 1, T23S, R30E

ϕ = ±6% (Logs)
S_w = 35% (Logs)
h = 14' (JR-3 Log + Avg. of Isopach)
Bgi = 256 Reservoir Conversion Factor
A = 320 Acres
.06 x $1-S_w$(.65) x 14 x 256 x 43560 x 320 =
1,998,323 MCF x 75% (Estimated Recovery Factor) =
1,498,742 MCF Minimum Recoverable

B. Ultimate Recovery of Morrow Gas from JR-3

Cum. to 6-1-79	244,436
Future Production, derived from 20%/annum decline	63,542
JR-3 Ultimate Recovery	307,978

C. **Remaining Recoverable Gas**
E/2 Sec. 1 (Proposed JR-10)

A.	1,498,742 MCF
B.	307,978
	1,190,764 MCF

D. Drainage of JR-3 (Existing well on 320 Ac. proration Unit)

$$\frac{\text{Est. Ultimate Recovery}}{\text{Theoretical Recovery}}$$

$$\frac{307,978}{1,498,742} \times 320 = 21\% \text{ or } (67) \text{ Acres}$$

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 6
CASE NO. 6646
Submitted by Belco
Hearing Date 9-5-79

FERC-121

1.0 API well number: (If not available, leave blank. 14 digits.)	30-015-20232				
2.0 Type of determination being sought: (Use the codes found on the front of this form.)	108 Section of NGPA	Category Code			
3.0 Depth of the deepest completion location: (Only needed if sections 103 or 107 in 2.0 above.)	feet				
4.0 Name, address and code number of applicant: (35 letters per line maximum. If code number not available, leave blank.)	Belco Petroleum Corporation (Name) 001490 Seller Code 10,000 Old Katy Road - Suite 100 (Street) Houston (City) Texas (State) 77055 (Zip Code)				
5.0 Location of this well: (Complete (a) or (b).) (a) For onshore wells (35 letters maximum for field name.)	Los Medanos Morrow (Field Name) Eddy (County) New Mexico (State)				
(b) For OCS wells:	Area Name Block Number Date of Lease: Mo. Day Yr. OCS Lease Number				
(c) Name and identification number of this well: (35 letters and digits maximum.)	James Ranch #3 20232				
(d) If code 4 or 5 in 2.0 above, name of the reservoir: (35 letters maximum.)					
6.0 (a) Name and code number of the purchaser: (35 letters and digits maximum. If code number not available, leave blank.)	Natural Gas Pipeline Company (Name) 013302 Buyer Code				
(b) Date of the contract:	0 6 0 2 7 2 (Mo. Day Yr.)				
(c) Estimated annual production:	1.85 MMcf.				
		(a) Base Price ($/MMBTU)	(b) Tax	(c) All Other Prices (Indicate. (+) or (-).)	(d) Total of (a), (b) and (c)
7.0 Contract price: (As of filing date. Complete to 3 decimal places.)		.360	.0000	.0000	.360
8.0 Maximum lawful rate: (As of filing date. Complete to 3 decimal places.)		2.375	.001	.0000	2.376
9.0 Person responsible for this application:	James Patrick Miller (Name) Attorney (Title) (Signature) July 31, 1979 (Date Application is Completed) (713) 9 2-4700 (Phone Number)				
Agency Use Only Date Received by Juris. Agency Date Received by FERC					

RECEIVED
U.S. Geological Survey
Conservation Division
AUG 06 1979
Albuquerque, New Mexico

DOCKET NO. 04502-79

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 7
CASE NO. 6646
Submitted by Belco
Hearing Date 9-5-79

FT7900806/2-2

Exhibit No. 6

CASE NO. 6646 BELCO EXHIBIT NO. 6 9-5-79.

Derivation of
Reservoir Conversion Factor "(Bgi)"
of 256 scf/cf used in
A. Calculation of Morrow gas
in place E/2, Sec. 1, T23S, R30E

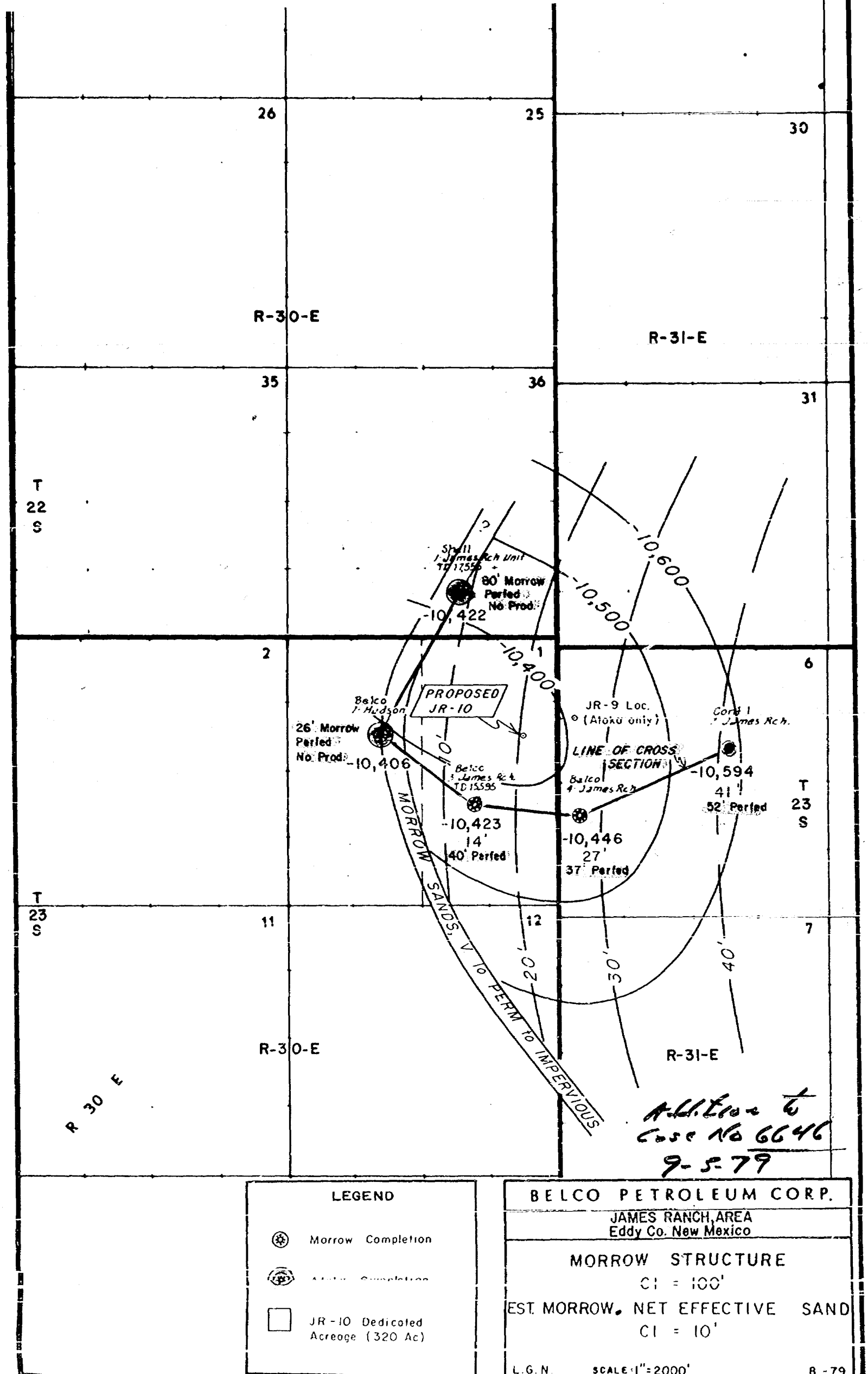
Gg (Gas Gravity) = 0.58 (Measured)
T (Temperature) = 227° F or 687° R (Measured)
Pcr, Critical Pressure = 672 (Calif. Natural Gasoline Assoc. Bulletin No. TS-461)
Tcr, Critical Temperature = 350
Ppr, Pseudo Reduced Pressure = $\frac{5185.2}{672}$ (measured pressure) = 7.72 (calculation)

Tpr, Pseudo Reduced Temperature = $\frac{687}{350}$ = 1.96 (Calculation)

Z, Compressibility Factor = 1.04 (Standing and Katz Chart, Trans, AIME, 1942)

"(Bgi)" gas initial Reservoir volume factor =
Equation (1.7) from $\frac{35.35^{*}\ P}{Z\ T}$ standard cubic feet per cubic foot
Applied Petroleum Reservoir Engineering
Craft and Hawkins = $\frac{(35.35)\ (5185.2)}{(1.04)\ \ (687)}$ = 256 scf/cf
Prentice Hall 1959
p. 24

*35.35 = scf/cf at Standard Conditions of 14.7 psi and 60° F (520°R) and Z = 1.0



Attached to
Case No 6646
9-5-79

LEGEND

- Morrow Completion
- Atoka Completion
- JR-10 Dedicated Acreage (320 Ac)

BELCO PETROLEUM CORP.

JAMES RANCH, AREA
Eddy Co. New Mexico

MORROW STRUCTURE
CI = 100'

EST. MORROW, NET EFFECTIVE SAND
CI = 10'

L.G.N. SCALE 1" = 2000' 8-79

MORROW GAS PRODUCTION
(MCF)

Year	Month	JR-3	JR-4
1972	Aug.	29,589	
	Sept.	85,646	
	Oct.	68,176	
	Nov.	33,269	
	Dec.	0	
1973	Jan.	15,118	
	Feb.	1,429	
	Mar.	2,558	
	April		
	May		
	June		
	July		
	Aug.		
	Sept.		127,590
	Oct.		174,758
	Nov.		135,256
	Dec.		140,854
1974	Jan.		120,449
	Feb.		97,889
	Mar.		94,836
	April		82,611
	May		128,790
	June		119,263
	July		143,392
	Aug.		173,793
	Sept.		154,177
	Oct.		157,377
	Nov.		109,611
	Dec.		152,369
1975	Jan.		164,685
	Feb.		132,788
	Mar.		137,368
	April		105,967
	May		92,289
	June		106,212
	July		101,724
	Aug.		100,519
	Sept.		95,770
	Oct.		84,962
	Nov.		79,347
	Dec.		77,357

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

EXHIBIT NO. 4
CASE NO. 6696
Submitted by Reco
Hearing Date 9-5-79

Year	Month	JR-3	JR-4
1976	Jan.		72,684
	Feb.		69,508
	Mar.		73,070
	April		4,505
	May		5,818
	June		10,335
	July		10,371
	Aug.		9,356
	Sept.		12,328
	Oct.		12,106
	Nov.		12,578
	Dec.		14,770
1977	Jan.		15,102
	Feb.		12,196
	Mar.		15,540
	April		15,528
	May		15,462
	June		15,204
	July		19,935
	Aug.		33,788
	Sept.		50,401
	Oct.		74,220
	Nov.		76,824
	Dec.		77,096
1978	Jan.		73,018
	Feb.		64,787
	Mar.		72,778
	April		68,591
	May		67,086
	June		58,085
	July		66,772
	Aug.		42,897
	Sept.		46,337
	Oct.		65,247
	Nov.		32,342
	Dec.		53,532
1979	Jan.	0	51,652
	Feb.	2,612	45,626
	Mar.	1,642	64,353
	April	1,469	55,393
	May	1,472	59,250
	June	1,456	56,052

JR-3 DECLINE AT CONSTANT RATE OF 20%/ANNUM
TO 10 MCF/DAY
ASSUMING SUFFICIENT WELL PRESSURE TO OVERCOME LINE PRESSURE

Year		Production
2nd half, 1979	est.	8,700 MCF
1980	"	13,881 MCF
1981	"	11,104 MCF
1982	"	8,883 MCF
1983	"	7,106 MCF
1984	"	5,684 MCF
1985	"	4,547 MCF
1986	"	3,673 MCF
	"	63,542 MCF

A. **Calculation of Morrow gas in place**
E/2 Section 1, T23S, R30E

ϕ = ±6% (Logs)
S_w = 35% (Logs)
h = 14' (JR-3 Log + Avg. of Isopach)
Bgi = 256 Reservoir Conversion Factor
A = 320 Acres
.06 x $1-S_w$(.65) x 14 x 256 x 43560 x 320 =
1,998,323 MCF x 75% (Estimated Recovery Factor) =
1,498,742 MCF Minimum Recoverable

B. Ultimate Recovery of Morrow Gas from JR-3

Cum.to 6-1-79	244,436
Future Production, derived from 20%/annum decline	63,542
JR-3 Ultimate Recovery	307,978

C. **Remaining Recoverable Gas** A. 1,498,742 MCF
E/2 Sec. 1 (Proposed JR-10) B. 307,978
1,190,764 MCF

D. Drainage of JR-3 (Existing well on 320 Ac. proration Unit)

$$\frac{\text{Est. Ultimate Recovery}}{\text{Theoretical Recovery}}$$

$$\frac{307,978}{1,498,742} \times 320 = 21\% \text{ or } 67 \text{ Acres}$$

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 6
CASE NO. 6646
Submitted by Belco
Hearing Date 9-5-79

FERC-121

1.0 API well number: (If not available, leave blank. 14 digits.)	30-015-20232
2.0 Type of determination being sought: (Use the codes found on the front of this form.)	108 (Section of NGPA) ____ (Category Code)
3.0 Depth of the deepest completion location: (Only needed if sections 103 or 107 in 2.0 above.)	____ feet
4.0 Name, address and code number of applicant: (35 letters per line maximum. If code number not available, leave blank.)	Belco Petroleum Corporation (Name) 001490 (Seller Code) 10,000 Old Katy Road - Suite 100 (Street) Houston (City) Texas (State) 77055 (Zip Code)
5.0 Location of this well: (Complete (a) or (b).) (a) For onshore wells (35 letters maximum for field name.)	Los Medanos Morrow (Field Name) Eddy (County) New Mexico (State)
(b) For OCS wells:	____ (Area Name) ____ (Block Number) Date of Lease: ____ (Mo. Day Yr.) ____ (OCS Lease Number)
(c) Name and identification number of this well: (35 letters and digits maximum.)	James Ranch #3 20232
(d) If code 4 or 5 in 2.0 above, name of the reservoir: (35 letters maximum.)	
6.0 (a) Name and code number of the purchaser: (35 letters and digits maximum. If code number not available, leave blank.)	Natural Gas Pipeline Company (Name) 013302 (Buyer Code)
(b) Date of the contract:	06 02 72 (Mo. Day Yr.)
(c) Estimated annual production:	1.85 MMcf.

	(a) Base Price ($/MMBTU)	(b) Tax	(c) All Other Prices (Indicate (+) or (-).)	(d) Total of (a), (b) and (c)
7.0 Contract price: (As of filing date. Complete to 3 decimal places.)	.360	.____	.____	.360
8.0 Maximum lawful rate: (As of filing date. Complete to 3 decimal places.)	2.375	.001	.____	2.376

9.0 Person responsible for this application:

James Patrick Miller (Name) Attorney (Title)

(Signature)

July 31, 1979 (Date Application is Completed) (713) 9 2-4700 (Phone Number)

Agency Use Only
Date Received by Juris. Agency
Date Received by FERC

RECEIVED
U.S. Geological Survey
Conservation Division
AUG 06 1979
Albuquerque, New Mexico

DOCKET NO. 04502-79

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 7
CASE NO. 6646
Submitted by Belco
Hearing Date 9-5-79

FT7900806/2-2

Add. Data To:

CASE NO. 6646 BELCO EXHIBIT NO. 6 9-5-79.

Derivation of
Reservoir Conversion Factor "(Bgi)"
of 256 scf/cf used in
A. Calculation of Morrow gas
in place E/2, Sec. 1, T23S, R30E

Gg (Gas Gravity) = 0.58 (Measured)
T (Temperature) = 227° F or 687° R (Measured)
Pcr, Critical Pressure = 672 (Calif. Natural Gasoline Assoc. Bulletin No. TS-461)
Tcr, Critical Temperature = 350
Ppr, Pseudo Reduced Pressure = $\frac{5185.2}{672}$ (measured pressure) = 7.72 (calculation)

Tpr, Pseudo Reduced Temperature = $\frac{687}{350}$ = 1.96 (Calculation)

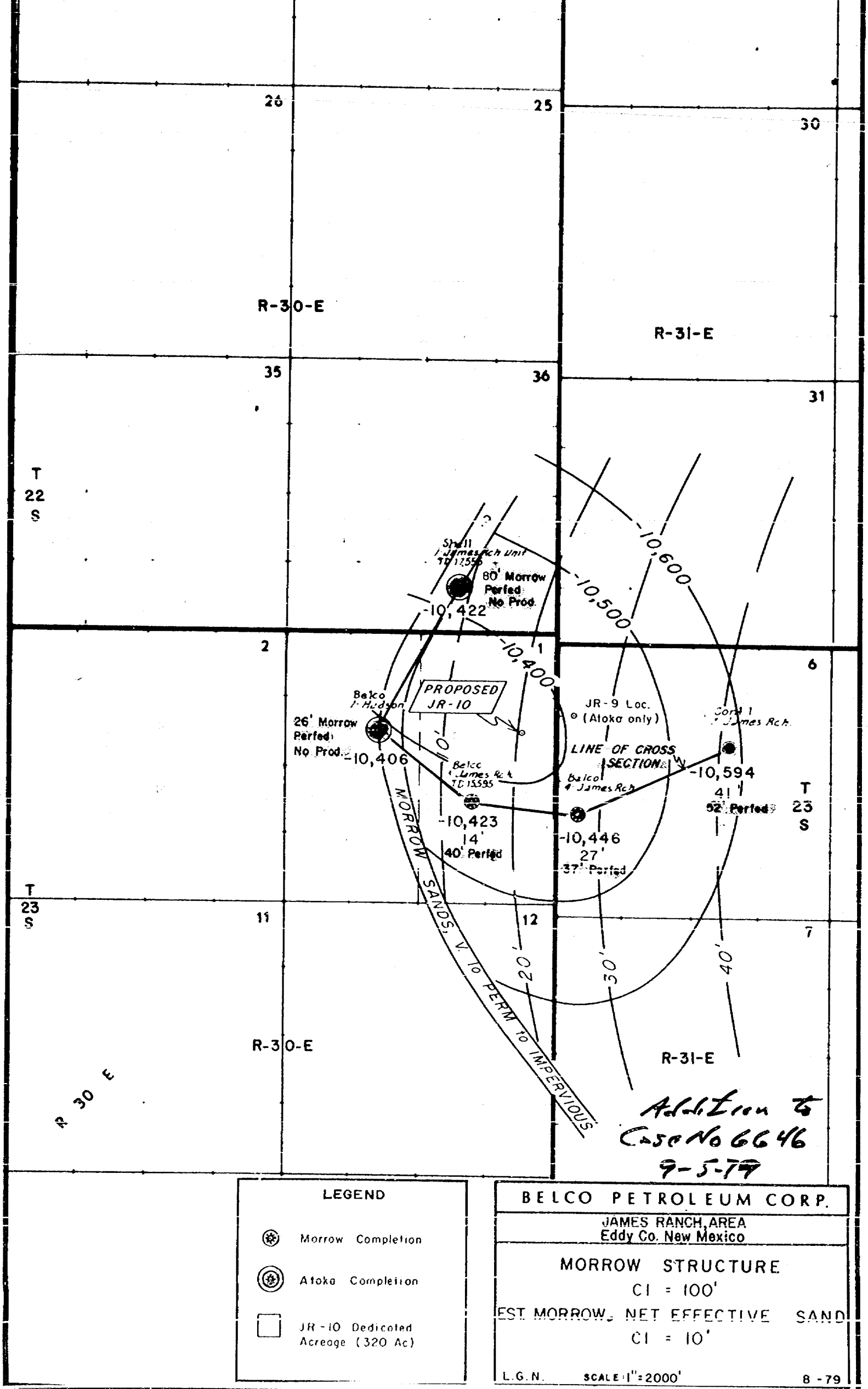
Z, Compressibility Factor = 1.04 (Standing and Katz Chart, Trans, AIME, 1942)

"(Bgi)" gas initial Reservoir volume factor =
Equation (1.7) from Applied Petroleum Reservoir Engineering Craft and Hawkins = Prentice Hall 1959 p. 24

$\frac{35.35^{*}\ P}{Z\ T}$ standard cubic feet per cubic foot

$\frac{(35.35)\ (5185.2)}{(1.04)\ \ (687)}$ = 256 scf/cf

*35.35 = scf/cf at Standard Conditions of 14.7 psi and 60° F (520°R) and Z = 1.0



LEGEND

- Morrow Completion
- Aloka Completion
- JR-10 Dedicated Acreage (320 Ac)

BELCO PETROLEUM CORP.

JAMES RANCH, AREA
Eddy Co. New Mexico

MORROW STRUCTURE
CI = 100'

EST. MORROW, NET EFFECTIVE SAND
CI = 10'

L.G.N. SCALE 1"=2000' 8-79

CASE 6645: Application of Depco Inc. for a unit agreement, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Apache Springs Unit Area, comprising 31,199 acres, more or less, of State, federal, and fee lands in Townships 10, 11, and 12 South, Ranges 30 and 31 East.

CASE 6646: Application of Belco Petroleum Corporation for approval of infill drilling and simultaneous dedication, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of its James Ranch Unit Well No. 10 to be located in Unit H of Section 1, Township 23 South, Range 30 East, Morrow formation, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6638: (Continued from August 22, 1979, Examiner Hearing)

Application of Ladd Petroleum Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Largo-Gallup and Basin-Dakota production in the wellbore of its Lindrith Well No. 24 located in Unit F of Section 4, Township 26 North, Range 7 West.

CASE 6647: Application of O. H. Berry for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Seven Rivers well to be located 1650 feet from the North line and 330 feet from the East line of Section 15, Township 24 South, Range 36 East, Jalmat Gas Pool, the NE/4 of said Section 15 to be dedicated to the well.

CASE 6648: Application of Morris R. Antweil for pool creation and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Mississippian oil pool for its Landlady Well No. 1 located in Unit B of Section 8, Township 12 South, Range 32 East, and special rules therefor, including 160-acre oil well spacing and a 4,000 to 1 gas-oil ratio.

CASE 6649: Application of Morris R. Antweil for an unorthdox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Morrow test well to be located 660 feet from the South line and 1980 feet from the East line of Section 5, Township 12 South, Range 32 East, the E/2 of said Section 5 to be dedicated to the well.

CASE 6650: Application of Doyle Hartman for compulsory pooling, non-standard gas proration unit, and unorthodox well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Jalmat Gas Pool underlying the W/2 NE/4 of Section 36, Township 24 South, Range 36 East, to form an 80-acre non-standard gas proration unit to be dedicated to a well to be drilled at an unorthodox location 2310 feet from the North line and 1650 feet from the East line of said Section 36. 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. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6651: Application of Alpha Twenty-One Production Company for a non-standard proration unit, unorthodox well location, and approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of its El Paso Plant Well No. 1 at an unorthodox location 1650 feet from the South line and 660 feet from the West line of Section 32, Township 23 South, Range 37 East, Jalmat Gas Pool, is necessary to effectively and efficiently drain that portion of the non-standard proration unit, to comprise the N/2 SW/4 of said Section 32, which cannot be so drained by the existing well.

CASE 6652: Application of Shell Oil Company for statutory unitization, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order unitizing, for the purpose of a pressure maintenance project, all mineral interests in the North Hobbs Grayburg-San Andres Unit encompassing 10,650 acres, more or less, underlying all or portions of the following lands in Lea County, New Mexico: Sections 13, 14, 23, 24, 25, 26, and 36, Township 18 South, Range 37 East; Sections 17 thru 21 and 27 thru 34, Township 18 South, Range 38 East.

The unitized interval would be the Grayburg-San Andres Formation between the depths of 3,698 feet and 4,500 feet in Shell's State A Well No. 7, located in Unit H of Section 32, Township 18 South, Range 38 East.

Among the matters to be considered at the hearing will be the necessity of unit operations; the designation of a unit operator; the determination of the horizontal and vertical limits of the unit area; the determination of a fair, reasonable, and equitable allocation of production and costs of production, including capital investment, to each of the various tracts in the unit area; the determination of credits and charges to be made among the various owners in the unit area for their investment in wells and equipment; and such other matters as may be necessary and appropriate for carrying on efficient unit operations, including, but not necessarily limited to, unit voting procedures, selection, removal, or substitution of unit operator, and time of commencement and termination of unit operations. (This case will be continued to September 19, 1979.)

KELLAHIN and KELLAHIN
Attorneys at Law
500 Don Gaspar Avenue
Post Office Box 1769
Santa Fe, New Mexico 87501

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

Telephone 982-4285
Area Code 505

August 9, 1979

Mr. Joe Ramey
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Belco

Dear Joe:

Please set the enclosed application on behalf of Belco Petroleum Corporation for hearing on September 5, 1979.

Thank you.

Very truly yours,

W. Thomas Kellahin

enclosure

cc: Mr. Lee Nering

WTK:mf

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION
OF BELCO PETROLEUM CORPORATION
FOR WELL-HEAD PRICE CEILING
CATEGORY DETERMINATION AND
SIMULTANEOUS DEDICATION,
EDDY COUNTY, NEW MEXICO

Case 6646

APPLICATION

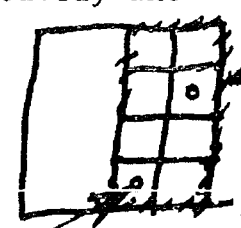
COMES NOW BELCO PETROLEUM CORPORATION and applies to the Oil Conservation Division of New Mexico for an order for well-head price ceiling category determination pursuant to Special Rules of the Division, and Part 271.305(b) Federal Energy Regulatory Commission's Regulations Implementing the Natural Gas Policy Act of 1978 and for simultaneous dedication and in support hereof would show the Division:

1. Applicant is the operator of the E/2 of Section 1, T23S, R30E, N.M.P.M., Eddy County, New Mexico.

2. Applicant operates the James Ranch Unit Well No. 3, located in Unit O of said Section 1, a Morrow producer, to which the E/2 of said Section is dedicated.

3. Applicant desires approval to drill the James Ranch Unit Well No. 10 at a location 1,980 feet from the North line and 660 feet from the East line of Section 1 to the Morrow formation to be simultaneously dedicated to the same proration unit as the James Ranch Unit Well No. 3.

4. Applicant seeks a determination pursuant to F.E.R.C.Rules, Part 271.305 that the subject well is necessary to effectively and efficiently drain a portion of the Morrow reservoir covered by the existing proration unit which cannot be effectively and



efficiently drained by any existing well within the proration unit and will offer evidence in support of that determination.

WHEREFORE, Applicant respectfully requests that this matter be set for hearing at the September 5, 1979 Examiner Hearing and that after notice and hearing as required by law, the Division enter its order making the wellhead price ceiling category determination as requested.

Respectfully submitted,

BELCO PETROLEUM CORPORATION

By _____
W. Thomas Kellahin
KELLAHIN & KELLAHIN
P. O. Box 1769
Santa Fe, New Mexico 87501
ATTORNEYS FOR APPLICANT

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. 6646
Order No. R-6130

APPLICATION OF BELCO PETROLEUM CORPORATION FOR APPROVAL OF INFILL DRILLING AND SIMULTANEOUS ~~DRILLING~~, ~~LEA~~ DEDICATION, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on ~~August 8,~~ Sept 5 1979, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 10th day of ~~September,~~ 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, Belco Petroleum Corporation, seeks a finding that the drilling of a well to be located in Unit H of Section 1, Township 23 South, Range 30 East, NMPM, Los Medanos-Morrow Gas Pool, Eddy County, New Mexico, is necessary to effectively and efficiently drain a portion of the reservoir covered by the proration unit which cannot be so drained by the existing well.

(3) That the applicant further seeks approval of a waiver of existing well-spacing requirements and simultaneous dedication

(4) That the standard spacing unit in the Los Medanos-Morrow Gas Pool is 320 acres.

(5) That Belco Petroleum Corporation is the operator of an 320-acre standard proration unit consisting of the E/2 of said Section 1, in the Los Medanos-Morrow Gas Pool.

(6) That said 320-acre proration unit is dedicated to ~~the~~ applicant's James Ranch Unit Well No. 3 located in Unit J of said Section 1.

(7) That the evidence presented demonstrated that said James Ranch Unit Well No. 3 cannot effectively and efficiently drain said 320-acre proration unit.

(8) That the evidence presented further demonstrated that the drilling and completion of applicant's said new well should result in ~~the~~ production ~~of an additional~~ in excess of 1 Billion additional cubic feet ~~more~~ of gas from said proration unit which would not otherwise be recovered from the proration unit.

(9) That such additional recovery will result in said unit being more efficiently and economically drained.

(10) That said new well is to be drilled as an "infill" well on the existing 320-acre standard proration unit.

(11) That in order to permit the drainage of a portion of the reservoir covered by said 320-acre standard proration unit which cannot be effectively and efficiently drained by the existing well thereon, the subject application for infill drilling, and simultaneous dedication should be approved as an exception to the standard well spacing requirements for said ~~Flying "M"-San Andres~~ Los Medanos-Morrow Gas Pool.

IT IS THEREFORE ORDERED:

(1) That the applicant, Belco Petroleum Corporation, is hereby authorized to drill a well to be located in Unit H of Section 1, Township 23 South, Range 30 East, NMPM, as an infill well on an existing 320-acre standard proration unit being the E/2 of said Section 1, Los Medanos-Morrow Gas Pool, Eddy County, New Mexico. The authorization for infill drilling granted by this order is an exception to applicable well spacing requirements and is necessary to permit the drainage of a portion of the reservoir covered by the existing 320-acre proration unit which cannot efficiently and economically be drained by any existing well thereon.

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

(3) That said proration unit shall be simultaneously dedicated to applicant's proposed new well and to its James Ranch Unit Well No 3. located in Unit J of said Section 1.

(3)