

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARINGSANTA FE, NEW MEXICOHearing Date OCTOBER 23, 1985 Time: 8:00 A.M.

NAME	REPRESENTING	LOCATION
CJ Boyce	Amoco	Denver
T.M. Olson	Amoco	Denver
GARY PARSON	"	DENVER
F. Kimball Joyner, Jr.	SUN	Dallas
Jim Bruce	Hinkle Law Firm	Santa Fe
William L. Lau	Campbell and Steele	Santa Fe
Mel Schroeder	Sun E&P	midland
Russ Sutter	Doyle Hartman	midland
WM. D. ANCOCK	Doyle Hartman	Midland
RH EVERETT	SUN EXPL. + PROD	MIDLAND
Bob Walker	Sun Exploration & Production	Midland
LOUIS MAZZULLO	CHAMA PETROLEUM CO	MIDLAND
TIM MACDONALD	CHAMA PETROLEUM CO.	DALLAS
DAN NUTTER	CONS ENGR	S.F.

1 STATE OF NEW MEXICO
2 ENERGY AND MINERALS DEPARTMENT
3 OIL CONSERVATION DIVISION
4 STATE LAND OFFICE BLDG.
5 SANTA FE, NEW MEXICO

6 23 October 1985

7 EXAMINER HEARING

8 IN THE MATTER OF:

9 Application of Amoco Production CASE
10 Company for pool reclassification, 8734
11 pool extension, and special pool
12 rules, San Juan County, New Mexico.

13 BEFORE: Michael S. Stogner, Examiner
14

15
16 TRANSCRIPT OF HEARING

17
18 A P P E A R A N C E S

19 For the Division: Jeff Taylor
20 Attorney at Law
21 Legal Counsel to the Division
22 Energy and Minerals Dept.
23 Santa Fe, New Mexico 87501

24 For the Applicant: Gary L. Paulson
25 Attorney at Law
Amoco Production Company
17th & Broadway
Denver, Colorado 80202

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

2

I N D E X

STATEMENT BY MR. PAULSON 3

TERRY LYN OLSON

Direct Examination by Mr. Paulson 5

Cross Examination by Mr. Stogner 14

CHARLES BOYCE

Direct Examination by Mr. Paulson 18

Cross Examination by Mr. Stogner 44

E X H I B I T S

Amoco Exhibit One, Structure map 8

Amoco Exhibit Two, Cross Section 11

Amoco Exhibit Three, Completion Report 20

Amoco Exhibit Four, Log 22

Amoco Exhibit Five, Plot 23

Amoco Exhibit Six, Graph 26

Amoco Exhibit Seven, Graph 28

Amoco Exhibit Eight, Analysis 29

Amoco Exhibit Nine, Analysis 31

Amoco Exhibit Ten, Data 32

1
2
3 MR. STOGNER: Call Case Number
4 8734.

5 MR. TAYLOR: Application of
6 Amoco Production Company for pool reclassification, pool ex-
7 tension, and special pool rules, San Juan County, New
8 Mexico.

9 MR. STOGNER: We'll now call
10 for appearances in this matter.

11 MR. PAULSON: Gary Paulson, ap-
12 pearing in association with Bill Carr of Campbell, Byrd, and
13 Black of Santa Fe.

14 MR. STOGNER: Are there any
15 other appearances in this matter?

16 Mr. Paulson, please continue.

17 MR. TAYLOR: Do you have any
18 witnesses to be sworn?

19 MR. PAULSON: I do. I have
20 two.

21 MR. TAYLOR: Please stand.

22 (Witnesses sworn.)
23

24 MR. PAULSON: If the Examiner
25 please, this is an application by Amoco Production Company

1
2 requesting a number of things concerning an existing pool
3 presently classified as a gas pool in San Juan County. It's
4 the Hogback Pennsylvanian Pool and we're requesting that the
5 pool be reclassified as an oil pool; we're requesting that
6 the pool be extended in certain aspects; and that special
7 pool rules be established for that pool to be applicable to
8 production from the pool.

9 I would point out with respect
10 to the notice that Section 8 of Township 29 North, Range 16
11 West has been noticed as being the area, within the area for
12 which extension is requested, and that's incorrect. Section
13 8 should not have been included. It's our understanding we
14 may proceed nevertheless to present our evidence.

15 With respect to the special
16 field rules we're requesting, we're asking that 160-acre
17 spacing units be created; that within each unit a 660-foot
18 setback be established with several requested exceptions
19 that will be addressed during the course of our testimony.

20 We're also requesting an
21 exemption from the gas/oil ratio limitation factor and an
22 exception to Division General 306 to permit venting of gas
23 to the extent that that rule applies to noncombustible gas
24 that is not composed chiefly of hydrocarbons and that will
25 be the evidence presented, that in fact the gas is not com-
bustible and that it is not composed chiefly of hydrocarbons.

1
2 We're also requesting the as-
3 signment of an oil allowable greater than the regular depth
4 bracket allowable for 160-acre units.

5 We have two witnesses, Miss
6 Terry Olson, a petroleum geologist, and a Mr. Charles Boyce,
7 petroleum engineer.

8 We have ten exhibits to pre-
9 sent. The first two will be sponsored by Ms. Olson and the
10 last eight by Mr. Boyce.

11 I believe the witness has been
12 sworn.

13 TERRY LYN OLSON,
14 being called as a witness and being duly sworn upon her
15 oath, testified as follows, to-wit:

16 DIRECT EXAMINATION

17 BY MR. PAULSON:

18 Q Would you state your name for the record,
19 please?

20 A Terry Lyn Olson.

21 Q And your business address?

22 A Amoco Production Company, P. O. Box 800,
23 Denver, Colorado, 80202.

24 Q And by whom are you employed?
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

A Amoco.

Q In what capacity?

A As a petroleum geologist.

Q Ms. Olson, have you ever testified before this Division as an expert in the field of petroleum geology?

A No.

Q Would you therefore give the Examiner some indication of your educational background and your work experience to the present date?

A I received my Bachelor's degree in geology from the Colorado College; my Master's from Dartmouth.

I worked for a short period for Anaconda in mineral exploration and I've worked for over three years for Amoco in oil exploration.

Q And does your present job entail the making of geologic studies in and around the area of the San Juan Basin in San Juan County, New Mexico?

A Yes, it does.

Q And have you made a geologic study of the area in question here?

A Yes.

Q And in connection with that study have you prepared certain exhibits to be sponsored in this proceeding?

1
2 A Yes.

3 MR. PAULSON: If the Examiner
4 please, we would offer Ms. Olson as an expert in the field
5 of petroleum geology.

6 MR. STOGNER: Ms. Olson is so
7 qualified.

8 MR. PAULSON: Thank you.

9 Q Ms. Olson, I believe you have color coded
10 map of New Mexico that you don't intend to sponsor as an ex-
11 hibit but simply wish to use as a locator map to show the
examiner where this field would be?

12 A Yes, sir, that's true.

13 Q Would you please proceed to do that?

14 A Yes, I will. This is a portion of the
15 geologic map of the State of New Mexico, and it shows the
16 area of the San Juan Basin.

17 The area of interest in this hearing to-
18 day is Hogback Field, which is right here with an orange ar-
row. The green dot shows Farmington for reference.

19 We will also later refer to Tocito Dome
20 Field, which is approximately 20 miles south of Hogback here
21 along the flank of the basin.

22 MR. STOGNER: This map will not
23 be entered as an exhibit, I understand?

24 A That's correct.
25

1
2 MR. STOGNER: Where is this map
3 from?

4 A This is from the State geologic map of
5 New Mexico and the State geologic map of Colorado.

6 MR. STOGNER: You referred to,
7 as you were explaining this map to me, this geological map
8 of New Mexico, an orange arrow pointing somewhere. Could
9 you be more specific?

10 A The orange arrow points to the location
11 of Hogback Field, along the flank of -- the western flank of
12 the San Juan Basin. The Basin is this area right here.

13 MR. STOGNER: The Basin being
14 the San Juan Basin as we know it, covering --

15 A San Juan County, and --

16 MR. STOGNER: -- Rio Arriba,
17 San Juan --

18 A -- part of Rio Arriba Counties.

19 MR. STOGNER: Thank you. Is
20 that all you're going to refer to this map?

21 A Yes.

22 MR. STOGNER: Okay.

23 Q Miss Olson, referring now to what's been
24 marked as Exhibit Number One in this proceeding, would you
25 identify that document and explain its significance to the
application, please?

1
2 A Yes. Exhibit Number One is a structure
3 map on the Pennsylvanian Akah, Zone 2, of Hogback Field.

4 This interval is one of the producing
5 zones within the Pennsylvanian at Hogback Field. It covers
6 an area of approximately 100 sections in San Juan County,
7 including the area of interest, which lies in Township 29
8 North, Range 16 West, and Township 29 North, Range 17 West.

9 The San Juan River runs across the middle
10 of the map.

11 The dashed line shows Amoco's lease that
12 is the lease area almost entirely by Amoco with minor inter-
13 est by other parties in the section.

14 Q If I might just interrupt. When you said
15 the dashed line, you mean the ldashed line with the longer
16 dashes?

17 A Yes, I do.

18 Q And down in Section 36, Township --

19 A 29 North, 17 West.

20 Q -- 17 West there's a little arrow point-
21 ing to that line, indicating the Amoco Lease, is that cor-
22 rect?

23 A That is true.

24 Q Thank you.

25 A The dotted line, or line with smaller
dashes, indicates the recommended field limits that we are

1
2 proposing today.

3 Down in the lefthand corner there is a
4 legend indicating the well symbols used on the map; notably
5 standard dry hole symbols; standard black dots for producing
6 oil wells; abandoned producing wells are represented by dry
7 hole symbols with black dots superimposed on them; and per-
8 mitted locations are represented by open circles on this
9 map.

10 The key wells here are the discovery well
11 in Section 19 of 29 North, 16 West, which is the Stanolind
12 USG No.13; the recently drilled offset in the section to the
13 north, Section 18, that's 29 North, 16 West, is the Amoco
14 USG No. 43; and we are currently drilling a well one section
15 to the north of that in Section 7, the USG No. 47.

16 The series of elliptical contour lines on
17 the southern portion of this map represent my structural in-
18 terpretation on the zone that is productive within the re-
19 cently drilled No. 43 Well.

20 The contour interval is 50 feet and
21 that's the most important part of this map.

22 Q Ms. Olson, on this exhibit is there an-
23 other smaller dashed line running roughly north to south
24 from the Amoco 43 in Section 18 of Township 29 North, Range
25 17 West, and running generally south through Section 19 and
into Section 30?

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

A Yes, there is.

Q And does that dashed line correspond to a cross section represented by Exhibit Number Two?

A Yes, it does.

Q Would you then identify Exhibit Two for us, please?

A Exhibit Two is a north/south cross section running across the area of interest today with south on the left, north on the right.

I'd like to point out a stratigraphic column in the lower righthand corner of this exhibit. This stratigraphic column illustrates the zones within the Pennsylvanian that I will be referring to this cross section, notably Ismay, Desert Creek, Akah, and Barker Creek intervals of the Hermosa in the Pennsylvanian.

The significance of this exhibit lies in the production history and geologic correlation for this field, and I'd like to go over each of the wells, the production from the Pennsylvanian from these four wells.

Starting with the discovery well, the Stanolind USG, Section 19, No. 13, which is second from the right, it was discovered in 1952. The original production was from the Mississippian, which is not relevant to this proceeding.

After a short period of Mississippian

1
2 production the well was recompleted from four zones in the
3 Barker Creek, Akah, and Desert Creek of the Pennsylvanian.
4 This well produced approximately 85,000 barrels of oil and
5 approximately 2.7 BCF of gas from those intervals.

6 It was subsequently recompleted in the
7 same Lower Barker Creek Zone and produced almost 150,000
8 barrels of oil from that zone alone.

9 This well was abandoned in 1968.

10 The second well to be drilled in the
11 field was the PanAmerican USG Section 19 No. 17, which is
12 the second well from the left on the exhibit.

13 It was originally completed in two inter-
14 vals, the Akah and the Barker Creek Zones. It produced ap-
15 proximately 14,000 barrels of oil. It was shortly there-
16 after recompleted in the Lower Barker Creek Zone that pro-
17 duced in the No. 13 Well and produced from that interval al-
18 most 138,000 barrels of oil.

19 This well was abandoned in 1965.

20 In 1984 Amoco drilled another well, which
21 is the one on the left in the exhibit. This well was wet in
22 the Barker Creek Zone that produced in the 13 and 17 Wells.
23 It IP'ed last year at a stabilized rate of about 52 barrels
24 of oil per day from three zones in the Akah and Barker
25 Creek.

And finally the No. 43 Well on the right-

1
2 hand side was drilled this year. It IP'ed for 448 barrels
3 of oil per day from three zones in the Akah.

4 The Lower Barker Creek, which produced
5 from the original two wells was again wet.

6 I'd like to point out that there's an-
7 other prospective zone in this well, the Desert Creek, up
8 hole from the Akah. I do not feel we got a good test from
9 this zone and that therefore this well is possibly capable
10 of producing more than 448 barrels of oil per day.

11 Q Ms. Olson, in the lower righthand corner
12 there's a stratigraphic column presented. Did you address
13 that?

14 A Yes, I did.

15 Q And your testimony is that all the wells
16 presented on Exhibit Number Two are in fact producing from
17 the Pennsylvanian?

18 A This is true.

19 Q And it's your testimony that you're able
20 to correlate the zones within the Pennsylvanian across this
21 interval?

22 A Yes, they do correlate.

23 Q Are these wells producing from fractured
24 rock?

25 A I believe that they are on the basis of
core data and the flow rates we've achieved, particularly

1
2 from the No. 43 Well.

3 I'd also like to point out that as far as
4 the correlations go, this field is geologically similar to
5 Tocito Dome Field. The stratigraphic variations and the
6 fractures that occur here are similar to the ones that are
7 documented at Tocito Dome.

8 Q Referring just a minute to Exhibit Number
9 One, is it your opinion that the area identified on Exhibit
10 Number One as the recommended field limits for the Hogback
11 Pennsylvanian Field, in your opinion does that represent a
12 reasonable area given the present state of geologic know-
ledge of the field?

13 A Yes, I do.

14 MR. PAULSON: I have no further
15 questions, Mr. Examiner. We would offer Exhibits Numbers
16 One and Two and tender the witness for cross examination.

17 MR. STOGNER: Exhibits One and
18 Two will be admitted into evidence.

19 CROSS EXAMINATION

20 BY MR. STOGNER:

21 Q Ms. Olson, on Exhibit Number One, I do
22 not show any other Pennsylvanian wells outside of the Amoco
23 lease area. Do you know if there's any other Pennsylvanian
24 wells within this mapped area?
25

1
2 A There is one well that had in the past
3 produced from the Pennsylvanian in the mapped area. That is
4 the PanAmerican Navajo C No. 1 in Section 1 of Township 29
5 North, Range 17 West.

6 Q Okay, that's shown on here, right?

7 A Yes. It -- the symbol conforms to an
8 abandoned producer.

9 Q Was that put in a designated pool or was
10 that an undesignated Hogback well?

11 A I don't know.

12 MR. BOYCE: I can answer that.

13 MR. STOGNER: Okay, I'll ask
14 you the same question whenever you get up on the witness
15 stand.

16 MR. BOYCE: Okay.

17 Q You believe that this is fractured rock,
18 is that right?

19 A Yes, I do.

20 Q Is that through the whole Pennsylvanian
21 formation or just portions?

22 A It is my opinion that it's probably not
23 uniformly fractured but significantly enough to affect pro-
24 duction in most areas of the field.

25 Q Are there communications -- is there com-
munication between all the members of the Pennsylvanian in

1
2 this area?

3 A To the best of our current knowledge
4 there is not.

5 Q What member has most of the production in
6 this -- in your lease in here in this area?

7 A To date most of the production is from
8 the Lower Barker Creek Zone; however, the zone producing
9 from the No. 43 Well is a new zone.

10 Q And what zone is that?

11 A That is the Akah.

12 Q Do you think the Akah and the Barker Creek
13 have communications between those two zones?

14 A In some parts of the field I think that
15 they do.

16 Q What parts?

17 A On the flanks of the structure where
18 there's the most fracturing it's likely that there is com-
19 munication.

20 Q Okay. In those portions where there's
21 not -- where's there no communication, do you feel that the
22 Akah and the Barker Creek members are homogeneous with each
23 other?

24 A No, I do not. I don't believe that the
25 reservoir quality within or between zones is homogeneous
across this field. There are different facies represented

1
2 in the limestones here. The porosities vary dramatically.

3 Q How much do they vary?

4 A From zero or negligible measureable poro-
5 sity up to 18 or 10 percent, as measured by the density neu-
6 tron logs.

7 MR. STOGNER: Mr. Paulson, will
8 your other witness present testimony showing the area of
9 drainage between the Akah and the Barker Creek?

10 MR. PAULSON: Is that --

11 MR. STOGNER: To support the
12 160-acre --

13 MR. PAULSON: He'll present
14 evidence concerning drainage.

15 MR. STOGNER: Okay.

16 MR. PAULSON: Yes.

17 MR. STOGNER: Okay, I have no
18 further questions of Ms. Olson at this time.

19 MR. PAULSON: We'd call Mr.
20 Charles Boyce as a witness.

21 CHARLES BOYCE,
22 being called as a witness and being duly sworn upon his
23 oath, testified as follows, to-wit:
24
25

DIRECT EXAMINATION

BY MR. PAULSON:

Q Would you state your name for the record, please?

A Charles Boyce, B-O-Y-C-E.

Q And your business address.

A Is Amoco Production Company, P. O. Box 800, Denver, Colorado, 80201

Q What is your occupation and by whom are you employed?

A I'm a petroleum engineer with Amoco Production Company.

Q Mr. Boyce, have you previously testified before the Division as an expert in the field of petroleum engineering?

A Yes, I have.

Q Have you made a study of the area in question in this proceeding?

A Yes.

Q And have you prepared exhibits in anticipation of testifying here today?

A I have, yes.

MR. PAULSON: Mr. Examiner, we'd offer Mr. Boyce as an expert in the field of petroleum engineering.

1
2 MR. STOGNER: Mr. Boyce is so
3 qualified.

4 Q Mr. Boyce, would you detail for the
5 examiner what is sought by Amoco in connection with this
6 application?

7 A Basically the -- our recommendation is
8 that the existing Hogback Pennsylvanian Gas Pool, as defined
9 by the Commission, and which until recent drilling has not
10 produced for several years, be reclassified as an oil pool,
11 based upon the re-evaluation of past performance and more
12 recent performance; that the original area designated be ex-
13 panded to cover that area shown on our Exhibit Number One,
14 which is the lightly dashed line and which shows our recom-
15 mended field limits based on our current interpretation.

16 The basic recommendation beyond those
17 field limits is to space the pool on 160 acres; to include
18 the entire Pennsylvanian within the defined spaced pooled
19 area; to allow drilling of wells within each 160-acre spac-
20 ing unit no closer than 660 feet from the unit boundary; to
21 grant exceptions for two wells which we do have permitted,
22 which would meet 40-acre spacing requirements but will not
23 meet the 160-acre footage requirements we're requesting;
24 that no limiting GOR be established due to the gas and re-
25 servoir characteristics I'll explain later in the testimony,
the gas being nonflammable; and that an allowable of 1.5

1
2 times the normal 160-acre allowable be granted due to the
3 particular characteristics of the wells and of the pool it-
4 self.

5 Q Mr. Boyce, would you identify Exhibit
6 Number Three and explain its significance to the applica-
7 tion?

8 A Exhibit Number Three is the completion
9 report of our USG Section 18 Well No. 43. Gary, could you
10 hand me Exhibit One there, please?

11 And briefly, reviewing some of the testi-
12 mony of our geologic witness, she covered basically the per-
13 formance of our discovery well, USG 13, the second well, USG
14 7 -- 17, both of which have been abandoned, and which were
15 actually drilled in what was then designated as the Hogback
16 Pennsylvanian Gas Pool on 160-acre spacing.

17 The more recent USG Well 38 in Section 30
18 of 29 North, 16 West, which was basically a 160-acre south
19 offset to our Well No. 17, and as it was pointed out, this
20 well found the Barker Creek formation wet, that horizon had
21 produced substantial quantities of oil in the two earlier
22 completions, NO. 13 and 17, which are, by the way, the high-
23 est structurally in the pool, as shown by the struc-
24 ture/contour map.

25 During the later stages of those wells'
production, those zones essentially watered out or reached

high water/oil ratios.

That Barker Creek was found to be nonproductive in No. 38. The Akah tested 52 barrels a day. We are producing right now substantial amounts of water from that zone.

Considering the state of depletion of the crestal wells, the fact that they did produce water in their later life, the performance of No. 38 was not unexpected.

The Well No. 43 in Section 18, which is more than a mile north of the existing production, was down dip as we can see from the first three wells; however, due to its distance from those wells we did find water-free production in the Akah at extremely high rates and the high producing characteristics of that well plus the fact that we did produce water-free oil, indicated to us that we did have a substantial remaining area of the field that could be developed.

Q Mr. Boyce, this field was established by prior order of the Division, isn't that correct?

A That's correct. In May of 1954 the Pennsylvanian Gas Pool was established.

In November of 1954 it was reclassified as an oil pool and in September of 1955 it was reclassified as a gas pool.

Due to the varying performance of indivi-

1
2 dual zones in our first two wells, depending on which hori-
3 zon we produced, there was some question about whether we
4 were a gas pool or an oil pool.

5 Q And was the entirety of the Pennsylvanian
6 interval included within the pool that was established?

7 A That's correct, it was.

8 Q Is there anything else on Exhibit Three
9 that you'd like to speak to?

10 A No.

11 Q Referring then to Exhibit Number Four,
12 would you identify that document and explain its signifi-
13 cance, please?

14 A Exhibit Four is a partial section of the
15 formation density compensated neutron log of our USG Sec-
16 tion 18 Well 43. It shows the three zones that were perfor-
17 ated as indicated on the completion report. It was from
18 these three zones that we produced 448 barrels of oil per
19 day.

20 These three zones have not been stimu-
21 lated at all. During perforating the well began to flow and
22 we just recently were able to install tubing in the well.

23 I think the high flow capacity of these
24 intervals without stimulation is -- is support for the fact
25 that we obviously have naturally fractured rock in the
reservoir.

1
2 From the porosities we see on the log we
3 would not expect this type of natural production from this
4 well and since -- until we did install tubing in the well,
5 which we did recently, we really were unable to attempt any
6 stimulation of these zones. I feel that the horizons we've
7 opened are capable of substantially higher rates than we're
8 seeing right now.

8 Q Does Exhibit Number Four indicate the
9 zones that were perforated in the No. 43 Well?

10 A That's correct, yes.

11 Q Referring then to Exhibit Number Five,
12 would you please identify that exhibit and explain its sig-
13 nificance to the application?

14 A Following perforating of this well, and
15 as I indicated it was capable of flowing up the casing, we
16 realized that we had encountered a part of the reservoir
17 which hadn't been fully developed or evaluated from past
18 production history.

19 Also, Well No. 43 was permitted as a 40-
20 acre oil well by the Commission, even though it was a step
21 out to the -- to the Pennsylvanian gas pool.

22 For that reason the allowable for that
23 well was 142 barrels a day, which is the normal allowable
24 for 40 acres.

25 To obtain information about this well in

1
2 preparation for this hearing, we obtained from the -- from
3 the Commission office in Aztec approval to produce this
4 well at substantially higher rates than normal, up to a to-
5 tal of 6400 barrels of oil, for the purposes of obtaining
6 flow test data and bottom hole pressure data to support our
7 suspicion that this well indeed was capable of draining more
8 than 40 acres, and Exhibit Five shows the plot of the daily
9 production rates of 43 from the day it was first perforated
until it was shut in after 17 days of testing.

10 During that period we flowed the well on
11 different choke sizes. A bottom hole pressure bomb was on
12 bottom to record flowing bottom hole pressure and we'll dis-
13 cuss those later.

14 I think the notable thing here is speci-
15 fically the high rate of production of this well, even
16 though it was flowing up the casing, which is a very ineffi-
17 cient well -- way to flow a gas well or an oil well with a
reasonable gas/oil ratio.

18 The most notable thing is the rate of de-
19 cline of the gas production, quite apparently, visibly, is
20 decreasing at a higher rate than the oil production, which
21 means the gas/oil ratio is decreasing. I think that's sig-
22 nificant in that we can determine from this test that pro-
23 ducing this well at high rates, or relatively high rates, is
24 not resulting in an increasing gas/oil ratio; therefore
25

1
2 we're not looking at a normal associated gas type reservoir
3 where we have gas in solution with the oil that provided the
4 driving mechanisms.

5 We believe that of the three zones that
6 we've perforated in Well No. 43 one or more of those zones
7 is perhaps more predominately oil productive and one or more
8 of the zones may be predominately more productive of this
9 nonflammable gas.

10 For that reason it's my opinion that con-
11 sidering a gas/oil ratio limitation, which is a normal case
12 in an associated reservoir, is -- is not really relevant to
13 this reservoir.

14 Q This well produced from September 18th
15 and for 17 days thereafter?

16 A That's correct, yes, and then was shut in
17 since we had reached the limit of our special allowable.

18 Q And is it your testimony and your opinion
19 that the production tests that were run during that period
20 of time convinced you that this well would drain more than
21 40 acres?

22 A That's correct.

23 Q Did this well produce any water?

24 A At no time during the test did it produce
25 any -- any amounts of water.

Q And your testimony is that the gas/oil

1 ratio is in fact declining at a more rapid rate than the --
2 than the production rate.
3

4 A Yes.

5 Q Would you then turn to Exhibit Six and
6 identify that document, please?

7 A Gary, one thing before I leave Exhibit
8 Five, and Mr. Examiner, we -- we have terminated this test
9 because we were producing at rates far in excess of the 142
10 barrels a day normally allowed for 140 acres.

11 We -- we need to test this well further,
12 in the short term, specifically, because of the well that
13 we're drilling immediately to the north. The purpose of
14 this high flow rate test was to gain reservoir information
15 to support this hearing. We are drilling Well No. 47.
16 We're approaching the point of coring the potentially pro-
17 ductive zones that we encountered in No. 43.

18 What our plan is, and we're not sure
19 whether it's proper to request it as a part of this hearing
20 or possibly outside the hearing, is to allow us for a
21 reasonable term to continue our test on No. 43, during which
22 time we will run production logs to determine which of these
23 three zones are contributing oil, which are contributing the
24 nonflammable gas, to help us in better selecting the core
25 points on our No. 47 to gain some additional information re-
garding the saturations, the porosity, and the fracturing in

1
2 these rocks.

3 This perhaps more properly can be ob-
4 tained through the District Office in Aztec. They're not
5 represented here today but that's what we plan to request, I
6 think, immediately after this hearing, the continuous test-
ing to gain further information.

7 Q Do you have an idea how long that test
8 might take?

9 A From my discussions with our production
10 people, perhaps a matter of three to five days.

11 Q Would you request an additional time
12 period or would you request an additional amount of produc-
13 tion that might be produced?

14 A I think we'll probably do as we did be-
15 fore, request an amount of production. If our application
16 is successful and an order is granted for 160-acre spacing,
17 for the allowable we ask, as soon as that occurs we will be
18 able to produce the well at those high rates, but until that
time we're -- we're kind of in a limbo of 40-acre spacing.

19 Q So what you're requesting is the right to
20 produce these additional volumes pending the issuance of an
21 order --

22 A That's correct.

23 Q -- by the Division.

24 A Uh-huh.
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Q Anything else?

A No, we've covered Exhibit Five.

Q Exhibit Six and Seven should perhaps be considered together, is that correct?

A Yes. I think probably, probably so.

Q Could you identify them and explain their significance, please?

A Exhibit Six is a production plot, historically, of our discovery well, No. 13.

Exhibit Seven is a -- let me see, let me make sure I've got it right.

Yeah, Exhibit Six is a plot of production from Well 13.

Exhibit Seven is the plot of production from Well 17.

The cumulative production from these two wells is shown on those respective plots, along with their gas/oil ratios. The average of those two wells, which basically were on a 160-acre pattern, was 193,000 barrels of oil and approximately 1.47 BCF of gas; a cumulative gas/oil ratio of 7653 cubic feet per barrel.

For this reason and as a result of the early time production of Well No. 43, in my opinion this pool is actually an oil reservoirs when we take the zones as a total together.

1
2 One problem that was brought up by the
3 Examiner earlier is the number of zones that we've opened
4 both in the early wells and in the present well throughout
5 the Pennsylvanian interval and whether they are in communi-
6 cation with each other.

7 I think the significant fact about this
8 pool is that the type of productivity, high fracture, high
9 productivity, the type of gas produced, which I'll present
10 analysis of later, indicate that they are all producing the
11 same type of crude and gas.

12 From the economics we'll present later I
13 think it's quite apparent that no one of these many inter-
14 vals could be produced individually economically and as
15 we've seen from the production testing of Well No. 38 and
16 Well No. 43, I suspect every well we drill here we may find
17 different horizons productive; some that may produce water
18 will have to be squeezed off; others may be put on the oil;
19 others put on the gas. The only practical way to produce
20 this pool is as a common reservoir with all productive zones
21 found in any well produced together.

22 Q Anything else on Exhibit Six and Seven?

23 A No, I don't believe so.

24 Q Moving on to Exhibit Eight, would you
25 identify that document?

A Exhibit Eight is an analysis of the gas

1
2 produced by our recently completed Well No. 43. The most
3 significant things to note on the righthand side near the
4 top is the high nitrogen content; on this sample 43.16 Mol
5 percent. That accounts for the fact that the well, or the
6 gas will not burn.

7 The methane content is 39.5 Mol percent.
8 We do see helium in this gas, as was seen in all of the
9 other wells that have been drilled in this pool in the Penn-
sylvanian.

10 The heating value shown is in the 600 BTU
11 range, which again is a confirmation of the fact that it
12 will not burn and is not a salable gas as hydrocarbon gas.

13 Q To the extent that the rules of this Div-
14 ision define gas or natural gas as a combustible vapor, do
15 you have an opinion as to whether this gas is a combustible
vapor?

16 A It is not.

17 Q And to the extent the rules define gas or
18 natural gas as one that is composed chiefly of hydrocarbons,
19 do you have an opinion as to whether this is composed chief-
20 ly of hydrocarbons?

21 A It is not in the normal sense, and we
22 cannot sell it as a hydrocarbon gas.

23 Q When Wells 13 and 17 in the field were
24 produced in the past, what was done with the gas?
25

1
2 Q The Exhibit Number Nine is an analysis of
3 the gas produced from Well No. 13 on an original test in
4 1954 and it also indicates a high nitrogen content, a heat-
5 ing content in the 6 to 7 percent range, a very low calcu-
6 lated BTU. It also is nonflammable.

7 At the time the Nos. 13 and 17 were pro-
8 duced, the government had a helium extraction plant in this
9 area and those wells were produced for that plant until they
10 were essentially depleted and the plant was dismantled.

11 Mention was made initially of the loca-
12 tion and the comparison of this pool with Tocito Dome. North
13 of Tocito there is also some gas that contains helium and
14 there is a plant there. There's processing of helium.

15 Just yesterday we had discussions with
16 that company and they are interested in processing this gas.
17 Two problems, of course, immediately, we need to drill addi-
18 tional wells to determine what really our potential is here.

19 Secondly, since the original BLM plant
20 was dismantled, there are no lines from this field that we
21 could flow the gas through. That's what we and the possible
22 purchaser are searching now to find what lines might be in
23 place. The nearest that we know of is 10 miles away.
24 That's an older line. So we really can't determine for the
25 near future whether this gas might be salable as helium gas.

Q And in your opinion would it be necessary

1
2 to drill additional wells and determine the extent of nonhy-
3 drocarbon gas production from those wells before plans could
4 be made to perhaps market that helium?

5 A I believe it would be essential, yes, due
6 to the econmics of a long, long collection system.

7 Q And until such time as that determination
8 can be made and the gas perhaps marketed, what is your re-
9 quest with respect to the gas?

10 A That the gas, being a nonsalable product
11 and nonflammable, that we be allowed to vent the gas and
12 that has been done on Well No. 38 since completion. We have
13 the approval of the BLM to do that and also we have obtained
14 approval to do so for Well No. 43.

15 Q Anything else on Exhibits Eight and Nine?

16 A No, I don't believe so.

17 Q Will you then identify Exhibit Ten,
18 please?

19 A Exhibit Ten presents a summation of data
20 that we have collected and calculated to show what kind of
21 reservoir we have here.

22 At the top we have three flowing tests
23 which were taken from the flow data obtained as shown on Ex-
24 hibit Five, Well No. 43.

25 As we requested of the District Office in
Aztec, we flowed this well for several days on different

size chokes shown here, 1/2 inch, 3/4, and 1-inch.

The oil rates shown were during the last three days of each test, 365 a day, 352 a day, and 347 a day.

The next column is the flowing bottom hole pressure measured during those tests, declining slightly, which would be indicative of the early time of a high capacity well, such as this.

From that flow rate data and flowing bottom hole pressure data, just for information purposes we calculated productivity indices, which is a measure of the capacity of a formation to produce. It's basically barrels per day divided by drawdown in pressure.

The range of figures we're looking at, considering the thin pay zones we have.

In Tocito Dome where we had similar high capacity rock, much thicker horizons, it was not unusual to have PI's up to as much as 10 barrels per psi; in my opinion a confirmation that we are in a highly fractured reservoir, producing at these rates from unstimulated rock.

Just below that I've shown a static bottom hole pressure. At the conclusion of the flow tests and when the well was shut in we logged the build-up, recorded the pressures, calculated that to establish value at the mid-perforations depth and found a pressure of 3255 psi.

1
2 Actually, we subtracted the flowing bot-
3 tom hole pressures from this in each case to calculate that
4 PI.

5 A notable thing, at the end of the test,
6 even though we were producing nearly 350 barrels a day flow-
7 ing up the casing, we still had over 1000 pounds of avail-
8 able bottom hole pressure. Had we been able to produce the
9 well at its maximum capacity, using this PI value, that it
10 it would flow, in my estimation at a rate of about 425 bar-
11 rels per day, which is higher than the normal allowable, and
12 as we previously indicated, in Well 43 the present zones are
unstimulated.

13 We feel there are other zones that are
14 potentially productive, and we would expect to encounter
15 similar type zones in the other wells we drilled. It's for
16 this reason that, partially, that I'm recommending we be al-
17 lowed to produce at a rate higher than the normal 382-barrel
18 a day rate for 160 acres. Based on our evaluation of these
19 wells and our expectations for future production, we feel 1-
20 1/2 times that allowable, which would be 573 barrels a day,
would be acceptable.

21 I'll point out further on that we don't
22 see that this would damage the reservoir in any way.

23 The next thing shown in Exhibit Ten under
24 the hearing Perforations, was our determination from the log
25

on Well No. 43 of the feet of pay we actually have and the average porosity in each of those horizons.

A total of 21 feet of net pay and average porosity of 6.2 percent. 6.2 percent is a very minimal range for any producing horizon unless there is natural fracturing and therefore I think this supports the fact that we do have a highly fractured reservoirs.

Using those values, next we calculated a potentially recoverable quantity of oil, using from left to right, the barrels of oil in an acre foot, 21 feet of pay; 6.2 percent porosity; the next value is the actual oil saturation, our log calculations indicating a water saturation of 25 percent.

The next value, .4, is our estimate of recovery from these wells. It's reasonably high for two reasons. One, that we have a naturally fractured reservoir. We believe we have a natural water drive down dip in this reservoir. Both of those were apparent in Tocito Dome and in that field we recovered, I believe, more than 50 percent of the calculated oil in place on primary recovery. So I don't think that figure is too high.

The next is an expansion factor. 2.2, which is fairly high but for the type of crude and type of unusual gas, from theoretical calculations this is what we determined it to be. Using those we had 1377 barrels per

acre.

For a 40-acre drainage pattern the oil recoverable would be 55,000 barrels.

For a 160-acre drainage pattern I calculate the recoverable oil to be 220,000 barrels per day.

I think it's significant to point out that our early wells, 13 and 17, which were on essentially 160-acre pattern, and even though they produced from different specific zones in the gross Pennsylvanian, averaged 193,000 barrels each, which correlates reasonably closely with what I'd expect a well to recover on 160 acres. I indicated that gas/oil ratio on those wells combined was 7653. Again, they're basically oil wells.

Next, what I've shown is a projected decline curve recovery for Well No. 43. Granted at this time we only have 17 days of production but based on our knowledge of typical Pennsylvanian wells and including the two plots on our earlier wells, I believe that this well will stabilize at approximately a 35 percent decline rate within two to three months at about a 200-barrels per day rate.

With that expected decline rate over the life of the well, we should recover 231,000 barrels, which shows me that this well should be capable of effectively draining approximately 160 acres, and that one well drilled on 160 would be the most appropriate spacing.

1
2 I have shown below the probable economics
3 of drilling this type of well, which are fairly expensive,
4 \$753,000, on a 160-acre pattern using an expected 80 percent
5 success.

6 It shows that on 160 acres we can recover
7 our investment and have return of 1.6 on that.

8 In doing these calculations we determined
9 that there's insufficient oil under 40 acres to pay out
10 these wells; therefore it cannot be economically developed
11 on 40 acres.

12 80 acre development would be extremely
13 marginal and I think the most significant thing is that
14 based on the reservoir rock qualities, our high producing
15 rates, the fracturing of the rock, that we can drain at
16 least 160 acres with these wells.

17 Q Do you also have an opinion as to whether
18 it would be economic to produce the individual members of
19 the Pennsylvanian as a separate source?

20 A It would not. I think we can see from
21 these calculations, using 21 feet of pay, that development
22 is -- is economic.

23 If we were to attempt to selectively pro-
24 duce any one of these horizons, which average 6 to 8 feet of
25 pay, it would be impossible to do so.

Q Is it then your opinion that the spacing

1
2 on less than 160 acres would result in the drilling of un-
3 necessary wells?

4 A I believe it would, yes.

5 Q Are you requesting temporary spacing
6 units or permanent units?

7 A Based on information we have from the
8 four wells to date, and our knowledge of this reservoir as
9 we see it now, the comparison with Tocito, which was devel-
10 oped on 160-acre spacing for many years, it's my opinion
11 that the 160-acre spacing is proper and it would really
serve no purpose to establish it on a temporary basis.

12 Shown on Exhibit One are locations that
13 we have permitted and planned to drill in this field on 160-
14 acre spacing. Within several months we hope to have the
15 field reasonably well developed and reasonable well defined
16 on 160-acre spacing, and if at some future time information
17 would lead us to believe that there would be a potential for
18 any infill drilling in some areas, due to the number of
19 zones we encountered, the structural locations, that could
20 be -- could be done on an individual well basis, but I
21 believe that 160 spacing for the field as we see it is pro-
per.

22 Referring then again to the request that
23 you've made of the Division in this application, you're re-
24 questing that each governmental quarter section within the
25

area specified be designated a drilling and spacing unit?

A Yes.

Q And what about a setback requirement?

A The setback we recommend is 660 feet from the unit boundary, which would allow us a reasonable discretion for either terrain or structure to locate a well and still, I think, effectively protect correlative rights.

Q Are there any locations that have been identified that would not meet that criteria?

A Yes. Of the locations that we've permitted, two of them do not meet the 160-acre pattern that I've recommended, basically because, as we were permitting these we were under 40-acre spacing requirements, and I'm asking that we be granted exception for those.

The first is in the west, or pardon me, the west half of Section 13 of -- may I have that plat, please -- of 29 North, 7 West.

Q 17 West?

A Or 17 West, pardon me. That is Well No. 39. That well is located 330 feet from the east line of the boundary and 330 feet from the south boundary of its 160 unit, if 160 were granted.

The lease on which it's located and the lease towards which it is closer than 660 are both owned and operated by Amoco Production Company and we feel that cor-

relative rights are protected by drilling the well at that location.

Q And would drilling at the 660 foot location increase the risk of the well being unproductive?

A Based on our analysis of the reservoir now, yes.

One other well which does not also exactly meet the 160 pattern, is Well No. 46. It's located in the northeast quarter of Section 18 of 29 North, 16 West.

That well is located 330 feet from the west line of its 160-acre unit and 410 feet from the south line.

Again the well is located on and in an Amoco owned and operated lease and this particular well is located there as a result of a terrain problem and we feel that due to the common ownership and our development, hopefully, on 160 in this pool, that that location should be granted an exception and would protect correlative rights.

Q I don't believe you've discussed the extent and nature of Amoco's ownership interest in the area. Would you do that briefly, please?

A Yes. Within the -- the outline of the Amoco lease shown, and this was a lease from the Navajo Indians in I think probably the early twenties, we own 100 percent of the working interest with the exception of Sec-

1
2 tion 19 of Township 29 North, Range 16 West. In that sec-
3 tion we own 95.2 percent of the working interest and the
4 other owners in that section were notified of this applica-
5 tion by certified mail, as shown on our application.

6 Q Then with respect to the request that
7 venting of the produced gas be permitted, your recommenda-
8 tion is that that be permitted until such time as the gas
9 can be marketed, if at all?

10 A That's right.

11 Q And lastly, with respect to the request
12 for an oil allowable greater than the regular depth bracket
13 allowable, do you have anything else to say on that?

14 A Yes. The name Tocito keeps coming up but
15 it's a very comparable field and we have many years of his-
16 tory there. In Tocito for a 2 year period starting in 1973,
17 we requested from the Commission at a hearing and received
18 approval for double the normal 160-acre allowable. That was
19 a result of step-out drilling along the east flank of the
20 pool where we encountered high rate wells that were capable
21 of producing 6-to-800 barrels per day. We basically pre-
22 sented at that time evidence similar to what I've presented
23 here; that we have a highly fractured reservoirs; we have a
24 high gravity crude, which has a density and viscosity char-
25 acteristics that enhances the effect of an edge-water drive.
We are not producing any water from No. 43, which indicates

1
2 water coning is not a problem, which is a common fear of
3 high rate production.

4 With the lack of concern about water con-
5 ing, with, in my estimation, the fact that high rate produc-
6 tion will not adversely affect any migration from down dip,
7 in fact it will probably enhance it as far as recovering oil
8 sooner, and with the high PI's we have, that producing at
9 the rates these wells are capable of will not create damage
10 and I think will be the most optimum way to produce the
pool, and our performance in Tocito bore that out.

11 Q Is there any indication that producing at
12 an allowable greater than the regular depth bracket allow-
13 able would create correlative rights problems in the field?

14 A I don't see that it would at all.

15 Q With respect to demand for the oil,
16 should that affect the request for a greater allowable?

17 A No. Our purchaser has indicated essen-
18 tially within the limits we're looking at there's no problem
as far as moving the oil.

19 Within the State itself I think recently
20 the State eliminated the requirement that oil purchasers
21 file a nomination each month because there is far more de-
22 mand than there is supply within the state, so for that
reason I see no problem with high producing rates.

23 As I indicated, the Well 47 was original-
24
25

1
2 ly spaced on 40 acres, even though it offset a gas pool, but
3 we know now that that's not a gas pool. The allowable for
4 40 acres is 142 barrels a day. Had we been concerned about
5 producing at high rates for -- for any selfish purpose, the
6 obvious pattern would be to develop on forties. Four times
7 the 40-acre allowable is 568 barrels a day. The allowable
8 for one well on 160, that I'm requesting, which is 1-1/2
9 times 382, is 573 barrels a day. So basically what we're
10 looking at is producing from one well, which I feel can ef-
11 fectively this reservoir based on our information, rather
12 than drilling four wells, which we could, and produce essen-
tially the same amount of oil.

13 Q Mr. Stogner asked a question concerning
14 the Navajo C No. 1 Well in Section 1 of Township 29 North,
15 Range 17 West. Do you have any information concerning that
16 well and its --

17 A To my knowledge it was drilled as an un-
18 designated well since it was -- if you'll hand me that map,
19 Gary -- the limits of the original Pennsylvanian gas pool to
20 the north was the north boundary of Section 18. The Navajo
21 C was nearly two miles north of that and for that reason it
22 was not drilled as a Hogback Pennsylvanian well but as an
undesignated well, and I think properly so.

23 Q Anything else, Mr. Boyce?

24 A No, I believe we've covered most of the
25

evidence that we wanted to present.

MR. PAULSON: If the Examiner please, we would offer Exhibits Two -- I'm sorry, Three through Ten and tender Mr. Boyce for cross examination.

MR. STOGNER: Exhibits Three through Ten will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q Now, Mr. Boyce, this is a lot of information you've covered today. Let me briefly go back over it.

The spacing requirements you wish are 160 acres and the well location requirements being 660 feet from the 160-acre unit boundary, is that correct?

A Yes.

Q To keep with the policy procedures of the New Mexico Oil Conservation Division, within 160 acres there's a quarter quarter section line. What do you propose to be the limits on that particular boundary line?

A I don't propose one. Since this is a unique pool and quite separate from any other production in the basin, other than Tocito, which is nearing depletion, and we are producing from an oil reservoir, and we are entirely on Navajo Tribal lands, I didn't see the need for

1
2 trying to select some set-back from the quarter quarter sec-
3 tion lines. I'm aware that that is generally accepted in
4 the State rules throughout, but in this pool I believe that
5 the location of a well anywhere within the quarter section
6 with the 660 limitation would meet all the requirements of
7 -- of proper development here.

8 Q One of the reasons we do this, Mr. Boyce,
9 is because of our computers. We use the unit letter desig-
10 nation for a location and if you have one right on the quar-
11 ter quarter section line or in the middle of the quarter
12 quarter section line the well is not going to have a loca-
13 tion.

14 A I see.

15 Q So would you like me to set 330 feet for
16 that limit? Would that be sufficient?

17 A I think I'd request less than that.
18 Would 150 feet be acceptable?

19 Q Sure. All righty. Okay, let's see here,
20 you wish to be allowed to vent this gas. Should there be a
21 limitation on that, to vent this gas until a market, if any,
22 becomes available or be allowed to vent this gas for the
23 duration of the well?

24 A At this time I would request that there
25 not be a limitation on it. The gas is nonflammable and non-
salable and we -- we are pursuing a hoped for sale; I really

1
2 have no assurance of that. If and when a market does dev-
3 elop we would certainly attempt to sell whatever gas we
4 could, but I guess due to its unusual nature, I believe that
5 it should be vented at this time and can be without waste
6 and for -- for the life of the pool.

7 Q Okay. Now there are several numbers on
8 the allowable running around today and if I got this right,
9 what is a normal 160-acre depth bracket allowable for this
10 well?

11 A The normal 160 depth bracket allowable is
12 382 barrels per day for the depth of 6-to-7000 feet, which
13 based on our current analysis all these wells will encoun-
14 ter.

15 Q So you wish to --

16 A And we're asking for one and one-half
17 times that.

18 Q One and one-half times, all right. Do
19 you wish these rules to be permanent?

20 A Yes. One -- one thing, as far as the al-
21 lowable is concerned, I don't believe I mentioned, I would
22 request, if it's not the normal procedure, if we are granted
23 our application, that the allowable to retroactive to the
24 date of completion for Well No. 47. If -- if our spacing
25 and allowable is accepted, I think it would be rather point-
less for us to have to restrict the production of No. 47 to

1
2 make up the 6400 barrels of special testing allowable when
3 indeed the well should have been able to have produced at
4 least that much.

5 Q Okay, that Well No. 7 is in the south half
6 of Section 7. Okay, when was that well completed?

7 A No, that would be No. 43.

8 Q Oh, 43.

9 A Yeah, the one in Section 18. Shown on
10 Exhibit Three, the completion report, the effective date of
11 completion was September 16th, 1985, so we'd like to have
12 the allowable retroactive to that date and I think it would
be proper if the spacing is accepted.

13 Q You show on the -- I'm going to refer
14 back to Exhibit Number One. There shows to be several pro-
15 posed locations (inaudible due to paper rattle). Have all
those wells been applied for through the USGS?

16 A Yes. They have been applied for and have
17 been permitted.

18 Q Okay.

19 A Over a considerable period of time.

20 MR. STOGNER: I have no further
21 questions of Mr. Boyce at this time.

22 Are there any other questions
23 of this witness?

24 If not, he may be excused.
25

1
2 Mr. Paulson, do you have any-
3 thing further in this case?

4 MR. PAULSON: I do not. That
5 concludes our presentation.

6 MR. STOGNER: Is there anything
7 further in Case Number 8734 that anyone wishes to state at
8 this time?

9 If not, this case will be taken
10 under advisement.

11 (Hearing concluded.)
12
13
14
15
16
17
18
19
20
21
22
23
24
25

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 (Commission) 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. 8734,
heard by me on 23 October 1985.

Michael E. Higgins, Examiner
Oil Conservation Division