STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:	)	CASE NO. 12,756
APPLICATION OF ARCH PETROLEUM, INC., FOR APPROVAL OF A PILOT PRESSURE MAINTENANCE PROJECT AND TO QUALIFY THE PROJECT FOR THE RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, LEA COUNTY, NEW MEXICO	)	

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

November 1st, 2001

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, November 11th, 2001, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

November 1st, 2001
Examiner Hearing
CASE NO. 12,756

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A P P E A R A N C E S

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ALSO PRESENT:

DAVID R. CATANACH
Hearing Examiner
New Mexico Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, NM 87501

* * *

WHEREUPON, the following proceedings were had at 11:59 a.m.:

EXAMINER CATANACH: At this time we'll call Case Number 12,756, the Application of Arch Petroleum, Incorporated, for approval of a pilot pressure maintenance project and to qualify the project for the recovered oil tax rate pursuant to the Enhanced Oil Recovery Act, Lea County, New Mexico.

Call for appearances.

MR. BRUCE: Mr. Examiner, my name is Jim Bruce of Santa Fe, representing the Applicant. I have three witnesses.

EXAMINER CATANACH: Any additional appearances?

Will the witnesses please stand to be sworn in?

(Thereupon, the witnesses were sworn.)

THOMAS LAND,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

A. Thomas Land, Midland, Texas.

Q. What is your occupation?

A. I'm a consultant with Arch Petroleum, landman.

Q. Okay. Have you previously testified before the Division?

A. No, sir.

Q. Would you please summarize your educational and employment for the Examiner?

A. Graduate of the University of Texas, PLM program in Austin, Texas in 1979, I've been in the business, came at it -- to Midland, Texas, since 1979 with Texas Oil and Gas and been in exploration and land work since that time.

I'm a member of the PBLA, which is the Permian Basin Landman Association, also the AAPL, the American Association of Professional Landmen, certified 31483.

Q. And working for Arch does your area of responsibility include this part of southeast New Mexico?

A. Yes, sir, it does.

Q. And are you familiar with the land matters involved in this Application?

A. Yes, sir.

MR. BRUCE: Mr. Examiner, I'd tender Mr. Land as an expert petroleum landman.

EXAMINER CATANACH: Mr. Land is so qualified.

Q. (By Mr. Bruce) Briefly, what does Arch seek in this case?

A. Arch presently seeks an order approving a pilot pressure maintenance project in the Teague-Paddock-Blinebry

Pool.

Q. Would you please identify Exhibit 1 and describe the lands and the lease involved?

A. Exhibit 1 is a land plat, a portion of Township 23 South, Range 37 East, Federal Lease Number LC-030187, and it's referred to as the Lamunyon lease. It covers lands highlighted in the yellow on the plats, and it covers parts of Sections 21, 22, 27 and 28.

The proposed project area, the 160 acres in there, is comprised of the east half, northeast of 21, the west half, northwest of 22, and the initial injection well and the first four producing wells in the project area are also identified.

Q. And are all of these wells operated by Arch?

A. Yes, sir.

Q. Where will the initial injection well be?

A. Arch's C.E. Lamunyon Well Number 79 will be located in the southeast northeast of Section 21. This well is in an unorthodox location, 1700 feet from the north line and 10 feet from the east line. It has not been approved, the Application has not gone in front of the Commission yet.

Q. Okay, so the well has not yet been drilled?

A. It hasn't been drilled.

Q. Okay. And initially how many wells are in the

project area?

A. Four wells.

Q. Okay. And are these wells, the numbers of them, underlined on the Exhibit 1?

A. Yes, sir.

Q. And are the wells identified and described by footage and API Number on Exhibit 2?

A. Yes, sir.

Q. Is the Teague-Paddock-Blinebry Pool developed on statewide rules?

A. Yes, sir.

Q. And is interest ownership, working royalty and overriding royalty common throughout the project area?

A. Yes, sir.

Q. Who is the surface owner of the injection well site?

A. George Weir out of San Antonio, Texas.

Q. Okay, and who are the offset operators within a half a mile of the proposed injection well?

A. Offset operators include Apache Corporation; Conoco, Inc.; Kaiser-Francis Oil Company; and Mid-Continent Energy Operating Company.

Q. Okay. And were all of these persons notified of the hearing?

A. Yes, sir.

Q. And is Exhibit 3 my affidavit of notice?

A. Yes, sir.

Q. Were Exhibits 1 through 3 prepared by you or under your supervision or compiled from company business records?

A. Yes, sir.

Q. And in your opinion is the granting of this Application in the interests of conservation and the prevention of waste?

A. Yes, sir.

MR. BRUCE: Mr. Examiner, I'd move the admission of Arch's Exhibits 1 through 3.

EXAMINER CATANACH: Exhibits 1 through 3 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Land, is Arch the only working interest owner in this unit?

A. Yes, sir.

Q. And it's all federal royalty?

A. Yes, sir.

Q. And there's no difference in the overrides, any overrides on these tracts?

A. No, sir, it's common interest.

Q. Okay, and there's currently four producing wells?

A. Yes, sir.

Q. And the plan is to add one additional injection well, at least initially?

A. Yes, sir.

EXAMINER CATANACH: That's all I have, this witness may be excused.

MR. BRUCE: Call Mr. Curry to the stand.

GLENN H. CURRY,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Will you please state your full name and city of residence?

A. Glenn H. Curry, Midland, Texas.

Q. And who do you work for and in what capacity?

A. I work for Arch Petroleum, Incorporated, as a senior geologist.

Q. Have you previously testified before the Division?

A. No, I have not.

Q. Please summarize your educational and employment background.

A. I have a bachelor's degree in geology from the University of Texas of the Permian Basin, 1976. I have 24

years' experience in petroleum in the Permian Basin and Rocky Mountain area. I've been employed by Arch Petroleum, Incorporated, and as a geologist.

Q. And now Arch Petroleum is a wholly owned subsidiary of Pogo Producing Company, is it not?

A. That's correct.

Q. Okay. And so you've been employed by them for some years?

A. I was previously employed by Arch Petroleum, and when Pogo acquired Arch I was brought over to Pogo.

Q. Okay. Does your area of responsibility at Arch and Pogo include this area of southeast New Mexico?

A. That's correct.

Q. And are you familiar with the geology involved in the Teague-Paddock-Blinebry Pool?

A. Yes, I am.

MR. BRUCE: Mr. Examiner, I'd tender Mr. Curry as an expert petroleum geologist.

EXAMINER CATANACH: Mr. Curry is so qualified.

Q. (By Mr. Bruce) Mr. Curry, would you identify your Exhibits 4 and 5 together and discuss the history of this pool and production from the pool?

A. Okay. Exhibit 4 is a map of the Teague-Paddock-Blinebry field. You'll note in yellow the Arch leasehold within the field. I have a red rectangle indicating the

pilot area that we'll discuss today. The colored spots indicate Paddock-Blinebry completions within the field.

I included this map to show the full extent of the Teague field. It begins in Section 16 of 23-37, extends to the southeast through Section 34 and 35.

Q. Is this a relatively old pool?

A. Yes, the field was discovered in 1948. It's approximately 10 miles south of Eunice; it's halfway between Eunice and Jal. It's on the western flank of the Central Basin platform. It produces from stacked Permian-age reservoirs as well as the deeper Devonian Simpson and Ellenburger formations.

The cumulative production from all horizons is 18 million barrels of oil and 60 billion cubic feet of gas. Production on the Arch leasehold totals 8 million barrels of oil and 29 billion cubic feet of gas. The current rate from Arch leasehold is 1198 barrels a day and 4410 MCF per day.

In 1968, Gulf discovered the Teague-Blinebry Pool. Arch Petroleum purchased the Chevron-operated leases in 1994. Subsequently, the field was infilled to 20-acre spacing within this pool.

In 1997 the vertical limits of the Teague-Blinebry Pool were extended to include the Paddock formation, and the pool was redesignated as the Teague-

Paddock-Blinebry Pool.

Production on the Arch leasehold from this pool totals 4.2 million barrels of oil and 24 BCF gas. The current rate from Arch leasehold is 627 barrels of oil per day and 3910 MCF per day from 60 active producers.

Of course, the Paddock production was originally completed in this area by Texaco, just north of the Teague field, and by Plains Petroleum, now Saga Petroleum, to the south of our leasehold. They were the first operators to complete in this Paddock reservoir. And I believe that Plains Petroleum was instrumental in getting the pool redesignated as Paddock-Blinebry Pool.

Q. So the initial production was really more Blinebry production, is what you're saying?

A. That's correct, that's correct.

Q. Okay, go ahead.

A. In 1998, December of 1998, the first successful Paddock well was completed on the Arch leasehold. And subsequent to that, 32 additional workovers and four new drills were completed within the Paddock interval.

Q. And then the increased production is shown on your Exhibit 5; is that correct, Mr. Curry?

A. Right, I'll call your attention to Exhibit 5, which is a production plot. This plot begins in 1993 to present. If you'll examine the plot from the period of

1994 through 1998, you can see a significant increase in oil production and gas production. That was attributed to 20-acre infill drilling in the Blinebry Pool. And then looking at the curve from December, 1998, to present, you can see another significant increase in production, and that would be attributed to the Paddock workovers and new drills.

Q. Looking at the Paddock wells, do they initially have a high rate of production, or have they, on the whole?

A. Yes, sir. For example, the initial well completed in the Paddock Pool was the Lamunyon 51, in the southeast of the northeast of Section 21, and that well -- we'll have a display on that later, but it completed at 120 barrels a day and 60 MCF per day. It was a fairly significant rate initially.

Q. Okay. Now, with respect to the Paddock, is -- Well, let me take a step back. Has there been a fairly rapid decline in production on these Paddock wells?

A. Yes, sir, that's correct. If you look at the production plot again, Exhibit 5, you can see that there's a very dramatic decline from, say, middle-1999 to present, and they're continuing to decline.

Q. Okay. Is it -- At least as to the Paddock, is it still in the relatively early stages of depletion?

A. Yes, sir, it is.

Q. Okay. Let's move on to your Exhibit 6 at this point and discuss in a little more detail primarily the Paddock geology in this area.

A. Okay, Exhibit 6 focuses on the Arch leasehold. The pilot area is indicated with a red rectangle. There's a green outline of the Paddock production, or the Paddock-productive area. Wells that were completed outside of that green outline produce water in the Paddock interval, so the Paddock-producing area is confined within that area drawn there.

The map on the left is a structure on top of the Paddock pay zone. Generally you have a northwest-southeast anticlinal closure, with the best production on the crest of the structure.

The map on the right is a net isopach of the Paddock pay. I've used a porosity cutoff of 8 percent, so that represents the feet of net pay greater than 8 percent.

The pilot-area outline is indicated on both maps, as well as the cross-sections that we'll show you.

Q. Okay. Now, just before we move off of this map --

A. Yes.

Q. -- even though the pilot area is 160 acres, the wells that would be immediately affected by the injector are just the four immediate offsets to the injector; is

that correct?

A. That's correct.

Q. Okay. Let's move on to your Exhibit 7 and discuss what you hope to achieve by instituting pressure maintenance in this pool.

A. Okay, Exhibit 7 shows the method of calculating the volumetric initial oil in place. This simply shows the parameters that are provided the engineer to calculate the oil in place.

The parameters were established well by well, and this simply represents an average of each parameter used, average pay 95 feet, average water saturation 49, and so forth.

In the Lower part of the exhibit I have an outline of the 160 acres that is represented on the map as the pilot area. And as Mr. Bruce said, our pilot injection well will affect the four immediate wells around it, Well 51, which was mentioned earlier, Well 49, 30 and 54.

Q. And are those four wells the only wells that were used in calculating the estimated secondary recovery?

A. That's correct.

Q. Okay.

A. For the pilot area.

Q. And for the record, what does Arch hope to recover from this particular pilot project?

A. We've estimated an incremental 60,000 barrels of oil and 150 million cubic feet of gas attributed to the pressure-maintenance project, single injector.

Q. Could you identify Exhibit 8 and discuss the Teague -- the interval covered by the Teague-Paddock-Blinebry Pool, and in particular the specific injection zone?

A. Exhibit 8 is a type log. This well is the Lamunyon 51. If you look back at your map, it's the third well from the left on cross-section A-A'. That is also the initial successful Paddock completion for this pool.

The type log is -- The curve on the left is gamma-ray, the color-filled porosity curve in the right track is the density neutron crossplot porosity. I have shaded porosity greater than 8 percent.

The injection interval for the Teague-Paddock-Blinebry Pool is indicated with a black bar on the right side of the porosity track. The top of it is -- it begins at the top of the Paddock pay, which is designated Paddock P5, at 5097. The base of the injection interval is 5960, which is the top of the Tubb or the base of the Blinebry formation.

Q. In particular, although -- That covers the Teague-Paddock-Blinebry Pool, does it not?

A. That's correct.

Q. Initially, the injection will only go into the Paddock; is that correct?

A. That's correct. The initial pilot pressure maintenance project is confined to the Paddock P5 and P4 only. The Blinebry formation below that is also a target for future pressure maintenance projects. It's obvious, looking at this long -- that the more interesting zone to utilize this pilot is the Paddock P5 and P4, because it has much better porosity and the core data shows it has better permeability and so forth.

Q. Now, some of these wells, they produce from both the Paddock and the Blinebry, do they not?

A. That's correct.

Q. How will the immediate four wells in the project area be treated? Will they be left open in the Paddock and Blinebry?

A. The wells, should we get approval for this pilot project, we can isolate the Paddock P5 and P4 zones.

Q. Okay, so they'll be isolated from the Blinebry?

A. Right, and we also feel that the Blinebry is such a low-permeability reservoir that it probably won't get any water in there.

Q. But just for practicalities at this time, those four wells would have the zones isolated?

A. Yes, sir.

Q. Okay. Let's move on to your cross-section. Please identify that for the Examiner.

A. Okay, Exhibit 9 is -- contains two cross-sections. There are two east-west stratigraphic cross-sections, A-A' and B-B'. As mentioned before, they're indicated on the map in blue lines.

The cross-section A-A' goes right through the pressure -- the pilot area.

Again, the porosity logs in the right track are color-filled for porosity greater than 8 percent. The pay zone is shaded light green.

Now, these are stratigraphic cross-sections, and they are flattened on the top of the Blinebry. You can see the Blinebry datum dashed across there. So the light-green-shaded area is the pay zone. My isopach and structure map relate to that shaded green area.

There are two wells on these cross-sections that have been cored. On A-A', Seeton Number 3, which is the far left well, you can see the core that cut through the Paddock pay as well as the upper portion of the Blinebry. And the Travis Number 4 is on cross-section B-B', the second well from the left. It shows a core in the Paddock 5 and 4.

Okay, I've examined both cores, and the Paddock is an upper Leonard carbonate. Its total extent is about

300 feet vertical thickness. It's bound above by the Glorieta and below by the Blinebry. It was deposited on a carbonate ramp, gently dipping to the southwest, to the Delaware Basin. Repeated transgressions and regressions deposited cycles of carbonate grainstones, packstones, wackestones and mudstones, forming multiple cleaning upward cycles stacked in packages or sequences. In most cases, the better perm and porosity occur in the grain-rich carbonates, cleaner at the top of each cycle.

Shows were encountered through the entire Glorieta-Paddock interval, but through production testing we've determined that the only commercially productive reservoir is confined to the Paddock 5 and Paddock 4 interval, which is shaded green on the cross-sections.

The average net pay is 95 feet, the average porosity is 12 percent, the average perm is 14 millidarcies, and the average water saturation is 49 percent.

In comparison, the Blinebry reservoir has a similar environment, although it is predominantly mudstone. It has porosities averaging 5, 6 percent, and the permeabilities average less than 1 millidarcy.

Q. So geologically speaking, the Paddock is a good candidate for waterflooding?

A. Yes, sir, it is. We also did some lab tests from

core plugs and actually did a laboratory-simulated flooding, and it showed that significant oil could be recovered in that reservoir.

Q. Based on your mapping, is the proposed injection zone continuous across the project area?

A. As the cross-section indicates, I can correlate easily the Paddock 4 zone throughout the area. The Paddock 5 zone is correlatable, it does show some changes laterally, but you can still correlate it across.

Q. Is there a freshwater-bearing zone in this area?

A. No, sir.

Q. And are there any faults in this area which would connect zones among each other?

A. No, sir.

Q. And does Exhibit 10 contain a summary of your testimony?

A. That's correct.

Q. Were Exhibits 4 through 10 prepared by you or under your supervision?

A. Yes, they were.

Q. And in your opinion is the granting of this Application in the interests of conservation and the prevention of waste?

A. Yes, it is.

MR. BRUCE: Mr. Examiner, I'd move the admission

of Arch Exhibits 4 through 10.

EXAMINER CATANACH: Exhibits 4 through 10 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Curry, do you know why the Paddock was originally -- or back in 1997, why they included the Paddock in the pool, the Blinebry Pool?

A. I'm not familiar with that hearing. I know that after the hearing I saw evidence in scout tickets that they had combined the two zones. That would be Plains Petroleum at that time, now Saga, just immediately south of our leasehold.

Q. Okay. You say the Blinebry is not a candidate for pressure maintenance operations at this time?

A. That's correct.

Q. Do you anticipate that it may be at a later time?

A. Yes, sir, we've done a study on the Blinebry, and it does show -- we've done some laboratory testing on the core plugs of the Blinebry, and we feel like that a portion of the Blinebry could be flooded. But we obviously see the best -- We need to start with the Paddock. There's a chance the Blinebry flood could be unsuccessful for several reasons. I've looked at Blinebry floods in other areas, Arco's, and there may be more discontinuity of the

reservoir.

We feel like that this pilot in the -- Well, I've answered your question about the Blinebry. There's a possibility it could become a pressure maintenance project in the future.

Q. The quality of the reservoir, you said it was tighter in the Blinebry?

A. Yes, sir.

Q. And you didn't think that you could get much water into it, is that what you --

A. We're uncertain if we can inject water into it or not.

Q. Okay. With regards to the Paddock, is the 4 and 5 -- I believe you call them P4 and P5?

A. Yes, sir, that's just my own designation to identify the sequences.

Q. Okay. Is that the only interval being produced in the Paddock?

A. That's correct, in this -- in our leasehold.

Q. In your leasehold?

A. Yes, sir.

Q. Okay, there's other Paddock production outside this area, besides the 4 and 5?

A. If you go back to the initial exhibit, the small map, that would be Exhibit Number 4 --

Q. Uh-huh.

A. -- now unfortunately, you can't distinguish Paddock or Blinebry completions, they're reported together. But I can tell you that Section 34, the northeast quarter of 34, has some wells that are productive from the Paddock. And if you look up in Section 8, 9, Texaco has a small field up there in the northwest corner of 9. That's very good Paddock wells up there.

It was actually Texaco and Plains' work that got me interested in pursuing the Paddock pay zone, and I'm really glad I did. It's been a very good reservoir for us.

Q. Okay.

A. It took me a while to find it. I drilled -- I perforated a lot of water wells first, but we did find it. And the outline indicated on the other map of the Paddock production, we've defined that outline with wells outside -- you know, perforated outside that limit, and they've produced water, a little bit of oil but noncommercial. So we know where it is. And it is limited to that lower Paddock interval. Perforations above it produce water.

I believe that's why it's been hidden this long. The upper Glorieta and Paddock was tested back in the 1960s and the -- DSTs, and got water. But this lower zone was never tested since 1948.

Q. Are the 4 and the 5 intervals, are they separated

by something that's some kind of barrier?

A. If you look at the cross-section, there's a hot gamma-ray streak. Let's say in the Lamunyon 51, the third well on A-A', you can see from 5460 to -70, there's a hot gamma-ray streak there. That is actually a coaly shale in many -- in my cores. It represents a significant low stand. It correlates for some distance. It's a very good timeline. So that's why I use that as a boundary for one of my sequences.

If you look at the gamma ray you can see cleaning upward cycles throughout the Paddock area, which is extremely common for Paddock, Blinebry, upper Clearfork. It's just a -- very common.

So yes, there's a separation. Is it a permeability barrier? Yes. I don't know how effective it is, but it's certainly a good strati- -- I was glad to find it. It helped me have more confidence in my correlation through there.

Q. Okay. Within the pilot area, on your Exhibit 7 you show six producing wells. Now, I assume all those wells are active producing wells?

A. Yes, sir, they are.

Q. Now, you've estimated that only four of those will be affected by the secondary recovery operations. Is that your assessment?

A. I believe the four immediate wells will have significant influence from the pressure maintenance project. I feel like the two wells to the north could possibly have some influence, but it would not be very significant, due to the distance away from the injector.

Q. Okay. Do you know, Mr. Curry, what the current production rate of your wells is?

A. I believe the -- Mark Kelly has that information recorded in his exhibit.

Q. Okay.

A. It's approximately -- I think they've declined to about 15 barrels a day or -- average.

Q. Now, is this thing going to be expanded later on?

A. I certainly hope so.

Q. You mentioned something about -- Let me ask you this: Is the 79, the injection well, is that going to be drilled through the Blinebry?

A. We have it right now through the Paddock. We may -- If the entire interval is approved, we could certainly take it down to the Blinebry for future -- you know.

Q. But the intent right now is just to take it to the Paddock?

A. We feel the Paddock is a much more interesting reservoir to test, has a much higher possibility of success than the Blinebry, just due to the higher perm and obvious

better continuity.

Q. Okay. You mentioned something also about in the producing wells, about isolating the Paddock from the Blinebry. Can you elaborate on that?

A. I may refer that to the engineer. I'm sure they'll use some type of plug to isolate it.

EXAMINER CATANACH: Okay, I believe that's all I have, Mr. Bruce.

MR. BROOKS: May I ask one question here?

THE WITNESS: Yes, sir.

EXAMINATION

BY MR. BROOKS:

Q. What is there about the reservoir or the production at this time that makes this a desirable time to commence the water injection project in this reservoir?

A. Well, sir, if you look at the production plot, I don't think we've reached the bubble point yet. A lot of the gas -- I would think that -- This is an engineering question that I may not be technically --

Q. Okay, well, I appreciate --

A. -- but I think we're still --

Q. -- your position here --

A. -- I think we're still above the bubble point, and it would be in the best interest of conservation to get pressure maintenance as soon as possible and increase

recovery.

MR. BROOKS: Okay.

EXAMINER CATANACH: Okay, this witness may be excused.

MARK KELLY,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

A. Mark Kelly.

Q. Where do you reside?

A. Midland, Texas.

Q. Who do you work for and in what capacity?

A. Arch Petroleum, senior petroleum engineer.

Q. Have you previously testified before the Division?

A. Yes, sir.

Q. And were your credentials as an expert engineer accepted as a matter of record?

A. Yes, sir.

Q. And are you familiar with the engineering matters related to this Application?

A. Yes.

MR. BRUCE: Mr. Examiner, I'd tender Mr. Kelly as

an expert petroleum engineer.

EXAMINER CATANACH: Mr. Kelly is so qualified.

Q. (By Mr. Bruce) Referring back to the Exhibit 7 just briefly, do you have a copy of that in front of you, Mr. Kelly?

A. Yes.

Q. Okay. Just again, reiterate what the initial injection and producing wells will be in the project area.

A. Initial injection well will be that Number 79, the proposed well. Proposed TD is 7300 feet, which is just to the Paddock and not into the Blinebry. The schematic of that is in our C-108 showing the setup for the injection well.

The producing wells are the direct offsets to the injection well Number 30, 49, 51 and 54, and those are Paddock wells producing at the present time. Two of those are still isolated from the Blinebry zone with plugs right now. Two of those have had the plugs pulled and are commingled, but we can reset those plugs and isolate so that we only have Paddock production coming from those four offset wells.

Q. Okay.

A. The average production from those four wells is 14 barrels a day right now. It ranges from 9 to 14 from those four wells. We still feel like they're in the

primary stage, so we have not seen any increase in the gas production from those wells.

Q. So even though you're down around that 15-barrel-per-well-per-day level, which is what you could call stripper state, this Paddock production is still primary production?

A. That's correct.

Q. Okay. So after the initial steep decline in these wells, it even flattens out --

A. Normally it's a hyperbolic-type decline. Initial decline is 55 to 65 percent and then begins to level out generally around 10 percent with an exponential decline from there on out.

Q. Okay. Maybe we'll come back to Exhibit 7 in a minute, but let's discuss the injection operations. Would you identify Exhibit 11 for the Examiner?

A. This exhibit is a copy of the Form C-108 for the project, and for reference the pages are numbered down in the bottom right-hand corner.

Q. Now, there's one question I forgot to ask you. What type of reservoir is this? I mean, what is the drive mechanism in the reservoir?

A. Solution gas drive reservoir.

Q. And once again, the injection well has not yet been drilled, has it?

A. That is correct.

Q. It won't be drilled unless you get approval for this project?

A. That is correct.

Q. Now, this is an old producing area. Referring to pages 1 through 11 of the exhibit, how many wells are there in the area of review which penetrate the Paddock-Blinebry?

A. There are 29 wells within the half-mile radius of the injector.

Q. And is a listing of those wells given at pages 2 through 11 of Exhibit 11?

A. Yes, included in those pages, yes, sir.

Q. Are any of these wells plugged and abandoned?

A. There are four wells that have been P-and-A'd. Data on those wells are included in the C-108. At the initial submittal of this form for administrative approval, there was some concern about the Travis Number 1 well, which is operated by Mid-Continent in there.

When initially submitted for the administration, there was some concern about the cement covering this zone in that well. We have gone back and researched those records, got some more records from Mid-Continent Energy about that particular well, and found that the cement top now should be at plus or minus 3600 feet, which is well above that Paddock zone.

Page 21 of that exhibit indicates the situation.

Q. Yeah, which -- there's several -- I think the total information is at pages what, 12 through 29?

A. Yes, that's right.

Q. Would you go down through that well by well and discuss whether those wells have been adequately cemented and what, if any, remedial work would be needed on any of the wells?

A. The Lamunyon 14 has been properly plugged; the Salt Mountain Number 1 was plugged without initial completion, drilled and plugged at that time; and the Lamunyon Number 47 is actually included in there, but it has not been permanently plugged but is still in the temporarily abandoned stage. And then the Travis Number 1, which was plugged back in 1967, but then later on another company attempted to re-enter the wellbore and make a producer out of it.

Q. So what you're saying is, what, the Lamunyon Number 47 will need to be plugged; is that what you're --

A. Yes, that is correct.

Q. Okay, so remedial work will need to be done on that well?

A. Right.

Q. The Salt Mount well, that one is adequate?

A. Yes, it was plugged initially after drilling.

Q. Okay, and then the other Lamunyon well, I forget the number of it --

A. Fourteen.

Q. -- Number 14, that one --

A. Properly plugged.

Q. -- is properly plugged.

And then the Travis Number 1, that one has kind of a convoluted history, doesn't it, Mr. Kelly?

A. Yes, there was concern about that one. 1948, the well was drilled, the 7-inch was cemented with 700 sacks at that time. Had a temperature survey that showed the top of the cement at 5400 feet. This information is indicated primarily on page 21 of that Exhibit, showing a wellbore schematic.

Two years later, they did a squeeze in the 7-inch at 4635 to -37, with 325 sacks. That calculation would indicate fill to the top of the cement at 3600 feet, plus or minus. There was no temperature survey or anything run to determine that.

In 1966 the well was P-and-A'd. The attempted to cut the 7-inch casing, once at 4489 and then again at 4416 and could not pull the casing. They went on up to 3608 and cut the casing at 3608 and could pull it at that depth. That pretty well fits with our estimated calculations of where that 325 sacks of squeeze would have gone. We knew

before the top of the cement was at 5400 feet with the temperature survey, and then the 325-sack squeeze would have brought it up to around 3600 feet.

And then when they -- and during the plugging operations when they attempted to pull that casing below there, they could not pull it, most likely because there was still cement below the pipe and they had to go up to 3608.

So we feel like we're covered pretty well with cement behind the zone, that Paddock zone, in this particular well.

Q. Okay, so that well in its current condition would present no problems for the injection project?

A. That is correct.

Q. Okay. Are the producing wells which are in the area of review properly completed, and will they prevent the movement of fluids to other zones?

A. Yes, I see no completion problems with any of the other producing wells. Again, when we initially submitted this 108 for administrative approval, there was some concern on the Lamunyon Number 10 well. It was indicated that the calculated top of cement was 5400, and that particular well would not cover the Paddock zone.

So again we went back and researched additional records on that well and did find that there was a second

cement job on the initial production casing setting of 325 sacks, so there was a total of 700 sacks, and there was a temperature survey run in that well that showed top of cement at 4876, and those records are indicated in the current C-108.

Q. Okay. What will be the proposed injection operations, as far as water injection goes?

A. We anticipate an average injection rate of 900 barrels of water per day into the injection well. Maximum rate is about 1500 barrels of water per day.

Q. And what will the pressures be?

A. We're looking at about 900 p.s.i., is what we anticipate to be the injection pressure, but certainly no higher than 1100 pounds, which is the maximum allowed at this time.

Q. You wouldn't initially exceed the .2-p.s.i.-per-foot limitation in the Division's rules?

A. That is correct, we would not exceed that.

Q. Okay. Is there a stimulation program for the injection well?

A. The only stimulation on the injection well would be an acid job, initial acid job.

Q. What about sources of fresh water in this area? Have the records been checked to determine where the nearest wells may be?

A. Yes, they have. The closest freshwater well is down in Section 29, which is off that smaller plat there, but it's about two miles away from our proposed injection well.

Q. Okay. What is the source of the injection water?

A. Injection water will be produced water from the surrounding wells in this field.

Q. Okay, so it will be coming from the same zones and just be reinjected?

A. That's correct.

Q. As a result, do you anticipate any compatibility problems between the injection and formation water?

A. No problems.

Q. Let's get back to the one thing about the current -- Roughly, what are the rates of these four producing wells, producing rates?

A. Okay, the four surrounding wells that we have there on -- I think it's Exhibit Number 7 -- Well Number 30 is 15 barrels a day, 14 barrels of water, 68 MCF.

Well Number 49 is 15 barrels a day, 2 water and 121 MCF.

Well Number 51 is 13 barrels a day, 30 water and 80 MCF.

And Well 54 is 9 barrels a day, 33 water, and 40 MCF a day.

Wells Number 30 and 54, the plug has been pulled. Those are the two currently commingled wells between the Paddock and Blinebry.

And 49 and 51 still have the plug installed to isolate the producing intervals. 49 and 51 are producing just from the Paddock formation.

Q. And again, what do you hope to recover in secondary production from these four wells?

A. We've estimated 15 percent recovery for primary and we're looking for another 15 percent for the secondary recovery, a one-to-one ratio on this particular flood. And then our pilot program, just using these four wells surrounding the injection well, we would hope to get an additional 60,000 barrels recovery from the pilot program.

Q. Will this project result in an increase in the amount of crude oil ultimately recovered from the reservoir?

A. Yes, it will.

Q. What are the approximate costs of this project?

A. Facility cost at our battery there where the water is all taken would be about $75,000. And then the cost to drill the 5300-foot injection well is approximately $600,000, a total of $674,000.

Q. Okay. And the project area requested is the east half, northeast quarter of Section 21 and the west half,

northwest quarter of Section 22; is that correct?

A. That is correct, which is 160 acres.

Q. What about an allowable for the project?

A. We would like to request an allowable of 200 barrels a day for the project. That would be for all four wells combined.

Q. Okay, that's not based on any depth bracket allowable --

A. No, it's not.

Q. -- it's just an outside number?

A. That's correct.

Q. Okay. In your opinion, is it prudent to apply enhanced oil recovery techniques to maximize recovery of oil from this pool?

A. Yes, I expect that the reservoir pressure decline will be stabilized with the injection of this water for a pressure maintenance program, and as a result, then, the solution gas drive energy will be conserved, give us a high recovery factor and extended life in the reservoir.

Q. Do you expect an increase in oil production rates?

A. I don't expect any significant increase in the oil rate, but more of a stabilized rate rather than a continued decline.

Q. Is this pressure maintenance project economically

and technically feasible at this time?

A. Yes, it is, based on assumed 60,000 barrels initial recovery and the cost we're looking at here to drill and complete the injection well, it would be an economical project.

Q. In your opinion, is the granting of this Application in the interests of conservation and the prevention of waste?

A. Yes.

Q. And was Exhibit 11 prepared by you?

A. Yes.

MR. BRUCE: Mr. Examiner, I'd move the admission of Arch Exhibit Number 11.

EXAMINER CATANACH: Exhibit Number 11 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Kelly, how would you determine when a positive production response to your water injection occurs?

A. Well, we can monitor wells, the production from the wells, individually. We'll continue to do that. When we see some production stabilization or a slight production increase, we'll know that we're getting some influence from the water.

And we'll probably also use some type of injection fluid in the water to monitor from the producing wells, include it into the injected water and monitor that from the producing wells to know when it has reached those particular wells.

Q. So are all of these wells pretty much declining at the same rate?

A. Yes. And most of them have come down from their 55-percent and are basically in the turn of the curve right now, 10- to 15-percent decline rate.

Q. Why would it be necessary -- well, let me ask you this: Do you plan on isolating the Blinebry and the Paddock and the two other wells?

A. Yes, we could do that, just in this pilot program, to see the effects of -- we intend to be putting water just in the Paddock zone because of the way we're setting up the injection well. I mean, we're not frac'ing anything, we're just doing a small acid job to clean it up. So we would hope everything would stay in zone, and we should get our response basically from the Paddock zones.

If we don't have the wells isolated, two of the wells isolated, we wouldn't know for sure where it was coming from. Say we got some of the chemical dispersion of whatever we're putting in the injection water to monitor the fluid, say it came out of a couple of the wells that

were not isolated by a bridge plug, we wouldn't know for sure that it was coming from the Blinebry or Paddock. But when we have the zones isolated we would know that for sure.

Q. So you plan on isolating those two wells?

A. Yes, that's correct.

Q. But not the two wells -- not the 42 and the 44

A. Those are the two further up north, no, not at this time.

Q. You're not going to do anything to those?

A. No.

Q. So the 54 and the 47 you're going to isolate?

A. Yes, the 54 and the 30.

Q. 54 and the 30.

A. Right. 49 and 51 are currently isolated.

Q. Okay. Now then, you said there was four P-and-A'd wells, right?

A. I think that's correct, yes.

Q. And the --

A. One of them is actually listed as TA'd. That was the Lamunyon 47, I believe.

Q. Okay, the Number 10, the Lamunyon Number 10 on page 12, that is a --

A. 10 is a producing well.

Q. It's a producing well, okay.

A. That was the one we initially had the concern about the cement top when this was submitted for administrative approval.

Q. Okay, and you found some additional cement that had been --

A. Right.

Q. -- squeezed behind that casing?

A. And a temperature survey that showed the top.

Q. Okay. The C.E. Lamunyon Number 79 --

A. That's the proposed injection well, that's a schematic for the completion of the injection well.

Q. I'm sorry, C.E. Lamunyon Number 14.

A. Oh, okay.

Q. There's two different --

A. Yeah, I think the 79 is the project. I think that name got on there, because this is the project --

Q. I got you.

A. I think the actual well name is below that.

Q. The 14. And the 14 you don't see any problem with?

A. No, sir.

Q. Okay, the Travis?

A. Yes, the Travis Number 1.

Q. Travis Number 1. Now, you said you did find where they squeezed some additional cement behind the

production casing?

A. Yes, they did a cement squeeze, 325 sacks. Before that squeeze the temperature survey showed the top of cement at 5400 feet. We did the cement squeeze, and assuming a 10-inch hole, we calculated the estimated top at about 3600 feet.

Q. Okay.

A. And then when they did P-and-A the well, attempting to cut the casing at 4400 and 4600, they weren't able to pull the casing at that point, and they had to go up to 3608 before they could pull the casing, which would indicate there was cement at least from that squeeze, would go along with the estimated calculations up to approximately 3600 feet.

Q. Okay, this is a P-and-A'd well?

A. It was P-and-A'd in 1966. In 1967 another company took the well over and attempted to re-enter the well, and they were unsuccessful in doing that, they lost quite a bit of junk in the hole, drill collars and washpipe and bits, and the well was temporarily suspended in 1967.

Q. Temporarily suspended?

A. Yes, they left it that way.

Q. So what's the well condition currently?

A. The schematic on page 21 shows what the well conditions are.

Q. The two plugs and the casing that you show at a depth of 4000 and a little bit deeper --

A. Yes.

Q. -- what are those right there?

A. Those are -- That's washpipe and drill collars and bits. And the same up at 1300 feet, that's washpipe and drill collars.

Q. And --

A. The attempt was to get back down to tie into that 7-inch and run it back to the surface, but they were never able to do that and kept losing junk in the hole.

Q. Okay, so you still have a situation where the casing -- there is no casing from 3600 up to 3000?

A. That's correct, the 7-inch casing has been cut at 3608.

Q. Was this well -- are there any perforations in the Blinebry or Paddock in this well?

A. It was a McKee well originally, and that is at about 9600 feet. And there were -- let's see, perforations -- perforations for the squeeze and the Abo at 6700 to 7200 feet.

So no perforations in the Paddock-Blinebry area.

Q. So it's your opinion that this well doesn't pose any kind of hazard to your injection operation?

A. That is correct.

Q. Where is this well located, Mr. Kelly?

A. It would be in Section 21, it would be the northeast of the southeast. There's a number 1 right there in the middle of that little 160 or 40. It's about 2000 feet just south of our injection well and a little bit to the west.

Q. What are the prospects of re-entering and plugging that well in a proper method?

A. They tried for several days and spent a lot of money trying to re-enter to tie that back, and it just continued to get worse, and that's when they suspended their operations.

Q. Now, who's "they" again?

A. At that time it was Branko. It's now operated by Mid-Continent Energy.

Q. It's just sitting out there in that condition?

A. That's correct.

Q. Okay. And you did mention something about a Number 47 well, which --

A. I believe that one is temporarily abandoned, not permanently abandoned, Lamunyon Number 47.

Q. And that's listed as a producing well or --

A. Yes, that's correct.

Q. And you said something needed to be done with that?

A. Yes, we would to go ahead and plug that well.

Q. It's currently T-and-A'd?

A. Correct.

EXAMINER CATANACH: Okay, that's all I have of the witness, Mr. Bruce.

EXAMINATION

BY MR. BROOKS:

Q. Okay, let me reiterate again to you the question that I addressed to the previous witness. What is there in terms of timing, what is there that makes this the appropriate timing for an injection well in this Paddock formation?

A. We still think we're in the primary phase, the gas doesn't appear to have come out of solution yet, so we still think we're above the bubble point and reservoir pressure.

And if we can maintain that we'll get a better recovery from the reservoir, rather than trying to maintain it after we've gone below the bubble point.

Q. And you think there'd be a hazard passing that if you postponed this project?

A. Yes, the longer we go, I think, the less chance we're going to have. We'd probably get some recovery but not as much as we anticipate right now.

MR. BROOKS: Thank you.

EXAMINER CATANACH: The witness may be excused.

MR. BRUCE: I have nothing further in this case, Mr. Examiner.

EXAMINER CATANACH: Okay, Mr. Bruce, there being nothing further in this case, Case 12,756 will be taken under advisement.

(Thereupon, these proceedings were concluded at 12:59 p.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 12756, heard by me on November 1, 2001.

David R. Catanach, Examiner
Oil Conservation Division

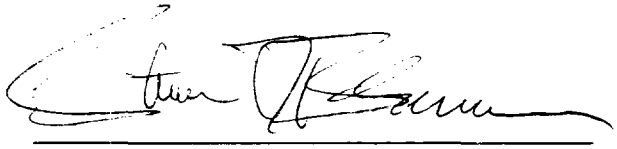
CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL November 6th, 2001.



STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 2002