STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISON
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

20 May 1987

EXAMINER HEARING

IN THE MATTER OF:

Application of Damson Oil Corporation for the extension of the proposed West Lusk-Delaware Pool and an exception to General Rule 505, Lea County, New Mexico. CASE 9138

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Jeff Taylor
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: James G. Bruce
Attorney at Law
HINKLE LAW FIRM
P. O. Box 2068
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

I N D E X CONT'D

MR. STOGNER: Call next Case Number 9138.

MR. TAYLOR: The application of Damson Oil Corporation for the extension of the proposed West Lusk-Delaware Pool and an exception to General Rule 505, Lea County, New Mexico.

MR. STOGNER: Call for appearances.

MR. BRUCE: Mr. Examiner, my name is Jim Bruce from the Hinkle Law Firm in Santa Fe, representing Damson Oil Corporation and I have one witness to be sworn.

MR. STOGNER: Are there any other appearances? There being none will the witness please stand and be sworn?

(Witness sworn.)

MR. BRUCE: Before we begin, Mr. Examiner, I would state that this case arises because the applicant had a 25 year old well that was producing 20 or 30 barrels of oil a day and suddenly began producing over 300 barrels a day, which, of course, isn't usual, and that's what precipitated this whole matter.

BRENT LOWERY,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q Mr. Lowery, would you pleawe state your full name and city of residence?

A My name is Brent Lowery and I live in Midland, Texas.

Q And what is your occupation and who is your employer?

A I am currently on rotational assignment as a production technician for Damson Oil Corporation in Midland.

Q And have you previously testified before the New Mexico OCD?

A No, I have not.

Q Would you please briefly state your educational and work background?

A I received a BS in petroleum engineering from Texas Tech University in August of 1984.

Upon graduation from Texas Tech University I went to work for Damson as a production engineer.

I've worked a variety of areas in West Texas and southeastern New Mexico.

I have recommended and designed recompletion, recompletions, evaluated resrvoir performance and potential, and have participated in evaluation of several waterflood projects.

I am also a member of the Society of Petroleum Engineers.

Q And are you familiar with Damson's application in Case Number 9138 and the engineering matters involved in that case?

A Yes, I am.

MR. BRUCE: Mr. Examiner, is the witness considered qualified?

MR. STOGNER: Mr. Lowery is so qualified.

Q Briefly, Mr. Lowery, what does Damson seek by its application?

A Damson Oil Corporation is requesting an extension of the proposed West Lusk-Delaware Pool to include Unit H in Section 29, Township 19 South, Range 32 East, Lea County, New Mexico, and also for eception to statewide Rule 505.

In addition, Damson is requesting relief from the usual shut-in requirements of th Oil Conservation

Division in the event of possible overproduction.

Q Would you please now refer to Exhibit Number One and describe that briefly for the Examiner?

A Exhibit One is a 0-sectionn land map centered around Section 29, T 19 South, R 32 East, Lea County, New Mexico.

The area of Section 29 highlighted in yellow represents acreage that Damson currently has under lease below a depth of 4500 feet.

The red, yellow, and blue markers represent active Delaware producers in the area.

The dark yellow marker located in Unit H of Section 29 represents Damson Oil Corportion's Southern California Federal No. 1 Well.

The red marker located in Unit D of Section 32 represents Texaco, Incorporated's State of New Mexico "CR" No. 1 Well.

The blue marker located in Unit D of Section 33 represents Amoco Production Company's Plains Unit Federal No. 7 Well.

Q Did you notify offset operators of Damson's application?

A Yes, I did.

Q And who did you notify?

A Based on the best information we had

available, I notified Amoco Production Company at their Hobbs office; Mobil Producing Texas and New Mexico, Incorporated, at their Hobbs office; Phillips Petroleum Company at their Odessa office; Texaco, Incorporated, at their Hobbs office; and Yates Petroleum Corporation in Artesia.

Q Would you please now refer to Exhibit Number Two and also Exhibit Number Eleven and describe what's on those exhibits?

A Exhibit Two is a wellbore schematic of Damson's Southern California Federal No. 1 as it currently exists.

Instead of describing all features of the sketch at this time, I will refer back to Exhibit Two at the appropriate time during discussion of the well's history.

Also at this time I'd like to describe Exhibit Eleven, which is a decline curve for Damson's Southern California Federal No. 1. It is submitted at this time to help understand their chronology of events to be described.

Q Would you please go into the history of Damson's well?

A Okay. El Paso Natural Gas drilled the Southern California Federal No. 1 in the summer of 1962 to a total depth of 12,830 feet and completed it as a dual Strawn and Morrow producer.

As noted on Exhibit Two, the following casing program was used:

13-3/8ths inch 54.5 pound J-55 surface casing was set at 826 feet with 950 sacks of cement.

9-5/8ths inch 40 pound N-80 intermediate casing was set at 3947 and cemented in place with a total of 2,725 sacks of cement. This should give adequate protection to all fresh water zones.

A split string production casing design consisting of 5-1/2 inch 17 pound P-110 pipe from 8,048 feet to 12,841 feet, and 5-1/2 inch 17 pound N-80 pipe from zero to 8,048 feet were cemented in place with 850 sacks.

A temperature survey indicated the top of cement to be at 10,380 feet from surface.

After Morrow and Strawn perforations were place, two Brown Oil Tool hydraulic packers and two strings of 2-1/16th integral joint tubing were run.

The long string packer isolating the Morrow perforations was set at 12,396 feet.

The short string dual packer was set at 11,337 feet to isolate Strawn perforations from the tubing and casing annulus.

This equipment remained in place until August, 1982, when Dorchester Enhanced Recovery began operations to convert the well to artificial lift. At that time

the Morrow completion was temporarily abandoned by means of a Baker "FW" type equalizing check valve and tubing stop set in the long string tubing at 11,337 feet after having mud pumped in it.

The long string was then jet-cut and pulled. An unsuccessful attempt was made to unset the hydraulic packer at 11,337, and it was left in the hole.

After an acid treatment the sucker rod pumping system was installed and the well placed on production.

After a casing leak occurred on September 29th, 1986, operations were initiated to protect the Strawn completion and repair the leak, which was located at 4631 to 4646. As noted on Exhibit Two, this interval was squeezed with 485 sacks on October 5th, 1986, with the top of cement estimated to be at 2450 feet, which is 1900 -- excuse me, which 1497 feet up inside the 9-5/8ths intermediate casing.

The squeeze was drilled out and a bridge plug protecting the Strawn was removed. A packer was run and set above the hydraulic packer at 11,337 feet.

The tubing was swabbed and no fluid entry was obtained. Apparently the Brown packer had become plugged. Several unsuccessful attempts were made to circulate fill off of the packer and regain communication through it with the Strawn.

After several attempts were made to release the packer it was deemed necessary to cut over and fish it to recover production and also to get a cast to -- and also to set a cast iron bridge plug over the Morrow to abandon it.

After the Morrow tubing stub with the plug in it was jarred loose, casing pressure built up ot 1000 psig and began flowing mud and gas, presumably from the Morrow. No show of oil had been realized at this time. After the packer was cut over it could not be pulled.

Estimated expenditures at this time had exceeded the AFE amount verbally authorized by Damson's partners. Instead of continuing with fishing operations, it was decided to place the well back on production until a supplemental AFE could be prepared, circulated, and signed by all joint interest partners.

After the decision was made, preparations to put the well on production were begun.

Tubing was run and the well was swabbed to clean up drilling mud that was being recovered. Problems caused by paraffin, drilling mud, and keeping the well under control, required an additional 7-days work before production resumed. A supplemental AFE was prepared to cover over-expenditures already incurred, plus additional funds to complete fishing operqtions and abandonment of the Morrow.

Several days after production was resumed on October 29th, the well began to flow and pump 200 barrels of oil plus 35 barrels of water and 170 MCF of gas per day.

November production totaled 5,833 barrels of oil, which an average rate of 194 barrels per day.

During December 9,871 barrels were produced, averaging 318 barrels per day. Production for the first 12 days of January, 1987, averaged 274 barrels per day. 5,135 barrels of oil were produced in January, bringing total oil production from November 1st, 1986, to February 1st, 1987, to 20,839 barrels.

Production prior ot September 28th, 1986, was 32 barrels of oil per day with 50 to 60 psig casing pressure.

Oil, gas, and water samples were taken from several wells in the area for comparison with historical data. Oil and gas samples do not correlate with either Strawn or Morrow data and water samples correlated very well with known Delaware producers. Knowing that the Strawn and Morrow were both open and that oil, gas, and water samples indicated that production was coming from another source, it was decided to attempt to pinpoint the source of production while the well was still capable of flowing.

On January 12th, 1987, operations were begun to determine the source of production. A packer with

an on/off tool was run and set at 11,247 feet. The well flowed 131 barrels of oil and 29 barrels of water up the annulus in 12 hours after the packer was set. The tubing was swabbed and started flowing, also. An attempt to isolate the Strawn and Morrow by setting a blanking plug in the packer failed, so the packer had to be pulled.

Problems with getting the packer out of the hole necessitated the use of an overshot. A tight spot in the casing at 4613 had to be reamed to allow passage of the overshot and fishing to be completed.

On January 24th, 1987, a reconditioned packer and retrievable bridge plug was then run. The bridge plug was set and tested at 11,141 feet, which on that date effectively isolated the Strawn and Morrow. As noted on Exhibit 2, the casing was tested and a hole was located between 7958 and 8085. That packer failed and a third packer was run and set at 5501 feet.

At this point no flow up the tubing or annulus had occurred since the bridge plug had been set at 11,141. Setting the packer at 5501 feet was done to determine if the hole at plus or minus 8000 was the source of production. The fact that this hole appeared after the squeeze at 4631 was completed suggested it as a source of production.

As the tubing was swabbed, annular pres-

sure built up and annular flow began. At the same time the tubing swabbed dry and went on vacuum. The tubing was then lowered and the packer reset at 7805. Annular flow continued. Noise and temperature logs were run in an attempt to pinpoint the source but by the time they were run, the well had loaded up and very little flow was occurring. Nothing definitive was suggested by either log.

In addition to the well not flowing, tool problems were experienced which resulted in an unusable temperature log presentation. Schlumberger agreed to run the next temperature log at no charge because of the problems experienced.

Since fluid was entering the casing at some point above 5501, the second bridge plug was set at 7156. A second hole was located between 4615 and 4677. The packer was removed and production equipment was run. Production was 108 barrels of oil plus 62 barrels of load water the first 12 hours after pumping resumed.

Production for February 10th was 393 barrels of oil per day plus 122 barrels of water plus 220 MCF of gas.

After this work was completed the Bureau of Land Management was consulted to find out what would be required to bring this well into compliance to their

satisfaction with Federal operating regulations. In addition, the presentation was given to NMOCD personnel in Hobbs. At that time Damson was advised by the NMOCD to amend C-115's to reflect Delaware production from the Southern California Federal No. 1 back to January the 24th of 1987.

AT this point we felt comfortable that production was coming from the Delaware as opposed to the Bone Springs, but we did not know what specific Delaware zone was producing. Log analysis showed a number of possibilities.

Because of the poor mechanical condition of our wellbore, in addition to not knowing at that time the exact source of production, it was requested that Damson not be required to squeeze the hole at 4615 to 4577. After a discussion with Pete Chester of the BLM in Roswell, the following requirements to abandon the Strawn and Morrow and plug back the Delaware were made. The abandonment of the Strawn and Morrow would have to be done in one of two ways.

One method required that the dual packer stuck at 11,337 feet be recovered and a cast iron bridge plug be set between the Strawn and Morrow completions, with a second bridge plug set above the Strawn and capped with 50 feet of cement.

The second alternative was to set a re-

tainer 50 feet above the dual packer and squeeze both zones together.

To complete plugback opertions the hole between 7958 and 8085 would have to be squeezed. After these requirements were met, then production of Delaware from the casing leak between 4615 and 4677 would be allowed with no additional cementing work.

A meeting of all partners in the well was held at Damson's office in Midland to discuss what plan of action would be appropriate. The main point of concern was the poor mechanical condition of the production casing. As noted on Exhibit Two, two additional leaks occurred after the initial hole was cemented. Also, as I've already mentioned, the the tight spot in the casing at 4613 had to be reamed to allow passage of an overshot.

In the process of trying to pinpoint the source of production in January, great difficulty was experienced in trying to get the tools to set. To avoid a great risk of losing the wellbore by fishing the dual packer, a decision was made to give up plans of possibly re-entering the Strawn at a later time and permanently abandoning the Strawn and Morrow by squeezing both zones with the dual packer in place.

It was decided to attempt to run a second noise and temperature log and definitively locate the pro-

ducing zone. The logging tools worked properly and and results of this temperature survey will be presented as Exhibit Eight later in the testimony.

As noted on Exhibit Two, on April 29th, 1987, a retainer was set at 11,292 feet and a running squeeze to 4500 psig was obtained on the Strawn and Morrow completions.

A second retainer was set at 7812 and the hole between 798 -- 7958 and 8085 was cemented with 150 sacks.

Calculated top of the cement outside the casing is 7585 and the new plugback TD is 7746.

Production tubing has not been run below 4632 since the cement was placed, so integrity of the wellbore below this point is not known. Both cementing procedures were witnessed by BLM personnel.

Q Would you please now refer to the cross sections marked as Exhibits Three, Four, and Five, and discuss what they show with respect to the producing zone?

A Exhibit Three is a structural cross section A-A' that includes from left to right wells located in Unit F and D in Section 33, Units I and H in Section 29, and Unit M in Section 21.

This cross section runs from south to north as shown on the index map. A subsea datum of -800

feet was used.

The color scheme used to identify features on this exhibit are as follow:

Green represents productive sands.

Yellow represents nonproductive sands.

Brown represents nonproductive shaly sands.

And white represents porosity below 4 percent.

The purpose of Exhibit Three is to identify the north/south horizontal limits of the present Lusk Delaware Field.

In 1969 Amoco Production Company drilled the Plains Unit No. 9 as a shallow Delaware test and recompleted their Plains Unit No. 7, which was formerly a Lusk Strawn producer. Both commercial -- both were commercial producers and the new field was designated as the Lusk Delaware Field.

As noted on Exhibit Three, the interval for 4828 to 4836 was perforated in the Plains Unit No. 9 and produced about 25,000 barrels of oil before being abandoned. This zone corresponds to the non-productive interval from 4840 to 4860 that was tested in the Plains Unit No. 7.

Moving from south to north this zone is productive in the Plains Unit No. 9, nonproductive in the

Plains Unit No. 7 and disappears almost entirely before it gets to Damson's Southern California Federal No. 4, No. 1, and the Plains Unit 4 Well.

Most production for the Lusk Delaware Field has originated in an interval from 4712 to 4732 in the Plains Unit No. 7. Again following the cross section from south to north beginning with the Plains No. 9, the zone is a nonproductive shaly sand, a very good productive sand which has produced in excess of 197,000 barrels of oil in the Plains Unit No. 7, grades into a shaly sand in Damson's Southern California Federal No. 4, Southern California No. 1, and Plains Unit No. 4 Well.

Exhibit Four is a structural cross section B-B' that includes from left to right wells located in Unit A of Section 31, Unit D and Unit A of Section 32, Unit D of Section 33, Unit N and Unit J of Section 48. This cross section runs from west to east, as indicated on the index map. The datum of 900 -- of 800 -- minus 800 subsea was used and the same color scheme used in Exhibit Three is used here, as well.

The purpose of Exhibit 4 is to identify the east/west horizontal limits of the Lusk Delaware Field.

Texaco's State of New Mexico "DH" No. 1, located in Unit A of Section 32 and Amoco's Plains Unit No. 10, located in the Unit N of Section 28, were both drilled

as extensions of the Lusk Delaware Pool. Both wells were noneconomic producers which were abandoned.

Amoco perforated the Plains Unit No. 10 from 4719 to 4729, which is the same zone that was productive in the Plains Unit No. 7, even though it appears as a shaly sand. Prodution history verifies this. Cumulative production for that completion was 2,884 barrels of oil.

Texaco perforated two zones from 4760 to 4780 and 4804 to 4816. Both appear as nonproductive shaly sands. Cumulative production for that completion is 583 barrels of oil.

It is readily apparent that the only productive Lusk Delaware zone in this east/west cross section is the 4712 to 4732 zone in the Plains Unit No. 7.

Exhibit Five is a structural cross section C-C' that included from left to right wells located in Unit I of Section 31, Unit D of Section 32, Unit K and Unit H of Section 29, and Unit E of Section 28.

This cross section runs from southwest to northeast as shown on the index map. A datum of -800 feet subsea was used and the same color scheme used in Exhibits Three and Four is used here, also.

The purpose of Exhibit Five is to show that the zones from 6416 to 6422, which was recently completed in Texaco's State of New Mexico CR No. 1 Well, is not

only present but much better developed and potentially productive in Damson's Southern California Federal No. 1.

Moving from left to right across the section, development of the West Lusk Delaware Pool can be traced.

On the Middleton Federal "B" No. 2 a net thickness of 3 feet and porosity of 15 percent was calculated.

Moving to the Texaco State "CR" Well, which is the discovery well for this reservoir, net thickness is increased to 8 feet and porosity calculated to be about 14 percent.

Initial potential for this zone was 172 barrels of oil, 196 MCF of gas per day, from perforations at 6416 to 6422.

As we continue to move northeastward, the Damson Southern California Federal No. 1 zone development continues. In the Southern California Federal No. 3 net thickness is 16 feet and porosity calculates to be 17.9 percent.

In Damon's Southern California Federal No. 1 the West Lusk Delaware pay is 16 feet thick with about 17 percent porosity.

Exhibit Six is a structure map based on the top of the West Lusk Delaware zone. The four digit num-

ber representing the subsea elevation top is listed below each well location used to construct the map.

Colored markers represent active Delaware wells in the area.

The blue marker located in Unit D of Section 33 represents Amoco's Plains Unit No. 7, although it is not completed in the West Lusk Delaware zone.

The red marker located in Unit D of Section 32 represents Texaco's State "CR" No. 1 Well, which again is the discovery well for this pool.

The yellow marker located in Unit H of Section 29 is Damson's Southern California Federal No. 1, which contend is in fact producing from the West Lusk Delaware zone.

Exhibit Six is designed to show that no structural change exists that would cause Damson's well to be nonproductive relative to the Texaco well. Over a distance of roughly 1.3 miles the subsea elevation between the Damson well and the Texaco well changes by only 18 feet with the Damson well being 18 feet low in structure to the Texaco well.

Q Would you please now refer to Exhibit Seven and discuss the net porosity in this area?

A Okay. Exhibit Seven is a Phi-H map of the West Lusk Delaware pay. Numbers located adjacent to the

various well locations represent a porosity times thickness value as calculated from sonic porosity logs.

As in the previous exhibit, the yellow marker located in Unit H of Section 29 represents Damson's Southern California Federal No. 1.

The red marker located in Unit D of Section 32 represents the Texaco State "CR" No. 1.

And the blue marker located in Unit D of Section 33 represents Amoco's Plains Unit No. 7.

The blue marker was plotted for reference only and has no bearing on the conclusion to be demonstrated by this exhibit.

Exhibit Seven is designed to demonstrate the distribution of net porosity thickness in Section -- in Sections 29 and 32. It also shows that Damson's Southern California Federal No. 1 has roughly 2-1/2 times as much net porosity thickness as Texaco's State "CR" No. 1. In addition, the gross interval thickness in Damson's well is 16 feet and in Texaco's well it is only 8 feet.

Based on zone thickness along the Damson well could be expected to have two times the productivity of the Texaco well.

Q Would you please now move on to the temperature log marked as Exhibit Eight?

A Exhibit Eight is a temperature log run on the Damson Oil Corporation Southern California Federal No. 1 by Schlumberger on April 7, 1987.

The log was run from surface to 7080 feet. Since it was logged through tubing which was set at plus or minus 4336, a portion of the log from surface to 4400 feet was not included.

The heavy solid lines represents a normal temperature gradient in this well. This gradient was calculated using a temperature reading at 4400 feet and a second at 7050 feet.

The resulting calculated gradient is .82 degrees Fahrenheit per 100 feet.

The interpretation made by myself and concurred with by Schlumberger is that fluid is channeling up behind pipe from a point in the vicinity of 6450 feet from surface, referring to that portion of the log, this can be readily observed.

As can be seen by correlation of the gamma ray tract with an open hole log, the West Lusk Delaware zone is located in the vicinity where the anomaly appears. The temperature scale on the log increases from left from right. Since the anomaly originating at 6450 falls to the right of what is considered to be the normal gradient line, the heating effect is represented. This hearing effect is

most probably caused by warmer fluid entering the casing-formation annulus at that point and channeling upwards. This channel can be traced up to about 5,250 feet where the anomaly dissipates.

Q Please move on to Exhibit Number Nine and discuss its contents.

A Exhibit Nine is the tabulated results of oil and gas analyses run by Bell Petroleum Labs on oil and gas samples taken from Amoco's Plains Unit Federal No. 7, producing from the Lusk Delaware Pool; Texaco's State of New Mexico "CR" No. 1, which is producing from the proposed West Lusk Delaware Pool; and Damson's Southern California Federal No. 1, which is treated as an unknown.

Inspection of gas analyses tabulated on Pages 6, 7, and 8 of Exhibit Nine reveals a close correlation between the percent in methane measured in the Texaco State "CR" No. 1 sample and Damson's Southern California Federal No. 1 sample; however, a difference of about 2 percent is noted between both samples as compared with Amoco's Plains Unit No. 7 gas sample.

The chromatographic analyses of the heptanes plus fractions of the oil samples, in addition to determination of API gravity and molecular weights of the heptanes plus fraction, a positive determination of the origin of Southern California Federal No. 1 production can be made.

Page 2 and 3 of Exhibit Nine provide a description of methods and equipment used in the analyses.

The Southern California Federal No. 1 oil sample had a gravity of 41.5 degrees API at 60 degrees Fahrenheit. This was almost identical to the State -- the Texaco State "CR" No. 1 sample, which was measured to be 41.3 degrees API at 60 degrees Fahrenheit.

The API gravity of Amoco's Plains Unit No. 7 sample was measured to be 38.2 degrees API.

Since API gravity generally increases with formation depth, oil produced from the shallower zone completed in the Plains Unit No. 7 would be expected to have a lower gravity than oil produced from the deeper Delaware zone completed in the Texaco well.

Based on API gravity alone, production from the Southern California Federal No. 1 appears to originate from the same zone as the Texaco State "CR" No. 1.

The second point of comparison is the measured molecular weights of the heptanes plus oil fraction.

The heptanes and heavier fractions have a much higher boiling point than normally experienced atmospheric temperatures. As a result sampling techniques and handling do not affect or alter their composition, which allows accurate analytical results.

Comparison of the measured molecular weight of various samples tabulated at the bottom of the fourth page in Exhibit Nine indicate a similarity of the Texaco State "CR" No. 1 sample and Damson's Southern California Federal No. 1 sample. Neither of the two compare favorably with the measured molecular weight of the Plains Unit No. 7 sample. Again, based on measured molecular weight of the heptanes plus fractions, oil production from the Southern California Federal No. 1 appears to originate from the same zone as that of the Texaco State "CR" No. 1.

The most definitive of the three analysis techniques used for identification purposes is a chromatographic measurement of the heptanes plus oil fractions. From these measurements relative ratios of normal paraffinic hydrocarbons through C30 to C13 are tabulated.

In addition to the normal to C13 ratios, relative ratios of the isomers, farnesane, pristane, and phytane, to their normal paraffinic --

MR. STOGNER: Back up on those three.

A Okay.

MR. STOGNER: What are they again?

A Okay, the farnesane is an isomer of C14.

MR. STOGNER: Okay. How do you

spell that?

A F-A-R-N-E-S-A-N-E.

MR. STOGNER: Okay, continue.

A And pristane.

MR. STOGNER: Spell that.

A P-R-I-S-T-A-N-E.

MR. STOGNER: Okay.

A And phytane is P-H-Y-T-A-N-E.

MR. STOGNER: Okay, now what was the carbons again on each one?

A The farnesane is a C14 isomer. The pristane is a C17 isomer, and phytane is a C18 isomer.

MR. STOGNER: Okay. Thank you.

A Okay. Results of these analyse are tabulated for comparison on page four of Exhibit Nine.

The ratios, as just described, are considered to be very indicative of the origin of crude oil. Hydrocarbons formed under different conditions would have different ratios.

In the case of the particular Delaware samples being compared in Exhibit Nine, the ratio of pristane to normal C17 provides a strong point of positive correlation between the State "CR" No. 1 sample and Southern California Federal No. 1 sample. It also provides a distinction between those two samples and a sample collected

from Amoco's Plains Unit No. 7.

In summary, all three analytical techniques show positive correlation between Texaco's State "CR" No. 1 samples and Damson's Southern California Federal No. 1 samples. At the same time all three techniques provide differentiation of those two samples from the Plains Unit No. 7 samples.

Q Please move on to the water analysis marked as Exhibit Number Ten.

A Exhibit Ten is a copy of water analyses performed by Martin Water Lab on Damson's Southern California Federal No. 1, Texaco's State of New Mexico "CR" No. 1, and Amoco's Plains Unit Federal No. 7.

This exhibit is presented to provide a complete produced fluid sample analysis. No real distinctions can be made between West Lusk Delaware and Lusk Delaware zones using this information.

Q Please move on to Exhibit Number Eleven, which has already been partially discussed and discuss briefly the change in production rates.

A Okay. Exhibit Eleven is a decline curve of our Damson Southern California Federal No. 1. It's to be noted in the production reflected in October, this is the area in which the casing leak initially appeared and the work on fishing the packer above the Strawn and Morrow was

done.

MR. STOGNER: Okay, I'm having a hard time locating Exhibit Eleven.

A It was presented --

MR. STOGNER: Okay. Start over again on Exhibit Eleven.

A Okay. Exhibit Eleven is a decline curve on the Damson Southern California Federal No. 1.

The production prior to September 28th was typical Strawn production. That's known Strawn production. The area of no production in October of 1986 is the time the initial casing leak appeared and the work was done and they put the well back on production.

The work done to try to locate the source of production was done in late January of 1987, which corresponds with the gaps in production there, and --

Q What has been the approximate increase in production due to the casing problem?

A Production of this well prior to the casing leak was approximately 30 barrels of oil per day. Subsequent to the casing leak has been initially in excess of 300 barrels of oil per day.

Q Okay. Would you please move on to Exhibit Number Twelve and describe what it shows?

A Exhibit Twelve is a decline curve of

of Amoco's Plains Unit No. 7 Well. An average daily production rate was calculated by dividing monthly production figures reported to the Commission by the number of days in the corresponding month.

This was done to provide a curve with units consistent with Exhibit Eleven, which has already been described.

Upon comparisons of Exhibits Eleven and Twelve it is apparent -- it is apparent that the capacity of Damson's Southern California Federal No. 1 Well is much greater than that of Amoco's Plains Unit No. 7 Well when it was initially completed.

The Amoco well's producing zone has a gross thickness of 32 feet and porosity of about 21 percent as compared with 16 feet of gross pay and 17 percent porosity in the Damson well.

Damson's well has demonstrated a deliverability of two to three times that of the Amoco well.

Based on the reservoir performance it is obvious that the two wells are producing from different zones.

Q Mr. Lowery, before we move on to Exhibit Number Thirteen, when the well was producing from the Strawn formation what was the spacing for that well?

A Well, the well had 160 acres assigned to

it.

Q Under the local pool rules?

A Yeah, under special pool rules.

Q Would you please now describe Exhibit Thirteen for the Examiner?

A Exhibit Thirteen is a Form C-102 that has been prepared to rededicate only 40 acres to the Southern California Federal No. 1 Well and it will be submtted to the proper offices upon our return to Midland from this hearing.

Q Is the ownership in the northeast quarter of Section 29 common?

A Yes, it is.

Q And who is the lessor of that area?

A Damson.

Q I mean is the Federal government the lessor there?

A Yes, it's a Federal lease.

Q Mr. Lowery, would you please discuss Damson's request that any possible overproduction of the well be made up at a reduced production rate rather than by a complete shut-in of the well?

A In reference to Damson's request for relief from possible complete shut-in of the well due to possible overproduction, referring to Exhibit Eleven, we would point out that our well is currently producing at a rate of

approximately 200 barrels per day; however, the allowable for the proposed West Lusk Delaware is 142 barrels per day and the Lusk Delaware allowable is 80 barrels per day.

In late March I met with personnel of the Hobbs OCD office to discuss possible overproduction from the well. Jerry Sexton suggested that our production records be amended back to January the 24th of 1987 to reflect Delware production.

Amended C-115's were prepared and submitted; however, because of the poor condition of this well as shown by our casing leak and othe problems, Damson requests that it not be required to completely shut-in the well. Instead Damson requests that it be allowed to produce the well at a reduced rate of 100 barrels per day until any overproduction is made up.

We feel this is necessary to prevent total loss of the wellbore due to downhole mechanical problems. We would note that Texaco's State "CR" No. 1 wellbore experienced casing problems during their recent recompletion and it resulted in loss of access to the wellbore below the Delaware.

Q Were Exhibits One through Thirteen prepared by you or obtained from Damson's business records?

A Yes, they were.

Q And in your opinion will the granting of

this application be in the interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, it will.

MR. BRUCE: We'd move the introduction of Damson's Exhibits One through Thirteen.

MR. STOGNER: Exhibits One through Thirteen will be admitted into evidence.

MR. BRUCE: And I have no further questions of the witness at this time.

MR. STOGNER: Let's take a five minute recess.

(Thereupon a recess was taken.)

MR. STOGNER: We'll continue Case Number 9138.

Mr. Bruce, do you have any further questions?

MR. BRUCE: No, sir.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Lowery, let's refer to your Exhibit Eight, which is the log, the temperature log.

Okay, I'm looking at the depth of about 6450. Now, if I look to the temperature line to the -- on the lefthand side of the line bar, now that indicates where the flow is coming in?

A Yes, sir. The dotted line to the right of the heavy, solid line, where it departs from that solid curve, would indicate the point where fluid -- about the point where fluid is entering.

Q So we're looking at the righthand side.

A Yes, sir.

Q Okay, I've got the solid line, which is going up --

A The solid line represents the -- what would be the normal gradient.

Q Okay, when I look at the lefthand side at about 6470 there tends to be a norm -- I guess that's the cable speed.

A Right, that's the cable speed curve, the movement to the right.

Q All right, would that indicate -- let's look at the temperature, the dotted temperature surevy line on the lefthand side and that doesn't seem to be moving. Is there any indication of why, or can you tell me why that temperature line didn't move?

A That temperature line on the left track

of the log is a very small scale temperature log where each chart division represents approximately -- represents 10 degrees of temperature change for each chart division.

The righthand track, each chart division on that side represents 1/2 of one degree temperature change so the temperature change is very slight and would not show up on the -- the small scale temperature curve.

Q Okay, if I follow on the lefthand side, the solid line, it seems to cross over at about 6650. Is there indication there or does that tell me anything? Between 6650 and 6700?

A That's a very small anomaly that could be attributed to possibly a number of things but I don't feel there's any significance in this discussion.

Q Okay, but up there at 6450 where the line obviously does cross over and makes a hotter temperature, I guess it would be, all the way up on this scale, does indicate a flow at that point.

A That is correct.

Q And referring back to Exhibit Two, behind the casing, the 5-1/2 inch casing, the top of the cement at 7585, and then you have another squeeze job with the bottom of the cement behind the casing there at 4615, is that correct?

A The bottom of the squeeze rigorously

would be considered 4646 feet, because that's the bottom limit of the test. The hole is somewhere between 4631 feet and 4646 feet and we do not know in that 15-foot interval what the precise point of the hole is.

So in our case we considered it to be the bottom of the interval.

Q Okay, I was reading the worng one in there.

So you essentially have fluid filling up from 7585 up until the hole in the casing at 4615.

A Right, there is no -- not believed to be any cement in that area.

Q Is there any tubing in this hole presently?

A Yes, sir, the tubing is currently set at about 4633 feet.

Q Is there a packer in there, too?

A No, there is not. It's a conventional sucker rod pumpng system that's installed.

Q Is this a temporary completion or will you come back and recomplete this in a more permanent manner and will you go down there and perforate the casing at 7585?

A Currently we do not have any plans to do that. After a discussion with the BLM we've done all that they will require us to do as far as a recompletion is con-

cerned.

We've obtained permission from them to produce the well as is from the casing leak between 4615 and 4677.

Q When we say casing leak, what kind of profile do we see in that casing? Do we see holes? Do we see --

A In all probability --

Q -- what?

A -- this isn't known for certain, but in all probability the casing has been corroded from the outside in by salty Delaware formation fluids, water. The Delaware formation has a very high salt content and is prone to cause corrosion if it cannot be treated and in this case there's no way to put chemical behind the 5-1/2 casing in the casing formation annulus, so this Delaware water has been allowed to corrode the casing most probably for the life of the well, which is approximately 25 years.

Q Now is this salt water from that upper zone? Is it still flowing into the casing?

A We have not established that a zone up the hole is flowing salt water at all; just from the residual water left when it was drilled and percolation over the years, the formation water probably isn't flowing but has accumulated in the wellbore, you know, over a period of time

but we are getting produced water most probably from the zone we suspect is producing the oil, as well, and we have noted a similar water/oil ratio in our produced fluid as Texaco has in their well.

Q Let's talk about the Amoco 7 Plains Unit, or Plains Unit Well No. 7. The perforated interval is at 4840, 4860, is that correct?

A In the -- that was a nonproductive completion. The productive completion is from 4712 to 4732 in the Amoco Plains Unit No. 7.

The zone you mentioned was perforated, acidized, and was swabbed dry.

Q Okay.

A And then later squeezed.

Q Now the production intervals in the Amoco well, it does not correlate to your well, is that correct?

A By the time it -- it stratigraphically pinches out, grades into a shaly sand, which we contend is nonproductive in our well by the time it reaches that area, and we base this on the results of the completions of other Delaware wells in the immediate area, namely the Amoco Plains Unit No. 10, which was specifically shot in the same zone that correlates to the productive interval in the Amoco Plains No. 7 and turned out to be nonproductive, or noneconomically productive.

Q From 6450 to 4640 from the logs and from the data that you know, is there any possible thief zones for this oil to creep into, that you know of?

A We don't believe upon analysis of the logs, normal Delaware zones have to be fracture treated before they become productive and we do not believe that any zone exists that would be a thief zone between those two intervals.

Q What is the drive mechanism for the -- that West Lusk Delaware producing sand?

A The drive mechanism appears to be a solution gas drive type reservoir. There is no reason to believe that there is a water influx of any kind and there doesn't appear to be a gas cap initially present.

Q Now, from the time that the fluid is entering into behind the casing and the time that it makes its way up to the perforations in the casing, we'll call those holes perfs at this time, that's quite a hydrostatic head, about 2000 feet, isn't it?

A Yeah, that's correct.

Q Do you -- do you see this any problem presently or in the future to overcome this 2000 --

A At present it doesn't present a problem. It's possible that it might present a problem later in the life of the well when the reservoir pressure declines to

such that not enough gas can be produced to aerate the column, fluid column behind the pipe and carry out any produced fluids.

Q What kind of gas production are you seeing up at the surface?

A The GOR is running approximately 500-to-1 and it's held constant throughout this period of production, since the Delaware started producing through the casing leak.

Q Okay, let's refer now to Exhibit Number One. The yellow shows Damson's acreage, is that correct?

A That is correct.

Q Okay. Do you know the horizontal extent of the present Lusk Delaware Pool?

A Yes, sir. It appears that the horizontal extent would be limited to the northwest quarter of Section 33 and in the case of the Amoco Plains Unit No. 7 zone, the limits of that would in all probability be that Unit D in Section 33.

There are three -- three plugged Lusk Delaware wells offsetting the Amoco Plains Unit No. 7 that would help verify this.

Q But do you know the legal limits of the Lusk Delaware Pool at this time?

A Not as prescribed by the Commission, no,

I don't.

Q For the record, the boundaries of the Lusk Delaware Pool will take in the northwest quarter of Section 33, the southwest quarter of 28, the northeast quarter of Section 32. You're roughly about a quarter of a mile away from the pool boundaries of the Lusk Pool and the proposed boundary, I believe, for the proposed West -- the proposed boundary for the proposed pool in the West Lusk Delaware Pool, I believe takes in the northwest quarter. Is that correct? Is that your understanding?

A That's my understanding.

Q For the record, that is scheduled to be heard June 17th.

Looking at our records it is advertised, or will be advertised, and shown that it's classified as an oil pool for Brushy Canyon production.

Could you elaborate where the Brushy Canyon falls within the Delaware Pool?

A My geologic experience is limited and I could not define the exact location of the beginning of the Brushy Canyon but I do know it is the lowest of the three canyon members of the Delaware Mountain Group.

Q Okay, how about the Amoco production? Do you know if that's within the -- within this Brushy Canyon or is it considered another canyon production?

A I believe it's considered as one of the upper members of the canyon group, Delaware Mountain Group.

I do not believe it's part of the Brushy Canyon.

Q But you don't know its vertical extent as far as the Lusk Delaware Pool goes at this time?

A No, I don't.

Q And I'm assuming that the proposed pool will be developed on 40-acre spacing, is that correct?

A Yes, sir.

Q As is the Lusk Delaware presently, is being developed on 40, is that correct?

Okay, you're asking that this pool be extended, the proposed pool be extended to include your well. Do you foresee what acreage it would entail to make this (unclear) over to your well?

A I would -- I would assume it would have to include all of Section 29 in addition to the quarter section already described.

Q Okay, let's look at Section 29 on Exhibit One. Down in the southeast quarter there shows to be a Southern California Well No. 4. Do you know what production that is?

A That currently is a Strawn well that Damson is currently producing.

Q Okay. Let's look at the -- let's look up in the northwest quarter, I show two wells; one to be plugged and abandoned and that shows to be the Watson Bowman Well No. 1, TD at 2746, so, obviously, that never penetrated this area, correct?

A That's correct.

Q Okay, now how about the El Paso Production Well No. 2 up in the northwest northwest?

A That was originally drilled as a Strawn producer and was plugged and abandoned, I believe, about 1971.

Q Do you know if the Delaware was ever tested in that well?

A No, it was not.

Q Now let's go down to the east side of the southwest quarter and there's two wells shown in there. Let's look at the one that's marked El Paso Well No. 3. What do you know about that one?

A That well also was drilled as a Strawn producer and has been plugged and abandoned at some point. I don't have the exact date.

Q Do you know if that was ever tested in the Delaware?

A That was not ever tested in the Delaware.

Q Okay. How about the Bowman one?

A The Bowman Federal was a Yates discovery which did not penetrate the Delaware.

Q Do you have the drilling records on this well, on the subject well that we're talking about today?

A I have them at the office but I do not have them here with me.

Q When you looked through there, I assume you dug them out and looked through it --

A Yes, sir.

Q -- did you see any kind of a drilling break or anything of an abnormality when it went through this particular area?

A The only -- our -- our records on this well are very incomplete and the only records that we have of any drilling that was done have been reported on the BLM forms and the New Mexico Oil Conservation Division forms. Tht's the extent of our -- our records on drilling of this well.

Q Okay.

A One -- there were a couple of drill stem tests in the Delaware when that well was drilled. No zones were ever actually tested.

Q So they might have perforated the Delaware up in the upper portions to do this test?

A No, they have not. They have not tested the Delaware. A drill stem test was done when the well was originally drilled.

Q Oh, okay.

A On the way to the Strawn.

Q So in the subject well the Strawn and the Morrow production have been P&A'd.

A Yes, sir, they have.

Q Okay. Was it -- was it Damson's intent to plug off the Strawn production at this time?

A Considering the fragile nature of our wellbore, considerable risk was involved to -- to plug the Morrow and temporarily abandon the Strawn in accordance with regulations and to avoid that considerable risk of fishing the packer that's located at 11,337 and replacing it with a bridge plug, you know, after having set a cast iron bridge plug between the Morrow and Strawn as would be required, we felt that we would have lost the entire wellbore anyway, and also the condition of the wellbore certainly isn't going to improve with age and by the time we deplete the Delaware zone, we felt that there wouldn't be enough integrity to re-enter the Strawn and again produce it, and it was an economical producer at the time the casing leak occurred, and subsequent to us abandoning it.

Q Was it your intent to test the Delaware

coming up later on in this well's life?

A No, it wasn't. This was an accident.

Q Was it an undesireable accident?

A I'm sure we would have looked at it aftr knowing Texaco shot a Delawre zone offsetting us but we didn't.

Q Okay. Let's refer now -- or let's to your request to -- for an exemption to the General Rule 505. Let's be more specific on that. What kind of an exemption do you want again?

A It's my understanding of Rule 505 that the allowable is based on the top perforation in the well-bore.

Q Which would be in your case what?

A In our case this would be the casing leak, which occurred not by our direct work but by accident.

Q Which would be up about 46 --

A The top of it would be at 4615.

Q Okay, in this case referring to Rule 505, the depth pool range zero to 5000 feet, is that correct?

A That's correct.

Q That would have put you at 80 barrels a day?

A That's correct.

Q Okay, and what do you propose the depth

bracket allowable be here?

A Since our -- we contend that our producing zone is in the vicinity of 6450 feet, we request that the depth bracket allowable assigned to this well be in the 6-to-7000 foot range, which I believe is 142 barrels per day.

Q All right. Is this the only exception to Rule 505 what you're seeking?

A I believe that's correct.

Q I believe you said that the well is making 300 barrels of oil roughly, is that right?

A It has in the past. It's declined somewhat and now its capacity would be more on the order of 200 to 220 barrels per day.

Q Okay, so you're proposing to pinch down the production?

A That is correct.

Q From 200 to make this 142 barrel limit?

A That's correct, and in the event of overproduction, we also request that we be allowed to produce the well at a reduced rate of 100 barrels of day, which is below the allowable, to accrue enough allowable to make up our overproduction.

Q Okay.

A As opposed to --

Q Run that -- run that portion by me again.

A Okay. We propose to produce our well at a rate of 100 barrels per day to attribute the 42 barrels per day of excess allowable to -- to apply towards our make-up of overproduction.

Q Do you know how much you're overproduced at this time?

A Not precisely. Also entering into that problem is the point at which we will be required to report our production as Delaware. At the direction of the Hobbs OCD office, Jerry Sexton specifically -- he required or suggested that we amend our C-115s back to January the 24th, which corresponds to the time that we set our bridge plug over the Strawn and definitely ruled it out as a source of production.

Q Okay, so the C-115s from January 24th will reflect Delaware.

A That is correct.

Q And anything before that would have been -- would be considered Strawn or Morrow.

A That is correct. Relative to the Strawn we did early, early when this event happened, we did ask for and got an increased Strawn allowable, so prior to January we were not overproduced relative to the Strawn allowable that we were assigned.

I guess the point is that we did not know where our production was coming from prior ot January the 24th, and after that point we knew it wasn't coming from the Strawn.

Q Did Jerry Sexton in our Hobbs District office, is he -- did he verbally tell you this January 24th date or do -- or did he write a letter or anything?

A He verbally told us when we made our presentation of the facts we had at the time and I then called him on the telephone the next day and again verified this. When we talked with him, he did not specifically say January the 24th, but he did say back to when the bridge plug was set above the Strawn, which is January the 24th.

But this is verbally confirmed with him on two different occasions.

Q Have you -- have you done that change?

A Yes, sir, we have, and I have copies of the amended C-115s that we sent in last week to reflect the Delaware production.

Q Do you have some copies you can give me?

A Yes, sir, I do. Also at this point I'd like to mention in reference to amended C-115s, when this problem started there was a problem with how our production was split up between the two Strawn wells on the lease. They both were produced at a common battery and through

several errors the wrong amount of production was assigned to the Southern California Federal No. 1 relative to the Strawn and amended C-115s to make those corrections were submitted previous to this second set of amendments to reflect Delaware production from the Southern California Federal No. 1.

Q So what you have here is an amended -- amendment to an amendment.

A Correct.

Q Okay. But this amendment deals particularly with from the Strawn to the Delaware.

A Correct.

Q Okay.

MR. BRUCE: Mr. Examiner, I have marked the amended forms Exhibit Fourteen and request their admission.

MR. STOGNER: I don't really think that's necessary but since you already marked it, Exhibit Fourteen will be admitted into evidence.

At this time we'll also take note that these are a part of the Division records.

Q You show 8 production days, so that would be 24.

A That is correct.

Q Great. Okay. If your exception to Rule

505 was not granted, what would -- what kind of -- what would happen?

A We feel like that if this exception is not granted other West Lusk Delaware operators would have an unfair advantage in producing fluids from their wellbore at the higher allowable where we would only be able to produce our 80 barrels a day. This, I feel like, would be a violation of our correlative rights.

Q What would happen if you were ordered or requested to perforate down at 6500 feet? What kind of a hardship or would there be a hardship --

A We feel like being required to perforate the zone at 6500 feet could possibly cause additional casing damage that might -- that might allow the casing to fall over to one side of the hole. We don't know exactly what the condition is but we would -- we'd feel like the potential damage this could cause would not -- not better our situation, that possibly cause us additional hardship.

We have a top allowable well as it currently exists, and we would like to leave it that way until we -- production declines to some point where we would have to -- to perforate that zone to possibly increase our production back up to the top allowable.

Q What would happen if your request to extend the West Lusk Delaware Pool, let's say everything else

was granted but your request to extend the proposed pool, and that was denied, how would that affect this well?

A Again, going back to the allowables in the respective pools, would you mean to have our well put in a different pool than the Lusk West -- the West Lusk or the Lusk Delaware?

Q Yeah.

A Okay. If this were, if our well were not placed in the West Lusk Delaware Pool, I feel like that our correlative rights would still be violated since we are in fact producing from the same zone that makes up the West Lusk Delaaware Field.

Q How would your correlative rights be violated? Would you elaborate a little bit more?

A Well, offset operators would be allowed to produce 142 barrels per day from the same zone that we would only be able to produce 80 barrels a day, you know, based on the depth bracket allowable.

But if that exception to Rule 505 was granted and we did get the depth bracket allowable assigned at the depth that our zone is, that would have no adverse affect on us.

Q Okay.

A What would cause the adverse affect would be us getting an allowable lesser than that of the West Lusk

Delaware Pool.

MR. STOGNER: I have no further questions of this witness.

Are there any further questions of Mr. Lowery?

If not, he may be excused.

Do you have anything further in this case, Mr. Bruce?

MR. BRUCE: Nothing further.

MR. STOGNER: If not, this case will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY 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 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. 9138, heard by me on 20 May 1987.

Examiner
Oil Conservation Division