Case No.

6580

Application

Transcripts

Small Exhibits

ETC.

H. A. Ingram

Case No. 6587

conoco

To Dick Stamets Date 2-13-85

Here's the latest report on our MCA CO_2 Pilot Project.

Also, I just recd the Opec brochure. Look it over & I'll see you next week (Pit Hearing).

Thx,

JD

conoco

Interoffice Communication

To MCA Working Interest Owners

From D. W. Johnson, Hobbs

Date January 23, 1985

Subject ENHANCED OIL RECOVERY INFORMATION FOR THE SECOND HALF OF 1984
MALJAMAR CO_2 PILOT - HOBBS DIVISION

Introduction

The five-acre inverted five-spot CO_2 Pilot was instituted to evaluate oil recovery, determine CO_2 requirements, and provide operating experience for evaluating the feasibility of larger scale operations in the MCA Unit.

Four producers, two logging observation wells, and one center injection well were drilled and dual completed in the Grayburg 6th and San Andres 9th massive zones, the two major MCA Unit producing intervals having the most potential for CO_2 flooding. The location of these wells is shown in Figure 1.

Project History

The operating phases of the Pilot are shown in Figure 2. Following the completion of the drilling and equipment installation phase, the Pilot was operated under water injection from August, 1981, to February, 1983, to establish oil decline rates for the producers. The injection of fresh water during the first nine months established a reservoir fluid conductivity that provided a sharp contrast to the brine injection which followed. This contrast enhanced the response timing and layering data as recorded by the induction logging program in the observation wells. Several months prior to the beginning of CO_2 injection, radioactive tracers were injected into each zone of the center injector and into each of the four confining water injection wells. Gamma ray logging in the observation wells for the tracers, provided a more detailed response and layering pattern than was possible with the induction logging.

A 9159 ton CO_2 slug (40% of HCPV) was injected in a continuous operation from May 12, 1983, to December 13, 1983. CO_2 injection was followed by the brine post-flush phase which is still in progress.

First response was observed in June, 1983, and through December, 1984, 11,120 barrels of tertiary oil had been produced from the five acre area inside the producers. The Grayburg 6th zone produced 6,050 STB (12.7% OOIP) and the San Andres 9th massive zone produced 5,070 STB (6.8% OOIP) through 1984.

CO_2 production has remained low when compared with injection rates. Cumulative CO_2 production has been 21.0% (14.8 MMCF) for the 6th zone and 5.4% (4.7 MMCF) for the 9th massive zone of the volumes injected.

Possible Project Expansion

A possible expanded CO_2 injection project in the MCA Unit would be expected to involve approximately 5000 acres of the unit. It is anticipated that an expanded project would proceed in two stages to allow for maximum recycling of produced CO_2 volumes and that the potential enhanced oil recovery could range from 33 to 51 million barrels of oil, depending on the number of zones that could be successfully flooded.

The MCA CO_2 expansion evaluation and design will continue through the first half of 1985 and produce: (a) a final expansion production and injection schedule model prediction; (b) a surface facility design; (c) a well work plan; (d) a final economic analysis, and (e) a final logging pilot evaluation report.

Field Work Progress During Second Half of 1984

During the second half of 1984, the following activities were completed in the CO_2 Pilot area:

1. Injection Profiles

   Injection profiles were run in the four pattern confinement water injection wells during July and did not show any significant changes in injection patterns in these wells.

2. Injection Well Treatment

   MCA No. 358 injection had declined to 50 BWPD in the 6th zone and 90 BWPD in the 9th zone during the month of August. Each zone was treated with acetic acid, HCl, penetrating surfactants, and xylene to remedy suspected oil, solids, and emulsion damage. Injection rates increased to 100 BWPD in the 6th zone and 150 BWPD in the 9th massive zone.

3. Producing Well Study

   On September 16, Schlumberger ran TDT logs in two of the Pilot producers, MCA Nos. 359 and 362. Schlumberger is developing a new evaluation technique for determining fluid saturation changes in CO_2 flood producing wells which will indicate response and layering. These logs and data evaluation are being furnished without charge in return for using our wells in their study.

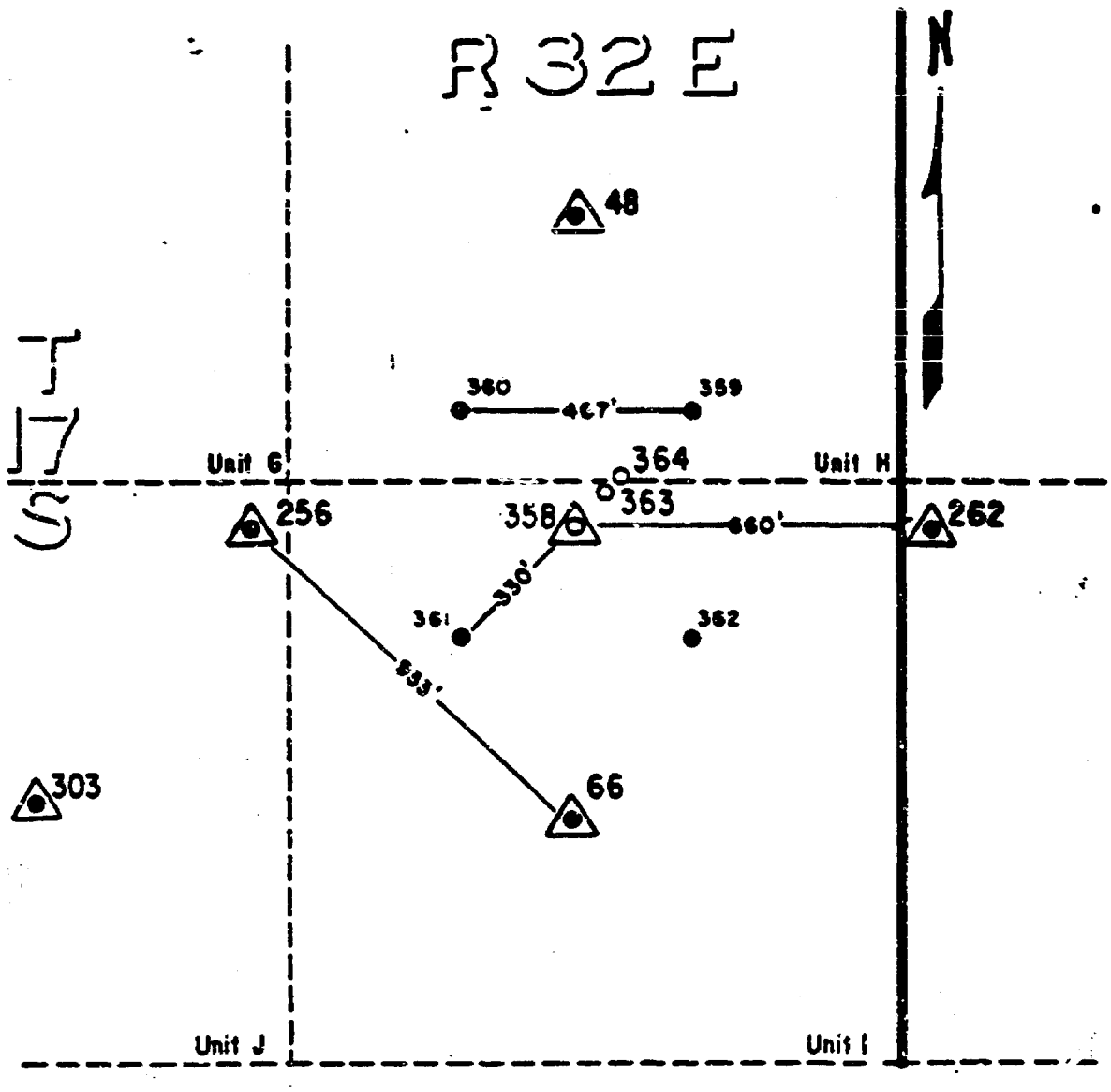
4. Injection Profiles

   Injection profiles were run in the pattern confinement wells, MCA Nos. 48, 66, 256, and 262. The only significant changes were 20-30% declines in the 6th zone injection percentages. A tracer profile was

also run in MCA No. 358 and verified that all injection water is leaving the well bore through the perforations and there are no channels or p..cker leaks present.

D. W. Johnson
Division Manager

JWH:mc



● PRODUCING WELLS

○ LOGGING WELLS

INJECTION WELLS

conoco

PRODUCTION DEPARTMENT — HOBBS DIVISION

MCA UNIT
LEA COUNTY, NEW MEXICO
CO_2 PILOT AREA

SCALE
0 200 400 approx.

Figure 1

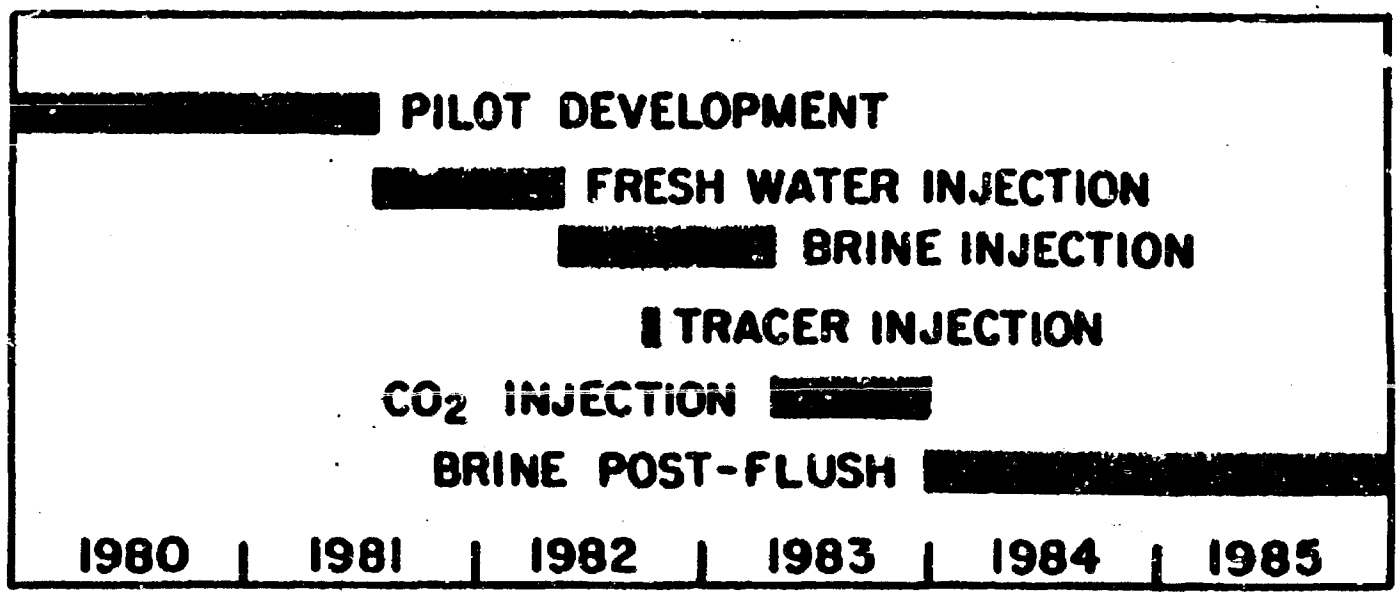


Figure 2. Operating Phases, Maljamar CO_2 Pilot

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: We'll call now Case Number 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. KELLAHIN: Tom Kellahin, Santa Fe, appearing on behalf of the applicant. I have one witness. If the Examiner please, I'd like the record to reflect that Mr. Lowell Deckert has previously qualified as an expert witness and is still under oath.

MR. NUTTER: Mr. Deckert is still under oath.

LOWELL DECKERT

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Deckert, would you please refer to what we have marked as Exhibits Numbers One and Two and explain to the Examiner what Conoco is seeking to accomplish by this application?

A Okay. We desire to initiate a pilot CO2 recovery project for purposes of evaluating CO2 enhanced

oil recovery in the Maljamar-Grayburg-San Andres. We propose to do this by installing a 5-acre inverted 5-spot pattern in proration Units H and I of Section 20 of Township 17 South, Range 32 East, Lea County.

This will be within an existing waterflood pattern in our MCA Unit waterflood project. The pilot, as you see it there in Exhibit One, will require drilling seven wells in non-standard locations; approximate depth of 4100 feet. These will be Grayburg-San Andres wells.

There will be four producing wells, one center injector, and two logging observation wells.

Q. Would you go back and summarize chronologically what has been the history of this particular portion of the Maljamar-Grayburg-San Andres?

A. Okay. The development in the Maljamar Field, this was one of the first fields discovered in Lea County, New Mexico, and the majority of the development took place in the late '30s and early 1940s.

In the mid-1940s they started a gas injection project and this continued up until the start of our waterflood operations in 1963. And since 1963 we've been conducting a waterflood of the Grayburg-San Andres in the Maljamar Field.

Q. At this point Conoco believes that the installation of a CO2 recovery project is necessary in order

to recover additional reserves?

A Yes.

Q In applying to the Commission for approval, Mr. Deckert, what specific things are you requesting the Division to do with regards to its approval of this application?

A Okay, we're asking for approval, first of all, to inject CO2 in the pilot area at a bottom hole pressure not to exceed 3700 pounds.

The second thing we're requesting is approval to drill four producing wells, one CO2 injection well, and two logging observation wells at non-standard locations in the 5-acre pilot area.

Third, we're seeking approval to convert Wells Nos. 66, 256, and 262 MCA to water injection service. These are, incidentally, the wells that border the -- are immediately bordering the pilot area.

Q Let's look at Exhibit Number One now, Mr. Deckert, and have you describe for me the sequence of events with regards to the development of this pilot project.

A Okay, the -- as we see the time schedule for this pilot, it would start with the drilling of the center well, MCA No. 358.

Q All right, at this point right now, are

any of the wells within the 5-spot pattern in existence now?

A No.

Q All right. First of all, you'll drill the 358 Well.

A Yes.

Q And what will you do with that well?

A Okay, we plan to production test it for a period of approximately two months to establish that the pilot area is watered out by the water injection program in that area.

Q Then what will happen?

A The second step would be to convert that well to water injection service and conduct pressure pulse tests for reservoir information and to get any idea of directional preference.

Now this information will allow us to select the producer location insofar as the orientation with respect to No. 358.

Q All right. Wells labeled P-1 through P-4, are those the exact locations that Conoco intends to drill those wells?

A No, and really until we -- we feel like until we do the pressure pulse testing, why, we won't be able to establish the exact location of these wells.

Q Under the existing rules for this area what

are the limitations, if any, with regards to the well locations?

A Within 25 feet of a proration unit boundary, I believe.

Q All right. The P-1 through P-4 wells would all be producing wells.

A Yes.

Q The L-1 and the L-2 are what kind of wells?

A Okay, now those will be logging observation wells.

Q What do you intend to detect or how do you intend to detect by use of those two wells?

A Okay, now those wells will be used to provide information on, well, the presence of any thin, high permeable layers through a logging program and changes in CO_2 and water saturation with time.

Q What are you going to do with wells 66, 256, 48, and 262?

A Okay. No. 66, 256, and 262 will be converted to injection service to provide backup for this pilot area to minimize fluid migration into or out of the pilot area.

Q What is their status now?

A They are the three wells I just mentioned

are producing wells, active producing wells.

MR. NUTTER: You'll also continue to inject in No. 48 after --

A. Yes, yes, uh-huh.

MR. NUTTER: -- this, so you'd have four water injection wells.

A. Yes, uh-huh, right. No. 48 is an active injection well at this time.

Q. Would you identify Exhibit Number Two?

A. Okay. Exhibit Number Two is a map of the general area showing a larger expanse of the MCA Unit, and the circle that is -- circles that are drawn on this map show the area within one-half mile of the proposed injection wells.

Q. How do you propose to complete the pilot wells, Mr. Deckert?

A. Okay. The pilot wells will be completed to provide separate Grayburg Sixth and San Andres Ninth massive injection and production, and the reason for this is that we want an evaluation of the CO2 process for the two major producing intervals in this field.

MR. NUTTER: Now, what did you mean by pilot wells?

A. Okay, that would be the injector and the four producing wells.

MR. NUTTER: Okay.

A. Yeah, and they will be completed to provide separate injection and production from those two zones.

Q. And how do you intend to use the two logging observation wells?

A. Okay. The logging observation wells again will be -- the exact location of those two wells will be based on pressure pulse information that we obtain after we drill the producing wells, and they will be drilled between the injector and two of the producers, and the purpose of these logging observation wells will be to provide a study of zone isolation, vertical heterogeneity, and the CO2 displacement process and reservoir directional variation.

Q. What do you anticipate to be the total life of the pilot project?

A. We view it as being a total of four years. It will, we think it will probably, according to our time schedule, it will probably be a year and a half before we're ready to start CO2 injection into this area.

Q. I assume that you will use these two logging observation wells by conducting certain periodic electric logs in the wells.

A. Yes, we would.

Q. Would you explain what your plan is with regards to those wells?

A. Okay. We plan to run approximately thirty logs over the two year period, starting with the injection of CO2, continuing to the end of the project; run about thirty logs in the two wells over this period, and this would be gamma ray neutron and resistivity type logs, and we're looking for information, again, on presence of any thin, high permeability layers and changes in CO2 and water saturation.

Q. And what again will be the purpose of these four outlining injectors, or backup injectors, as you called them?

A. Okay. They would be to minimize fluid migration into or out of the pilot area.

Q. Would you describe Exhibit Number Three and identify the information on that exhibit?

A. Okay. Exhibit Number Three is a sketch of the downhole mechanics of how we intend to complete Well MCA No. 358, or center CO2 injection well.

Q. And do you have a specific location for this well?

A. Yes, we do.

Q. What is that location?

A. The location that we've chosen is 660 feet from the east line, 2600 feet from the north line of Section 20.

Now, the thing that you'll note about this exhibit is that we have two strings of tubing in the well and that the well will be completed in the Grayburg Sixth and the San Andres Ninth massive only, and that these zones will be separated by a packer.

And I might say that the Maljamar-Grayburg San Andres is one pool, but this separation would -- would allow us to study the CO2 process in the two major pay intervals in this field.

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

A. Okay. Exhibit Number Four is the typical CO2 pilot producer and shows how we intend to complete the four producing wells in this pattern. And here again you'll notice the separation between the Sixth and Ninth zones to provide -- to isolate them and provide separate production.

Q. Would you identify Exhibit Number Five?

A. Exhibit Number Five is the wellbore schematic of the logging observation wells and, as we previously discussed, it would be to provide a study of zone isolation and vertical reservoir variation through study of logs.

Q. I notice on your Exhibit Number Five you've indicated fiberglass casing?

A. Right, we plan to run fiberglass casing

through the pay section and in order that we can run electric logs for interpretation of the reservoir fluid saturations.

Q. All right, Exhibit Number Six.

A. Exhibit Number Six is a typical gamma ray neutron log in the -- showing the Grayburg-San Andres waterflood intervals in the proposed pilot area.

The Sixth through the Ninth massive zone tops are marked on this log section.

Q. Would you identify Exhibit Number Seven?

A. Exhibit Number Seven is a tabulation of all wells within one-half mile of the proposed injection wells, and it shows the location, completion intervals, TD, plugged back TD, casing, and cementing records for these wells.

Q. What conclusion have you reached with regards to all the wells within a half mile radius that have penetrated the zone of interest?

A. Well, it leads me to believe that we should have the pressure -- the pressure fluid should be confined to the waterflood intervals in this area.

Q. In your study of all those offsetting wells have you discovered any of those wells that are defective either in their casing cementing or any other production problems that might cause a migration of the pressurized fluids through those wells up into other zones?

A. No, not in my opinion.

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

A. Okay. Exhibit Number Eight is a wellbore schematic for the Baish B 36, and if you'll refer to Exhibit Two, you'll see that this well is located in the extreme northwest corner of Section 28.

This is a well that was drilled and abandoned in 1949 and the well is located almost a half mile from our proposed pilot area.

Q. What's the purpose of the exhibit?

A. Well, the purpose of the exhibit is to demonstrate that this well is -- does provide zonal isolation for the injected fluids.

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

A. Okay. Exhibit Number Nine is a wellbore schematic for the William Mitchell "B" No. 23.

Q. And where is that well located?

A. And that well is located next to MCA No. 65 in -- and refer to Exhibit One, it's in proration unit "J" of Section 20.

MR. NUTTER: Exhibit Two, you mean.

A. One or Two.

MR. NUTTER: Oh, yes.

Q Would you refer to Exhibit Number Ten and identify it?

A Okay. Exhibit Number Ten is the present wellbore schematic for well -- MCA No. 56, and this is one of the wells that we propose to convert to -- for backup injection service.

Q And Exhibit Number Eleven?

A Eleven would be the proposed schematic after conversion.

Q Okay. Exhibit Twelve?

A Exhibit Twelve is a wellbore schematic for MCA No. 256, and shows the schematic as it is a producing well presently.

Q And Exhibit Number Thirteen.

A Okay. Thirteen is the schematic after proposed conversion of this well to backup injection service. The main difference between Exhibits Twelve and Thirteen is that the -- we plan to drill out the bridge plug there so this well will give us injection into both Sixth and Ninth massive zones.

Q Exhibit Number Fourteen?

A Exhibit Fourteen is a wellbore schematic for MCA No. 262.

Q Okay, and Exhibit Number Fifteen.

A Fifteen is a wellbore schematic for after

conversion of this well to backup injection service.

Q In your opening comments, Mr. Deckert, you indicated to the Examiner that you propose a bottom hole pressure not to exceed 3700 psi. What if any tests have you conducted with regards to the confining strata around the producing formation to demonstrate that that maximum pressure, injection pressure, is reasonable?

A Okay. We conducted a pressure breakdown test in the caprock overlying the proposed injection interval, in MCA No. 256. Again, this is a well that's immediately adjacent to the pilot area.

The reason for this test was the pressure limitation contained in the EPA proposed underground injection control program. Paragraph 146.24, titled Operating Monitoring and Reporting Requirements, Volume 44, No. 78 of the Federal Register, dated April 14th, 1979.

This section states that injection pressure at the surface shall not exceed a maximum which shall be calculated so as to assure that the bottom hole pressure during injection does not initiate fracture in the confining strata or cause the migration of injected or formation fluids into an underground source of drinking water.

Now the test we conducted on No. 256 --

Q Let me ask you, Mr. Deckert, is Exhibit Number Six a log or a portion of a log for MCA Well NO. 256?

A Yes, it is.

Q All right. Would you refer to Exhibit Six and describe now to the Examiner how you went about conducting your pressure breakdown test?

A Okay. We perforated an interval of the caprock from approximately 3580 to 3590 feet with two jet shots per foot in acid and then we subjected these to various pump pressures and we took 250 pound increments and went up on the pressure and held each pressure step for fifteen minutes and we went up to a maximum of 2150 pounds, and at that pressure we did not have any breakdown of the caprock.

Q A maximum of how -- what pressure?

A 2150 surface.

Q That's surface?

A Yeah, or 3700 pounds bottom hole, which would be 1.0 psi per foot.

Q Mr. Deckert, you're familiar with the Division's memorandum requiring that the bottom hole pressure in waterflood be no more than 0.2 psi per foot of depth unless there is information indicating that pressure in excess of that will not fracture the confining strata. How does this pressure of 3700 psi bottom hole compare into psi per foot of depth?

A It figures out to be 1.03 psi per foot.

Q Why has the applicant sought that as a maximum bottom hole pressure for the CO2 injection?

A In order to -- well, it's a maximum that we think we'll ever need to conduct this pilot, in order to successfully inject fluids into this pilot area.

Q In your opinion could the pilot be operated successfully by limiting the injection to the 0.2 psi per foot of depth?

A No.

Q Would you go ahead and describe for us the overall purpose of this CO2 pilot injection project?

A Okay. The MCA unit's in the final stages of waterflood operation. We estimate that CO2 injection in the Maljamar-Grayburg-San Andres could result in additional oil recovery of anywhere from 2 to 10 percent of original oil in place.

The added recovery would be the result of in place oil swelling by CO2, reduced interfacial tension, and the extraction of crude components by the CO2 to form a hydrocarbon bank, which would admissably displace oil ahead of it.

We believe that approximately 1000 acres of the MCA Unit to be prospective for CO2 enhanced oil recovery. The original oil in place in this 1000 acres is estimated at 35 million barrels, and I might point out that

the -- we figure the remaining oil after waterflooding this area is something in the order of 20 million barrels.

Q What are some of the purposes of this CO2 project, Mr. Deckert?

A Well, as we see it, there will be three main points we're attempting to establish in the CO2 pilot.

First of all, to see if CO2 can mobilize oil in flooded out Grayburg-San Andres waterflood intervals, and determine if additional oil recovery would be sufficient to justify a full scale CO2 project.

Secondly we need an idea of what the CO2 process recovery efficiency is; that is, the amount of CO2 required for a barrel of enhanced oil.

The third thing that we're attempting to establish is the CO2 injection rates.

Q The CO2 injection rates, Mr. Deckert, what's your initial plan with regards to the injection?

A Okay, the -- we propose to operate the pilot under water injection, first of all, until the oil decline rates are established for the pilot area. Then we propose to inject a 12-1/2 percent pore volume CO2 slug, which would be about 6000 tons of CO2, either in a straight or water alternate gas process. The CO2 would be injected at a bottom hole pressure not to exceed 3700 pounds.

We intend to follow this CO2 slug with

water and we estimate that the total four year operating life of this pilot from the time we drilled No. 358 until we finally are finished with this pilot area.

Q. Mr. Deckert, do you have an estimate of what the parting pressure within the formation would be?

A. The -- yes, we do.

Q. And what is that figure?

A. The -- based on our testing in this area, the parting pressure would be of the order of 3300 pounds bottom hole.

MR. NUTTER: As opposed to 3700 pounds in this caprock --

A. Yes, sir. Yes, sir. Now, this is -- this parting pressure is based on testing in four wells immediately adjacent to the pilot area.

Q. Mr. Deckert, are you familiar with the Petroleum Recovery Research Center?

A. Yes, I am.

Q. And what is that?

A. The Petroleum Recovery Research Center is located in Socorro and their primary purpose, as I understand it, is to encourage and study enhanced oil recovery processes.

Q. What if any coordination is being made by Conoco with regards to the Petroleum Recovery Research Center?

A. Well, we are working together in two areas.

They're doing some work with us on crude oil CO2 admissability and we're also getting ready to do a joint geological study of the MCA Unit area with them.

Q. Were Exhibits One through Fifteen, I believe, prepared by you or compiled under your direction and supervision, Mr. Deckert?

A. Yes.

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

A. Yes, sir.

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

MR. NUTTER: Conoco Exhibits One through Fifteen will be admitted in evidence.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Deckert, now if I understand your -- first of all, you're going to drill this No. 358, and do you have a location for it? I think it was --

A. Yes, un-huh, it will be 660 feet from the east line, 2600 feet, I believe it is, from the --

Q. From the north line.

A. North line, uh-huh. Section 20.

Q. And the locations of P-1 through P-4 and L-1 and L-2 are still undetermined.

A. Yes.

Q. These locations will be determined as a result of this pulse testing.

A. Yes, sir.

Q. So any order authorizing this project would have to contain provisions for authorizing these unorthodox locations for these wells.

A. Yes, sir.

Q. And authorize a location for the No. 358. Now, Nos. 256, 66, and 262 have as yet not been authorized for water injection, have they?

A. No, sir, that's part of this application.

Q. So an order would authorize those wells also.

A. Yes, sir.

Q. Now, as I understand it, after you drill No. 358 you will put that well on production and produce it for a couple of months and after that you would conduct the pulse testing in that well.

A. Yes, sir, we would convert it to injection and then conduct the pulse test.

Q. And be injecting water into it.

A. Yes.

Q. And make pulse tests and determine the locations of P-1 through P-4.

A. Yes, sir.

Q. And then after you determine the locations for those, those wells would be drilled.

A. Uh-huh.

Q. And you'd put them on production while continuing to inject in No. 358 and determine the location of where you want to drill L-1 and L-2.

A. Yes, sir.

Q. Now, after you have drilled P-1 through P-4 and L-1 and L-2, then you would start the CO2 injection program in No. 358.

A. We would have first of all a period of time where we would establish the base level production for these pilot wells to make sure we knew what our production, base production was in order that we could recognize the oil increase due to the CO2 injection.

Q. Okay, so you'd be producing P-1 through P-4 while you were injecting water into the five injection wells and after you had established the base rate of production for P-1 through P-4, then you would commence your injection of CO2.

A. Yes.

Q Into 358. Now, you would inject CO2 into No. 358 at the rate of 12-1/2 percent of the pore volume that you calculate for this 5-acre 5-spot?

A Yes sir, uh-huh, 12-1/2 percent slug, right.

Q And this would approximate approximately 6000 tons of CO2.

A Yes, sir.

Q Which would either be a straight injection slug or alternately with water.

A Yes, sir.

Q Now, in conducting this test in the cap-rock confining this formation on the top, you mentioned that it was from 3580 to 3590 feet?

A Uh-huh.

Q In the No. 256?

A Yes.

Q And this Exhibit Number Six, that's identified as a typical gamma ray neutron log, doesn't identify it as being any particular well, but this is the log of No. 256?

A Yes, sir.

Q So you've got that little bitty interval there from 3580 to 90.

A Uh-huh.

Q Which you determined to be the caprock in this well.

A Yes. Well, I might say here that the reason we didn't want to get any closer to the top of the Sixth zone with this test was that the Sixth zone was fractured on initial completion, so we wanted to stay some distance away from the Sixth zone perforated interval to stay out of that --

Q So you stayed a good 100 feet above that Sixth zone in the well?

A Yes, uh-huh.

Q And you made a couple perforations in there or a couple of feet of perforations.

A Yes, we shot seven feet with two shots per foot in acid.

Q Now I understood you to say that you subjected these perforations to various pressures in 250 pound increments.

A Uh-huh.

Q For fifteen minutes each.

A Yes.

Q What were you injecting?

A Water.

Q And what was the volume of water? Did that depend on the pressure you were injecting with?

A. Just enough to --

Q. To build up to a --

A. Build up to the pressure.

Q. -- certain pressure.

A. Yes, uh-huh. And we did get up to that 3700 pounds and we did not have any -- it held there and did not breakdown at that point.

Q. Which was 2150 pounds at the surface.

A. Surface, yes, sir.

Q. And you saw no breakdown.

A. Yes, sir, that's right.

Q. Now -- and that calculates out to be this 1.03 pounds per square inch per foot of depth.

A. Yes, sir.

Q. But the formation itself, I presume in the Sixth and Ninth zones, parts at 3300 pounds.

A. Uh-huh.

Q. As determined by breakdown tests or injectivity tests done.

A. Pressure parting tests, yes.

Q. And all of the injection into the No. 358 will be selected injection to Sixth and Ninth zones through separate strings of tubing but the injection into the four offsetting wells would not be selected injection, is that it?

A. That's right.

Q. And each of the four producing wells would be produced separately from the two zones.

A. Yes, sir. Yes, right, they will be selective producers.

Q. Now, you mentioned that you figured that there were 1000 acres in the MCA that may be susceptible to this?

A. Yes, sir.

Q. Why only 1000 acres?

A. Well, the --

Q. What's the total acreage in this MCA Unit?

A. About 8000 acres. Now, this was premised primarily on the -- on this Ninth massive pay, and there's approximately 1000 acres that are underlined by this Ninth massive pay, and incidentally, that same area contains some of the best Sixth zone pay in that unit, in the entire MCA unit, so we thought that this area would probably be the most prospective for CO2 injection.

Q. You don't think that an area that doesn't have the Ninth pay would be profitable for CO2 injection?

A. Well, not --

Q. If it had a Sixth only?

A. Not at this time, but this may depend a lot on the results of this pilot test and what we -- what we

see from it.

Q Now you're also estimating that from 2 to 10 percent of the original oil in place may be recovered by this CO2 project.

A Yes.

Q 2 to 10 percent of the original oil in place.

A Uh-huh.

Q What are you estimating as complete secondary recovery with water injection only to be the total percent of original oil in place to be recovered here?

A It looks like something in the order of 40 percent.

Q Leaving 60 percent in the ground.

A Right. Of course, this is a pretty big target for enhanced oil recovery project and that's the reason we want to pilot the area.

Q Uh-huh. And what was your estimate about recoverable oil in the 1000 acres if the project was successful? Did you give a figure for the total 1000 acres?

A No, I didn't but it would be somewhere -- well, at 10 percent it would be as much as 3-1/2 million barrels.

Q I see. Okay.

MR NUTTER: Are there any further ques-

tions of Mr. Deckert? He may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 6580?

A SPECTATOR: Dan, may I interject something here?

MR. NUTTER: Yes, sir.

SPECTATOR: I did not want you to be confused in here when he said that the gradient, pressure gradient in there was 1.03 psi per foot at the surface, comparing it to the .2 psi per foot surface pressure that the Commission had been using as a guideline, but actually the surface pressure at the 3700 psi per foot would be, in this breakdown test, or test of the confining strata, was only about .6 per pound per foot of depth at the surface.

MR. NUTTER: At the surface.

A. Uh-huh, right.

MR. NUTTER: Okay.

MR. KELLAHIN: It came out as 1.03.

A. Bottom hole.

MR. KELLAHIN: You didn't say bottom hole.

A. Well, we did, we did earlier.

MR. NUTTER: All right, I think I understood that, although I'm confused on a lot of other things.

Does anyone have anything they wish to offer in Case Number 6580?

MR. KELLAHIN: No, sir.

MR. NUTTER: If not, we'll take the case under advisement and the hearing is adjourned.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
[illegible]

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

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6680, heard by me on 9/19 1979.

_________________, Examiner
Oil Conservation Division

Amoco Production Company
500 Jefferson Building
P.O. Box 3092
Houston, Texas 77001

September 4, 1980

File: LRS-539.41 -3718

Re: Hearing Transcript for
Maljamar Field, New Mexico CO_2 Pilot

Miss Florence Davidson
State of New Mexico
Energy and Minerals Department
Oil Conservation Division
State Land Office Building, Room 206
Santa Fe, Mexico

Dear Miss Davidson:

Enclosed with this letter are the materials which I borrowed from your Case File 6580 on August 29, 1980 when I visited your office in Santa Fe. I very much appreciate having had the opportunity to look over this information.

Sincerely yours,

Lowell R. Smith

Lowell R. Smith
Regional Petroleum Engineering Supervisor

LRS/rlc
580/C

Enclosures

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

IN THE MATTER OF THE APPLICATION OF
CONTINENTAL OIL COMPANY FOR AUTHORITY
TO INITIATE A PILOT CARBON DIOXIDE INJEC-
TION SYSTEM FOR ENHANCED RECOVERY PURPOSES
ON ITS MCA UNIT, SECTION 20, T-17-S, R-32-E,
LEA COUNTY, NEW MEXICO.

Case 6580

APPLICATION

Applicant, Continental Oil Company, respectfully requests authority to initiate a pilot carbon dioxide injection system into the Grayburg-San Andres formation in Section 20, T-17-S, R-32-E, Lea County, New Mexico, in order to improve enhanced recovery techniques and recover additional hydrocarbons from an area in which secondary recovery operations now exist. In support of this application, the applicant would show:

1. Applicant is co-owner and operator of the MCA Unit which, in addition to other lands, includes the E/2 of Section 20, T-17-S, R-32-E, Lea County, New Mexico.

2. Applicant was authorized by Order R-2403 dated December 31, ~~1938~~ 1962, as Operator and has been injecting water into the Grayburg-San Andres formation since 1963 by the authority of such order.

3. That the proposed project will be a 5-acre inverted 5-spot pattern which will require drilling one CO_2 injection well and four producing oil wells to the Grayburg-San Andres formation; also, two logging observation wells will be drilled within the pattern area.

4. That CO_2 will be injected at a pressure equal to the present reservoir pressure in the area.

5. That the proposed pilot area is in the latter stages of its flood life.

6. That the success of this pilot project could provide technical knowledge concerning CO_2 enhanced oil recovery that would be useful on an expanded basis.

7. That the granting of this application will result in the recovery of oil and gas reserves that would otherwise be lost.

8. That the granting of this application will result in the prevention of waste and will not impair the correlative rights of any party.

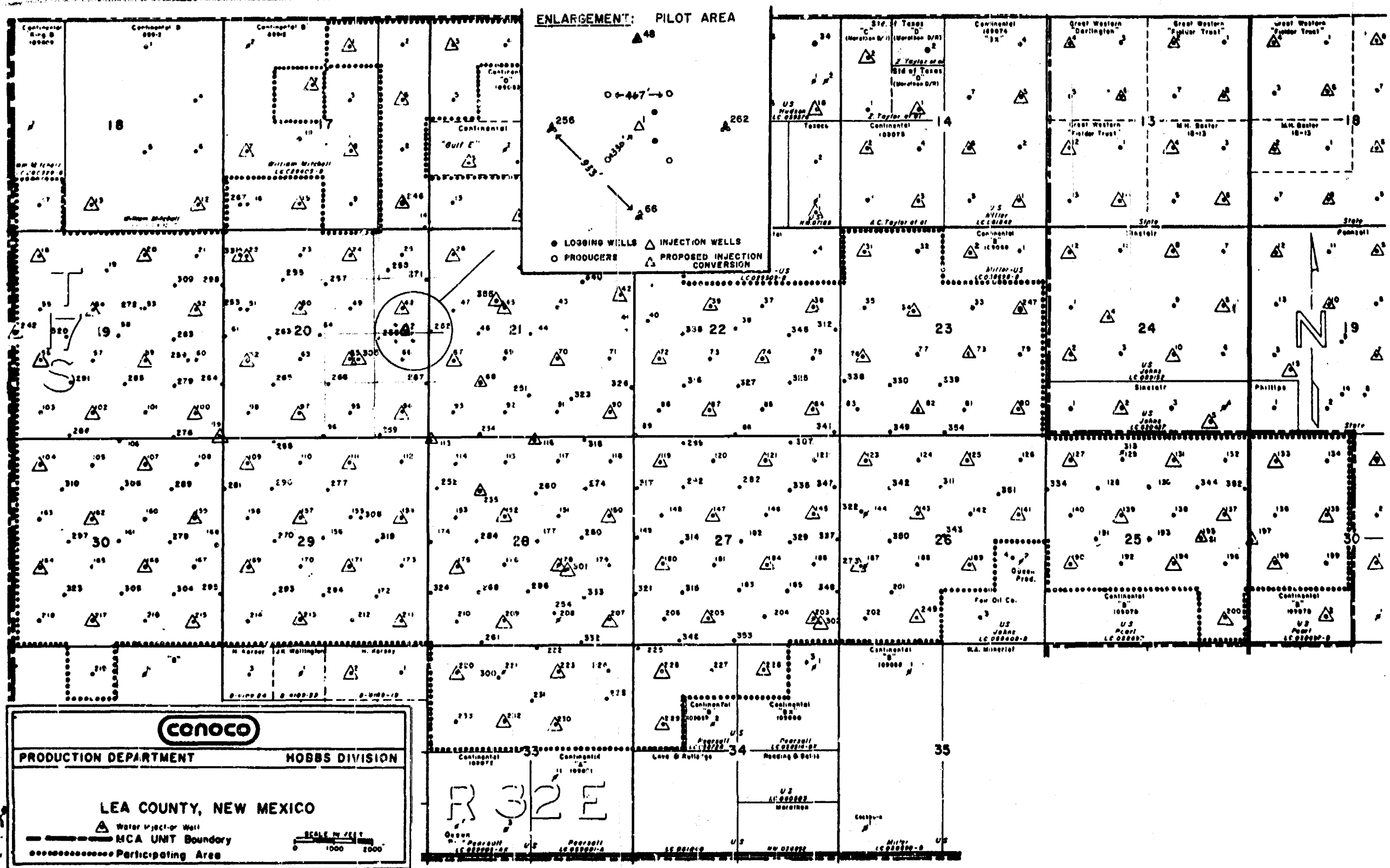
WHEREFORE, applicant respectfully requests that this matter be set for hearing before the Division's duly appointed examiner and, upon hearing, an order be entered authorizing the enhanced recovery project as described above.

Respectfully submitted,

CONTINENTAL OIL COMPANY

By John R Kemp
John R. Kemp, Assistant Division Manager of Production

HAI/vjk


ENLARGEMENT: PILOT AREA
467'
933'
256
262
66
LOGGING WELLS
PRODUCERS
INJECTION WELLS
PROPOSED INJECTION CONVERSION
conoco
PRODUCTION DEPARTMENT
HOBBS DIVISION
LEA COUNTY, NEW MEXICO
Water Injection Well
NCA UNIT Boundary
Participating Area
SCALE IN FEET
0 1000 2000
R 32 E
N
18
17
19
20
21
22
23
24
30
29
28
27
26
25
33
34
35
36

CONOCO

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Conoco Inc.
P. O. Box 460
1001 North Turner
Hobbs, NM 88240
(505) 393-4141

July 23, 1980

Case 6590

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

Mr. Jerry Sexton
New Mexico Oil Conservation Division
P.O. Box 1980
Hobbs, New Mexico 88240

Gentlemen:

Quarterly Status Report - MCA Unit CO_2 Pilot Project

Here's a copy of the second quarterly report on the above named project. We sent the first report to you just last month, but we are getting lined out so that you should receive one quarterly from now on.

Very truly yours,

John R Kemp

HAI:rej
Enc

Joe
Thanks for the help on our State F #6 enhanced recovery application
John

CONOCO

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Conoco Inc.
P. O. Box 460
1001 North Turner
Hobbs, NM 88240
(505) 393-4141

July 14, 1980

MCA Unit Working Interest Owners
(Per attached List)

Quarterly Report of Operations - MCA CO_2 Pilot - June 30, 1980

We have finished the dual completion operations on MCA No. 358 and installed producing equipment for pump testing. This well will remain shut in until we finish equipping the four direct offset wells with pressure gauges for the pulse-interference test. The object of this test is to determine 6th and 9th Massive Zone pay continuity and any directional variation across the pilot area. This will be important information for the final selection of the well locations for the pilot producers.

The Grayburg 6th Zone in MCA No. 358 swab tested at the rate of 4 BWPH after acidizing and on injection test showed a rate of 75 BPD at 800 psi surface pressure. We subsequently fracture stimulated the 6th Zone with 3000 gallons and 2500 pounds of sand to achieve an adequate injection rate for a four year pilot life. The injection rate after the frac job was 150 BPD at 180 psi surface pressure and the interval swab tested at the rate of 10-12 BWPD. MCA No. 358 has been equipped with pressure gauges opposite the 6th and 9th Massive Zones to allow us to run pressure buildup and zonal isolation tests after the pulse-interference test.

We will be ready to start the pulse-interference testing, the next phase in the CO_2 pilot program, by the end of July.

John R. Kemp
J. R. Kemp

LBD-JS

EXHIBIT NO. 1

R 32 E

Unit G

Unit H

Unit J

Unit I

Unit O

Unit P

(SEC. 20)

(SEC. 21)

T 17 S

49

48

47

95

94

93

23

65

303

66

67

269

256

358

262

P-1

P-2

P-3

P-4

L-1

L-2

467'

660'

330'

933'

N

2615' FNL 25' FWL

2590 S
1310 E

980 S
660 E

LEGEND

- LOGGING WELLS
- PRODUCERS
- INJECTION WELLS
- PROPOSED INJECTION CONVERSION

CONOCO

PRODUCTION DEPARTMENT — HOBBS DIVISION

MCA UNIT
LEA COUNTY, NEW MEXICO
ENLARGEMENT: PILOT AREA

SCALE 0 200 400' approx. 1in

9-79

LEGEND:
- LOCATION
- OIL WELL
- GAS WELL
- DRY HOLE
- INJECTION WELL
- ABANDONED WELL
- SHUT-IN WELL
- SALT WATER DISPOSAL WELL
- DEEPER WELL - ZONE UNTESTED

Conoco
EXHIBIT NO. 1
Cs 6580

EXHIBIT NO. 1

R 32 E

T 17 S

Unit G

Unit H

Unit J

Unit I

Unit O

Unit P

(SEC. 20)

(SEC. 21)

N

49

48

47

95

94

93

67

66

65

303

23

269

256

358

262

P-1

P-2

P-3

P-4

L-1

L-2

467'

660'

330'

933'

2600

2615' FNL 25' FWL

25905
1310E

4805
660E

LEGEND:

- LOGGING WELLS
- PRODUCERS
- INJECTION WELLS
- PROPOSED INJECTION CONVERSION

conoco

PRODUCTION DEPARTMENT — HOBBS DIVISION

MCA UNIT
LEA COUNTY, NEW MEXICO
ENLARGEMENT: PILOT AREA

SCALE 0 200 400' approx.

9-79

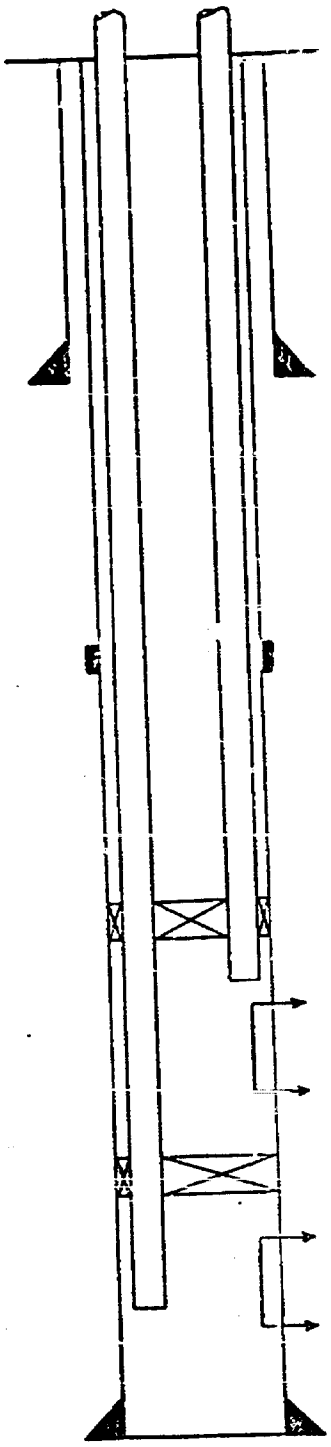
LEGEND:

- LOCATION
- OIL WELL
- GAS WELL
- DRY HOLE
- INJECTION WELL
- ABANDONED WELL
- SHUT-IN WELL
- SALT WATER DISPOSAL WELL
- DEEPER WELL - ZONE UNTESTED

Conoco
EXHIBIT NO. 1
Case 6580

Dual CO_2 Injection Well

Well No. 350
2600' FNL & 660 FEL of Sec 20



9 5/8, 36# @ 700' w/400 sx (circ)

D.V. Tool at 2100' cmnt. with 1300 sx (circ)
2 3/8", P.L. tbg. (two strings)

6th Zone

separate inj into 6th & 9th zones

9th Massive

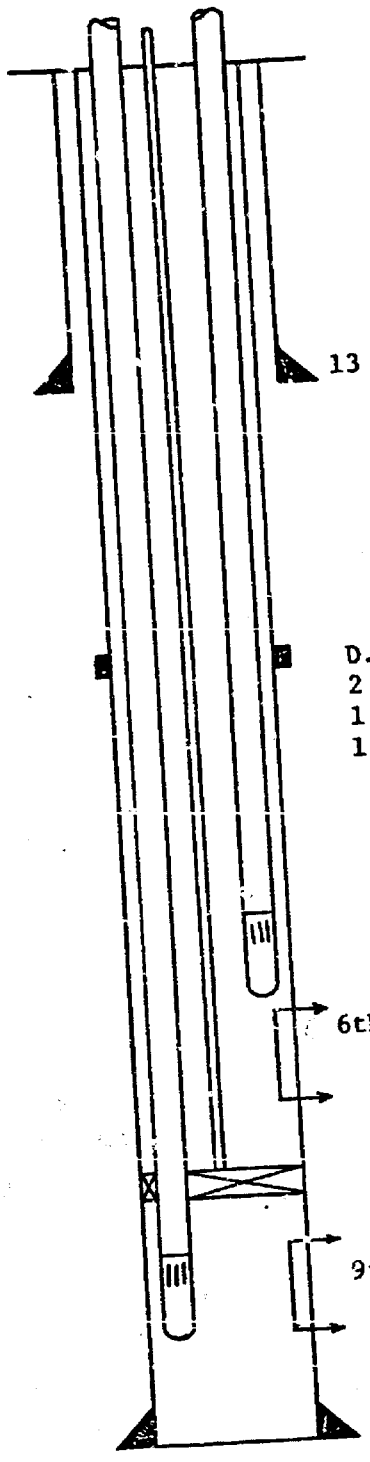
7 5/8", 26.4# K-55 cmnt w/500 sx (circ to D.V. tool)
TD-4150'

EXHIBIT NO. 3

EXHIBIT NO. 4

Typical Dual Pilot Producer

P1 P2 P3 P4



13 3/8", 48# @ 700' w/500 sx (circ)

D. V. Tool at 2100' cmnt. with 1300 sx. (circ)
2 7/8" P.L. tbg. (2 strings)
1 1/4" I.J. vent string
1 1/4" I.J. treating string

6th & 9th zones isolated.

6th Zone

9th Massive

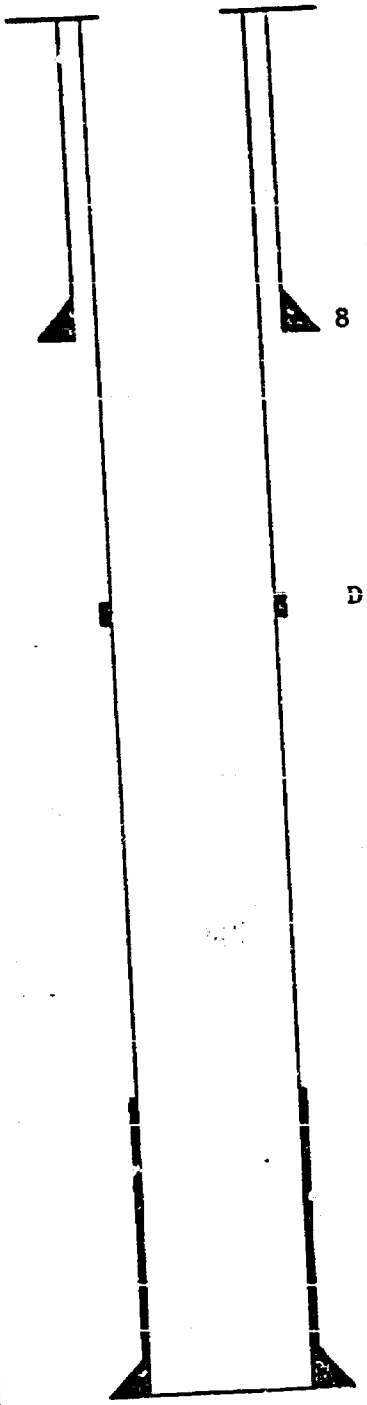
8 5/8", 36# @ 4150' w/550 sx (circ. to D.V. tool)
TD-4150'

EXHIBIT NO. 4

EXHIBIT NO. 5

TYPICAL CO_2 LOGGING OBSERVATION WELL

C-1 C2



8 5/8", 28# @ 700' w/340 sx. (circ)

D.V. Tool at 2100' cmnt. w/1300 sx. (circ)

5 1/2", 15.5# K-55 down to ± 3600' w/5 1/2" fiberglass casing from ±3600' to TD. Cmt. 5 1/2" csg w/500 sx. (circ to DV tool)

fiberglass casing thru pay to facilitate logging

TD-4150'

EXHIBIT NO. 5

EXHIBIT NO. 6

TYPICAL GAMMA RAY-NEUTRON LOG

MCA CO_2 PILOT AREA
SEC. 20 T17S R32E
MALJAMAR FIELD
LEA COUNTY, NEW MEXICO

Well No. 257

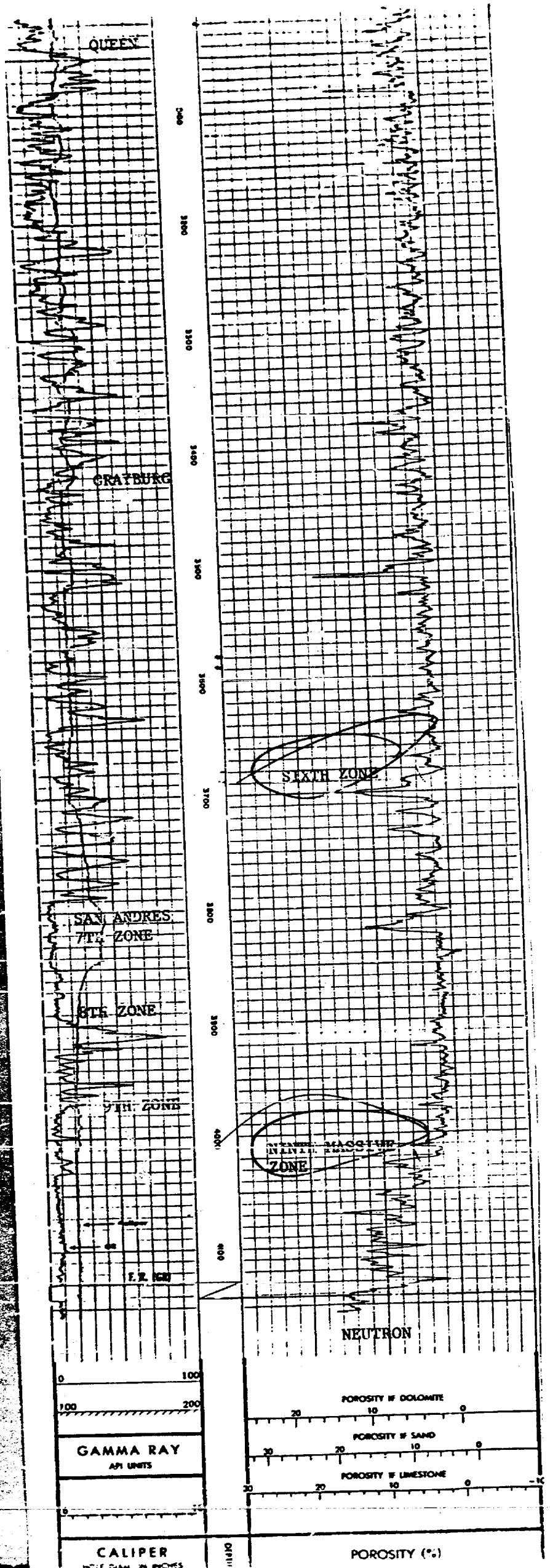


EXHIBIT NO. 6

EXHIBIT NO. 7 Page 1 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 14	40' FSL & 40' FEL Sec. 17, T-17S, R-32E	3920-4015	4147 4015	8 5/8 7	951 3920	50 175	Circ Est. 1645'
	MCA 24 WIW	660' FNL & 1980' FEL Sec. 20, T-17S, R-32E	3709-3764 3995-4106	4106	8 5/8 7 4 1/2	848 3659 3995	50 150 150	616 1709 2700
	MCA 25	660' FNL & 660' FEL Sec. 20, T-17S, R-32E	3630-4114	4129 4114	10 3/4 7	700 3630	50 450	Circ. 2000
	MCA 26 WIW	660' FNL & 660' FWL Sec. 21, T-17S, R-32E	3734-4175	4175	10 7 4 1/2	905 3603 3734	50 150 275	Circ. 1653 190
	MCA 45 WIW	1980' FNL & 1980' FWL Sec. 21, T-17S, R-32E	3751-3807 3821-4181	4181	10 3/4 8 5/8 7	2301 3050 3821	300 78 80	Circ. 2200 2500
	MCA 46	2615' FNL & 1295' FWL Sec. 21, T-17S, R-32E	3730-3955 4080-4117	4120 4117	10 3/4 7 5 liner	55 3647 3605-4080	50 250 50	Circ. 650 Circ.
	MCA 47	1980' FNL & 660' FWL Sec. 21, T-17S, R-32E	3676-3995	4103 3995	10 7 4 1/2	2287 3575 3676	300 150 350	Circ. 2500 Circ.
	MCA 48 WIW	1980' FNL & 660' FEL Sec. 20, T-17S, R-32E	3670-4110	4110	10 7	794 3670	25 150	Circ. 1720
	MCA 49	1980' FNL & 1980' FEL Sec. 20, T-17S, R-32E	3598-4088	4088	7	3598	500	2000

EXHIBIT NO. 7 Page 2 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 50 WIW	1980' FNL & 1980' FWL Sec. 20, T-17S, R-32E	3669-3689 3733-4081	4081	8 5/8 7 4 1/2	810 3461 3733	50 150 300	Circ. Est. 2000 650
	MCA 63	1980' FSL & 1980' FWL Sec. 20, T-17S, R-32E	3508-4027	4027	8 5/8 7	814 3508	50 150	Circ. 1558
	MCA 64	2615' FSL & 2610' FWL Sec. 20, T-17S, R-32E	3620-4039	4039	10 3/4 7	57 3620	45 250	Circ. Est. 1900
	MCA 65 WIW	1980' FSL & 1980' FEL Sec. 20, T-17S, R-32E	3780-4100	4100	12 1/2 7 4 1/2 liner	40 3565 3137-3780	No Record of Cement 150 60	Est. 2000 Circ.
	MCA 66	1980' FSL & 660' FEL Sec. 20, T-17S, R-32E	3561-4072	4072	No Record of Surface Casing 7	3561	485	Est. 2000
	MCA 67 WIW	1980' FSL & 660' FWL Sec. 21, T-17S, R-32E	3738-3829 3842-4145	4145	12 1/4 7 5 1/2	40 3594 3842	20 400 40	Circ. 2000 3500
	MCA 68 WIW	1395' FSL & 1347' FWL Sec. 21, T-17S, R-32E	3748-4098	4098	10 3/4 8 5/8 7	95 880 3748	50 15 310	Circ. 160 1710
	MCA 69	1980' FSL & 1980' FWL Sec. 21, T-17S, R-32E	3610-4131	4136	8 4/8 5 1/2	868 3610	50 150	Circ. 1990
	MCA 93	660' FSL & 660' FWL Sec. 21, T-17S, R-32E	3566-4080	4080	8 5/8 7	889 3566	50 150	Circ. 2066

EXHIBIT NO. 7 Page 3 of 4

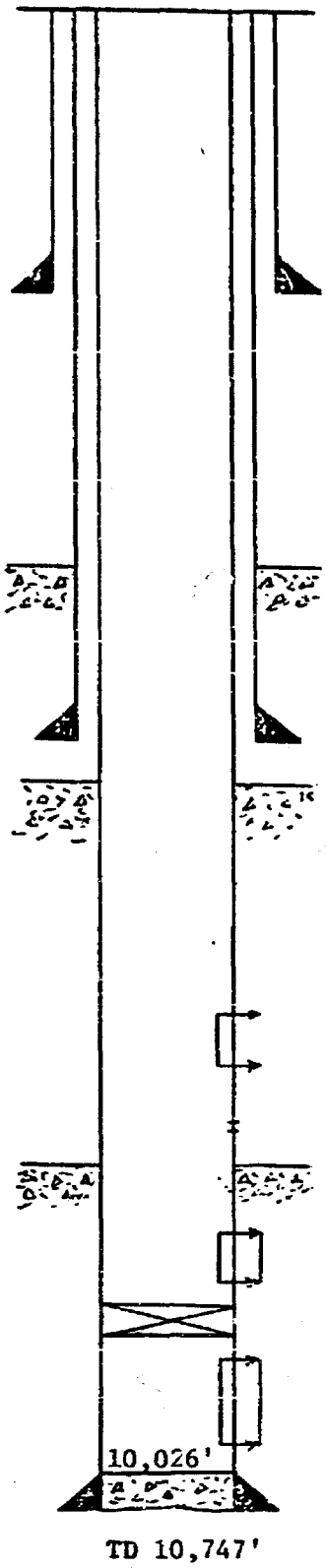
OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 94 WIW	660' FSL & 660' FEL Sec. 20, T-17S, R-32E	3600-4090	4090	12 1/2 7	20 3600	0 360	Mudded To Top 439
	MCA 95	660' FSL & 1980' FEL Sec. 20, T-17S, R-32E	3550-4036	4055 5036	8 5/8 7	880 3550	50 150	Circ. 2050
	MCA 113 WIW	80' FNL & 25' FWL Sec. 28, T-17S, R-32E	3630-4058	4058	8 5/8 7	965 3630	50 350	Circ. Circ.
	MCA 256	2590' FSL & 1310' FEL Sec. 20, T-17S, R-32E	3686-3821	4145 3920	8 5/8 5 1/2	748 4145	300 300	28 2400
	MCA 257	1345' FNL & 2615' FWL Sec. 20, T-17S, R-32E	3676-3906	5500 4090	8 5/8 5 1/2	262 5498	150 1500	Circ. 1725
	MCA 258	990' FNL & 990' FEL Sec. 20, T-17S, R-32E	3722-4118	5445 4200	7 5/8 4 1/2	825 5445	405 400	Circ. 1950
	MCA 262	2615' FNL & 25' FWL Sec. 21, T-17S, R-32E	3709-3901 4038-4102	4145 4125	8 5/8 5 1/2	780 4145	350 250	Circ. 2900
	MCA 266	1345' FSL & 2615' FWL Sec. 20, T-17S, R-32E	3792-4043	4110 4056	8 5/8 5 1/2	700 4110	325 250	Circ. 2100
	MCA 269	125' FSL & 1295' FEL Sec. 20, T-17S, R-32E	3856-3875 4002-4030	4130 4114	8 5/8 5 1/2	770 4130	400 300	Circ. 2700

EXHIBIT NO. 7 Page 4 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 271	1295' FNL & 25' FEL Sec. 20, T-17S, R-32E	3753-3761	4163 3850	8 5/8 5 1/2	770 4163	425 450	Circ. 2460
	MCA 287	1395' FSL & 25' FEL Sec. 20, T-17S, R-32E	3724-4083	4120 4109	8 5/8 5 1/2	800 4120	450 300	Circ. 2126
	MCA 303 WIW	1980' FSL & 1830' FEL Sec. 20, T-17S, R-32E	3730-3758	13965 4400	13 3/8 9 5/8 7	444 4740 4595-5578	350 4300 138	Circ. Circ. 4775
	MCA 355 WIW	1780' FNL & 1780' FWL Sec. 21, T-17S, R-32E	3716-3738	12780 4094	13 3/8 9 5/8 5 1/2	180 4200 4162-11813	160 3370 1850	Circ. Circ. 4860
	MCA 44	2615' FNL & 2615' FWL Sec. 21, T-17S, R-32E	3814-4050	4124 4050	8 5/8 7	880 3814	65 200	670 est. 2058 est.
	MCA 112	660' FNL & 660' FEL Sec. 29, T-17S, R-32E	3560-4072	4072	8 5/8 7	950 3560	50 100	790 est. 2260 est.
	MCA 263	2594' FSL & 1224' FWL Sec. 20, T-17S, R-32E	3616-4066	4070 4066	8 5/8 5 1/2	680 4070	350 250	Circ. 2400
	BAISH A #5	2310' FSL & 2310' FWL Sec. 21, T-17S, R-32E	2293-2458	2458	10 3/4 8 5/8 7	96 508-943 2293	85 25 250	Surf. -- 2000 est.
	BAISH B #36	554' FNL & 554' FWL Sec. 28, T-17S, R-32E	T.A.	10747 -- 6900	13 8 5/8 5 1/2	825 4200 10745	175 200 1375	275 3391 4250 est.
	WILLIAM MITCHELL B #23	1980' FSL & 2193' FEL Sec. 20, T-17S, R-32E	P&A	5359	13 3/8 8 5/8	80 2521	60 185 115	Circ. 1st & 2nd Stages 795

EXHIBIT NO. 8

BAISH B #36
554' FNL & 554 FWL of Sec. 28, T-17S, R-32E



13", 50# csg. @ 825' w/175 sks.

TOC @ 3391' (Temp Survey)

8 5/8", 28# & 32# @ 4183' w/200 sx.

Est. TOC @ 4250

5335' - 53, 5372' - 84, 5394 - 5400', 5410' - 22', 5422 - 28', 5460 - 78'

Shot 3-1/2"holes @ 5825' and pump 275 sx.

TOC @ 5890' (Temp Survey)

6653-65', 6678-90' squeezed.

Bridge plug at 6900'

Perfs: 8914-20, 8954-60, 8972-78 cement
9020-26, 9042-48, 9070-76 squeezed
9098-9110, 9330-50, 9974-80

5 1/2", 17# csg. @ 10,745' w/1100 sks.

PRESENT

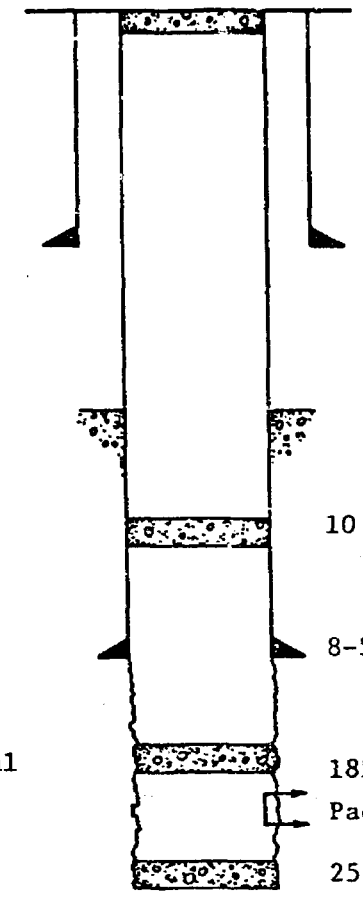
Well T. A.

CONTINENTAL OIL COMPANY

MCA UNIT

Plugged and Abandoned

William Mitchell B #23



Location: 1980' FSL & 2193' FEL
Sec. 20, T17S - R32E

Elevation: 3997'

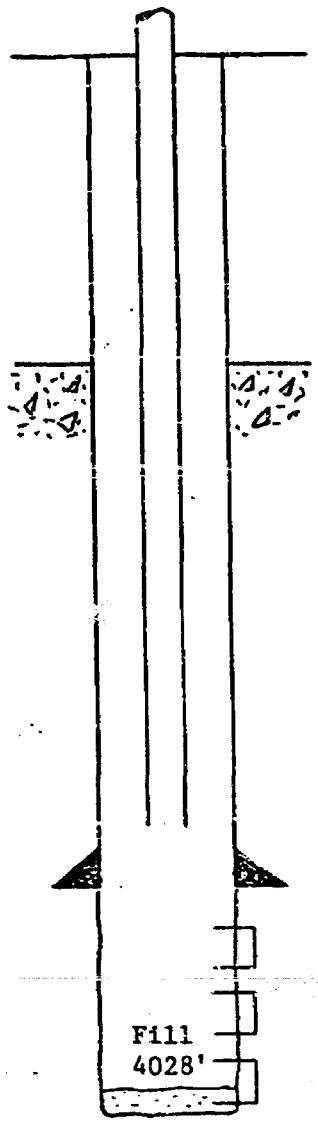
Datum: D.F.

Top Of Salt: 815'

Base Of Salt: 1900'

EXHIBIT NO. 10

MCA Unit No. 66



Location: 1980'F SL & 660'FEL Sec. 20

T- 17S R- 32E ;Elevation 4001'

Est. TOC @ 2000'

7", 22# csg. @ 3561' w/485 sks.

3800' - 3840' shot w/130 qts. nitro

3969' - 3989' shot w/70 qts. nitro

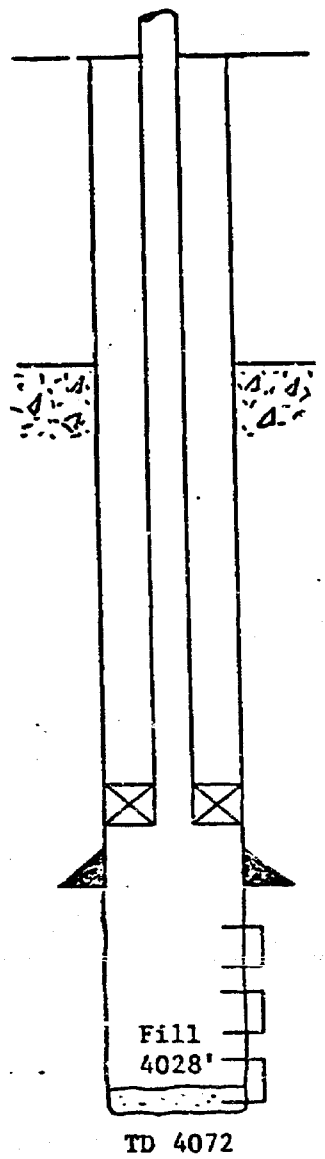
4029' - 4066' shot w/120 qts. nitro

EXHIBIT NO. 10

PRESENT

EXHIBIT NO. 11

MCA Unit No. 66



Location: 1980' F SL & 660' FEL Sec. 20

T- 17S R- 32E ;Elevation 4001'

Est. TOC @ 2000'

2 3/8" plastic lined tbg.

Packer set @ 3460'

7", 22# csg. @ 3561' w/485 sks.

3800' - 3840' shot w/120 qts. nitro

3969' - 3989' shot w/70 qts. nitro

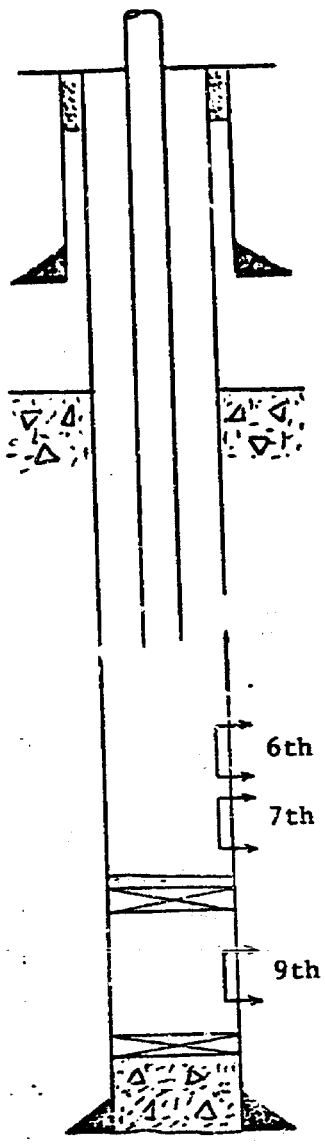
4029' - 4066' shot w/120 qts. nitro

PROPOSED

EXHIBIT NO. 11

EXHIBIT NO. 12

MCA Unit No. 256



Pea Gravel
TOC @ 28'

Location: 2590 'F SL & 1310 'F EL Sec. 20
T- 17S R- 32E ;Elevation 4015'

8 5/8", 24# csg. @ 748' w/300 sks.

TOC 2400' (temp. survey)

6th 3686', 3688', 3690', 3683',
3697', 3701', 3704' w/1 JSPF

7th 3808', 3812' 3815', 3818',
3821' w/1 JSPF

CIBP @ 3920' w/1 sk. cmt. on top

9th M. 4026.5', 4030.5', 4036.5', 4041.5'
4053.5', 4058.5', 4063.5', 4066' w/1 JSPF

CIBP @ 4077'

5 1/2", 14# csg. @ 4145' w/300 sx.

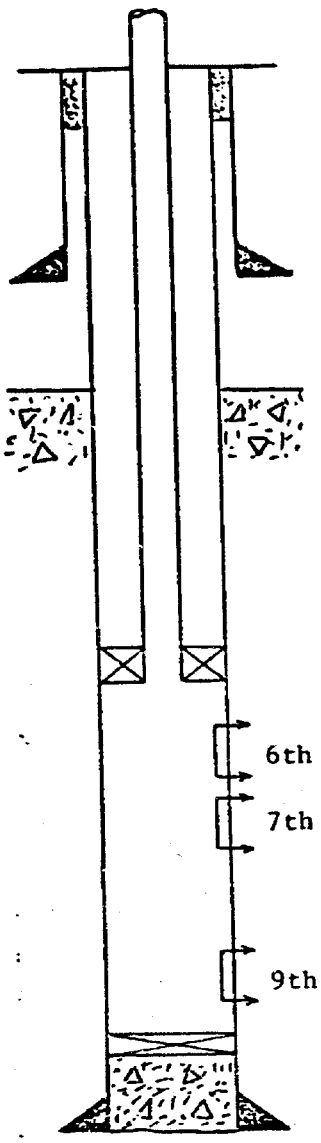
TD 4145'
PBTD 3920'

EXHIBIT NO. 12

PRESENT

EXHIBIT NO. 13

MCA Unit No. 256



8 5/8", 24# csg. @ 748' w/300 sks.

Location: 2590 'F SL & 1310 'F EL Sec. 20
T- 17S R- 32E ;Elevation 4015'

TOC 2400' (temp. survey)

2 3/8" plastic lined tubing
packer set @ 3580'

6th 3686', 3688', 3690', 3683', 3697', 3701', 3704' w/1 JSPF

7th 3808', 3812', 3815', 3818', 3821' w/1 JSPF

9th M 4026.5', 4030.5', 4036.5', 4041.5', 4053.5', 4058.5', 4063.5', 4066' w/1 JSPF

CIBP @ 4077'

5 1/2", 14# csg. @ 4145' w/300 sx.

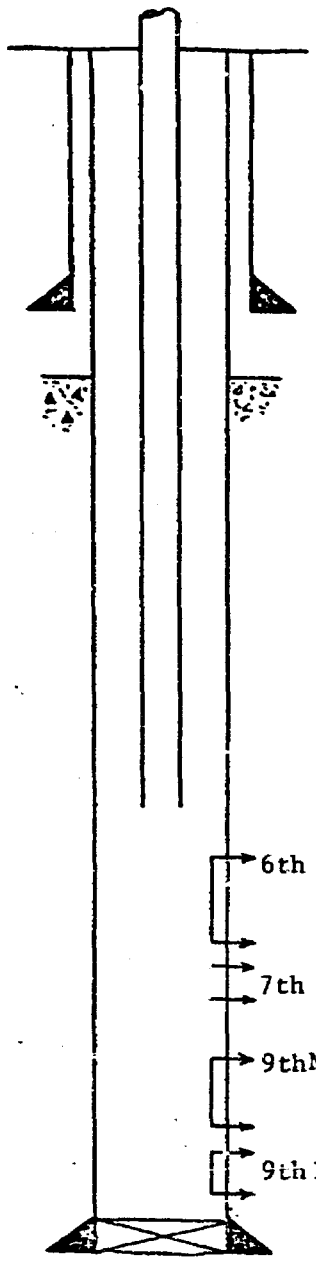
TD 4145'
PBTD 4077'

PROPOSED

EXHIBIT NO. 13

EXHIBIT NO. 14

MCA NO. 262



2615' FNL & 25' FWL, Sec. 21
T-17S; R-32E, Elev. 4023'
Measuring Datum 11' AGL

8 5/8", 20# csg. @ 780'
w/350 sks. (circ.)

TOC 2900'

6th 3709, 13, 18, 25, 30, 38, 49, 54,

3899', w/1 JS

7th 3823, 32, 35, 39 w/1 JSPF
3901, w/1 JS

9thM. 4038', 42', 51', 58', 66', 71', 78'

and 4078', w/1 JSPF

9th M. 4098' - 4102' w/2 JSPF

5 1/2", 14# csg. @ 4145' w/250 sks.

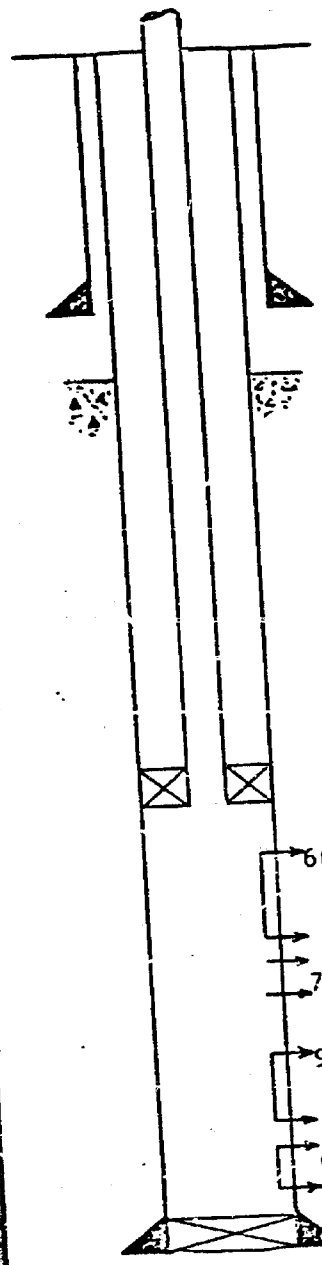
TD-4145'
PBTD-4130'

EXHIBIT NO. 14

EXHIBIT NO. 15

MCA NO. 262

2615' FNL & 25' FWL, Sec. 21
T-17S; R-32E, Elev. 4023'
Measuring Datum 11' AGL



8 5/8", 20# csg. @ 780'
w/350 sks. (circ.)

TOC 2900'

2 3/8" plastic lined tbg.

packer set at 3609'

6th 3709, 13, 18, 25, 30, 38, 49, 54,

3899', w/1 JS
7th 3823, 32, 35, 39 w/1 JSPF
3901', w/1 JS

9th M. 4038', 42', 51', 58', 66', 71', 78'

and 4078', w/1 JSPF

9th M. 4098' - 4102' w/2 JSPF

5 1/2", 14# csg. @ 4145' w/250 sks.

TD-4145'
PBTD-4130'

EXHIBIT NO. 15

PROPOSED

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

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

October 31, 1979

Re: CASE NO. 6580
ORDER NO. R-6157

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

Applicant:

Continental Oil Company

Dear Sir:

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

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide inection project, Lea County, New Mexico. — CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:

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

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

EXAMINER HEARING

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Application of Continental Oil Company for a carbon dioxide inection project, Lea County, New Mexico. CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

MR. NUTTER: We'll call next Case 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. NUTTER: Applicant has rquested continuance.

Case Number 6530 will be continued to the Examiner Hearing scheduled to be held at this same place at 9:00 o'clock a. m. September 19th, 1979.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-8448
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6580, heard by me on 8/22 19 79.

, Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-8448
Santa Fe, New Mexico 87501

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide inection project, Lea County, New Mexico.

CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:

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

MR. NUTTER: We'll call next Case 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. NUTTER: Applicant has requested continuance.

Case Number 6580 will be continued to the Examiner Hearing scheduled to be held at this same place at 9:00 o'clock a. m. September 19th, 1979.

(Hearing concluded.)

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

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

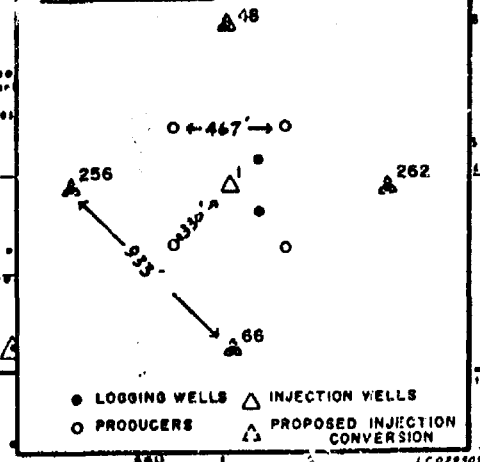
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6580, heard by me on 8/22 19 79.

Oil Conservation Division, Examiner

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-9408
Santa Fe, New Mexico 87501

ENLARGEMENT: PILOT AREA



conoco

PRODUCTION DEPARTMENT — HOBBS DIVISION

LEA COUNTY, NEW MEXICO

Water Injection Well

MCA UNIT Boundary

Participating Area

SCALE IN FEET 0 1000 2000

R 32 E

N

EXHIBIT NO. 2

N

R 32 E

CONOCO

PRODUCTION DEPARTMENT — HOBBS DIVISION

MCA UNIT

LEA COUNTY, NEW MEXICO

LEGEND — GRAYBURG-SAN ANDRES UNLESS OTHERWISE NOTED

Y = Yates — SR = Seven Rivers — J = Queen
P = Paddock — A = Abo — W = Wolfcamp
Pn = Pennsylvanian — S = Strawn — M = Morrow
D = Devonian

Unit Boundary

Participating Area

SCALE 0 1000 2000

LEGEND:
- LOCATION
- OIL WELL
- GAS WELL
- DRY HOLE
- INJECTION WELL
- ABANDONED WELL
- SHUT-IN WELL
- SALT WATER DISPOSAL WELL
- DEEPER WELL
- ZONE UNTESTED

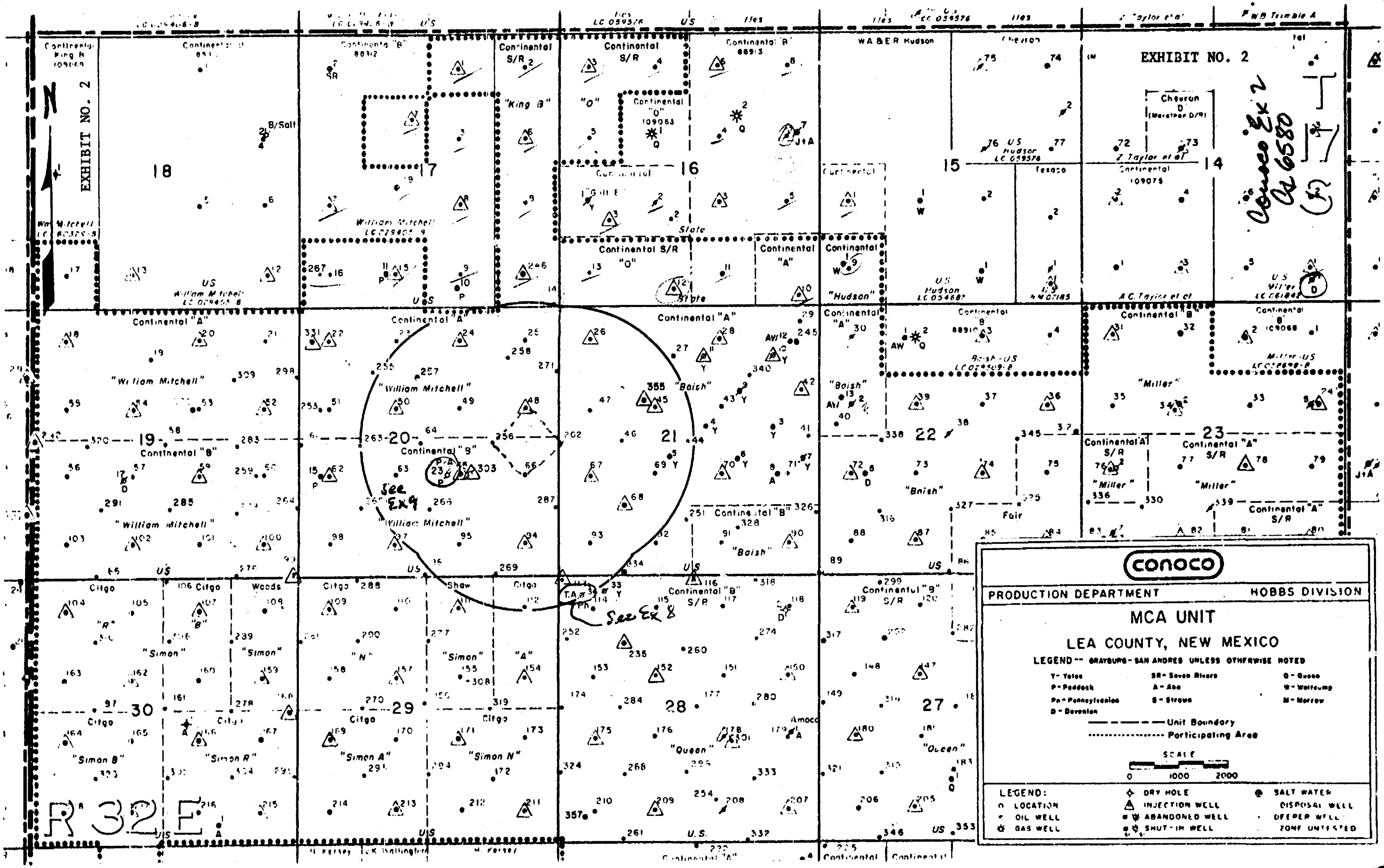


EXHIBIT NO. 2
Conoco Ex 2
Cs 6580
EXHIBIT NO. 2
N
R 32 E
See Ex 9
See Ex 8
conoco
PRODUCTION DEPARTMENT
HOBBS DIVISION
MCA UNIT
LEA COUNTY, NEW MEXICO
LEGEND-- GRAYBURG-SAN ANDRES UNLESS OTHERWISE NOTED
Y - Yates
P - Paddock
Pn - Pennsylvanian
D - Devonian
SR - Seven Rivers
A - Abo
S - Strawn
Q - Queen
W - Wolfcamp
M - Morrow
Unit Boundary
Participating Area
SCALE
0 1000 2000
LEGEND:
LOCATION
OIL WELL
GAS WELL
DRY HOLE
INJECTION WELL
ABANDONED WELL
SHUT-IN WELL
SALT WATER DISPOSAL WELL
DEEPER WELL ZONE UNTESTED

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: We'll call now Case Number 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. KELLAHIN: Tom Kellahin, Santa Fe, appearing on behalf of the applicant. I have one witness. If the Examiner please, I'd like the record to reflect that Mr. Lowell Deckert has previously qualified as an expert witness and is still under oath.

MR. NUTTER: Mr. Deckert is still under oath.

LOWELL DECKERT

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Deckert, would you please refer to what we have marked as Exhibits Numbers One and Two and explain to the Examiner what Conoco is seeking to accomplish by this application?

A Okay. We desire to initiate a pilot CO2 recovery project for purposes of evaluating CO2 enhanced

oil recovery in the Maljamar-Grayburg-San Andres. We propose to do this by installing a 5-acre inverted 5-spot pattern in proration Units H and I of Section 20 of Township 17 South, Range 32 East, Lea County.

This will be within an existing waterflood pattern in our MCA Unit waterflood project. The pilot, as you see it there in Exhibit One, will require drilling seven wells in non-standard locations; approximate depth of 4100 feet. These will be Grayburg-San Andres wells.

There will be four producing wells, one center injector, and two logging observation wells.

Q. Would you go back and summarize chronologically what has been the history of this particular portion of the Maljamar-Grayburg-San Andres?

A. Okay. The development in the Maljamar Field, this was one of the first fields discovered in Lea County, New Mexico, and the majority of the development took place in the late '30s and early 1940s.

In the mid-1940s they started a gas injection project and this continued up until the start of our waterflood operations in 1963. And since 1963 we've been conducting a waterflood of the Grayburg-San Andres in the Maljamar Field.

Q. At this point Conoco believes that the installation of a CO2 recovery project is necessary in order

to recover additional reserves?

A. Yes.

Q. In applying to the Commission for approval, Mr Deckert, what specific things are you requesting the Division to do with regards to its approval of this application?

A. Okay, we're asking for approval, first of all, to inject CO2 in the pilot area at a bottom hole pressure not to exceed 3700 pounds.

The second thing we're requesting is approval to drill four producing wells, one CO2 injection well, and two logging observation wells at non-standard locations in the 5-acre pilot area.

Third, we're seeking approval to convert Wells Nos. 66, 256, and 262 MCA to water injection service. These are, incidentally, the wells that border the -- are immediately bordering the pilot area.

Q. Let's look at Exhibit Number One now, Mr. Deckert, and have you describe for me the sequence of events with regards to the development of this pilot project.

A. Okay, the -- as we see the time schedule for this pilot, it would start with the drilling of the center well, MCA No. 358.

Q. All right, at this point right now, are

any of the wells within the 5-spot pattern in existence now?

A. Nc.

Q. All right. First of all, you'll drill the 358 Well.

A. Yes.

Q. And what will you do with that well?

A. Okay, we plan to production test it for a period of approximately two months to establish that the pilot area is watered out by the water injection program in that area.

Q. Then what will happen?

A. The second step would be to convert that well to water injection service and conduct pressure pulse tests for reservoir information and to get any idea of directional preference.

Now this information will allow us to select the producer location insofar as the orientation with respect to No. 358.

Q. All right. Wells labeled P-1 through P-4, are those the exact locations that Conoco intends to drill those wells?

A. No, and really until we -- we feel like until we do the pressure pulse testing, why, we won't be able to establish the exact location of these wells.

Q. Under the existing rules for this area what

are the limitations, if any, with regards to the well locations?

A. Within 25 feet of a proration unit boundary, I believe.

Q. All right. The P-1 through P-4 wells would all be producing wells.

A. Yes.

Q. The L-1 and the L-2 are what kind of wells?

A. Okay, now those will be logging observation wells.

Q. What do you intend to detect or how do you intend to detect by use of those two wells?

A. Okay, now those wells will be used to provide information on, well, the presence of any thin, high permeable layers through a logging program and changes in CO2 and water saturation with time.

Q. What are you going to do with wells 66, 256, 48, and 262?

A. Okay. No. 66, 256, and 262 will be converted to injection service to provide backup for this pilot area to minimize fluid migration into or out of the pilot area.

Q. What is their status now?

A. They are the three wells I just mentioned

are producing wells, active producing wells.

MR. NUTTER: You'll also continue to inject in No. 48 after --

A. Yes, yes, uh-huh.

MR. NUTTER: -- this, so you'd have four water injection wells.

A. Yes, uh-huh, right. No. 48 is an active injection well at this time.

Q. Would you identify Exhibit Number Two?

A. Okay. Exhibit Number Two is a map of the general area showing a larger expanse of the MCA Unit, and the circle that is -- circles that are drawn on this map show the area within one-half mile of the proposed injection wells.

Q. How do you propose to complete the pilot wells, Mr. Decker?

A. Okay. The pilot wells will be completed to provide separate Grayburg Sixth and San Andres Ninth massive injection and production, and the reason for this is that we want an evaluation of the CO2 process for the two major producing intervals in this field.

MR. NUTTER: Now, what did you mean by pilot wells?

A. Okay, that would be the injector and the four producing wells.

MR. NUTTER: Okay.

A. Yeah, and they will be completed to provide separate injection and production from those two zones.

Q. And how do you intend to use the two logging observation wells?

A. Okay. The logging observation wells again will be -- the exact location of those two wells will be based on pressure pulse information that we obtain after we drill the producing wells, and they will be drilled between the injector and two of the producers, and the purpose of these logging observation wells will be to provide a study of zone isolation, vertical heterogeneity, and the CO2 displacement process and reservoir directional variation.

Q. What do you anticipate to be the total life of the pilot project?

A. We view it as being a total of four years. It will, we think it will probably, according to our time schedule, it will probably be a year and a half before we're ready to start CO2 injection into this area.

Q. I assume that you will use these two logging observation wells by conducting certain periodic electric logs in the wells.

A. Yes, we would.

Q. Would you explain what your plan is with regards to those wells?

A. Okay. We plan to run approximately thirty logs over the two year period, starting with the injection of CO2, continuing to the end of the project; run about thirty logs in the two wells over this period, and this would be gamma ray neutron and resistivity type logs, and we're looking for information, again, on presence of any thin, high permeability layers and changes in CO2 and water saturation.

Q. And what again will be the purpose of these four outlining injectors, or backup injectors, as you called them?

A. Okay. They would be to minimize fluid migration into or out of the pilot area.

Q. Would you describe Exhibit Number Three and identify the information on that exhibit?

A. Okay. Exhibit Number Three is a sketch of the downhole mechanics of how we intend to complete Well MCA No. 358, or center CO2 injection well.

Q. And do you have a specific location for this well?

A. Yes, we do.

Q. What is that location?

A. The location that we've chosen is 660 feet from the east line, 2600 feet from the north line of Section 20.

Now, the thing that you'll note about this exhibit is that we have two strings of tubing in the well and that the well will be completed in the Grayburg Sixth and the San Andres Ninth massive only, and that these zones will be separated by a packer.

And I might say that the Maljamar-Grayburg San Andres is one pool, but this separation would -- would allow us to study the CO2 process in the two major pay intervals in this field.

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

A. Okay. Exhibit Number Four is the typical CO2 pilot producer and shows how we intend to complete the four producing wells in this pattern. And here again you'll notice the separation between the Sixth and Ninth zones to provide -- to isolate them and provide separate production.

Q. Would you identify Exhibit Number Five?

A. Exhibit Number Five is the wellbore schematic of the logging observation wells and, as we previously discussed, it would be to provide a study of zone isolation and vertical reservoir variation through study of logs.

Q. I notice on your Exhibit Number Five you've indicated fiberglass casing?

A. Right, we plan to run fiberglass casing

through the pay section and in order that we can run electric logs for interpretation of the reservoir fluid saturations.

Q. All right, Exhibit Number Six.

A. Exhibit Number Six is a typical gamma ray neutron log in the -- showing the Grayburg-San Andres waterflood intervals in the proposed pilot area.

The Sixth through the Ninth massive zone tops are marked on this log section.

Q. Would you identify Exhibit Number Seven?

A. Exhibit Number Seven is a tabulation of all wells within one-half mile of the proposed injection wells, and it shows the location, completion intervals, TD, plugged back TD, casing, and cementing records for these wells.

Q. What conclusion have you reached with regards to all the wells within a half mile radius that have penetrated the zone of interest?

A. Well, it leads me to believe that we should have the pressure -- the pressure fluid should be confined to the waterflood interval in this area.

Q. In your study of all those offsetting wells have you discovered any of those wells that are defective either in their casing cementing or any other production problems that might cause a migration of the pressurized fluids through those wells up into other zones?

A. No, not in my opinion.

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

A. Okay. Exhibit Number Eight is a wellbore schematic for the Baish B 36, and if you'll refer to Exhibit Two, you'll see that this well is located in the extreme northwest corner of Section 28.

This is a well that was drilled and abandoned in 1949 and the well is located almost a half mile from our proposed pilot area.

Q. What's the purpose of the exhibit?

A. Well, the purpose of the exhibit is to demonstrate that this well is -- does provide zonal isolation for the injected fluids.

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

A. Okay. Exhibit Number Nine is a wellbore schematic for the William Mitchell "B" No. 23.

Q. And where is that well located?

A. And that well is located next to MCA No. 65 in -- and refer to Exhibit One, it's in proration unit "J" of Section 20.

MR. NUTTER: Exhibit Two, you mean.

A. One or Two.

MR. NUTTER: Oh, yes.

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

A. Okay. Exhibit Number Ten is the present wellbore schematic for well -- MCA No. 66, and this is one of the wells that we propose to convert to -- for backup injection service.

Q. And Exhibit Number Eleven?

A. Eleven would be the proposed schematic after conversion.

Q. Okay. Exhibit Twelve?

A. Exhibit Twelve is a wellbore schematic for MCA No. 256, and shows the schematic as it is a producing well presently.

Q. And Exhibit Number Thirteen.

A. Okay. Thirteen is the schematic after proposed conversion of this well to backup injection service. The main difference between Exhibits Twelve and Thirteen is that the -- we plan to drill out the bridge plug there so this well will give us injection into both Sixth and Ninth massive zones.

Q. Exhibit Number Fourteen?

A. Exhibit Fourteen is a wellbore schematic for MCA No. 262.

Q. Okay, and Exhibit Number Fifteen.

A. Fifteen is a wellbore schematic for after

conversion of this well to backup injection service.

Q In your opening comments, Mr. Deckert, you indicated to the Examiner that you propose a bottom hole pressure not to exceed 3700 psi. What if any tests have you conducted with regards to the confining strata around the producing formation to demonstrate that that maximum pressure, injection pressure, is reasonable?

A. Okay. We conducted a pressure breakdown test in the caprock overlying the proposed injection interval, in MCA No. 256. Again, this is a well that's immediately adjacent to the pilot area.

The reason for this test was the pressure limitation contained in the EPA proposed underground injection control program. Paragraph 146.24, titled Operating Monitoring and Reporting Requirements, Volume 44, No. 78 of the Federal Register, dated April 14th, 1979.

This section states that injection pressure at the surface shall not exceed a maximum which shall be calculated so as to assure that the bottom hole pressure during injection does not initiate fracture in the confining strata or cause the migration of injected or formation fluids into an underground source of drinking water.

Now the test we conducted on No. 256 --

Q Let me ask you, Mr. Deckert, is Exhibit Number Six a log or a portion of a log for MCA Well NO. 256?

A. Yes, it is.

Q. All right. Would you refer to Exhibit Six and describe now to the Examiner how you went about conducting your pressure breakdown test?

A. Okay. We perforated an interval of the caprock from approximately 3580 to 3590 feet with two jet shots per foot in acid and then we subjected these to various pump pressures and we took 250 pound increments and went up on the pressure and held each pressure step for fifteen minutes, and we went up to a maximum of 2150 pounds, and at that pressure we did not have any breakdown of the caprock.

Q. A maximum of how -- what pressure?

A. 2150 surface.

Q. That's surface?

A. Yeah, or 3700 pounds bottom hole, which would be 1.0 psi per foot.

Q. Mr. Deckert, you're familiar with the Division's memorandum requiring that the bottom hole pressure in waterflood be no more than 0.2 psi per foot of depth unless there is information indicating that pressure in excess of that will not fracture the confining strata. How does this pressure of 3700 psi bottom hole compare into psi per foot of depth?

A. It figures out to be 1.03 psi per foot.

Q. Why has the applicant sought that as a maximum bottom hole pressure for the CO2 injection?

A. In order to -- well, it's a maximum that we think we'll ever need to conduct this pilot, in order to successfully inject fluids into this pilot area.

Q. In your opinion could the pilot be operated successfully by limiting the injection to the 0.2 psi per foot of depth?

A. No.

Q. Would you go ahead and describe for us the overall purpose of this CO2 pilot injection project?

A. Okay. The MCA unit's in the final stages of waterflood operation. We estimate that CO2 injection in the Maljamar-Grayburg-San Andres could result in additional oil recovery of anywhere from 2 to 10 percent of original oil in place.

The added recovery would be the result of in place oil swelling by CO2, reduced interfacial tension, and the extraction of crude components by the CO2 to form a hydrocarbon bank, which would admissably displace oil ahead of it.

We believe that approximately 1000 acres of the MCA Unit to be prospective for CO2 enhanced oil recovery. The original oil in place in this 1000 acres is estimated at 35 million barrels, and I might point out that

the -- we figure the remaining oil after waterflooding this area is something in the order of 20 million barrels.

Q. What are some of the purposes of this CO2 project, Mr. Deckert?

A. Well, as we see it, there will be three main points we're attempting to establish in the CO2 pilot.

First of all, to see if CO2 can mobilize oil in flooded out Grayburg-San Andres waterflood intervals, and determine if additional oil recovery would be sufficient to justify a full scale CO2 project.

Secondly we need an idea of what the CO2 process recovery efficiency is; that is, the amount of CO2 required for a barrel of enhanced oil.

The third thing that we're attempting to establish is the CO2 injection rates.

Q. The CO2 injection rates, Mr. Deckert, what's your initial plan with regards to the injection?

A. Okay, the -- we propose to operate the pilot under water injection, first of all, until the oil decline rates are established for the pilot area. Then we propose to inject a 12-1/2 percent pore volume CO2 slug, which would be about 6000 tons of CO2, either in a straight or water alternate gas process. The CO2 would be injected at a bottom hole pressure not to exceed 3700 pounds.

We intend to follow this CO2 slug with

water and we estimate that the total four year operating life of this pilot from the time we drilled No. 358 until we finally are finished with this pilot area.

Q. Mr. Deckert, do you have an estimate of what the parting pressure within the formation would be?

A. The -- yes, we do.

Q. And what is that figure?

A. The -- based on our testing in this area, the parting pressure would be of the order of 3300 pounds bottom hole.

MR. NUTTER: As opposed to 3700 pounds in this caprock --

A. Yes, sir. Yes, sir. Now, this is -- this parting pressure is based on testing in four wells immediately adjacent to the pilot area.

Q. Mr. Deckert, are you familiar with the Petroleum Recovery Research Center?

A. Yes, I am.

Q. And what is that?

A. The Petroleum Recovery Research Center is located in Socorro and their primary purpose, as I understand it, is to encourage and study enhanced oil recovery processes.

Q. What if any coordination is being made by Conoco with regards to the Petroleum Recovery Research Center?

A. Well, we are working together in two areas.

They're doing some work with us on crude oil CO2 admissability and we're also getting ready to do a joint geological study of the MCA Unit area with them.

Q. Were Exhibits One through Fifteen, I believe, prepared by you or compiled under your direction and supervision, Mr. Deckert?

A. Yes.

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

A. Yes, sir.

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

MR. NUTTER: Conoco Exhibits One through Fifteen will be admitted in evidence.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Deckert, now if I understand your -- first of all, you're going to drill this No. 358 and do you have a location for it? I think it was --

A. Yes, un-huh, it will be 660 feet from the east line, 2600 feet, I believe it is, from the --

Q. From the north line.

A. North line, uh-huh. Section 20.

Q. And the locations of P-1 through P-4 and L-1 and L-2 are still undetermined.

A. Yes.

Q. These locations will be determined as a result of this pulse testing.

A. Yes, sir.

Q. So any order authorizing this project would have to contain provisions for authorizing these unorthodox locations for these wells.

A. Yes, sir.

Q. And authorize a location for the No. 358. Now, Nos. 256, 66, and 262 have as yet not been authorized for water injection, have they?

A. No, sir, that's part of this application.

Q. So an order would authorize those wells also.

A. Yes, sir.

Q. Now, as I understand it, after you drill No. 358 you will put that well on production and produce it for a couple of months and after that you would conduct the pulse testing in that well.

A. Yes, sir, we would convert it to injection and then conduct the pulse test.

Q. And be injecting water into it.

A. Yes.

Q. And make pulse tests and determine the locations of P-1 through P-4.

A. Yes, sir.

Q. And then after you determine the locations for those, those wells would be drilled.

A. Uh-huh.

Q. And you'd put them on production while continuing to inject in No. 358 and determine the location of where you want to drill L-1 and L-2.

A. Yes, sir.

Q. Now, after you have drilled P-1 through P-4 and L-1 and L-2, then you would start the CO2 injection program in No. 358.

A. We would have first of all a period of time where we would establish the base level production for these pilot wells to make sure we knew what our production, base production was in order that we could recognize the oil increase due to the CO2 injection.

Q. Okay, so you'd be producing P-1 through P-4 while you were injecting water into the five injection wells and after you had established the base rate of production for P-1 through P-4, then you would commence your injection of CO2.

A. Yes.

Q Into 358. Now, you would inject CO_2 into No. 358 at the rate of 12-1/2 percent of the pore volume that you calculate for this 5-acre 5-spot?

A. Yes, sir, uh-huh, 12-1/2 percent slug, right.

Q And this would approximate approximately 6000 tons of CO_2.

A. Yes, sir.

Q Which would either be a straight injection slug or alternately with water.

A. Yes, sir.

Q Now, in conducting this test in the cap-rock confining this formation on the top, you mentioned that it was from 3580 to 3590 feet?

A. Uh-huh.

Q In the No. 256?

A. Yes.

Q And this Exhibit Number Six, that's identified as a typical gamma ray neutron log, doesn't identify it as being any particular well, but this is the log of No. 256?

A. Yes, sir.

Q So you've got that little bitty interval there from 3580 to 90.

A. Uh-huh.

Q. Which you determined to be the caprock in this well.

A. Yes. Well, I might say here that the reason we didn't want to get any closer to the top of the Sixth zone with this test was that the Sixth zone was fractured on initial completion, so we wanted to stay some distance away from the Sixth zone perforated interval to stay out of that --

Q. So you stayed a good 100 feet above that Sixth zone in the well?

A. Yes, uh-huh.

Q. And you made a couple perforations in there or a couple of feet of perforations.

A. Yes, we shot seven feet with two shots per foot in acid.

Q. Now I understood you to say that you subjected these perforations to various pressures in 250 pound increments.

A. Uh-huh.

Q. For fifteen minutes each.

A. Yes.

Q. What were you injecting?

A. Water.

Q. And what was the volume of water? Did that depend on the pressure you were injecting with?

A. Just enough to --

Q. To build up to a --

A. Build up to the pressure.

Q. -- certain pressure.

A. Yes, uh-huh. And we did get up to that 3700 pounds and we did not have any -- it held there and did not breakdown at that point.

Q. Which was 2150 pounds at the surface.

A. Surface, yes, sir.

Q. And you saw no breakdown.

A. Yes, sir, that's right.

Q. Now -- and that calculates out to be this 1.03 pounds per square inch per foot of depth.

A. Yes, sir.

Q. But the formation itself, I presume in the Sixth and Ninth zones, parts at 3300 pounds.

A. Uh-huh.

Q. As determined by breakdown tests or injectivity tests done.

A. Pressure parting tests, yes.

Q. And all of the injection into the No. 358 will be selected injection to Sixth and Ninth zones through separate strings of tubing but the injection into the four offsetting wells would not be selected injection, is that it?

A. That's right.

Q. And each of the four producing wells would be produced separately from the two zones.

A. Yes, sir. Yes, right, they will be selective producers.

Q. Now, you mentioned that you figured that there were 1000 acres in the MCA that may be susceptible to this?

A. Yes, sir.

Q. Why only 1000 acres?

A. Well, the --

Q. What's the total acreage in this MCA Unit?

A. About 9000 acres. Now, this was premised primarily on the -- on this Ninth massive pay, and there's approximately 1000 acres that are underlined by this Ninth massive pay, and incidentally, that same area contains some of the best Sixth zone pay in that unit, in the entire MCA unit, so we thought that this area would probably be the most prospective for CO2 injection.

Q. You don't think that an area that doesn't have the Ninth pay would be profitable for CO2 injection?

A. Well, nct --

Q. If it had a Sixth only?

A. Not at this time, but this may depend a lot on the results of this pilot test and what we -- what we

see from it.

Q. Now you're also estimating that from 2 to 10 percent of the original oil in place may be recovered by this CO2 project.

A. Yes.

Q. 2 to 10 percent of the original oil in place.

A. Uh-huh.

Q. What are you estimating as complete secondary recovery with water injection only to be the total percent of original oil in place to be recovered here?

A. It looks like something in the order of 40 percent.

Q. Leaving 60 percent in the ground.

A. Right. Of course, this is a pretty big target for enhanced oil recovery project and that's the reason we want to pilot the area.

Q. Uh-huh. And what was your estimate about recoverable oil in the 1000 acres if the project was successful? Did you give a figure for the total 1000 acres?

A. No, I didn't but it would be somewhere -- well, at 10 percent it would be as much as 3-1/2 million barrels.

Q. I see. Okay.

MR. NUTTER: Are there any further ques-

tions of Mr. Deckert? He may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 6580?

A SPECTATOR: Dan, may I interject something here?

MR. NUTTER: Yes, sir.

SPECTATOR: I did not want you to be confused in here when he said that the gradient, pressure gradient in there was 1.03 psi per foot at the surface, comparing it to the .2 psi per foot surface pressure that the Commission had been using as a guideline, but actually the surface pressure at the 3700 psi per foot would be, in this breakdown test, or test of the confining strata, was only about .6 per pound per foot of depth at the surface.

MR. NUTTER: At the surface.

A. Uh-huh, right.

MR. NUTTER: Okay.

MR. KELLAHIN: It came out as 1.03.

A. Bottom hole.

MR. KELLAHIN: You didn't say bottom hole.

A. Well, we did, we did earlier.

MR. NUTTER: All right, I think I understood that, although I'm confused on a lot of other things.

Does anyone have anything they wish to offer in Case Number 6580?

MR. KELLAHIN: No, sir.

MR. NUTTER: If not, we'll take the case under advisement and the hearing is adjourned.

(Hearing concluded.)

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

REPORTER's CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6680, heard by me on 9/19 19 79.

_____, Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2448
Santa Fe, New Mexico 87501

Docket No. 37-79

Dockets Nos. 38-79 and 39-79 are tentatively set for October 2 and October 17, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - TUESDAY - SEPTEMBER 25, 1979

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

CASE 6495: (DE NOVO) (Continued from August 24, 1979, Commission Hearing)

Application of Amax Chemical Corporation for the amendment of Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area by the inclusion of certain lands in Sections 23 and 24, Township 19 South, Range 29 East, Sections 1, 4, 5, 6, 7, 11, 12, 13, 14, 19, 20, 23, 24, and 29, Township 19 South, Range 30 East, and Sections 7, 8, 17, 18, and 19, Township 19 South, Range 31 East, all in Eddy County, New Mexico.

Upon application of Amax Chemical Corporation this case will be heard De Novo pursuant to the provisions of Rule 1220.

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Docket No. 36-79

DOCKET: EXAMINER HEARING - WEDNESDAY - SEPTEMBER 19, 1979

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

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

CASE 6656: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Energy Oil & Gas Corp., The Travelers Indemnity Co., and all other interested parties to appear and show cause why the Sadler Well No. 1 located in Unit I of Section 3, Township 24 North, Range 29 East, Union County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6652: (Continued from September 5, 1979, Examiner Hearing)

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

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

Among the matters to be considered at the hearing will be the necessity of unit operations; the designation of a unit operator; the determination of the horizontal and vertical limits of the unit area; the determination of a fair, reasonable, and equitable allocation of production and costs of production, including capital investment, to each of the various tracts in the unit area; the determination of credits and charges to be made among the various owners in the unit area for their investment in wells and equipment; and such other matters as may be necessary and appropriate for carrying on efficient unit operations, including, but not necessarily limited to, unit voting procedures, selection, removal, or substitution of unit operator, and time of commencement and termination of unit operations. (This case will be continued to the October 3, 1979, Commission Hearing.)

CASE 6653: (Continued from September 5, 1979, Examiner Hearing)

Application of Shell Oil Company for a pressure maintenance project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pressure maintenance project on its North Hobbs Grayburg-San Andres Unit, by the injection of water through 70 wells into the Grayburg-San Andres formation, and the adoption of special rules governing said project. (This case will be continued to the October 3, 1979, Commission Hearing.)

CASE 6657: Application of Petroleum Development Corporation for the rescission of special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of the special pool rules for the South Hope-Pennsylvanian Gas Pool to provide for 320-acre spacing rather than 640 acres. In the absence of objection, the pool rules will be rescinded and the pool placed on standard 320-acre spacing for Pennsylvanian gas pools rather than the present 640-acre spacing.

CASE 6658: Application of Texas Pacific Oil Company, Inc. for an unorthodox well location and a non-standard proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard gas proration unit comprising the S/2 NE/4 and N/2 SE/4 of Section 14, Township 24 South, Range 36 East, Jalmat Gas Pool, to be dedicated to its J. W. Cooper Well No. 8 at an unorthodox location 2010 feet from the North line and 2310 feet from the East line of said Section 14.

CASE 6659: Application of Amoco Production Company for an exception to Order No. R-3221, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Order No. R-3221 to permit disposal of produced brine in several unlined surface pits located in Sections 27, 34 and 35, Township 18 South, Range 31 East.

CASE 6660: Application of B. & W. Oil Reclaiming for an oil treating plant permit, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at a site in the NE/4 NE/4 NE/4 of Section 34, Township 18 South, Range 26 East.

CASE 6661: Application of LaRue and Muncy for an exception to R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the casing-cementing rules of Order R-111-A to permit a well to be drilled in Unit C of Section 22, Township 18 South, Range 30 East, Leo Queen-Grayburg Pool, to be cased by setting surface casing at the top of the salt, circulating cement on the oil string, and omitting the intermediate casing required by R-111-A; applicant further requests special rules to apply to all of Sections 15 and 22 of said township to permit additional wells to be completed in the same manner.

CASE 6662: Application of Supron Energy Corporation for a dual completion and downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Jicarilla "A" Well No. 22Y located in Unit K of Section 24, Township 26 North, Range 4 West, to produce gas from the Blanco Mesaverde Pool through tubing and to commingle and produce the Wildhorse Gallup and Basin-Dakota zones through a parallel tubing string.

CASE 6663: Application of Doyle Hartman for an unorthodox well location and approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of a well at an unorthodox location 330 feet from the South line and 2310 feet from the West line of Section 36, Township 23 South, Range 36 East, Jalmat Gas Pool, is necessary to effectively and efficiently drain that portion of the existing proration unit which cannot be so drained by the existing well.

CASE 6664: Application of Doyle Hartman for an unorthodox well location, two non-standard proration units and approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 40-acre non-standard proration unit comprising the NW/4 SW/4 of Section 27, Township 25 South, Range 37 East, Jalmat Pool, to be dedicated to El Paso Natural Gas Company's Harrison Well No. 1, and also a 120-acre unit comprising the E/2 SW/4 and SW/4 SW/4 of said Section 27 to be dedicated to a well to be drilled at an unorthodox location 330 feet from the South and West lines of the section; applicant further seeks a waiver of existing well spacing requirements and a finding that the drilling of said well is necessary to effectively and efficiently drain that portion of an existing proration unit which cannot be so drained by the existing well.

CASE 6647: (Continued from September 5, 1979, Examiner Hearing)

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

CASE 6665: Application of Amax Chemical Corporation for the amendment of Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area by the inclusion of certain lands in Sections 22 and 23, Township 19 South, Range 29 East, and Section 19, Township 19 South, Range 30 East.

CASE 6666: Application of Exxon Corporation for a non-standard proration unit, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 377.57-acre non-standard gas proration unit comprising Lots 1, 2, 3, and 4 and the N/2 N/2 of Section 36, Township 26 South, Range 25 East, and Lots 3 and 4 and the N/2 NW/4 of Section 31, Township 26 South, Range 26 East, to be dedicated to a Morrow test well to be located in Unit A of said Section 36.

CASE 6667: Application of Exxon Corporation for a non-standard proration unit, an unorthodox well location, and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the approval of a 320-acre non-standard gas proration unit comprising the W/2 of Section 10, Township 21 South, Range 36 East, Eumont Pool, to be simultaneously dedicated to its A. J. Adkins Com Well No. 1 located in Unit L, and to its Well No. 2, at an unorthodox location 1650 feet from the North and West lines of said Section 10.

CASE 6668: Application of Delta Drilling Company for pool creation and special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Bone Spring production for its SCB Unit Well No. 3 in Unit G of Section 23, Township 23 South, Range 28 East, and special rules therefor, including 80-acre spacing.

CASE 6669: Application of Mesa Petroleum Company for the amendment of Order No. R-6078, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6078 to cover the Wolfcamp and Pennsylvanian formations in the compulsory pooling of the E/2 of Section 10, Township 16 South, Range 27 East, rather than the Morrow formation only.

CASE 6644: (Continued from September 5, 1979, Examiner Hearing)

Application of Tenneco Oil Corporation for downhole commingling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Fruitland and Pictured Cliffs production in the wellbores of its State K Com Well No. 12 located in Unit E of Section 16, Township 30 North, Range 9 West, and its Florence Well No. 60R in Unit L of Section 1, Township 29 North, Range 9 West.

CASE 6670: Application of BTA Oil Producers for pool creation and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Devonian gas pool for its 7811 JV-P Pojo Well No. 1 located in Unit D of Section 27, Township 25 South, Range 33 East, and special rules therefor, including 640-acre gas well spacing.

CASE 6671: Application of Chapman and Schneider for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Seven Rivers Reef formation in the open-hole interval from 3422 feet to 3504 feet in its I. B. Ogg "A" Well No. 3 located in Unit E of Section 35, Township 24 South, Range 36 East, Jalmat Pool.

CASE 6672: Application of Coquina Oil Corporation for an exception to Rule 303C, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the Division's Rule 303C to permit its Vivian Well No. 1 located in Unit F of Section 30, Township 22 South, Range 38 East, in which Drinkard and Granite Wash production is commingled in the wellbore, to produce in excess of the 50-barrel limit imposed by said rule.

CASE 6673: Application of Conoco Inc. for a non-standard proration unit, unorthodox well locations, and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 440-acre non-standard gas proration unit comprising the SW/4 and S/2 NW/4 of Section 17 and the N/2 NE/4, SE/4 NE/4, and N/2 SE/4 of Section 18, all in Township 21 South, Range 36 East, Eumont Pool, to be simultaneously dedicated to the following wells at unorthodox locations: Meyer A-1 Wells Nos. 11 in Unit K of Section 17 and 6 and 14 in Units B and J of Section 18.

CASE 6580: (Continued from August 22, 1979, Examiner Hearing)

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to initiate a pilot carbon dioxide injection project in the Grayburg-San Andres formation in Units H and I of Section 20, Township 17 South, Range 32 East, Maljamar Pool, for tertiary recovery purposes.

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Continental Oil Company
P.O. Box 460
1001 North Turner
Hobbs, New Mexico 88240
(505) 393-4141

May 29, 1979

Oil Conservation Division
Department of Energy and Minerals
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention Mr. Dan Nutter

Gentlemen:

Application of Continental Oil Company for Authority to Initiate
CO_2 Injection - MCA Unit

Attached in triplicate is Continental Oil Company's application as shown above. Please place this matter on the earliest available examiner docket.

Yours very truly,

John K Kemp

HAI:vjk

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico
25 July 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:

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

MR. NUTTER: Call next Case 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. NUTTER: Applicant has requested this case be continued.

It will be continued to the Examiner Hearing scheduled to be held at this same place at 9:00 o'clock a. m. August 22nd, 1979.

(Hearing concluded.)

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Court Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that said transcript is a full, true, and corredt record of the hearing, prepared by me to the best of my ability, knowledge, and skill, from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6580 heard by me on 7/25 1977.

, Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-4402
Santa Fe, New Mexico 87501

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico
25 July 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

MR. NUTTER: Call next Case 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. NUTTER: Applicant has requested this case be continued.

It will be continued to the Examiner Hearing scheduled to be held at this same place at 9:00 o'clock a. m. August 22nd, 1979.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
5010 Paseo Blanco (505) 471-6448
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Court Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that said transcript is a full, true, and corredt record of the hearing, prepared by me to the best of my ability, knowledge, and skill, from my notes taken at the time of the hearing.

Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6589 heard by me on 2/25 19 29.

, Examiner
Oil Conservation Division

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

Dockets Nos. 35-79 and 36-79 are tentatively set for September 5 and 19, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - AUGUST 22, 1979

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

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

CASE 6545: (Continued from July 25, 1979, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Corinne Grace, Travelers Indemnity Company, and all other interested parties to appear and show cause why the Kuklah Baby Well No. 1 located in Unit G of Section 24, Township 22 South, Range 26 East, Eddy County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6626: Application of T. H. McElvain Oil & Gas Properties for pool commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the commingling of Gallup and Dakota production in its Miller B Well No. 6 located in Unit G of Section 12, Township 24 North, Range 7 West.

CASE 6627: Application of Caribou Four Corners, Inc. for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Gallup formation underlying a previously approved 64.32-acre non-standard unit comprising the NW/4 NW/4 and that portion of Lot 5 lying north of the San Juan River, all in Section 18, Township 29 North, Range 14 West, Cha Cha-Gallup Oil Pool, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6628: Application of Texaco Inc. for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Skaggs-Glorieta, Skaggs-Drinkard and East Weir-Blinebry production in the wellbore of its M. B. Weir "B" Well No. 9 located in Unit O of Section 12, Township 20 South, Range 37 East.

CASE 6629: Application of Hilliard Oil & Gas, Inc. for directional drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to directionally drill its Hanson Bonds Well No. 1 located 1650 feet from the North line and 330 feet from the East line of Section 20, Township 9 South, Range 35 East, to a Devonian bottom hole location within 100 feet of a point 1325 feet from the North line and 430 feet from the East line of said Section 20.

CASE 6630: Application of El Paso Natural Gas Company for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Basin-Dakota and BS Mesa-Gallup production in the wellbore of its San Juan 27-4 Unit Well No. 37 located in Unit N of Section 33, Township 27 North, Range 4 West.

CASE 6631: Application of Reserve Oil, Inc. for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Jalmat gas and Langlie Mattix oil production in the wellbore of its Cooper Jal Unit Well No. 149-306 located in Unit J of Section 18, Township 24 South, Range 37 East.

CASE 6632: Application of Mesa Petroleum Company for a dual completion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Frank State Well No. 1 located in Unit I of Section 7, Township 19 South, Range 23 East, to produce gas from the Abo and Morrow formations, Runyan Ranch Field, through the casing-tubing annulus and through tubing.

CASE 6633: Application of Mesa Petroleum Company for a dual completion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Yates Federal Com Well No. 1-Y located in Unit J of Section 20, Township 17 South, Range 27 East, to produce gas from the Logan Draw-Cisco Canyon Gas Pool and an undesignated Morrow pool through the casing-tubing annulus and through tubing.

CASE 6634: Application of Durham Inc. for special pool rules or a spacing exception, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the Lake Arthur-Pennsylvanian Gas Pool to provide for 320-acre spacing rather than 160 acres. In the absence of objection, this pool will be placed on the standard 320-acre spacing for Pennsylvanian gas pools rather than the present 160-acre spacing. In the alternative applicant seeks to limit the application of the pool's rules to the horizontal limits of the pool, being the SW/4 of Section 31 Township 15 South, Range 27 East.

CASE 6635: Application of Exxon Corporation for an unorthodox well location and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the simultaneous dedication of the W/2 of Section 31, Township 20 South, Range 37 East, Eumont Pool, to its Aggies State Well No. 4 located in Unit F, and to its Well No. 13, at an unorthodox location 660 feet from the South line and 1650 feet from the West line, both in said Section 31.

CASE 6636: Application of Exxon Corporation for an unorthodox well location and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the simultaneous dedication of all of Section 23, Township 21 South, Range 36 East, Eumont Pool, to its New Mexico "G" State Well No. 5 located in Unit E, and to its Well No. 20, at an unorthodox location in Unit M, both in said Section 23.

CASE 6637: Application of Exxon Corporation for an unorthodox well location and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the simultaneous dedication of the E/2 of Section 10, Township 21 South, Range 36 East, Eumont Pool, to its Knox Well No. 1 located in Unit J, and to its Well No. 13, at an unorthodox location 1650 feet from the North line and 990 feet from the East line, both in said Section 10.

CASE 6638: Application of Ladd Petroleum Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Largo-Gallup and Basin-Dakota production in the wellbore of its Lindrith Well No. 24 located in Unit F of Section 4, Township 26 North, Range 7 West.

CASE 6610: (Continued from July 25, 1979, Examiner Hearing)

Application of Koch Industries, Inc. for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Rustler formation through the perforated interval from 1190 feet to 1210 feet in its Wills "A" Well No. 7 located in Unit E of Section 35, Township 26 South, Range 37 East, Rhodes Field.

CASE 6579: (Continued from July 25, 1979, Examiner Hearing)

Application of R. N. Hillin for an unorthodox well location and approval of infill drilling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of a Morrow gas well at an unorthodox location 800 feet from the South line and 2000 feet from the East line of Section 34, Township 19 South, Range 28 East, is necessary to effectively and efficiently drain that portion of the E/2 of said Section 34 which cannot be so drained by the existing well.

CASE 6580: (Continued from July 25, 1979, Examiner Hearing)

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to initiate a pilot carbon dioxide injection project in the Grayburg-San Andres formation in Units H and I of Section 20, Township 17 South, Range 32 East, Maljamar Pool, for tertiary recovery purposes.

CASE 6622: (Continued from August 8, 1979, Examiner Hearing)

Application of Adams Exploration Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp-Penn formations underlying the N/2 of Section 15, Township 24 South, Range 28 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6639: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending certain pools in McKinley, Rio Arriba, Sandoval, and San Juan Counties, New Mexico:

(a) CREATE a new pool in McKinley County, New Mexico, classified as an oil pool for Mesaverde production and designated as the Star-Mesaverde Oil Pool. The discovery well is WTR Oil Company State Well No. 1 located in Unit D of Section 16, Township 19 North, Range 6 West, NMPM. Said pool would comprise:

TOWNSHIP 19 NORTH, RANGE 6 WEST, NMPM
Section 16: NW/4

(b) CREATE a new pool in San Juan County, New Mexico, classified as a gas pool for Farmington production and designated as the Bisti-Farmington Pool. The discovery well is Dome Petroleum Corporation Hanlad Federal Well No. 1 located in Unit F of Section 31, Township 26 North, Range 12 West, NMPM. Said pool would comprise:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM
Section 4: N/2 and SE/4
Section 5: N/2
Section 6: N/2
Section 9: NE/4
Section 10: NW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Section 19: SW/4
Section 20: W/2
Section 31: W/2

(c) CREATE a new pool in San Juan County, New Mexico, classified as a gas pool for Fruitland production and designated as the Farmer-Fruitland Pool. The discovery well is Manana Gas, Incorporated Bobbie Herrera Well No. 1 located in Unit K of Section 4, Township 30 North, Range 11 West, NMPM. Said pool would comprise:

TOWNSHIP 30 NORTH, RANGE 11 WEST, NMPM
Section 4: SW/4

(d) CREATE a new pool in San Juan County, New Mexico, classified as an oil pool for Pennsylvanian production and designated as the Big Gap-Pennsylvanian Oil Pool. The discovery well is Bass Enterprises Production Company Navajo 20 Well No. 1 located in Unit O of Section 20, Township 27 North, Range 19 West, NMPM. Said pool would comprise:

TOWNSHIP 27 NORTH, RANGE 19 WEST, NMPM
Section 20: SE/4

(e) EXTEND the Aztec-Fruitland Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
Section 29: NE/4

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Section 25: SE/4

(f) EXTEND the Aztec-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 31 NORTH, RANGE 11 WEST, NMPM
Section 35: E/2

(g) EXTEND the Bisti-Lower Gallup Oil Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Section 9: E/2 SE/4
Section 10: SW/4
Section 15: N/2 NE/4

(h) EXTEND the Blanco Mesaverde Pool in Rio Arriba and San Juan Counties, New Mexico, to include therein:

TOWNSHIP 25 NORTH, RANGE 3 WEST, NMPM
Section 4: N/2

TOWNSHIP 26 NORTH, RANGE 2 WEST, NMPM
Section 30: All (Partial Section)
Section 31: All (Partial Section)

TOWNSHIP 27 NORTH, RANGE 2 WEST, NMPM
Section 16: W/2
Section 20: E/2
Section 21: NW/4

(i) EXTEND the Blanco-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 8 WEST, NMPM
Section 4: NW/4
Section 5: NE/4

TOWNSHIP 31 NORTH, RANGE 9 WEST, NMPM
Section 28: SW/4
Section 33: NW/4

TOWNSHIP 32 NORTH, RANGE 11 WEST, NMPM
Section 7: All (Partial Section)
Section 8: E/2
Section 11: E/2
Section 12: All (Partial Section)
Section 13: NW/4
Section 14: N/2

(j) EXTEND the East Blanco-Pictured Cliffs Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 4 WEST, NMPM
Section 8: NE/4
Section 9: W/2

(k) EXTEND the South Blanco-Pictured Cliffs Pool in Rio Arriba, Sandoval, and San Juan Counties, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 2 WEST, NMPM
Section 18: E/2

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Section 36: SE/4

TOWNSHIP 25 NORTH, RANGE 5 WEST, NMPM
Section 19: SE/4
Section 30: All
Section 31: All
Section 32: All

(l) EXTEND the Bloomfield-Farmington Oil Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Section 25: N/2

(m) EXTEND the Chacon-Dakota Associated Pool in Rio Arriba and Sandoval Counties, New Mexico, to include therein:

TOWNSHIP 22 NORTH, RANGE 3 WEST, NMPM
Section 3: W/2
Section 10: W/2

TOWNSHIP 23 NORTH, RANGE 3 WEST, NMPM
Section 25: SW/4
Section 26: SE/4

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Section 31: S/2
Section 34: SW/4

(n) EXTEND the Choza Mesa-Pictured Cliffs Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 4 WEST, NMPM
Section 15: SE/4
Section 22: NE/4

(o) EXTEND the Escrito-Gallup Associated Pool in Rio Arriba and San Juan Counties, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 7 WEST, NMPM
Section 26: SW/4

(p) EXTEND the Harper Hill Fruitland-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 29 NORTH, RANGE 14 WEST, NMPM
Section 2: SE/4

TOWNSHIP 30 NORTH, RANGE 14 WEST, NMPM
Section 35: N/2 and SE/4

(q) EXTEND the Harris Mesa-Chacra Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 27 NORTH, RANGE 9 WEST, NMPM
Section 5: NE/4

TOWNSHIP 28 NORTH, RANGE 9 WEST, NMPM
Section 32: E/2

(r) EXTEND the Kutz-Fruitland Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 11 WEST, NMPM
Section 32: NE/4

(s) EXTEND the West Kutz-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 28 NORTH, RANGE 11 WEST, NMPM
Section 26: SW/4

(t) EXTEND the La Plata-Gallup Oil Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 32 NORTH, RANGE 13 WEST, NMPM
Section 32: N/2 and SW/4

(u) EXTEND the West Lindrith Gallup-Dakota Oil Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Section 6: S/2 (Partial Section)
Section 18: All (Partial Section)

TOWNSHIP 24 NORTH, RANGE 4 WEST, NMPM
Section 5: N/2
Section 6: N/2
Section 24: SE/4
Sectiyn 25: NE/4

(v) EXTEND the Otero-Chacra Pool in Rio Arriba and San Juan Counties, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM
Section 3: All
Section 4: All
Section 10: N/2 and SE/4

(w) EXTEND the Rusty-Chacra Pool in Sandoval County, New Mexico, to include therein:

TOWNSHIP 22 NORTH, RANGE 7 WEST, NMPM
Section 20: SE/4
Section 21: E/2 and SW/4

(x) EXTEND the Straight Canyon-Dakota Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 31 NORTH, RANGE 16 WEST, NMPM
Section 14: SE/4

(y) EXTEND the WAW Fruitland-Pictured Cliffs Pool in San Juan County, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Section 29: S/2
Section 30: E/2
Section 32: N/2

TOWNSHIP 26 NORTH, RANGE 13 WEST, NMPM
Section 13: E/2 and SW/4
Section 14: SE/4

TOWNSHIP 27 NORTH, RANGE 13 WEST, NMPM
Section 18: E/2

(z) EXTEND the Wild Horse-Gallup Pool in Rio Arriba County, New Mexico, to include therein:

TOWNSHIP 26 NORTH, RANGE 4 WEST, NMPM
Section 16: S/2

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Docket No. 33-79

DOCKET: COMMISSION HEARING - FRIDAY - AUGUST 24, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6495: (DE NOVO) (Continued from June 6, 1979, Commission Hearing)

Application of Amax Chemical Corporation for the amendment of Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area by the inclusion of certain lands in Sections 23 and 24, Township 19 South, Range 29 East, Sections 1, 4, 5, 6, 7, 11, 12, 13, 14, 19, 20, 23, 24, and 29, Township 19 South, Range 30 East, and Sections 7, 8, 17, 18, and 19, Township 19 South, Range 31 East, all in Eddy County, New Mexico.

Upon application of Amax Chemical Corporation this case will be heard De Novo pursuant to the provisions of Rule 1220.

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Docket No. 34-79

DOCKET: COMMISSION HEARING - TUESDAY - AUGUST 28, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6555: (DE NOVO) (Continued from August 7, 1979, Commission Hearing)

Application of Jake L. Hamon for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for an unorthodox location 660 feet from the North line and 560 feet from the East line of Section 30, Township 20 South, Range 36 East, North Osudo-Morrow Gas Pool, all of said Section 30 to be dedicated to the well.

Upon application of Texas Oil & Gas Corp. this case will be heard De Novo pursuant to the provisions of Rule 1220.

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

MR. NUTTER: We'll call now Case 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. NUTTER: On request of applicant, Case Number 6580 will be continued to the Examiner Hearing scheduled to be held at this same place, at 9:00 o'clock a. m., on July 25th, 1979.

(Hearing concluded.)

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, knowledge, and skill, from my notes taken at the time of the hearing.

Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6580 heard by me on 6/27 19 79.

Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-8463
Santa Fe, New Mexico 87501

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. CASE 6580

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

MR. NUTTER: We'll call now Case 6580.

MR. PADILLA: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico.

MR. NUTTER: On request of applicant, Case Number 6580 will be continued to the Examiner Hearing scheduled to be held at this same place, at 9:00 o'clock a. m., on July 25th, 1979.

(Hearing concluded.)

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

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a court reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, knowledge, and skill, from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.
Sally W. Boyd, C.S.R.

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3011 Plaza Blanca (505) 471-2435
Santa Fe, New Mexico 87501

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6580 heard by me on 6/27 19.79.

Examiner
Oil Conservation Division

Docket No. 27-79

Dockets Nos. 29-79 and 31-79 are tentatively set for hearing on August 8 and 22, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - TUESDAY - JULY 24, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6596: Application of Harvey E. Yates Company for pool creation and special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Upper Pennsylvanian gas pool to be designated as the Southeast Indian Basin-Upper Pennsylvanian Gas Pool for its Southeast Indian Basin Well No. 1 located in Unit A of Section 23, Township 22 South, Range 23 East, and special pool rules therefor including 320-acre gas well spacing.

CASE 6597: Application of Harvey E. Yates Company for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of its Southeast Indian Basin Well No. 2, an Upper Pennsylvanian well to be drilled 660 feet from the North and West lines of Section 24, Township 22 South, Range 23 East, with the N/2 or all of said Section 24 to be dedicated to the well, depending on the outcome of Case No. 6596.

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Docket No. 28-79

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 25, 1979

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

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

CASE 6545: (Continued from June 27, 1979, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Corinne Grace, Travelers Indemnity Company, and all other interested parties to appear and show cause why the Kuklah Baby Well No. 1 located in Unit G of Section 24, Township 22 South, Range 26 East, Eddy County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6598: Application of Gulf Oil Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Otero-Gallup and Basin-Dakota production in the wellbores of its Apache Federal Wells No. 8 located in Unit C of Section 8 and No. 9 located in Unit D of Section 17, both in Township 24 North, Range 5 West.

CASE 6599: Application of Gulf Oil Corporation for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Fusselman and Montoya production, North Justis Field, in the wellbore of its W. A. Ramsay Well No. 4 located in Unit M of Section 36, Township 24 South, Range 37 East.

CASE 6600: Application of Mesa Petroleum Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying the E/2 of Section 10, Township 16 South, Range 27 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6601: Application of Harvey E. Yates Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Mississippian formations underlying the E/2 of Section 8, Township 14 South, Range 36 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6602: Application of Tenneco Oil Company for an unorthodox well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of its Federal 33 C No. 2 Well 1010 feet from the North line and 1710 feet from the West line of Section 33, Township 17 South, Range 29 East, South Empire-Wolfcamp Pool, the E/2 NW/4 of said Section 33 to be dedicated to the well.

CASE 6603: (This case will be continued to the August 8 hearing.)

Application of Conoco Inc. for downhole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Penrose Skelly and Eumont production in the wellbore of its Hawk B-1 Well No. 12 located in Unit O of Section 8, Township 21 South, Range 37 East.

CASE 6604: Application of Cities Service Company for rescission of Division Order No. R-5921, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of Order No. R-5921 which order provided for the compulsory pooling of all of the mineral interests in the Pennsylvanian formation underlying the S/2 of Section 8, Township 23 South, Range 28 East.

CASE 6605: Application of Estoril Producing Corporation for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying the W/2 of Section 15, Township 20 South, Range 34 East, to be dedicated to a well to be drilled at an unorthodox location 660 feet from the North and West lines of said Section 15. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6564: (Continued and Readvertised)

Application of Herndon Oil & Gas Co. for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of its O. A. Kody Well No. 1 to be drilled 2310 feet from the North line and 330 feet from the West line of Section 35, Township 16 South, Range 38 East, Knowlee-Devonian Pool.

CASE 6606: Application of Getty Oil Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Yates formation in the open-hole interval from 3810 feet to 4169 feet in its State "AA" Well No. 1 located in Unit I of Section 35, Township 21 South, Range 34 East.

CASE 6607: Application of Getty Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Getty 36 State Well No. 1 located in Unit F of Section 36, Township 21 South, Range 34 East, to produce oil from the Wolfcamp formation and gas from the Morrow formation through parallel strings of tubing.

CASE 6608: Application of Getty Oil Company for pool creation and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Wolfcamp oil pool for its Getty 36 State Well No. 1 located in Unit F of Section 36, Township 21 South, Range 34 East, and special rules therefor, including 160-acre oil well spacing.

CASE 6609: Application of Napeco Inc. for pool creation and special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Strawn oil pool for its Benson Deep Unit Well No. 1 located in Unit O of Section 33, Township 18 South, Range 30 East, and special rules therefor, including 160-acre spacing and standard well locations.

CASE 6610: Application of Koch Industries, Inc. for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Rustler formation through the perforated interval from 1190 feet to 1210 feet in its Wills "A" Well No. 7 located in Unit E of Section 35, Township 26 South, Range 37 East, Rhodes Field.

CASE 6611: Application of Cabot Corp. for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the disposal of produced salt water in the Devonian formation through the perforated interval from 12,156 feet to 12,574 feet in its Reed Well No. 1 located in Unit H of Section 35, Township 13 South, Range 37 East, King Field.

CASE 6487: (Continued from May 23, 1979, Examiner Hearing)

Application of El Paso Natural Gas Company for approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Shell E State Com Well No. 2 located in Unit N of Section 6, Township 21 South, Range 36 East, Eumont Gas Pool, Lea County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6471: (Continued from May 23, 1979, Examiner Hearing)

Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Freeman Well No. 1-A to be located in Unit C of Section 31, Township 31 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6472: (Continued from May 23, 1979, Examiner Hearing)

Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Jenny Well No. 1-A to be located in Unit P of Section 13, Township 26 North, Range 4 West, Basin-Dakota Pool, Rio Arriba County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6473: (Continued from May 23, 1979, Examiner Hearing)

Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its McIntyre Well No. 1-A to be located in Unit K of Section 11, Township 26 North, Range 4 West, Basin-Dakota Pool, Rio Arriba County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6474: (Continued from May 23, 1979, Examiner Hearing)

Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Williams Well No. 1-A to be located in Unit C of Section 24, Township 31 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6475: (Continued from May 23, 1979, Examiner Hearing)

Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Montoya Well No. 1-A to be located in Unit I of Section 35, Township 32 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6535: (Continued from June 13, 1979, Examiner Hearing)

Application of Horreon Oil Company for a waterflood project, Sandoval County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the San Luis-Mesaverde Pool by the injection of water into the Menefee formation through two wells located in Section 21, Township 18 North, Range 3 West, Sandoval County, New Mexico.

CASE 6579: (Continued from June 27, 1979, Examiner Hearing)

Application of R. N. Hillin for an unorthodox well location and approval of infill drilling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of a Morrow gas well at an unorthodox location 800 feet from the South line and 2000 feet from the East line of Section 34, Township 19 South, Range 28 East, is necessary to effectively and efficiently drain that portion of the E/2 of said Section 34 which cannot be so drained by the existing well.

CASE 6580: (Continued from June 27, 1979, Examiner Hearing) (This case will be continued to the August 22 hearing.)

Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to initiate a pilot carbon dioxide injection project in the Grayburg-San Andres formation in Units H and I of Section 20, Township 17 South, Range 32 East, Maljamar Pool, for tertiary recovery purposes.

CASE 6270: (Continued from July 11, 1979, Examiner Hearing)

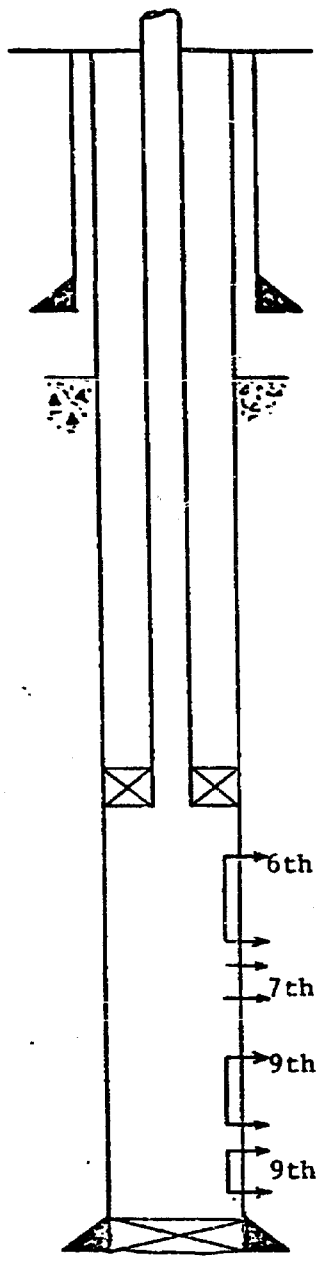
In the matter of Case 6270 being reopened pursuant to the provisions of Order No. R-5771 which order created the South Peterson-Fusselman Pool, Roosevelt County, New Mexico, and provided for 80-acre spacing. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.

CASE 6590: (Continued from July 11, 1979, Examiner Hearing)

Application of Grace Petroleum Corporation for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying Lots 9, 10, 15, and 16 and the SE/4 of Section 6, Township 21 South, Range 32 East, to be dedicated to a well to be drilled at an unorthodox location 4650 feet from the South line and 660 feet from the East line of said Section 6. Also to be considered will be the cost of drilling and completing said well and the allocation of the costs thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

EXHIBIT NO. 15

MCA NO. 262



2615' FNL & 25' FWL, Sec. 21
T-17S; R-32E, Elev. 4023'
Measuring Datum 11' AGL

8 5/8", 20# csg. @ 780'
w/350 sks. (circ.)

TOC 2900'

2 3/8" plastic lined tbg.

packer set at 3609'

6th 3709, 13, 18, 25, 30, 38, 49, 54,

3899', w/1 JS

7th 3823, 32, 35, 39 w/1 JSPF

3901', w/1 JS

9th M. 4038', 42', 51', 58', 66', 71', 78'

and 4078', w/1 JSPF

9th M. 4098' - 4102' w/2 JSPF

5 1/2", 14# csg. @ 4145' w/250 sks.

TD-4145'
PBTD-4130'

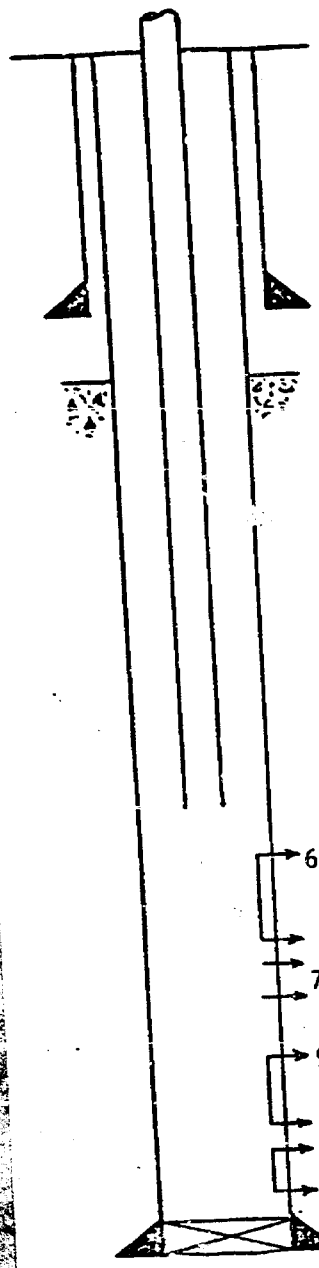
EXHIBIT NO. 15

PROPOSED

EXHIBIT NO. 14

MCA NO. 262

2615' FNL & 25' FWL, Sec. 21
T-17S; R-32E, Elev. 4023'
Measuring Datum 11' AGL



8 5/8", 20# csg. @ 780'
w/350 sks. (circ.)

TOC 2900'

6th 3709, 13, 18, 25, 30, 38, 49, 54,
3899', w/1 JS

7th 3823, 32, 35, 39 w/1 JSPF
3901, w/1 JS

9th M. 4038', 42', 51', 58', 66', 71', 78'
and 4078', w/1 JSPF

9th M. 4098' - 4102' w/2 JSPF

5 1/2", 14# csg. @ 4145' w/250 sks.

TD-4145'
PBTD-4130'

EXHIBIT NO. 14

EXHIBIT NO. 7 Page 3 of 4

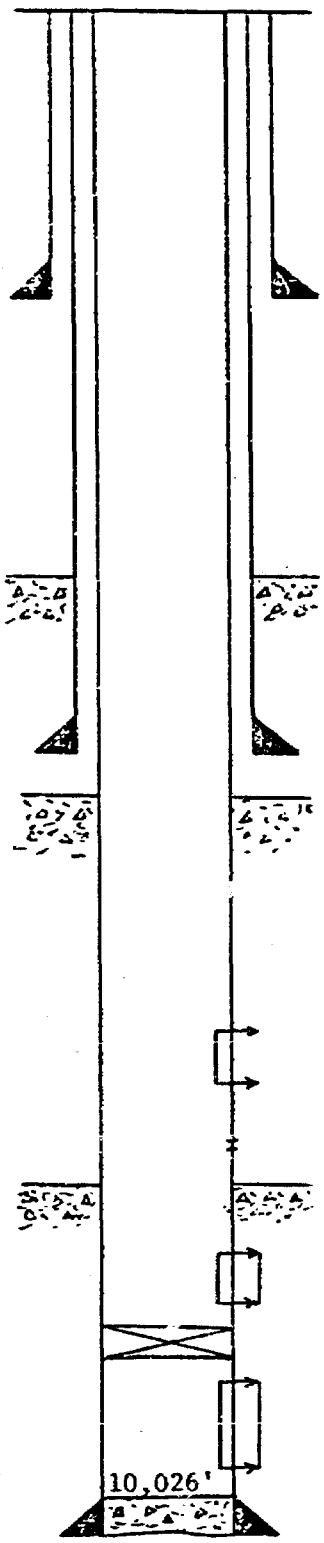
OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 94 WIW	660' FSL & 660' FEL Sec. 20, T-17S, R-32E	3600-4090	4090	12 1/2 7	20 3600	0 360	Mudded To Top 439
	MCA 95	660' FSL & 1980' FEL Sec. 20, T-17S, R-32E	3550-4036	4055 5036	8 5/8 7	880 3550	50 150	Circ. 2050
	MCA 113 WIW	80' FNL & 25' FWL Sec. 28, T-17S, R-32E	3630-4058	4053	8 5/8 7	965 3630	50 350	Circ. Circ.
	MCA 256	2590' FSL & 1310' FEL Sec. 20, T-17S, R-32E	3686-3821	4145 3920	8 5/8 5 1/2	748 4145	300 300	28 2400
	MCA 257	1345' FNL & 2615' FWL Sec. 20, T-17S, R-32E	3676-3906	5500 4090	8 5/8 5 1/2	262 5498	150 1500	Circ. 1725
	MCA 258	990' FNL & 990' FEL Sec. 20, T-17S, R-32E	3722-4118	5445 4200	7 5/8 4 1/2	825 5445	405 400	Circ. 1950
	MCA 262	2615' FNL & 25' FWL Sec. 21, T-17S, R-32E	3709-3901 4038-4102	4145 4125	8 5/8 5 1/2	780 4145	350 250	Circ. 2900
	MCA 266	1345' FSL & 2615' FWL Sec. 20, T-17S, R-32E	3792-4045	4110 4056	8 5/8 5 1/2	700 4110	325 250	Circ. 2100
	MCA 269	125' FSL & 1295' FEL Sec. 20, T-17S, R-32E	3856-3875 4002-4030	4130 4114	8 5/8 5 1/2	770 4130	400 300	Circ. 2700

EXHIBIT NO. 7 Page 4 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 271	1295' FNL & 25' FEL Sec. 20, T-17S, R-32E	3753-3761	4163 3850	8 5/8 5 1/2	770 4163	425 450	Circ. 2460
	MCA 287	1395' FSL & 25' FEL Sec. 20, T-17S, R-32E	3724-4083	4120 4109	8 5/8 5 1/2	800 4120	450 300	Circ. 2126
	MCA 303 WIW	1980' FSL & 1830' FEL Sec. 20, T-17S, R-32E	3730-3758	13965 4400	13 3/8 9 5/8 7	444 4740 4595-5578	350 4300 138	Circ. Circ. 4775
	MCA 355 WIW	1780' FNL & 1780' FWL Sec. 21, T-17S, R-32E	3716-3738	12780 4094	13 3/8 9 5/8 5 1/2	180 4200 4162-11813	160 3370 1850	Circ. Circ. 4860
	MCA 44	2615' FNL & 2615' FWL Sec. 21, T-17S, R-32E	3814-4050	4124 4050	8 5/8 7	880 3814	65 200	670 est. 2058 est.
	MCA 112	660' FNL & 660' FEL Sec. 29, T-17S, R-32E	3560-4072	4072	8 5/8 7	950 3560	50 100	790 est. 2260 est.
	MCA 263	2594' FSL & 1224' FWL Sec. 20, T-17S, R-32E	3616-4066	4070 4066	8 5/8 5 1/2	680 4070	350 250	Circ. 2400
	BAISH A #5	2310' FSL & 2310' FWL Sec. 21, T-17S, R-32E	2293-2458	2458	10 3/4 8 5/8 7	96 508-943 2293	85 25 250	Surf. -- 2000 est.
	BAISH B #36	554' FNL & 554' FWL Sec. 28, T-17S, R-32E	T.A.	10747 — 6900	13 8 5/8 5 1/2	825 4200 10745	175 200 1375	275 3391 4250 est.
	WILLIAM MITCHELL B #23	1980' FSL & 2193' FEL Sec. 20, T-17S, R-32E	P&A	5359	13 3/8 8 5/8	80 2521	60 185 115	Circ. 1st & 2nd Stages 795

EXHIBIT NO. 8

BAISH B #36
554' FNL & 554 FWL of Sec. 28, T-17S, R-32E



13", 50# csg. @ 825' w/175 sks.

TOC @ 3391' (Temp Survey)

8 5/8", 28# & 32# @ 4183' w/200 sx.

Est. TOC @ 4250

5335' - 53, 5372' - 84, 5394 - 5400', 5410' - 22', 5422 - 28', 5460 - 78'

Shot 3-1/2"holes @ 5825' and pump 275 sx.

TOC @ 5890' (Temp Survey)

6653-65', 6678-90' squeezed.

Bridge plug at 6900'

Perfs:	8914-20, 8954-60, 8972-78	cement
	9020-26, 9042-48, 9070-76	squeezed
	9098-9110, 9330-50, 9974-80	

5 1/2", 17# csg. @ 10,745' w/1100 sks.

PRESENT

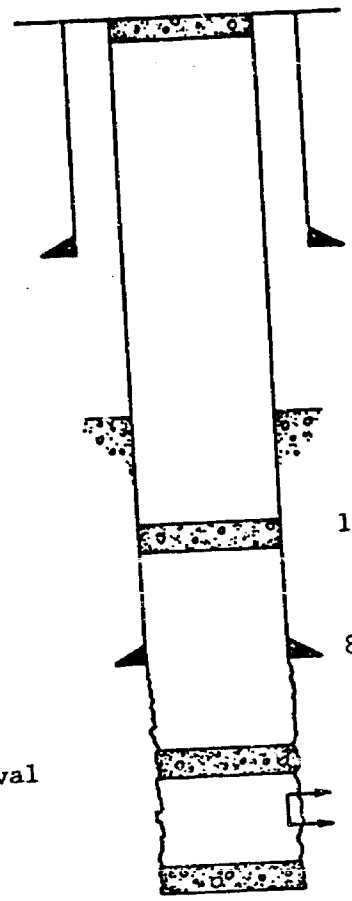
Well T. A.

CONTINENTAL OIL COMPANY

MCA UNIT

Plugged and Abandoned

William Mitchell B #23



10 sack surface plug

13-3/8" Csg. @ 80' Cmnt. w/60 Sacks Circulated to Surface

Est. TOC at 960'

10 Sacks Cmnt. 2438'-2470'

8-5/8" Csg. @ 2521' Cmnt. w/300 Sacks

Plug covers inj. interval

185 Sacks Cmnt. 3600'-4150'

Paddock Formation Found Dry

25 Sacks Cmnt. 5284'-5359'

TD 5359'

Location: 1980' FSL & 2193' FEL
Sec. 20, T17S - R32E

Elevation: 3997'

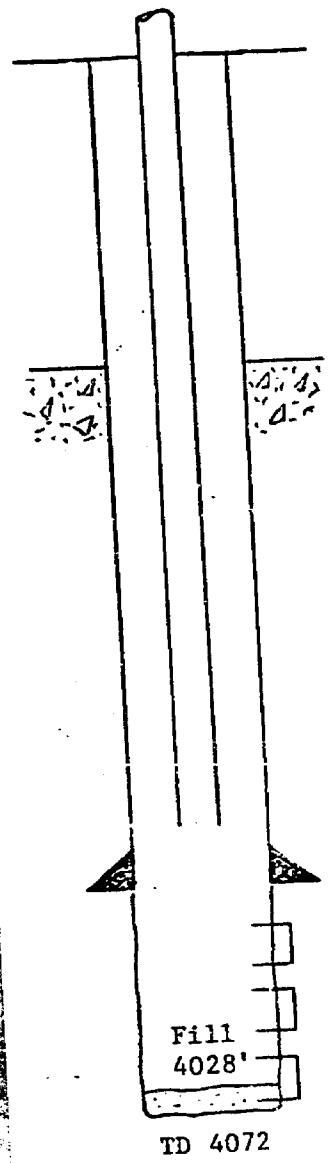
Datum: D.F.

Top Of Salt: 815'

Base Of Salt: 1900'

EXHIBIT NO. 10

MCA Unit No. 66



Location: 1980' F SL & 660' FEL Sec. 20

T- 17S R- 32E ;Elevation 4001'

Est. TOC @ 2000'

7", 22# csg. @ 3561' w/485 sks.

3800' - 3840' shot w/130 qts. nitro

3969' - 3989' shot w/70 qts. nitro

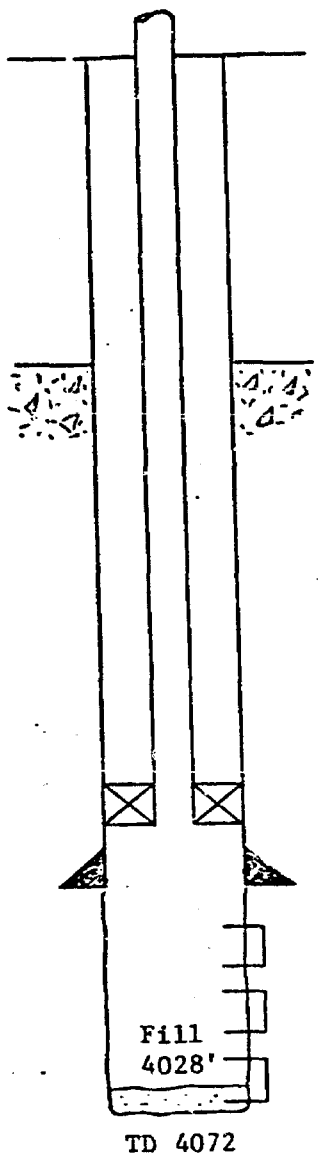
4029' - 4066' shot w/120 qts. nitro

EXHIBIT NO. 10

PRESENT

EXHIBIT NO. 11

MCA Unit No. 66



Location: 1980' F SL & 660' FEL Sec. 20

T- 17S R- 32E ; Elevation 4001'

Est. TOC @ 2000'

2 3/8" plastic lined tbg.

Packer set @ 3460'

7", 22# csg. @ 3561' w/485 sks.

3800' - 3840' shot w/130 qts. nitro

3969' - 3989' shot w/70 qts. nitro

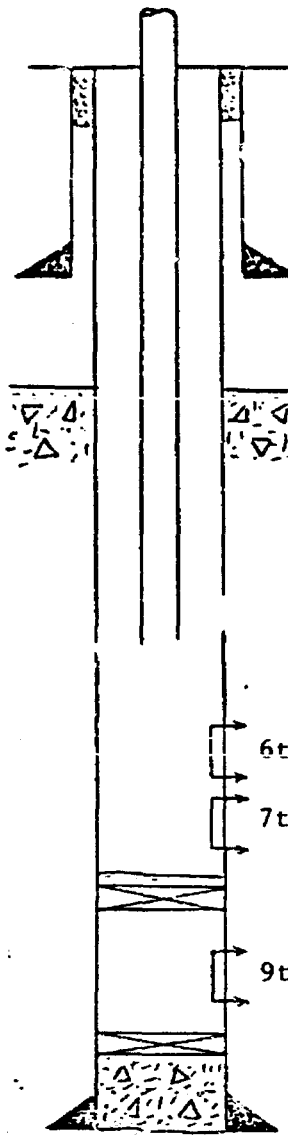
4029' - 4066' shot w/120 qts. nitro

PROPOSED

EXHIBIT NO. 11

EXHIBIT NO. 12

NCA Unit No. 256



Pea Gravel
TOC @ 28'

8 5/8", 24# csg. @ 748' w/300 sks.

Location: 2590 'F SL & 1310 'F EL Sec. 20
T- 17S R- 32E ;Elevation 4015'

TOC 2400' (temp. survey)

6th 3686', 3688', 3690', 3683',
3697', 3701', 3704' w/1 JSPF

7th 3808', 3812', 3815', 3818',
3821' w/1 JSPF

CIBP @ 3920' w/1 sk. cmt. on top

9th M. 4026.5', 4030.5', 4036.5', 4041.5'
4053.5', 4058.5', 4063.5', 4066' w/1 JSPF

CIBP @ 4077'

5 1/2", 14# csg. @ 4145' w/300 sx.

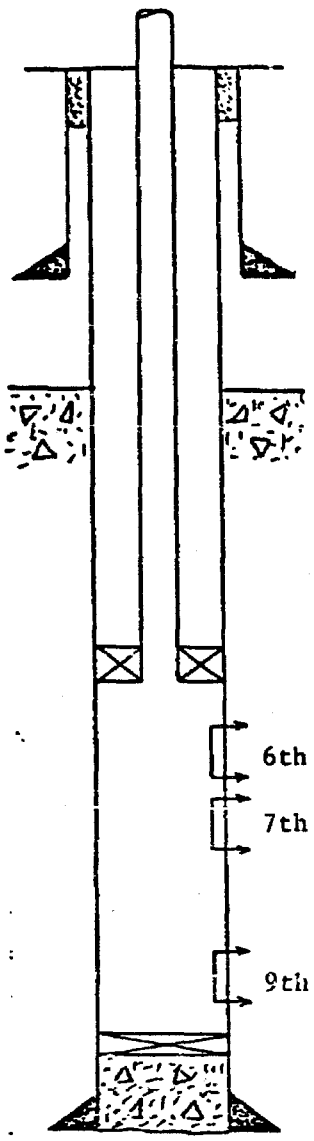
TD 4145'
PBTD 3920'

EXHIBIT NO. 12

PRESENT

EXHIBIT NO. 13

MCA Unit No. 256



8 5/8", 24# csg. @ 748' w/300 sks.

Locarion: 2590 'F SL & 1310 'F EL Sec. 20
T- 17S R- 32E ;Elevation 4015'

TOC 2400' (temp. survey)

2 3/8" plastic lined tubing
packer set @ 3580'

6th 3686', 3688', 3690', 3683',
3697', 3701', 3704' w/1 JSPF

7th 3808', 3812', 3815', 3818',
3821' w/1 JSPF

9th M. 4026.5', 4030.5', 4036.5', 4041.5'
4053.5', 4058.5', 4063.5', 4066' w/1 JSPF

CIBP @ 4077'

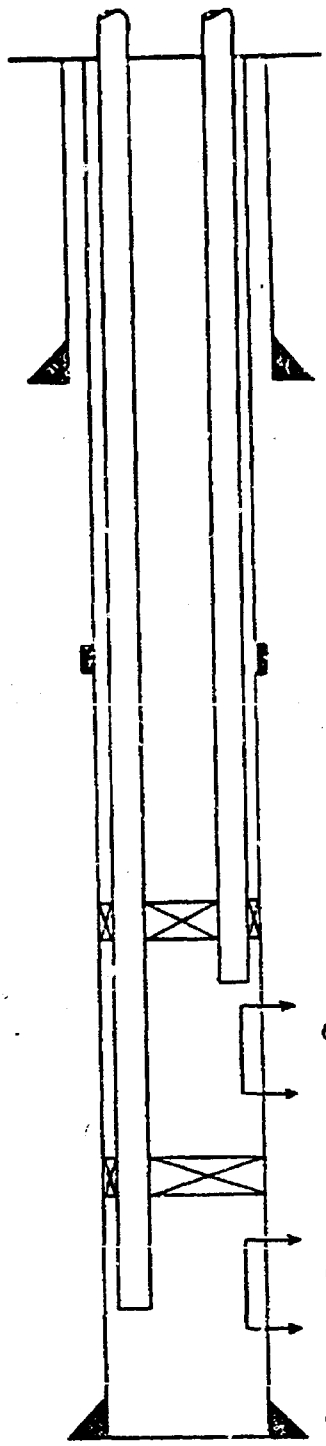
5 1/2", 14# csg. @ 4145' w/300 sx.

TD 4145'
PBTD 4077'

PROPOSED

EXHIBIT NO. 13

Dual CO_2 Injection Well



9 5/8, 36# @ 700' w/400 sx (circ)

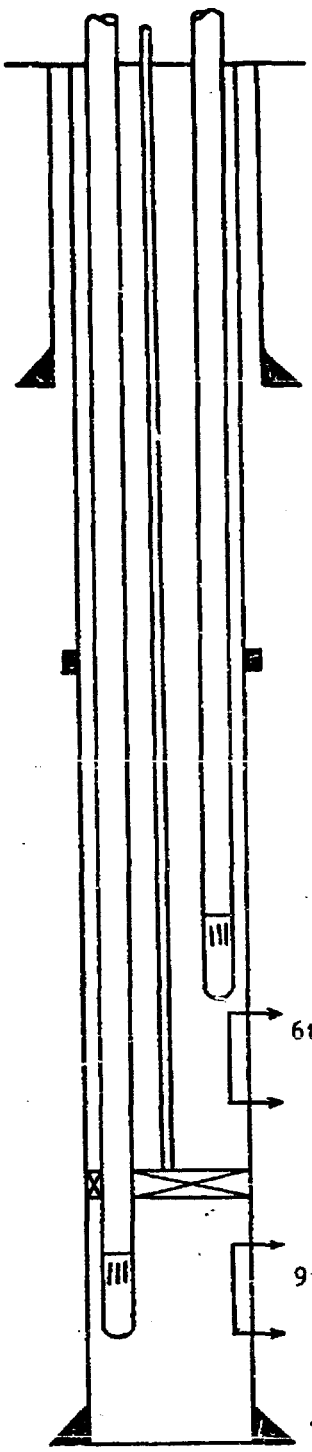
D.V. Tool at 2100' cmnt. with 1300 sx (circ)
2 3/8", P.L. tbg. (two strings)

6th Zone

9th Massive

7 5/8", 26.4# K-55 cmnt w/500 sx (circ to D.V. tool)
TD-4150'

Typical Dual Pilot Producer



13 3/8", 48# @ 700' w/500 sx (circ)

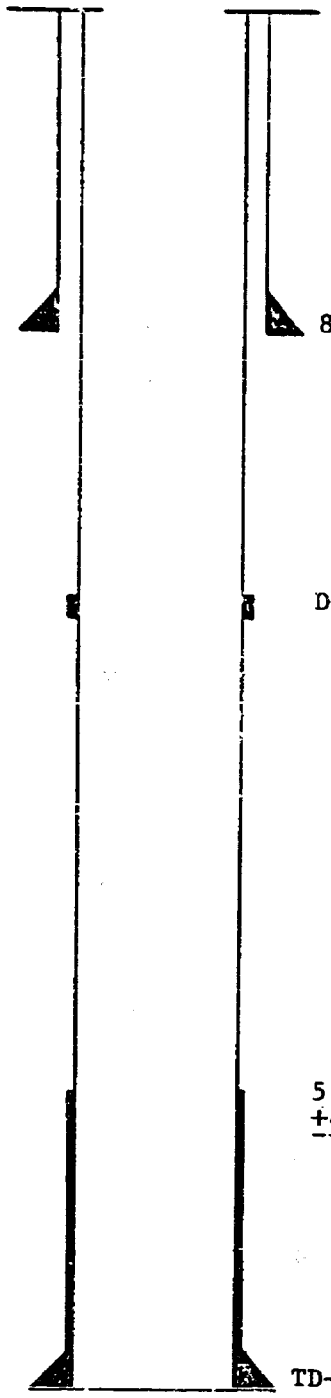
D. V. Tool at 2100' cmnt. with 1300 sx. (circ)
2 7/8" P.L. tbg. (2 strings)
1 1/4" I.J. vent string
1 1/4" I.J. treating string

6th Zone

9th Massive

8 5/8", 36# @ 4150' w/550 sx (circ. to D.V. tool)
TD-4150'

TYPICAL CO_2 LOGGING OBSERVATION WELL



8 5/8", 28# @ 700' w/340 sx. (circ)

D.V. Tool at 2100' cmnt. w/1300 sx. (circ)

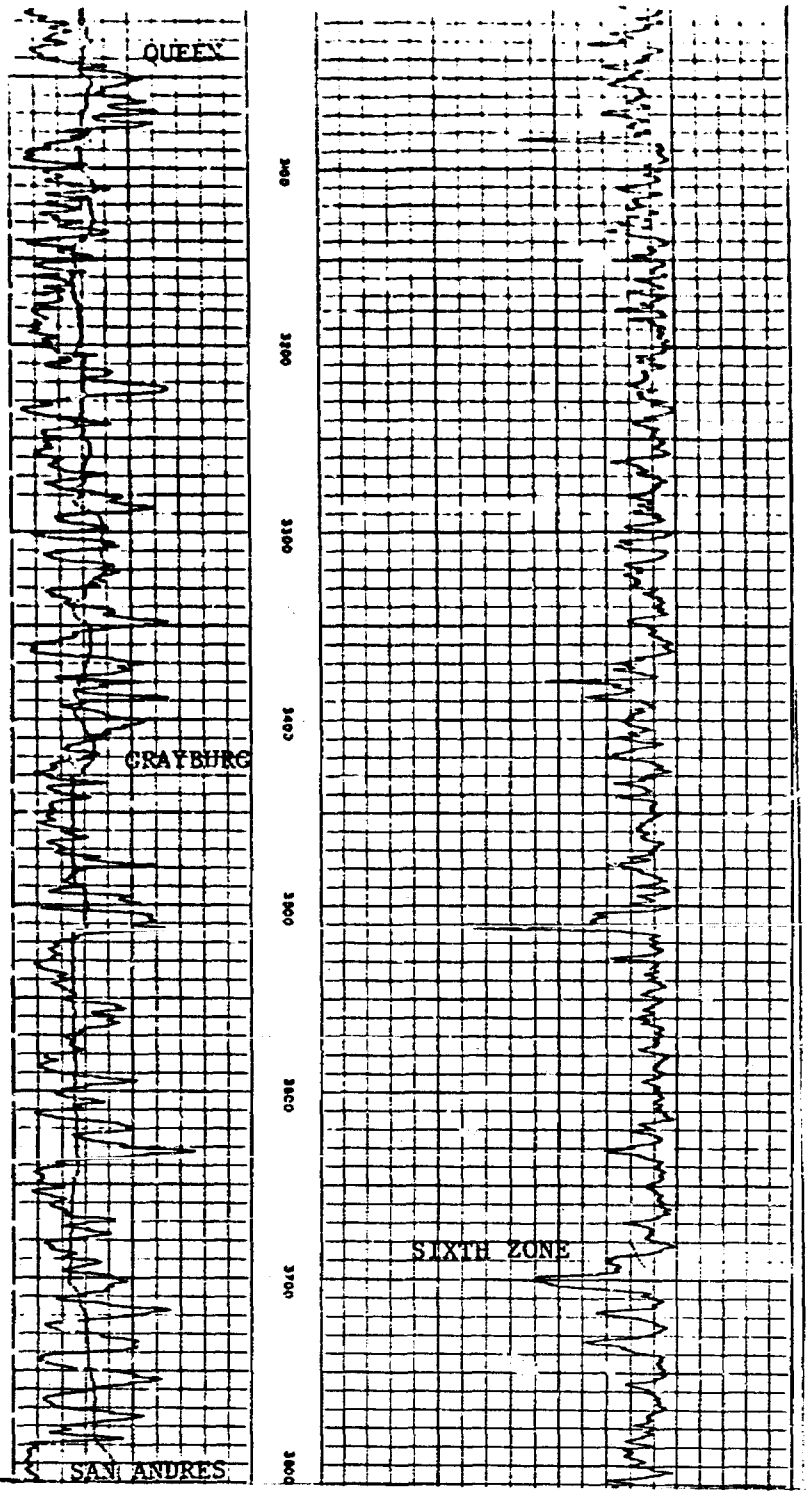
5 1/2", 15.5# K-55 down to ± 3600' w/5 1/2" fiberglass casing from ±3600' to TD. Cmt. 5 1/2" csg w/500 sx. (circ to DV tool)

TD-4150'

EXHIBIT NO. 6

TYPICAL GAMMA RAY-NEUTRON LOG

MCA CO_2 PILOT AREA
SEC. 20 T17S R32E
MALJAMAR FIELD
LEA COUNTY, NEW MEXICO



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Conoco EXHIBIT NO. 6
CASE NO. 6580

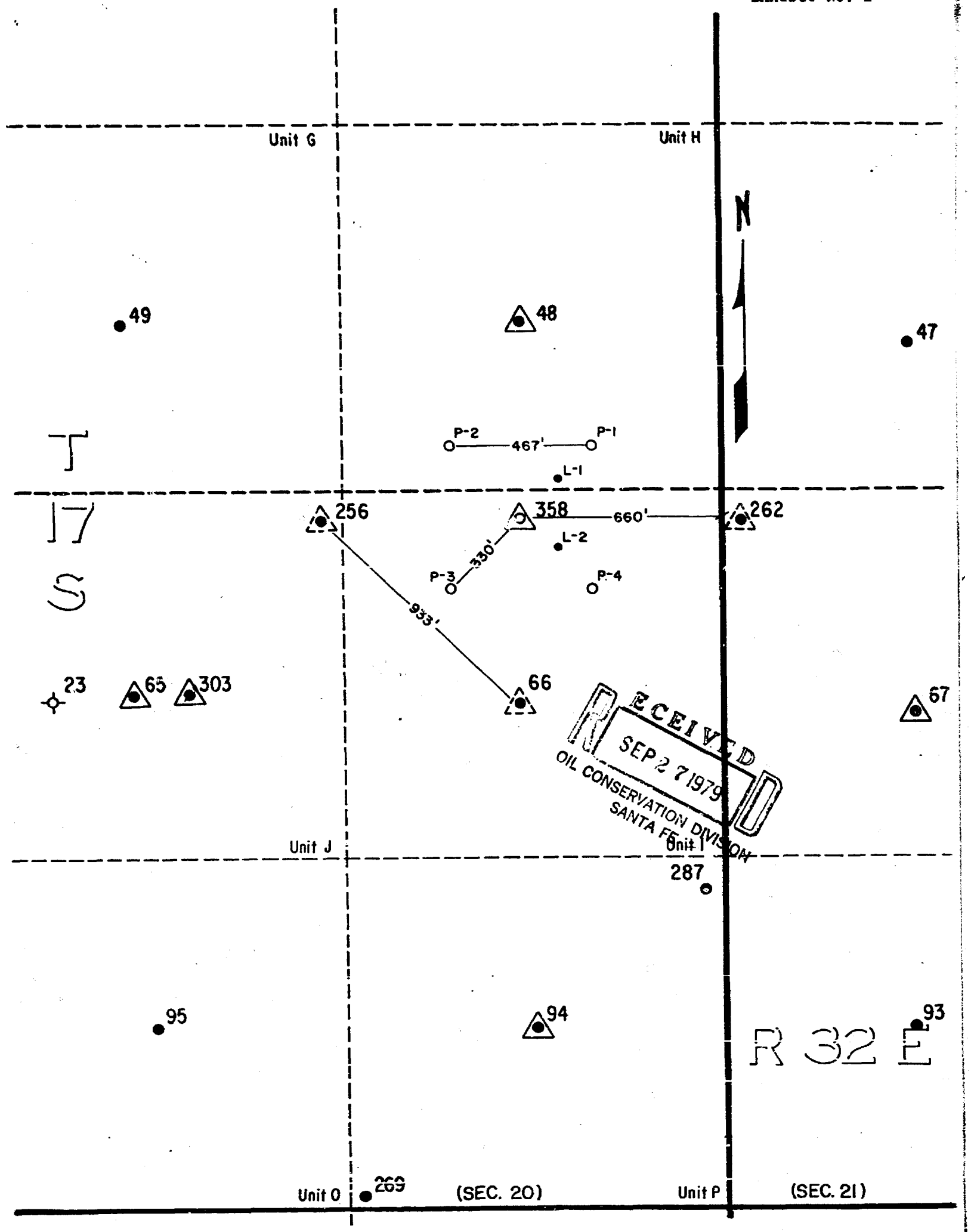
EXHIBIT NO. 7 Page 1 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 14	40' FSL & 40' FEL Sec. 17, T-17S, R-32E	3920-4015	4147 4015	8 5/8 7	951 3920	50 175	Circ Est. 1645'
	MCA 24 WIW	660' FNL & 1980' FEL Sec. 20, T-17S, R-32E	3709-3764 3995-4106	4106	8 5/8 7 4 1/2	848 3659 3995	50 150 150	616 1709 2700
	MCA 25	660' FNL & 660' FEL Sec. 20, T-17S, R-32E	3630-4114	4129 4114	10 3/4 7	700 3630	50 450	Circ. 2000
	MCA 26 WIW	660' FNL & 660' FWL Sec. 21, T-17S, R-32E	3734-4175	4175	10 7 4 1/2	905 3603 3734	50 150 275	Circ. 1653 190
	MCA 45 WIW	1980' FNL & 1980' FWL Sec. 21, T-17S, R-32E	3751-3807 3821-4181	4181	10 3/4 8 5/8 7	2301 3050 3821	300 78 80	Circ. 2200 2500
	MCA 46	2615' FNL & 1295' FWL Sec. 21, T-17S, R-32E	3730-3955 4080-4117	4120 4117	10 3/4 7 5 liner	55 3647 3605-4080	50 250 50	Circ. 650 Circ.
	MCA 47	1980' FNL & 660' FWL Sec. 21, T-17S, R-32E	3676-3995	4103 3995	10 7 4 1/2	2287 3575 3676	300 150 350	Circ. 2500 Circ.
	MCA 48 WIW	1980' FNL & 660' FEL Sec. 20, T-17S, R-32E	3670-4110	4110	10 7	794 3670	25 150	Circ. 1720
	MCA 49	1980' FNL & 1980' FEL Sec. 20, T-17S, R-32E	3598-4088	4088	7	3598	500	2000

EXHIBIT NO. 7 Page 2 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 50 WIW	1980' FNL & 1980' FWL Sec. 20, T-17S, R-32E	3669-3689 3733-4081	4081	8 5/8 7 4 1/2	810 3461 3733	50 150 300	Circ. Est. 2000 650
	MCA 63	1980' FSL & 1980' FWL Sec. 20, T-17S, R-32E	3508-4027	4027	8 5/8 7	814 3508	50 150	Circ. 1558
	MCA 64	2615' FSL & 2610' FWL Sec. 20, T-17S, R-32E	3620-4039	4039	10 3/4 7	57 3620	45 250	Circ. Est. 1900
	MCA 65 WIW	1980' FSL & 1980' FEL Sec. 20, T-17S, R-32E	3780-4100	4100	12 1/2 7 4 1/2 liner	40 3565 3137-3780	No Record of Cement 150 60	Est. 2000 Circ.
	MCA 66	1980' FSL & 660' FEL Sec. 20, T-17S, R-32E	3561-4072	4072	No Record of Surface Casing 7	3561	485	Est. 2000
	MCA 67 WIW	1980' FSL & 660' FWL Sec. 21, T-17S, R-32E	3738-3829 3842-4145	4145	12 1/4 7 5 1/2	40 3594 3842	20 400 40	Circ. 2000 3500
	MCA 68 WIW	1395' FSL & 1347' FWL Sec. 21, T-17S, R-32E	3748-4098	4098	10 3/4 8 5/8 7	95 880 3748	50 15 310	Circ. 160 1710
	MCA 69	1980' FSL & 1980' FWL Sec. 21, T-17S, R-32E	3610-4131	4136	8 4/8 5 1/2	868 3610	50 150	Circ. 1990
	MCA 93	660' FSL & 660' FWL Sec. 21, T-17S, R-32E	3566-4080	4080	8 5/8 7	889 3566	50 150	Circ. 2066

EXHIBIT NO. 1



RECEIVED
SEP 27 1979
OIL CONSERVATION DIVISION
SANTA FE

● LOGGING WELLS △ INJECTION WELLS
○ PRODUCERS △ PROPOSED INJECTION CONVERSION

conoco

PRODUCTION DEPARTMENT — HOBBS DIVISION

MCA UNIT
LEA COUNTY, NEW MEXICO
ENLARGEMENT: PILOT AREA

SCALE
9-79 — 0 200 400' approx. — IIm

LEGEND:
- ○ LOCATION
- ● OIL WELL
- ✲ GAS WELL
- ✧ DRY HOLE
- △ INJECTION WELL
- ✲ ABANDONED WELL
- ✲ SHUT-IN WELL
- ● SALT WATER DISPOSAL WELL
- ◦ DEEPER WELL - ZONE UNTESTED

EXHIBIT NO. 1

ROUGH

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 6580

Order No. R-6157

APPLICATION OF CONTINENTAL OIL
COMPANY FOR A CARBON DIOXIDE INJECTION
PROJECT, LEA COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on September 19, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

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

FINDS:

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

(2) That the applicant, Continental Oil Company, seeks authority to initiate a pilot carbon dioxide injection project in the Grayburg-San Andres formation in Units H and I of Section 20, Township 17 South, Range 32 East, NMPM, Maljamar Pool, Lea County, New Mexico, for tertiary recovery purposes.

(3) That said pilot project is in an area wherein primary recovery and secondary recovery operations have been ~~conducted~~.

(4) That the proposed pilot project is of an experimental nature to evaluate the ~~carbon dioxide disp~~ effectiveness of carbon dioxide injection into the subject reservoir, and as such, will require the drilling of a number of wells at close proximity to each other for purposes of injection and production, and to provide a study of zone isolation, vertical heterogeneity, reservoir directional variation, and the carbon dioxide displacement process.

(5) That in the event the pilot project is successful and indicates the desirability and economic feasibility of the process, the pilot project would be expanded to include additional

lands and wells, and would result in the production of otherwise unrecoverable oil, thereby preventing waste.

(6) That the pilot project is to be conducted well within the boundaries of the Maljamar Cooperative Area, a unitized area, and will therefore not impair correlative rights.

(7) That the proposed pilot project should be approved, as well as certain non-standard locations and provisions for additional injection, production, and observation wells at orthodox and unorthodox locations, and expansion of the pilot.

IT IS THEREFORE ORDERED:

(1) That the applicant, Continental Oil Company, is hereby authorized to inititate and conduct a pilot carbon dioxide/water injection project in the Maljamar Cooperative Area Unit, Maljamar Grayburg-San Andres Pool, Lea County, New Mexico.

(2) That the applicant is hereby authorized to continue to inject water in its MCA Unit Well No. 48, located 1980 feet from the North line and660 feet from the East line of Section 20, Township 17 South, Range 32 East, NMPM, and to convert to water injection its MCA Unit Well No. 256, located 2590 feet from the South line and 1310 feet from the East line of said Section 20, Well No. 66, located 1980 feet from the South line and 660 feet from the East line of said Section 20, and Well No. 262 located 2615 feet from the North line and 25 feet from the West line of Section 21, Township 17 South, Range 32 East, NMPM.

(3) That the applicant is hereby authorized to drill its MCA Unit Well No. 358 at a point 2600 feet from the North line and 660 feet from the East line of the aforesaid Section 20, and to place said well on temporary production.

(4) That the applicant is hereby authorized to drill four production wells, to be known as the P-1, P-2, P-3, and P-4, said wells to be located approximately 330 feet Northeast, 330 feet Northwest, 330 feet Southwest, and 330 feet Southeast, respectively, of the above described MCA Unit Well No. 358, and to drill two logging, testing, and observation wells, to be known as the L-1 and L-2, said wells to be located approximately midway between the aforesaid MCA

Unit Well No. 358 and P-1, and 358 and P-4, respectively.

(5) That upon completion of testing and evaluation of the wells and the reservoir in the pilot area, applicant is authorized to convert the aforesaid MCA Unit Well No. 358 to selective water/carbon dioxide injection into the Grayburg Sixth Zone and the San Andres Ninth Massive Zone.

(6) That the above-described P-1, P-2, P-3, and P-4 producing wells shall be equipped with surface casing set at approximately 700 feet with cement circulated to the surface, and with a long string set at approximately 4150 feet with cement circulated to the surface by means of a DV tool; that said wells shall be dually completed in the Grayburg Sixth Zone and the San Andres Ninth Massive Zone with parallel strings of tubing and separation of the zones by means of a packer.

(7) That the above-described MCA Unit Well No. 358 shall be cased and cemented in like manner to the aforesaid P-1, P-2, P-3, and P-4 wells, and for injection purposes, shall be dually completed equipped with parallel strings of plastic-lined tubing for water/carbon dioxide injection into the Grayburg Sixth Zone and the San Andres Ninth Massive Zone with separation of the zones achieved by means of a packer; further that another packer shall be installed above the uppermost Grayburg perforations and the casing-tubing annulus loaded with an inert fluid; that a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak detection device to facilitate detection of leakage in the casing, tubing, or packer.

(8) That the injection wells or injection system shall be equipped with a pressure regulator or other acceptable device which will limit the wellhead pressure on the injection wells to no more than 2150 psi.

(9) That the operator shall notify the Supervisor of the Hobbs district office of the Division when the injection system installation has been completed so that an inspection of the same may be made prior to its operation.

(10) That the operator shall immediately notify the Supervisor of the Hobbs district office of the Division of the failure of the tubing, casing, packer, or cement in any well in the project area, or of the leakage of water or oil from or around any of said wells, and shall take such timely steps as may be necessary to correct such failure or leakage.

(11) That the operator shall have the flexibility to drill its production, injection, and observation wells at locations other than those described above, dependent upon analysis of reservoir and fluid characteristics, provided however, that it shall notify the Santa Fe office of the Division of any such location change and provided further that none of the authorized injection/production/observation wells shall be located outside the project area as defined below.

(12) That the subject project shall be known as the Conoco Maljamar CO_2 Injection Project, and the project area shall comprise the following described lands:

TOWNSHIP 17 SOUTH, RANGE 32 EAST, NMPM
Section 20: S/2 NE/4 and SE/4
Section 21: SW/4 NW/4 and W/2 SW/4

(13) That said project area may be expanded and additional wells drilled and placed on production and/or water/carbon dioxide injection at orthodox and unorthodox locations upon filing written request therefor with the Division Director, with copies of such request being furnished to the operator of any directly or diagonally offsetting 40-acre proration unit not committed to and participating in the MCA Unit. The Division Director may approve the request if, after a period of 20 days, no such offset operator has objected thereto.

(14) That the Conoco Maljamar CO_2 Injection Project shall be governed by this order and the rules contained herein and by the provisions of Rules 701, 702, and 703 of the Division Rules which are not in conflict herewith.

(15) That monthly project reports of the project herein authorized shall be submitted to the Division in accordance with Rule 704 of the Division Rules, provided however, that a separate

supplemental report on Form C-115 shall also be filed each month reporting volumes of water and carbon dioxide injected.

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

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

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Continental Oil Company
P.O. Box 460
1001 North Turner
Hobbs, New Mexico 88240
(505) 393-4141

File

June 21, 1979

State of New Mexico
Oil Conservation Division
Energy & Minerals Department
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention Mr. Dan Nutter

Gentlemen;

Case No. 6580 - Application of Continental Oil Company for a CO_2 Injection ~~Project~~, Lea County, New Mexico

It is respectfully requested that Case No. 6580 scheduled for Examiner Hearing on June 27, 1979 be postponed and rescheduled for hearing on July 25, 1979. This request is made due to conflicts with our capital budget preparation and presentation to our headquarters management.

Please be advised that for the purpose of readvertising and hearing on the later date, Continental Oil Company's name will change effective July 1, 1979, to Conoco Inc.

Yours very truly,

HAI/jj

cc: Mr. Tom Kellahin
P.O. Box 1769
Santa Fe, NM 87501

Dockets Nos. 25-79 and 26-79 are tentatively set for hearing on July 11 and 25, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - JUNE 27, 1979

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

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

CASE 6545: (Continued from May 23, 1979, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Corinne Grace, Travelers Indemnity Company, and all other interested parties to appear and show cause why the Kuklah Baby Well No. 1 located in Unit G of Section 24, Township 22 South, Range 26 East, Eddy County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6549: (Continued from May 23, 1979, Examiner Hearing)

Application of Gulf Oil Corporation for pool creation, discovery allowable, and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order creating a new Bone Springs oil pool for its Lea "YH" State Well No. 1 located in Unit O of Section 25, Township 18 South, Range 34 East. Applicant also seeks a discovery allowable and promulgation of special pool rules, including a provision for 80-acre spacing.

CASE 6563: (Continued from June 13, 1979, Examiner Hearing)

Application of Roy L. McKay for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for his North Woolworth Ranch Unit Area, comprising 1,280 acres, more or less, of State lands in Township 23 South, Range 35 East.

CASE 6548: (Continued from May 23, 1979, Examiner Hearing)

Application of John F. Staver for salt water disposal, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Dakota formation through the open hole interval from 1408 feet to 1412 feet in his Table Mesa Well No. 22 located in Unit N and from 1394 feet to 1400 feet in his Table Mesa Well No. 23 located in Unit O, both in Section 34, Township 28 North, Range 17 West, Table Mesa-Dakota Oil Pool.

CASE 6576: Application of Bass Enterprises Production Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Townsend Unit Area, comprising 320 acres, more or less, of State lands in Township 15 South, Range 34 East.

CASE 6577: Application of Oil Processing for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at a site in the NE/4 SE/4 of Section 8, Township 20 South, Range 37 East.

CASE 6578: Application of Mesa Petroleum Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Pennsylvanian formation underlying the E/2 of Section 28, Township 17 South, Range 27 East, to be dedicated to a well to be drilled in Unit G of said Section 28. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6579: Application of R. N. Hillin for an unorthodox well location and approval of infill drilling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements and a finding that the drilling of a Morrow gas well at an unorthodox location 800 feet from the South line and 2000 feet from the East line of Section 34, Township 19 South, Range 28 East, is necessary to effectively and efficiently drain that portion of the E/2 of said Section 34 which cannot be so drained by the existing well.

CASE 6580: Application of Continental Oil Company for a carbon dioxide injection project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to initiate a pilot carbon dioxide injection project in the Grayburg-San Andres formation in Units H and I of Section 20, Township 17 South, Range 32 East, Maljamar Pool, for tertiary recovery purposes.

CASE 6581: Application of Belco Petroleum Corporation for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of its Warren-American State Well No. 2 660 feet from the South and West lines of Section 32, Township 9 South, Range 33 East, Flying "M"-San Andres Pool, the W/2 SW/4 of said Section 32 to be dedicated to the well.

CASE 6582: Application of Belco Petroleum Corporation for a non-standard proration unit and unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for a 40-acre non-standard proration unit comprising the NE/4 SW/4 of Section 31, Township 9 South, Range 33 East, Flying "M"-San Andres Pool, to be dedicated to its Federal 31 Well No. 2 to be drilled at an unorthodox location 1980 feet from the South and West lines of said section.

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

IN THE MATTER OF THE APPLICATION OF
CONTINENTAL OIL COMPANY FOR AUTHORITY
TO INITIATE A PILOT CARBON DIOXIDE INJEC-
TION SYSTEM FOR ENHANCED RECOVERY PURPOSES
ON ITS MCA UNIT, SECTION 20, T-17-S, R-32-E,
LEA COUNTY, NEW MEXICO.

Case 6580

APPLICATION

Applicant, Continental Oil Company, respectfully requests authority to initiate a pilot carbon dioxide injection system into the Grayburg-San Andres formation in Section 20, T-17-S, R-32-E, Lea County, New Mexico, in order to improve enhanced recovery techniques and recover additional hydrocarbons from an area in which secondary recovery operations now exist. In support of this application, the applicant would show:

1. Applicant is co-owner and operator of the MCA Unit which, in addition to other lands, includes the E/2 of Section 20, T-17-S, R-32-E, Lea County, New Mexico.

2. Applicant was authorized by Order R-2403 dated December 31, ~~1932~~ 1962, as Operator and has been injecting water into the Grayburg-San Andres formation since 1963 by the authority of such order.

3. That the proposed project will be a 5-acre inverted 5-spot pattern which will require drilling one CO_2 injection well and four producing oil wells to the Grayburg-San Andres formation; also, two logging observation wells will be drilled within the pattern area.

4. That CO_2 will be injected at a pressure equal to the present reservoir pressure in the area.

5. That the proposed pilot area is in the latter stages of its flood life.

6. That the success of this pilot project could provide technical knowledge concerning CO_2 enhanced oil recovery that would be useful on an expanded basis.

7. That the granting of this application will result in the recovery of oil and gas reserves that would otherwise be lost.

8. That the granting of this application will result in the prevention of waste and will not impair the correlative rights of any party.

WHEREFORE, applicant respectfully requests that this matter be set for hearing before the Division's duly appointed examiner and, upon hearing, an order be entered authorizing the enhanced recovery project as described above.

Respectfully submitted,

CONTINENTAL OIL COMPANY

By John R Kemp
John R. Kemp, Assistant Division Manager of
Production

HAI/vjk

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Conoco Inc.
P. O. Box 460
1001 North Turner
Hobbs, NM 88240
(505) 393-4141

August 13, 1979

cont to 9/19

Oil Conservation Division
Energy & Minerals Department
State of New Mexico
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention Mr. Dan Nutter

Gentlemen:

Case No. 6580 - Application of Conoco Inc. for a CO_2 Injection Project, Lea County, New Mexico

Confirming your verbal conversation with Hugh Ingram of this office, we wish to postpone the hearing of the above case. It is respectfully requested that this case be rescheduled for hearing on September 19, 1979.

If this is not acceptable to you, we would appreciate being advised.

Yours very truly,

John R Kemp

HAI/jj

cc: Mr. Tom Kellahin, P.O. Box 1769, Santa Fe, NM 87501
ARCO Oil & Gas Company, P.O. Box 1710, Hobbs, NM 88240
Mr. Gene Motter, Cities Service Oil Co., P.O. Box 1919, Midland, TX 79701
Fair N & N Trust, P.O. Box 689, Tyler, TX 75701
American Petrofina Company of Texas, ATTN: Manager of Outside Operations, P.O. Box 2159, Dallas, TX 75221

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 6580
Order No. R-6157

APPLICATION OF CONTINENTAL OIL
COMPANY FOR A CARBON DIOXIDE
INJECTION PROJECT, LEA COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on September 19, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 30th day of October, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Continental Oil Company, seeks authority to initiate a pilot carbon dioxide injection project in the Grayburg-San Andres formation in Units H and I of Section 30, Township 17 South, Range 32 East, NMPM, Maljamar Pool, Lea County, New Mexico, for tertiary recovery purposes.

(3) That said pilot project is in an area wherein primary recovery and secondary recovery operations have been conducted.

(4) That the proposed pilot project is of an experimental nature to evaluate the effectiveness of carbon dioxide injection into the subject reservoir, and as such, will require the drilling of a number of wells at close proximity to each other for purposes of injection and production, and to provide a study of zone isolation, vertical heterogeneity, reservoir directional variation, and the carbon dioxide displacement process.

(5) That in the event the pilot project is successful and indicates the desirability and economic feasibility of the process, the pilot project would be expanded to include additional lands and wells, and would result in the production of otherwise unrecoverable oil, thereby preventing waste.

(6) That the pilot project is to be conducted well within the boundaries of the Maljamar Cooperative Area, a unitized area, and will therefore not impair correlative rights.

(7) That the proposed pilot project should be approved, as well as certain non-standard locations and provisions for additional injection, production, and observation wells at orthodox and unorthodox locations, and expansion of the pilot.

IT IS THEREFORE ORDERED:

(1) That the applicant, Continental Oil Company, is hereby authorized to initiate and conduct a pilot carbon dioxide/water injection project in the Maljamar Cooperative Area Unit, Maljamar Grayburg-San Andres Pool, Lea County, New Mexico.

(2) That the applicant is hereby authorized to continue to inject water in its MCA Unit Well No. 48, located 1980 feet from the North line and 660 feet from the East line of Section 20, Township 17 South, Range 32 East, NMPM, and to convert to water injection its MCA Unit Well No. 256, located 2590 feet from the South line and 1310 feet from the East line of said Section 20, Well No. 66, located 1980 feet from the South line and 660 feet from the East line of said Section 20, and Well No. 262 located 2615 feet from the North line and 25 feet from the West line of Section 21, Township 17 South, Range 32 East, NMPM.

(3) That the applicant is hereby authorized to drill its MCA Unit Well No. 358 at a point 2600 feet from the North line and 660 feet from the East line of the aforesaid Section 20, and to place said well on temporary production.

(4) That the applicant is hereby authorized to drill four production wells, to be known as the P-1, P-2, P-3, and P-4, said wells to be located approximately 330 feet Northeast, 330 feet Northwest, 330 feet Southwest, and 330 feet Southeast, respectively, of the above described MCA Unit Well No. 358, and to drill two logging, testing, and observation wells, to be known as the L-1 and L-2, said wells to be located approximately midway between the aforesaid MCA Unit Well No. 358 and P-1, and 358 and P-4, respectively.

(5) That upon completion of testing and evaluation of the wells and the reservoir in the pilot area, applicant is authorized to convert the aforesaid MCA Unit Well No. 358 to selective water/carbon dioxide injection into the Grayburg Sixth Zone and the San Andres Ninth Massive Zone.

(6) That the above-described P-1, P-2, P-3, and P-4 producing wells shall be equipped with surface casing set at approximately 700 feet with cement circulated to the surface, and with a long string set at approximately 4150 feet with cement circulated to the surface by means of a DV tool; that said wells shall be dually completed in the Grayburg Sixth Zone and the San Andres Ninth Massive Zone with parallel strings of tubing and separation of the zones by means of a packer.

(7) That the above-described MCA Unit Well No. 358 shall be cased and cemented in like manner to the aforesaid P-1, P-2, P-3, and P-4 wells, and for injection purposes, shall be dually completed equipped with parallel strings of plastic-lined tubing for water/carbon dioxide injection into the Grayburg Sixth Zone and the San Andres Ninth Massive Zone with separation of the zones achieved by means of a packer; further that another packer shall be installed above the uppermost Grayburg perforations and the casing-tubing annulus loaded with an inert fluid; that a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak detection device to facilitate detection of leakage in the casing, tubing, or packer.

(8) That the injection wells or injection system shall be equipped with a pressure regulator or other acceptable device which will limit the wellhead pressure on the injection wells to no more than 2150 psi.

(9) That the operator shall notify the Supervisor of the Hobbs district office of the Division when the injection system installation has been completed so that an inspection of the same may be made prior to its operation.

(10) That the operator shall immediately notify the Supervisor of the Hobbs district office of the Division of the failure of the tubing, casing, packer, or cement in any well in the project area, or of the leakage of water or oil from or around any of said wells, and shall take such timely steps as may be necessary to correct such failure or leakage.

(11) That the operator shall have the flexibility to drill its production, injection, and observation wells at locations other than those described above, dependent upon analysis of reservoir and fluid characteristics, provided however, that it

shall notify the Santa Fe office of the Division of any such location change and provided further that none of the authorized injection/production/observation wells shall be located outside the project area as defined below.

(12) That the subject project shall be known as the Conoco Maljamar CO_2 Injection Project, and the project area shall comprise the following described lands:

TOWNSHIP 17 SOUTH, RANGE 32 EAST, NMPM
Section 20: S/2 NE/4 and SE/4
Section 21: SW/4 NW/4 and W/2 SW/4

(13) That said project area may be expanded and additional wells drilled and placed on production and/or water/carbon dioxide injection at orthodox and unorthodox locations upon filing written request therefor with the Division Director, with copies of such request being furnished to the operator of any directly or diagonally offsetting 40-acre proration unit not committed to and participating in the MCA Unit. The Division Director may approve the request if, after a period of 20 days, no such offset operator has objected thereto.

(14) That the Conoco Maljamar CO_2 Injection Project shall be governed by this order and the rules contained herein and by the provisions of Rules 701, 702, and 703 of the Division Rules which are not in conflict herewith.

(15) That monthly project reports of the project herein authorized shall be submitted to the Division in accordance with Rule 704 of the Division Rules, provided however, that a separate supplemental report on Form C-115 shall also be filed each month reporting volumes of water and carbon dioxide injected.

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

DONE at Santa Fe, New Mexico, on the day and year herein-above designated.

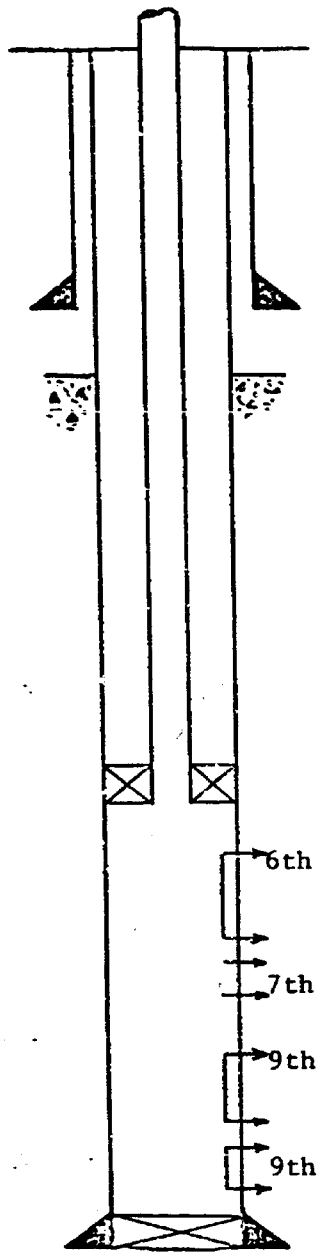
STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S
fd/

EXHIBIT NO. 15

MCA NO. 262



2615' FNL & 25' FWL, Sec. 21
T-17S; R-32E, Elev. 4023'
Measuring Datum 11' AGL

8 5/8", 20# csg. @ 780'
w/350 sks. (circ.)

TOC 2900'

2 3/8" plastic lined tbg.

packer set at 3609'

6th 3709, 13, 18, 25, 30, 38, 49, 54,
3899', w/1 JS

7th 3823, 32, 35, 39 w/1 JSPF
3901', w/1 JS

9th M. 4038', 42', 51', 58', 66', 71', 78'
and 4078', w/1 JSPF

9th M. 4098' - 4102' w/2 JSPF

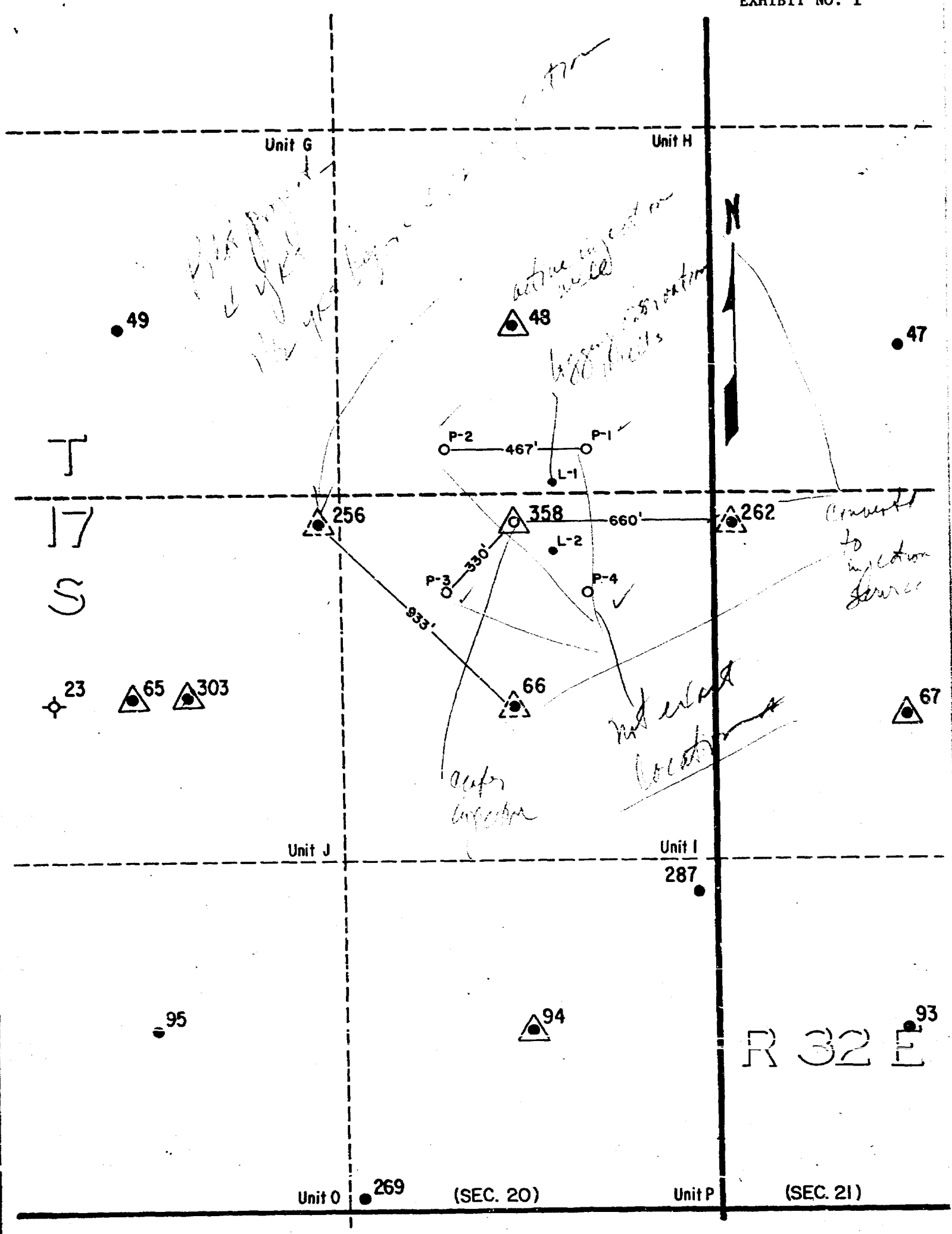
5 1/2", 14# csg. @ 4145' w/250 sks.

TD-4145'
PBTD-4130'

EXHIBIT NO. 15

PROPOSED

EXHIBIT NO. 1



● LOGGING WELLS △ INJECTION WELLS
○ PRODUCERS ▲ PROPOSED INJECTION CONVERSION

conoco

PRODUCTION DEPARTMENT — HOBBS DIVISION

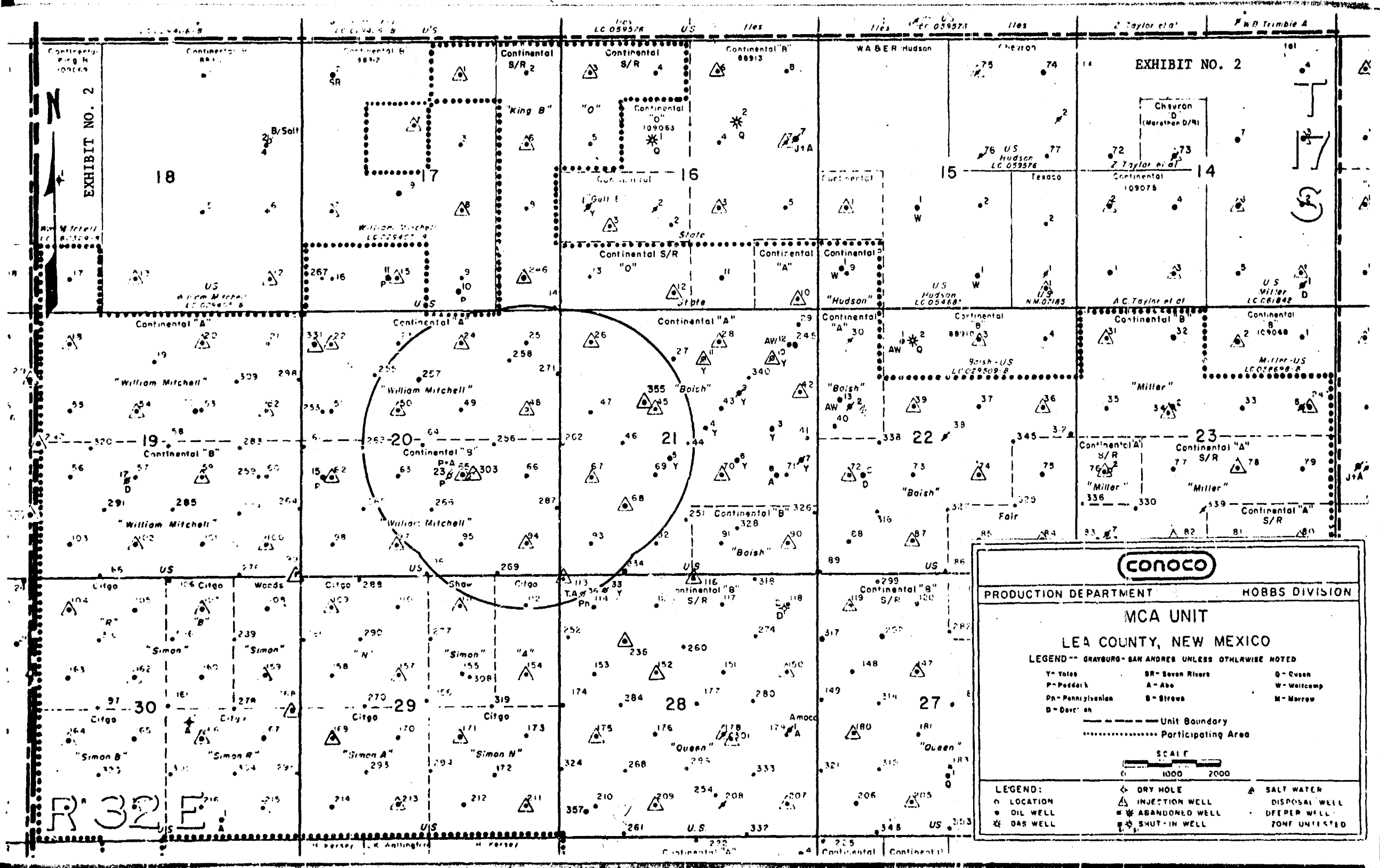
MCA UNIT
LEA COUNTY, NEW MEXICO
ENLARGEMENT: PILOT AREA

SCALE 0 200 400' approx. IIm

9-79

LEGEND:
- LOCATION
- OIL WELL
- GAS WELL
- DRY HOLE
- INJECTION WELL
- ABANDONED WELL
- SHUT-IN WELL
- SALT WATER DISPOSAL WELL
- DEEPER WELL - ZONE UNTESTED

EXHIBIT NO. 1



conoco

PRODUCTION DEPARTMENT — HOBBS DIVISION

MCA UNIT

LEA COUNTY, NEW MEXICO

LEGEND -- GRAYBURG - SAN ANDRES UNLESS OTHERWISE NOTED

Y - Yates	SR - Seven Rivers	Q - Queen
P - Paddock	A - Abo	W - Wolfcamp
Pn - Pennsylvanian	S - Strawn	M - Morrow
D - Devonian		

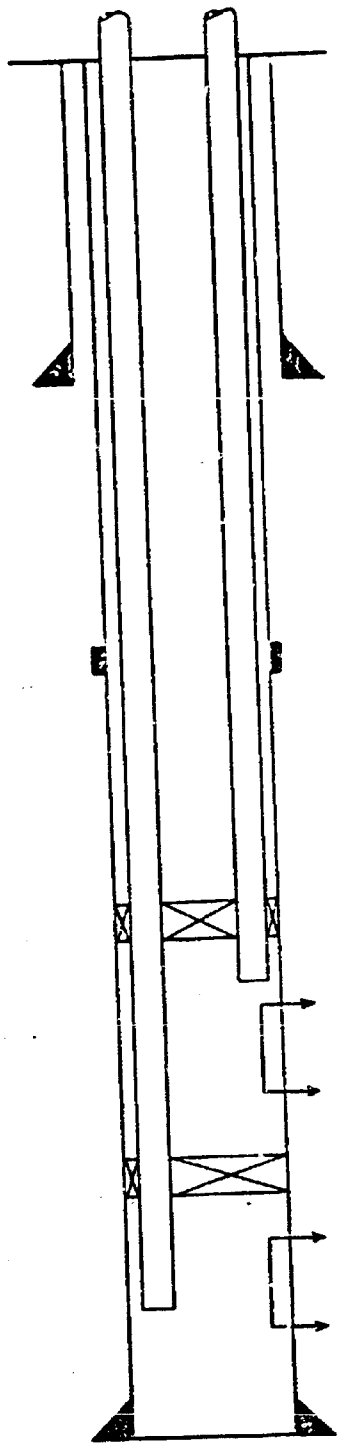
Unit Boundary

Participating Area

SCALE 0 1000 2000

LEGEND:	DRY HOLE	SALT WATER
LOCATION	INJECTION WELL	DISPOSAL WELL
OIL WELL	ABANDONED WELL	DEEPER WELL
GAS WELL	SHUT-IN WELL	ZONE UNTESTED

Dual CO_2 Injection Well



9 5/8, 36# @ 700' w/400 sx (circ)

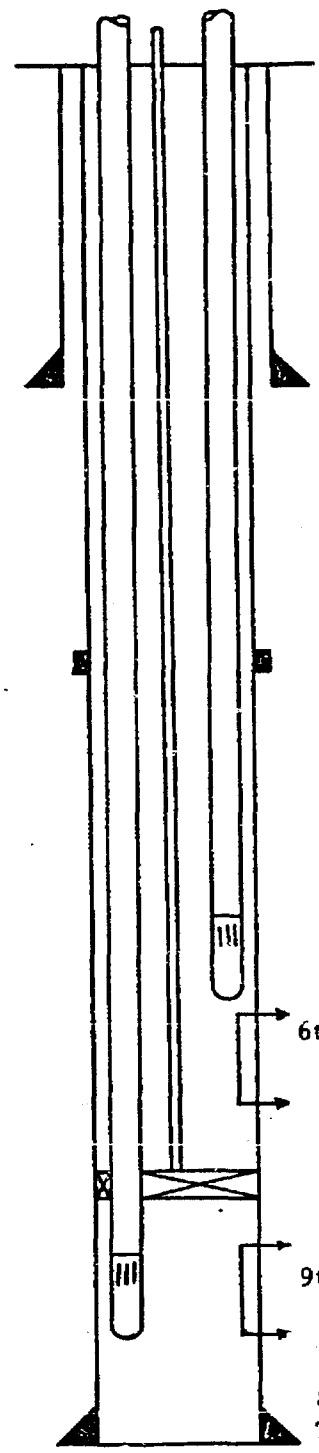
D.V. Tool at 2100' cmnt. with 1300 sx (circ)
2 3/8", P.L. tbg. (two strings)

6th Zone

9th Massive

7 5/8", 26.4# K-55 cmnt w/500 sx (circ to D.V. tool)
TD-4150'

Typical Dual Pilot Producer



13 3/8", 48# @ 700' w/500 sx (circ)

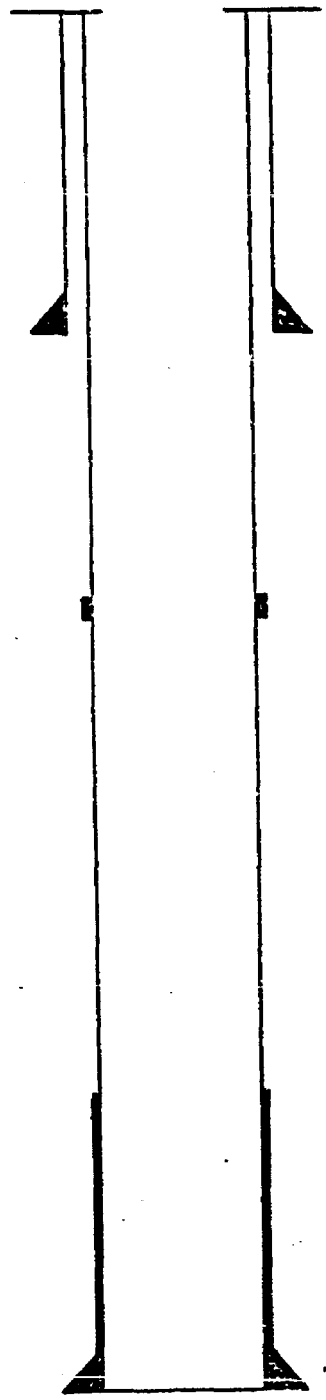
D. V. Tool at 2100' cmnt. with 1300 sx. (circ)
2 7/8" P.L. tbg. (2 strings)
1 1/4" I.J. vent string
1 1/4" I.J. treating string

6th Zone

9th Massive

8 5/8", 36# @ 4150' w/550 sx (circ. to D.V. tool)
TD-4150'

TYPICAL CO_2 LOGGING OBSERVATION WELL



8 5/8", 28# @ 700' w/340 sx. (circ)

D.V. Tool at 2100' cmnt. w/1300 sx. (circ)

for electric log capability

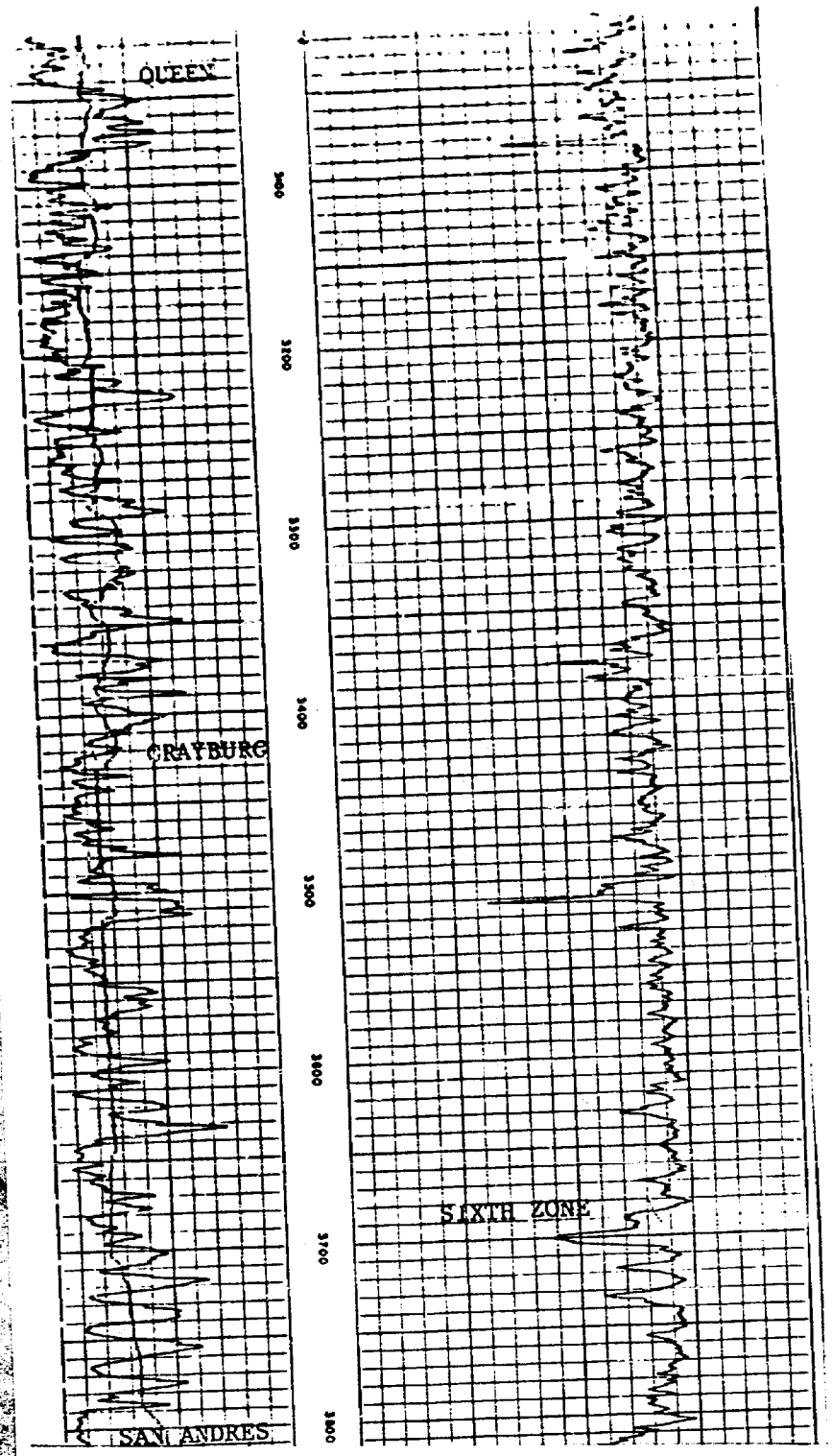
5 1/2", 15.5# K-55 down to ± 3600' w/5 1/2" fiberglass casing from ±3600' to TD. Cmt. 5 1/2" csg w/500 sx. (circ to DV tool)

TD-4150'

EXHIBIT NO. 6

TYPICAL GAMMA RAY-NEUTRON LOG

MCA CO_2 PILOT AREA
SEC. 20 T17S R32E
MALJAMAR FIELD
LEA COUNTY, NEW MEXICO



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Conoco EXHIBIT NO. 6
CASE NO. 6580

EXHIBIT NO. 7 Page 1 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 14	40' FSL & 40' FEL Sec. 17, T-17S, R-32E	3920-4015	4147 4015	8 5/8 7	951 3920	50 175	Circ Est. 1645'
	MCA 24 WIW	660' FNL & 1980' FEL Sec. 20, T-17S, R-32E	3709-3764 3995-4106	4106	8 5/8 7 4 1/2	848 3659 3995	50 150 150	616 1709 2700
	MCA 25	660' FNL & 660' FEL Sec. 20, T-17S, R-32E	3630-4114	4129 4114	10 3/4 7	700 3630	50 450	Circ. 2000
	MCA 26 WIW	660' FNL & 660' FWL Sec. 21, T-17S, R-32E	3734-4175	4175	10 7 4 1/2	905 3603 3734	50 150 275	Circ. 1653 190
	MCA 45 WIW	1980' FNL & 1980' FWL Sec. 21, T-17S, R-32E	3751-3807 3821-4181	4181	10 3/4 8 5/8 7	2301 3050 3821	300 78 80	Circ. 2200 2500
	MCA 46	2615' FNL & 1295' FWL Sec. 21, T-17S, R-32E	3730-3955 4080-4117	4120 4117	10 3/4 7 5 liner	55 3647 3605-4080	50 250 50	Circ. 650 Circ.
	MCA 47	1980' FNL & 660' FWL Sec. 21, T-17S, R-32E	3676-3995	4103 3995	10 7 4 1/2	2287 3575 3676	300 150 350	Circ. 2500 Circ.
	MCA 48 WIW	1980' FNL & 660' FEL Sec. 20, T-17S, R-32E	3670-4110	4110	10 7	794 3670	25 150	Circ. 1720
	MCA 49	1980' FNL & 1980' FEL Sec. 20, T-17S, R-32E	3598-4088	4088	7	3598	500	2000

EXHIBIT NO. 7 Page 2 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 50 WIW	1980' FNL & 1980' FWL Sec. 20, T-17S, R-32E	3669-3689 3733-4081	4081	8 5/8 7 4 1/2	810 3461 3733	50 150 300	Circ. Est. 2000 650
	MCA 63	1980' FSL & 1980' FWL Sec. 20, T-17S, R-32E	3508-4027	4027	8 5/8 7	814 3508	50 150	Circ. 1558
	MCA 64	2615' FSL & 2610' FWL Sec. 20, T-17S, R-32E	3620-4039	4039	10 3/4 7	57 3620	45 250	Circ. Est. 1900
	MCA 65 WIW	1980' FSL & 1980' FEL Sec. 20, T-17S, R-32E	3780-4100	4100	12 1/2 7 4 1/2 liner	40 3565 3137-3780	No Record of Cement 150 60	Est. 2000 Circ.
	MCA 66	1980' FSL & 660' FEL Sec. 20, T-17S, R-32E	3561-4072	4072	No Record of Surface Casing 7	3561	485	Est. 2000
	MCA 67 WIW	1980' FSL & 660' FWL Sec. 21, T-17S, R-32E	3738-3829 3842-4145	4145	12 1/4 7 5 1/2	40 3594 3842	20 400 40	Circ. 2000 3500
	MCA 68 WIW	1395' FSL & 1347' FWL Sec. 21, T-17S, R-32E	3748-4098	4098	10 3/4 8 5/8 7	95 880 3748	50 15 310	Circ. 160 1710
	MCA 69	1980' FSL & 1980' FWL Sec. 21, T-17S, R-32E	3610-4131	4136	8 4/8 5 1/2	868 3610	50 150	Circ. 1990
	MCA 93	660' FSL & 660' FWL Sec. 21, T-17S, R-32E	3566-4080	4080	8 5/8 7	889 3566	50 150	Circ. 2066

EXHIBIT NO. 7 Page 3 of 4

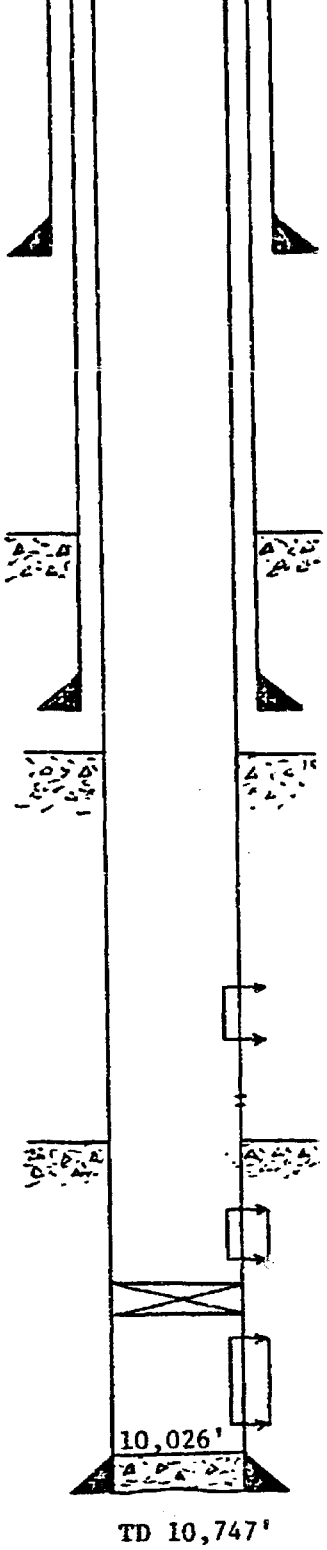
OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 94 WIW	660' FSL & 660' FEL Sec. 20, T-17S, R-32E	3600-4090	4090	12 1/2 7	20 3600	0 360	Mudded To Top 439
	MCA 95	660' FSL & 1980' FEL Sec. 20, T-17S, R-32E	3550-4036	4055 5036	8 5/8 7	880 3550	50 150	Circ. 2050
	MCA 113 WIW	80' FNL & 25' FWL Sec. 28, T-17S, R-32E	3630-4058	4058	8 5/8 7	965 3630	50 350	Circ. Circ.
	MCA 256	2590' FSL & 1310' FEL Sec. 20, T-17S, R-32E	3686-3821	4145 3920	8 5/8 5 1/2	748 4145	300 300	28 2400
	MCA 257	1345' FNL & 2615' FWL Sec. 20, T-17S, R-32E	3676-3906	5500 4090	8 5/8 5 1/2	262 5498	150 1500	Circ. 1725
	MCA 258	990' FNL & 990' FEL Sec. 20, T-17S, R-32E	3722-4118	5445 4200	7 5/8 4 1/2	825 5445	405 400	Circ. 1950
	MCA 262	2615' FNL & 25' FWL Sec. 21, T-17S, R-32E	3709-3901 4038-4102	4145 4125	8 5/8 5 1/2	780 4145	350 250	Circ. 2900
	MCA 266	1345' FSL & 2615' FWL Sec. 20, T-17S, R-32E	3792-4045	4110 4056	8 5/8 5 1/2	700 4110	325 250	Circ. 2100
	MCA 269	125' FSL & 1295' FEL Sec. 20, T-17S, R-32E	3856-3875 4002-4030	4130 4114	8 5/8 5 1/2	770 4130	400 300	Circ. 2700

EXHIBIT NO. 7 Page 4 of 4

OPERATOR	WELL NO.	LOCATION	GRAYBURG SAN ANDRES PRODUCING INTERVAL Ft.	Ft. TD/PB	CASING In. SIZE	CASING Ft. DEPTH	CEMENT SACKS	CEMENT TOC Ft.
CONOCO	MCA 271	1295' FNL & 25' FEL Sec. 20, T-17S, R-32E	3753-3761	4163 3850	8 5/8 5 1/2	770 4163	425 450	Circ. 2460
	MCA 287	1395' FSL & 25' FEL Sec. 20, T-17S, R-32E	3724-4083	4120 4109	8 5/8 5 1/2	800 4120	450 300	Circ. 2126
	MCA 303 WIW	1980' FSL & 1830' FEL Sec. 20, T-17S, R-32E	3730-3758	13965 4400	13 3/8 9 5/8 7	444 4740 4595-5578	350 4300 138	Circ. Circ. 4775
	MCA 355 WIW	1780' FNL & 1780' FWL Sec. 21, T-17S, R-32E	3716-3738	12780 4094	13 3/8 9 5/8 5 1/2	180 4200 4162-11813	160 3370 1850	Circ. Circ. 4860
	MCA 44	2615' FNL & 2615' FWL Sec. 21, T-17S, R-32E	3814-4050	4124 4050	8 5/8 7	880 3814	65 200	670 est. 2058 est.
	MCA 112	660' FNL & 660' FEL Sec. 29, T-17S, R-32E	3560-4072	4072	8 5/8 7	950 3360	50 100	790 est. 2260 est.
	MCA 263	2594' FSL & 1224' FWL Sec. 20, T-17S, R-32E	3616-4066	4070 4066	8 5/8 5 1/2	680 4070	350 250	Circ. 2400
	BAISH A #5	2310' FSL & 2310' FWL Sec. 21, T-17S, R-32E	2293-2458	2458	10 3/4 8 5/8 7	96 508-943 2293	85 25 250	Surf. -- 2000 est.
	BAISH B #36	554' FNL & 554' FWL Sec. 28, T-17S, R-32E	T.A.	10747 -- 6900	13 8 5/8 5 1/2	825 4200 10745	175 200 1375	275 3391 4250 est.
	WILLIAM MITCHELL B #23	1980' FSL & 2193' FEL Sec. 20, T-17S, R-32E	P&A	5359	13 3/8 8 5/8	80 2521	60 185 115	Circ. 1st & 2nd Stages 795

EXHIBIT NO. 8

BAISH B #36
554' FNL & 554 FWL of Sec. 28, T-17S, R-32E



13", 50# csg. @ 825' w/175 sks.

TOC @ 3391' (Temp Survey)

8 5/8", 28# & 32# @ 4183' w/200 sx.

Est. TOC @ 4250

5335' - 53, 5372' - 84, 5394 - 5400', 5410' - 22', 5422 - 28', 5460 - 78'

Shot 3-1/2"holes @ 5825' and pump 275 sx.

TOC @ 5890' (Temp Survey)

6653-65', 6678-90' squeezed.

Bridge plug at 6900'

Perfs:	8914-20, 8954-60, 8972-78	cement
	9020-26, 9042-48, 9070-76	squeezed
	9098-9110, 9330-50, 9974-80	

5 1/2", 17# csg. @ 10,745' w/1100 sks.

TD 10,747'

PRESENT

Well T. A.

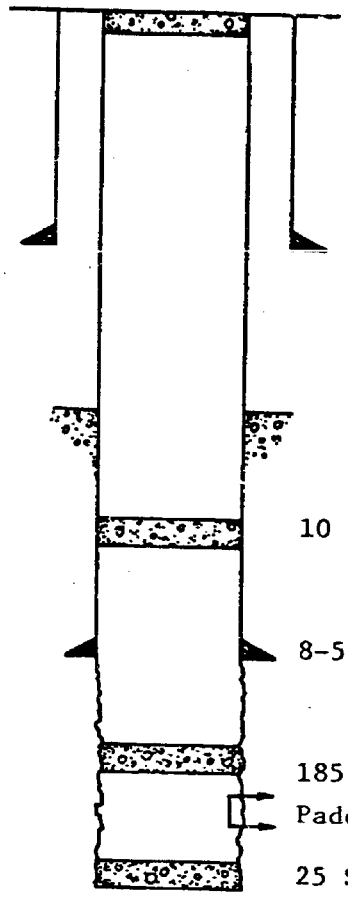
EXHIBIT NO. 9

CONTINENTAL OIL COMPANY

MCA UNIT

Plugged and Abandoned

William Mitchell B #23



10 sack surface plug

13-3/8" Csg. @ 80' Cmnt. w/60 Sacks Circulated to Surface

Est. TOC at 960'

10 Sacks Cmnt. 2438'-2470'

8-5/8" Csg. @ 2521' Cmnt. w/300 Sacks

Plug covers inj. interval

185 Sacks Cmnt. 3600'-4150'

Paddock Formation Found Dry

25 Sacks Cmnt. 5284'-5359'

TD 5359'

Location: 1980' FSL & 2193' FEL
Sec. 20, T17S - R32E

Elevation: 3997'

Datum: D.F.

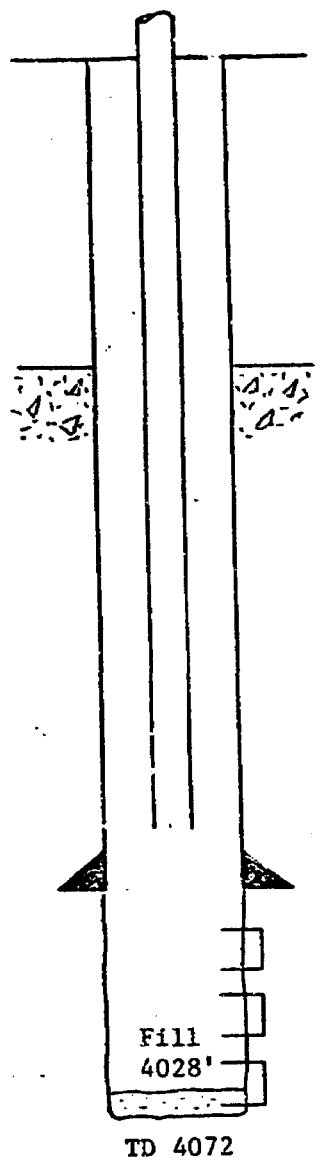
Top Of Salt: 815'

Base Of Salt: 1900'

EXHIBIT NO. 9

EXHIBIT NO. 10

MCA Unit No. 66



Location: 1980'F SL & 660'FEL Sec. 20

T- 17S R- 32E ;Elevation 4001'

Est. TOC @ 2000'

7", 22# csg. @ 3561' w/485 sks.

3800' - 3840' shot w/130 qts. nitro

3969' - 3989' shot w/70 qts. nitro

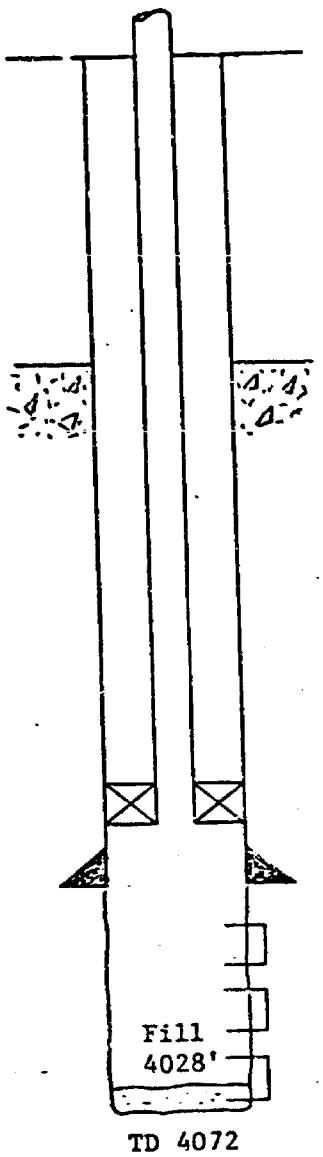
4029' - 4066' shot w/120 qts. nitro

EXHIBIT NO. 10

PRESENT

EXHIBIT NO. 11

MCA Unit No. 66



Location: 1980' F SL & 660' FEL Sec. 20

T- 17S R- 32E ;Elevation 4001'

Est. TOC @ 2000'

2 3/8" plastic lined tbg.

Packer set @ 3460'

7", 22# csg. @ 3561' w/485 sks.

3800' - 3840' shot w/130 qts. nitro

3969' - 3989' shot w/70 qts. nitro

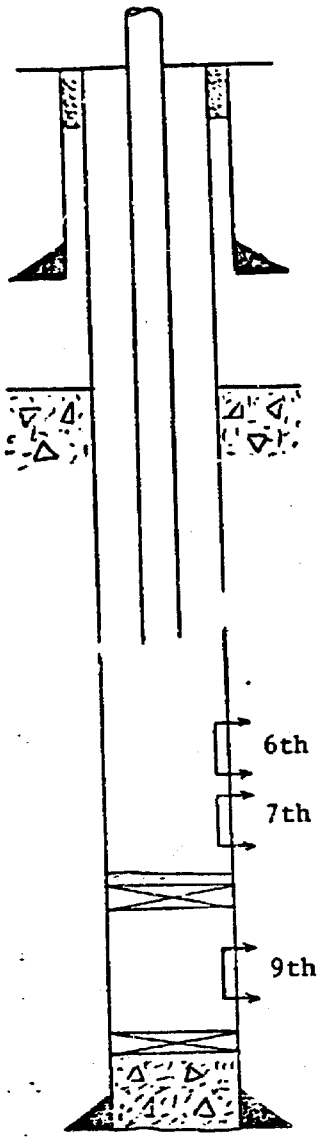
4029' - 4066' shot w/120 qts. nitro

PROPOSED

EXHIBIT NO. 11

EXHIBIT NO. 12

NCA Unit No. 256



Pea Gravel
TOC @ 28'

Location: 2590 'F SL & 1310 'F EL Sec. 20
T- 17S R- 32E ;Elevation 4015'

8 5/8", 24# csg. @ 748' w/300 sks.

TOC 2400' (temp. survey)

6th 3686', 3688', 3690', 3683',
3697', 3701', 3704' w/1 JSPF

7th 3808', 3812', 3815', 3818',
3821' w/1 JSPF

CIBP @ 3920' w/1 sk. cmt. on top

9th M. 4026.5', 4030.5', 4036.5', 4041.5'
4053.5', 4058.5', 4063.5', 4066' w/1 JSPF

CIBP @ 4077'

5 1/2", 14# csg. @ 4145' w/300 sx.

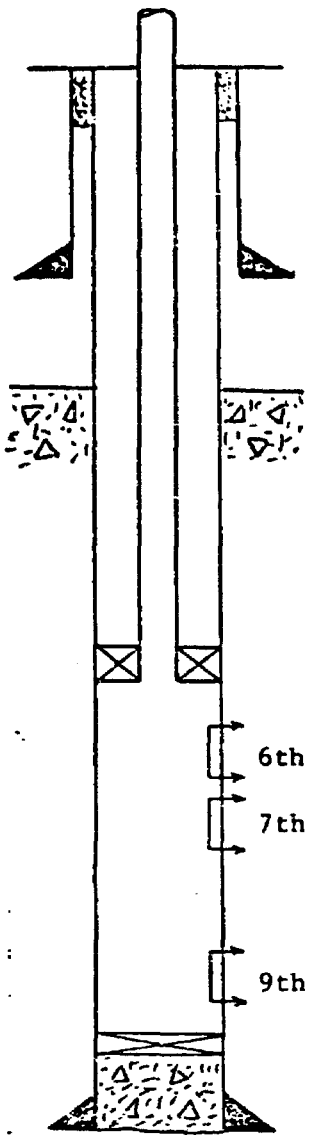
TD 4145'
PBTD 3920'

EXHIBIT NO. 12

PRESENT

EXHIBIT NO. 13

MCA Unit No. 256



8 5/8", 24# csg. @ 748' w/300 sks.

Location: 2590 'F SL & 1310 'F EL Sec. 20

T- 17S R- 32E ;Elevation 4015'

TOC 2400' (temp. survey)

2 3/8" plastic lined tubing
packer set @ 3580'

6th 3686', 3688', 3690', 3683',
3697', 3701', 3704' w/1 JSPF

7th 3808', 3812', 3815', 3818',
3821' w/1 JSPF

9th M 4026.5', 4030.5', 4036.5', 4041.5'
4053.5', 4058.5', 4063.5', 4066' w/1 JSPF

CIBP @ 4077'

5 1/2", 14# csg. @ 4145' w/300 sx.

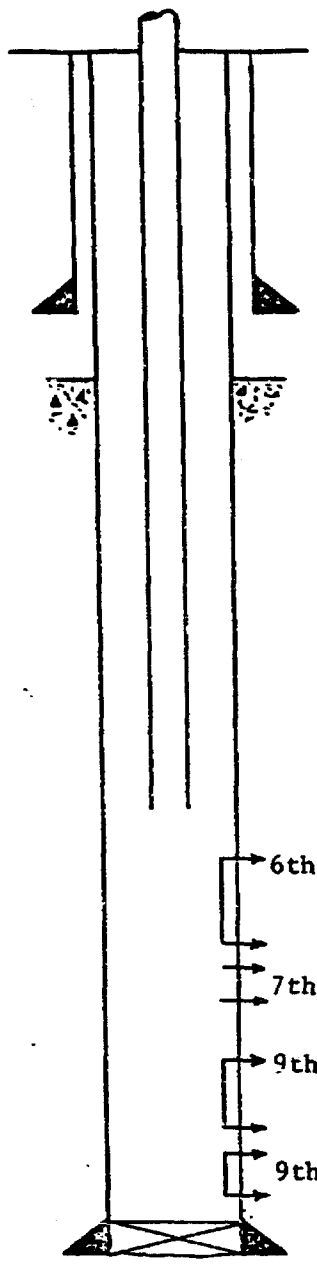
TD 4145'
PBTD 4077'

PROPOSED

EXHIBIT NO. 13

EXHIBIT NO. 14

MCA NO. 262



2615' FNL & 25' FWL, Sec. 21
T-17S; R-32E, Elev. 4023'
Measuring Datum 11' AGL

8 5/8", 20# csg. @ 780'
w/350 sks. (circ.)

TOC 2900'

6th 3709, 13, 18, 25, 30, 38, 49, 54,

3899', w/1 JS

7th 3823, 32, 35, 39 w/1 JSPF
3901, w/1 JS

9thM. 4038', 42', 51', 58', 66', 71', 78'

and 4078', w/1 JSPF

9th M.4098' - 4102' w/2 JSPF

5 1/2", 14# csg. @ 4145' w/250 sks.

TD-4145'
PBTD-4130'

EXHIBIT NO. 14