BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 18, 1970

EXAMINER HEARING

IN THE MATTER OF: Application of Tenneco Oil Company for the creation of a new pool, assignment of discovery allowable, and promulgation of special pool rules, McKinley County, New Mexico.	Case No. 4457

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case 4457.

MR. HATCH: Case 4457. Application of Tenneco Oil Company for the creation of a new pool, assignment of discovery allowable, and promulgation of special pool rules, McKinley County, New Mexico.

MR. BATEMAN: Mr. Commissioner, I'm Ken Bateman of White, Gilbert, and Kelly, appearing for the applicant.

MR. UTZ: Any other appearances?

MR. STEVENS: I'm Don Stevens of McDermott, Conley and Stevens, appearing for Allen J. Atweil. We will have no witnesses, we don't think.

MR. UTZ: Other appearances? You may proceed.

MR. BATEMAN: I have one witness. I'd like him sworn, please.

(Witness sworn)

(Whereupon, Applicant's Exhibits 1 through 8 were marked for identification.)

MR. BATEMAN: Mr. Hatch, I understand there's been some difficulty with the advertisement of this case. Accordingly, if the Commission please, I'd make a motion that testimony be heard at this time, that the case be readvertised for the next available date in order to issue after the completion of the readvertisement.

MR. UTZ: There was a mistake in the advertisement

of this case. Accordingly, if the Commission please, I'd make a motion that testimony be heard at this time, that the case be readvertised for the next available date in order to issue after the completion of the readvertisement.

MR. UTZ: There was a mistake in the advertisement in the local newspaper. Therefore, we will hear the case at this time, readvertise and call the case at the next --

MR. HATCH: The next examiner hearing will be advertised and will be December the 16th.

MR. UTZ: December the 16th, '69.

MR. HATCH: I hope I'm correct.

MR. UTZ: We'll call the case on examiner hearing on December the 16th in the event that anybody cares to make an appearance --

MR. BATEMAN: Thank you.

MR. UTZ: -- before the order is released.

A. DEAN RIAL

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BATEMAN:

Q State your name and occupation and place of residence.

A A. Dean Rial. I work for Tenneco Oil Company, district geological engineer. I live at 2685 U Concord in Denver.

MR. UTZ: Would you spell that name, please.

THE WITNESS: R-i-a-l.

MR. UTZ: First name?

THE WITNESS: A. Dean.

MR. UTZ: How do you spell it?

THE WITNESS: Oh. Initial A, then Dean.

MR. UTZ: Oh. Dean?

THE WITNESS: Right. Dean. Right. D-e-a-n.

MR. UTZ: For me you should say A.

Q (By Mr. Bateman) Mr. Rial, have you previously testified before the Commission?

A No, I haven't.

Q Would you state your educational background and work experience, please.

A All right. I graduated from Texas A & M in 1957 with a BS degree in Geological Engineering and a BS degree in Petroleum Engineering. With the exception of just a brief tour in the armed forces, I've been continually employed in the oil and gas business in area of geology and related petroleum engineering.

Q Are you personally familiar with the area in question, the application today?

A Yes, I am.

MR. BATEMAN: Are the witness's qualifications acceptable?

MR. UTZ: Yes, sir, they are.

Q Mr. Rial, refer to Applicant's Exhibit No. 1 now and state what Tenneco seeks by its application.

A Tenneco Oil Company seeks to establish a new pool, a special pool rule and the assignment of discovery allowable to the discovery well, the Don Ne Pah No. 1, which is located in the northwest of the northwest of section 18, seventeen north and eight west of McKinley County, New Mexico. We also propose limits as shown on exhibits outlined in red on the Exhibit No. 1. And we intend to present the available information to indicate that this is a new common source of supply and underlines this area.

Q What other information appears on Exhibit 1 relative to your application?

A This is a -- it shows a geographic limits of the proposed Lone Pine Dakota D zone or zone pool, and this is outlined in red. We show the location of the discovery well, the Don Ne Pah No. 1, and this is notated by the red arrow. The total depth of all dry holes are shown in the area, and we show all producing wells within the two mile radius of the Don Ne Pah No. 1. Circled in red on this exhibit are oil wells that have penetrated at least the top of the Dakota D zone. And we have also indicated by code down in the legend here the producing arisance of oil wells. We also note the locations of the Hospah field and also the south Hospah field in relationship to the proposed Lone Pine

Field.

Q All right. Now, regarding the -- just for the record, the well circled in red, are all of those wells productive in the D zone?

A No, they aren't. Now, this represents just wells that have penetrated. The wells that are now producing from the Dakota D zone are the Tenneco Hospah Well No. 10, which is located just about in the center of the north half of section 12 and --

MR. UTZ: Just a minute. I want to catch these as you --

THE WITNESS: We have these producing wells identified on the next exhibits specifically, but --

MR. UTZ: Oh, do you? All right. Well, perhaps it would be well to refer us to that.

Q All right. What are the vertical limits of the Dakota D zone?

A Well, I'd like to refer to Exhibit 2. This is a copy of a dual induction lateral log of the discovery well, the Don Ne Pah No. 1. It was measured to a depth of 2946. Noted on the log is the vertical limits of the Dakota D zone as shown on the two inch scale as being from 2792 to 2834. Also shown on this log are the vertical limits of the other producing zones in this immediate area.

MR. UTZ: Would you repeat those?

THE WITNESS: Okay. Excuse me. We're on the -- we have it on the small scale, or the two-inch scale.

MR. UTZ: All right.

THE WITNESS: All right. The top of the Dakota D zone is at 2733, and the -- no. It's B zone. The top of the B zone is 2792 to 2834.

Q (By Mr. Bateman) All right. Now, Exhibit No. 2 is a log of the discovery well; is that correct?

A Yes, it is.

Q Do you have anything further to say about Exhibit No. 2 before we go on?

A We also show on the log the perforations in the D zone, which are from 2802 to 21 and also from 2827 to 29.

Q All right. Mr. Rial, refer to your Exhibit No. 3 and state what that relates regarding the application. Also identify it, if you would.

A All right. Exhibit No. 3 is a structure map drawn on the top of the Dakota D zone as defined in the Exhibit No. 2. On this we see the relative locations of the Hospah field, which is just north of Fault B, and Fault B actually separates the north Hospah from the south Hospah. Fault A is shown, which is a normal down to the south fault running more or less northeast southwest. This fault separates the production in the south Hospah field from the proposed Lone Pine Field. We see here noted in red or

underlined in red right along or just north of Fault A we have noted the fault cuts and the location on a subsea depth of the position of that fault in each particular well. This fault, for instance, let's take a Tosoro 17 well, which is located by the red dot in the north half of section seven of 17 north and 8 west. Here we have identified the fault as being a hundred and seventy-five feet and the location of the cut on the fault as a plus 6228. We also have identified on here all wells that are now presently producing from the Dakota D zone. They are notated by both the red and the green dots. The red dots are significant in that they produce only from or have been completed only in the Dakota D zone.

The green dots are wells that are completed, have been perforated in the Dakota D zone and also are commingled with the Dakota A, the B and the girasic morrison. We see here -- we have identified fault as being the separating barrier between the south Hospah production and the proposed Lone Pine field in the Dakota D zone. We see here that we have identified on the left-hand portion of the western portion of the field, we have dashed a permeability barrier. Now, the well -- the Santa Fe Pacific Railroad No. 2, which is located in the northwest of the southwest of section 13 is structurally favorable for production from the D zone. However, on completion it may just be a slight amount of

oil and a considerable amount of water. We also find in the A one which is located in the northwest of the northeast of section 23 of 17 north and 9 west, this well also was extremely tight in the Dakota D zone. Both of these wells have been completed in the Dakota A zone. We interpret as being a permeability barrier of some nature or some -- of either permeability barrier or strategraphic barrier that exists along the western portion of the field south of the Fault Block A. Also noted on the structure map of significance to the field we show a contour which we have identified as oil down to plus 4205 feet. Now, this is identified as the limits of our production from the Gigosa No. 1, which is located in the northwest of the southwest of section 18 of 17 north and 8 west. We have also identified a gas cap present in the reservoir and we have presently located that at plus 4260, as shown by the dashed line with the X on it.

Q What is the nature of the production in the D zone wells to the north of Fault A?

A Do you want to go to the next exhibit, then?

Q Not just yet.

A What is the relationship?

Q No. The nature of the production.

A Oh, excuse me. The nature of the production in the south Hospah field is gas. We have no oil production in the south

Hospah Dakota D zone.

Q All right. Would you refer to Exhibit 4 and identify that and state what that has to do with the application.

A I would like to go back to just Exhibit 3 a minute before we look at Exhibit 4. Also shown on here are two cross section lines lettered A to A Prime and also B to B Prime. There is also an index map in the lower portion of Exhibit --

Q 4?

A -- 4 which shows the cross section. This is a cross section that was drawn -- subsurface cross section was drawn from Tenneco Wiggam No. 3, located in Section 11 of 17 north and 9 west through Tenneco Hospah Unit No. 23 in section 12 of 17 north and 9 west. Across the Fault A into the CTV Hospah A5 Section 12 of 17 9 west and into the discovery well of the Don Ne Pah No. 1, then on down to the Tenneco Gigosa No. 1, located in Section 1817 and north 9 west. Essentially what we show here is the separation of the Hospah field to the north where we have the gas and the proposed Lone Pine field to the south where in the vicinity of the discovery of the Don Ne Pah No. 1. We see that we've shown on the Hospah Unit 23 the completions as designated by the gas symbols in all three zones. We see in -- which is producing out of Oil Dakota A, the Dakota B and then the Dakota D. Of real significance, we feel, is the CTV Hospah A5. Although this did not get

to the Dakota D zone its structural relationship strongly supports the presence of the fualt and the separation of the two reservoirs.

Q All right. Mr. Rial, let's move on to Exhibit No. 5, if you would identify that and again state what relevance that has to the application.

A Exhibit No. 5 is cross section BB prime, which is more or less a north-south cross section that runs from Tosoro Santa Fe Pacific Railroad No. 17 in Section 7 of 17 north and 8 west through the Walker Brothers or Tosoro, now unit Santa Fe Pacific Railroad No. 11, also located in Section 7 of 17 north and 8 west down to Tenneco Don Ne Pah No. 1, the discovery well.

As noted here that the Tosoro Santa Fe Pacific No. 17 was completed in the Dakota D sand. As we also show the structural relationship from one side of the fault to the other, also shows the fault cut in the Santa Fe Pacific Railroad No. 17. Of significance, as in the other cross sections of Walker Brothers, shows the relationship of the shallower beds and as we cross the fault.

Q Do you have anything further to state about the last three exhibits?

A Only that they tend to demonstrate and indicate the presence of the fault and the separation of the production and producing area from the north to the south and the area

of the proposed Don Ne Pah Lone Pine Fields.

Q All right. If you'd move on to your Exhibit No. 6 and identify that and state what significance it has and particularly relative to the discovery well.

A This is a -- Exhibit No. 6 is the tabulation of the completion data available on the Dakota D zone in the McKinley County, New Mexico. This compares the Don Ne Pah No. 1, the pertinent data, as far as data completion, subsea tops, the perforations, initial potential, gas-oil ratio, oil gravity, bottom hole pressure and average porosity.

This compares these with the Tosoro Santa Fe Pacific No. 17, which was also completed in D zone, along with Tenneco's Hospah 10 and Hospah 23. The significance is that the wells in the fault block to the north are all gas.

Q All right. Mr. Rial, backing up just a little bit on the Don Ne Pah Well No. 1, have you made any inquiries as to whether or not there is other oil production at the depth in the County?

A According to the Oil Conservation Commission records, this is the deepest oil production in the County and would be subject to the appropriate discovery allowable under the rulings.

Q All right. Moving on to Exhibit No. 7, please identify

that and state what significance that has.

A Okay. No. 7 is a summary of the average reservoir data from the three primary producing wells. Now, let me regress a minute to exhibit -- refer back to Exhibit No. 3. We show on here locations of three red arrows and the locations of point two, the Don Ne Pah No. 1, the Gigosa No. 1, located in Section 18 and also to the Santa Fe Pacific Railroad No. 1, which is located in the northwest of the southwest of Section 13.

These wells were the initial three wells that were drilled in the development program and they represent the -- more or less are base of knowledge as far as reservoir properties and flood properties for this area, and also represent the majority of the production data to date.

Summarized here is what we consider average reservoir data and representative of the field of the reservoir itself. We have an average cost of twenty-four -- twenty point four percent, or saturation of thirty-five, permeability.

Now, this is permeability to reservoir fluid of thirty to fifty millidarcies; reservoir temperature of a hundred and eight degrees; original formation -- original reservoir pressure of a hundred and ten PSIG, oil gravity of fity-four degress, APE solution, gas-oil ratio of nine hundred and seventy standard cubic foot per barrel, and

an average thickness of twelve feet. These perimeters were taken from data based on core analysis, bottom hole pressure build-up test, crude samples and TVT data.

Q All right. Continuing on to Exhibit No. 8, please identify that and state what significance that has.

A All right. The Exhibit No. 8 is a plot of the bottom hole pressure in the Dakota D reservoir. It is pressure shown on the left as at a datum of forty-two hundred fifty feet, and time by months is along the bottom.

The wells plotted here are noted. The Santa Fe Pacific Railroad No. 3, the Don Ne Pah No. 1, the Santa Fe Pacific Railroad No. 1 and the Gigosa No. 1, the Santa Fe Pacific No. 5 and the Don Ne Pah No. 2 and the Santa Fe Pacific Railroad No. 6.

Now, based on the pressure data taken on the Don Ne Pah during the early part of June, 1970, we had initial pressure of one thousand and ten pounds. Now, on the latter part of June, a bottom pressure was -- build-up was taken, and it had declined to approximately nine hundred and seventy-nine to eighty pounds.

Upon the drilling of the Gigosa, we took a bottom hole pressure at that point, which is approximately nine hundred and eighty pounds. That is the green triangle. Upon the completion of the Santa Fe Pacific Railroad No. 3, we had a bottom hole pressure of just about nine hundred

and forty-nine to nine hundred fifty pounds. That was represented by the blue dot. A bottom hole field was shut in during the latter part of October, 1970, and we took a bottom hole pressure survey on the Don Ne Pah and the Santa Fe Pacific Railroad No. 1 and the Gigosa No. 1, and they were represented by their respective pressure in the latter part of October.

We can see by this that the Don Ne Pah No. 1 had declined to about nine hundred and twenty pounds. Following the second development phase in which wells No. 3, Santa Fe Pacific No. 3, No. 5, No. 6 and the Don Ne Pah No. 2 were drilled, we took bottom hole pressures of these wells.

It's interesting to note and particularly significant to the -- understanding the reservoir conditions that the -- most all our productions have been obtained from the three wells, the Don Ne Pah, the Gigosa and the Santa Fe Pacific No. 1, and this is represented by the cumulative oil production in barrels which, as of about the 7th of November, had produced about -- almost 36,500 barrels from -- primarily from three different wells.

We note here the location and the pressure of Santa Fe Pacific Railroad No. 5 which is just about twenty-five, I mean, excuse me, 925 pounds. We also note the pressure on the Don Ne Pah No. 2 which we were taking last week

and were there also at 925 pounds.

This indicates that the Santa Fe Pacific Railroad No. 5 had not produced and neither had the Don Ne Pah No. 2 and the Santa Fe Railroad No. 6 and they indicate very strongly that we have very excellent reservoir continuity in the wells that we have drilled.

I think that in discussing the reservoir at this time that it should be pointed out that by its pressure we -- by the presence of the gas cap we do have a saturated reservoir. And, I think that we feel now that the reservoir mechanic or primarly that of the solution gas drive, we should see some benefit from gas cap expansion because of the steady decline in our reservoir pressure with cumulative production we see no indications of water influence at this time.

I think that these conditions suggest to us early consideration for pressure maintenance there and our secondary recovery for optimum oil recovery from this field.

Q Mr. Rial, from present available information, do you believe that the wells in the proposed pool can effectively drain eighty acres?

A Yes, I think that they can very easily efffective draining of eighty acres. We have good permeabilities and good pressure distribution distributed even at this early time

in other development programs.

Q Should the Commission see fit to grant your application, what pool rules would you propose?

A We would propose a new pool designation as Lone Pine Dakota D Pool. We would propose that eighty acre spacing be applicable with provision for oversize proration units.

We propose fixed locations with the well to be located in the northwest and southeast of each 160 acre governmental quarter sections. Within this location we would propose the standard tolerance of 330 feet from the eastern forty-acre tract, from the boundaries of the forty acre tract in which the fixed well location was.

We also propose double allowable based on one hundred percent average participation. We propose a gas-oil ratio limit of 2,000 to 1 with provisions for quarterly well tests. We are proposing field results, these as temporary field results to cover a period of one year from date of order.

Q Why are fixed locations desirable?

A Tenneco, we feel at this point in the reservoir that vixed location provide an orderly and uniform development. We see no strong topographic obstacles that would prevent otherwise.

We feel that a -- since we have excellent reservoir communications present at this time that there is not a

problem of reservoir withdrawals or competition within a reservoir. We feel that ~~orally~~ Ardmore well spacing will enhance both the primary and secondary recovery of oil and gas from this reservoir, and we also feel that it will protect correlative rights and prevent undue pressure drawdown which is extremely critical in the type of reservoir in local areas.

It will also help us to efficiently define, and adequately define, the boundaries and limits of the reservoir at an early date.

Q In your opinion, will the wells produce the requested allowable?

A Yes, they will.

Q And finally, in your opinion, would the granting of your application be in the interest of conservation and would it prevent waste and would it protect correlative rights?

A Yes, it would.

Q Were Exhibits 1 through 8 prepared by you or under your direction?

A Yes, they were.

MR. STEVENS: Mr. Commissioner, I offer Exhibits 1 through 8 at this time.

MR. UTZ: Without objection, Exhibits 1 through 8 will be entered into the record in the case.

MR. STEVENS: Mr. Rial, do you have anything further

to offer at this time?

THE WITNESS: No, I don't.

MR. STEVENS: That concludes our direct testimony.

MR. UTZ: Any questions of the witness?

CROSS EXAMINATION

BY MR. KENDRICK:

Q Mr. Rial, I believe in your direct testimony you testified that the original reservoir pressure was 110 pounds.

A Yes, that's correct.

Q Plat says 1,010 pounds instead of 110.

A Excuse me, 1,010 pounds is correct.

Q On Exhibit 8, I think your test for the first pressure with the blue dot was identified as Santa Fe Pacific Railroad No. 3. The plat shows that to be Santa Fe Pacific Railroad No. 1.

A Test in August, right.

Q With your proposed 80-acre repattern, do you propose to set out the specific 80-acres of a quarter section to be dedicated or would you leave that to the flexibility of the operator?

A We have designated on the Exhibit 1 a specific alignment of the 80-acres. However, we have no real strong feelings as to the alignment as long as they are restricted to each 80-acres representing one quarter section, quarter section.

Q Do you mean that 240 would lie north and south from each

other to be delegated to the same well?

A Yes, they would. Yes, they would.

Q This might propose a bit of a problem in the vicinity to the east half of the east half of Sections 13 and 24 where that the additional fractional lots would be added in such that both lots would be added into one drill tract instead of into two drill tracts?

Does your footage proposal of 330 feet from the boundary of the 40-acre tract in the instance of the east half of the east half of Sections 13 and 24, is it your intent that it would be 330 feet from the edge of that half of the drill tract where these partial lots would be added on or would that be 330 feet from the boundary of the 40-acre tract which is the full standard 40-acre tract?

A It was our intent for this to be -- have the tolerance within 330 feet of the lease line whether it would be in the over-size units or in a regular sized unit?

Q Three hundred thirty feet from the tract line?

A Right, from the tract line.

MR. KENDRICK: I believe that's all.

THE WITNESS: This doesn't really pose a problem in the event that we have already drilled two of the wells under the normal 40-acre location of the Santa Fe Pacific Railroad No. 5 and No. 6.

Q (By Mr. Kendrick) The reason I considered that it might pose a problem is that in the well, an oil well drilled in northwest of the northeast of Section 13, which would be below the gas-oil contact would be an oil well with an 80-acre plus a fractional lot. As it is, you have 80 acres plus two fractional lots dedicated to a gas well singularly in the southeast portion.

A Excuse me. I misunderstood your initial point. Would you repeat that, please?

Q Santa Fe Pacific Railroad No. 6 --

A Right.

Q -- would have 80 acres plus two fractional lots dedicated to No. 6 as a gas well?

MR. UTZ: Which 80 acres?

MR. KENDRICK: Being the east half of the east half plus two fractional lots along the section.

If an oil well is drilled in the northwest of the northeast of Section 13 and the north half dedicated to that oil well that would offer on oil allowable of 80 acres plus one fractional lot if the north half of the northeast quarter is dedicated. Similarly the Santa Fe No. 5 in the southeast southeast of Section 13 would have 80 acres plus two fractional lots if the east half of the southeast quarter is dedicated; if the south half of the southeast quarter is dedicated 80 acres and one fractional lot would be dedicated to the No. 5 well. And

eighty acres and one fractional lot would be dedicated to the No. 1 which is in the gas cap area.

So there is a substantial difference in the amount of oil allowable assigned to wells if a rigid acreage dedication pattern is established here. Well, we have no strong objection or strong position as to the alignments of the unit. We felt there should be some conformity to them.

I believe that's all my questions.

MR. UTZ: You are proposing in the rules a rigid proration unit pattern?

THE WITNESS: No, we have not -- I don't -- we did not propose that. It was indicated on our map, but we do not necessarily feel that this is a -- should become a part of the rules, themselves.

MR. UTZ: In other words, it is satisfactory with you to dedicate the north -- or north-south, east or west?

THE WITNESS: Right, as long as they are restricted to the quarter quarter sections of no more than two units per quarter quarter section -- quarter section, excuse me.

MR. UTZ: Other questions?

MR. STEVENS: Mr. Rial, do you --

MR. UTZ: Would you identify yourself for the court reporter?

MR. STEVENS: Donald Stevens with the firm of McDermott, Conley and Stevens, representing Alan Antweil.

CROSS EXAMINATION

BY MR. STEVENS:

Q Mr. Rial, do you propose to add the lots along the east side of Sections 12, 13 and 24 to the existing wells to obtain an increased allowable based on overage and acreage?

A Yes, we do.

Q Could you tell us if the Pazo and Tosoro No. 17 well in Section 7 zippers producing out of the D which produces oil in your proposed field area?

A Yes. It's producing out of the same interval as what we're producing out of in the Don Ne Pah, yes.

Q Do you notice any pressure differentials, or do you know of any pressure differentials between that well and your oil wells?

A We have no data to indicate -- we have no data on the pressure on the Tosoro 17. The well was -- there is no gas market in the area, and the well was essentially shut in.

Q Was there any oil produced out of that well to your

knowledge?

A Not to my knowledge, no.

Q Was there any other gas producing out of the D zone in any of these other wells you've marked as gas wells?

A This is something that's extremely difficult for us to determine, because in the completion of the gas and the completion of the Tenneco Hospah 23 and 10, all zones were -- although treated separately were tested as -- they were all tested together. So we do not really know whether there was any contribution or how much contribution came out of the D zone, itself. Our feeling is that primarily most of the gas came out of the A zone in both the 10 and the 23.

Q You're proposing only to have rules applicable to the D zone; is that correct?

A That's correct.

Q If you find oil in any of these other wells in the B or C or A, would you seek a discovery allowable and new pool designation?

A Yes. I think we would at this time, because we feel that this D zone is a common source of supply and separated from the other zones.

Q Would you propose to dual complete a well in which more than one of those zones was completed? In other words, suppose you have the D and the B producing. Would you

propose to dual that well or drill two wells to that zone? In other words, you do not propose to commingle them?

A No. I do not propose to commingle them.

Q And yet the 17 is commingled as far as gas is concerned; is that correct?

A No. The 17 is a single completion in the D zone.

Q That's only in the D?

A Only the D, yes. The gas zones in the 10 and the 23 are commingled.

Q The D and other zones?

A Right.

Q Would you have any objection to commingling all of these zones together in one well board to avoid waste of drilling new wells and so forth if they should develop?

A I think that -- yes. I think that we would not initially, unless we have made a determination whether this is initially a separate reservoir. I do not feel that we should commingle the oil production if found in the A zone or the B zone with that of the D zone.

Q Are you familiar with the other Dakota field in the basin and whether they are, in fact, commingled or are separate?

A We have -- yes. We have -- our correlation is based -- or nomenclature here of the A -- of the B and the D zones are based on a network of cross sections on a subsurface correlation. Yes. To our knowledge, there are other

areas within the basin where these zones are commingled.

Q Do you note any deletarious effects from this?

A There are to my knowledge no oil wells. Most all of these are gas. There are no oil wells that are commingled.

Q The Rattlesnake Dakota Pool is one zone?

A To the best of my knowledge,yes, it is.

Q Referring to your structure map, Exhibit No. 3, if we can read that for a moment, would you give us your -- you have stated the fault A you have observed in the wells and in your Exhibit No. 2 the electric or was it the --

A Dual --

Q No. It was the cross section. Your second cross section.

A All right.

Q You showed that in the Well No. 17?

A Yes.

Q What was your evidence of the fault in that particular well? That was thickening or thinning of the zone?

A No. The evidence was the thing of the zone in the Santa Fe Pacific Railroad -- Tosoro Santa Fe Pacific Railroad No. 17. As we show there, it actually has a hundred and seventy-five feet missing.

Q In other words, from your orange line on the Tosoro well to the orange line to the left on your other wells there's one hundred seventy-five feet missing, right?

A Approximately, yes.

Q Does that apply also down in the Dakota? In other words, you'll have the same one hundred seventy-five feet missing?

A You should have recently, yes.

Q I note, then, that you have marked on here the amount of footage flow, I would presume, in each case, along the line of that cross section or that fault. The 2-F in the northeast northeast of 7 you show to have a hundred twenty feet of growth with a greater amount of the other three wells. Further down on the west side of this fault I note that the last contour line you have on the south side of the so-called faults, and then the north side it's 4200 in each case. On that basis would you presume that down dip to the southwest and to the northeast there's no fault? Since these contour lines are practically together here, it would show, I would guess, maybe twelve feet of fault -- flow. Pardon me. And you show yours from the center of the field off to the northeast a lessening in the flow. From this could you presume that as you go further down dip to the northeast and further down dip to the southwest that the fault disappears?

A Although this is probably what is indicated here, a fault of this size -- one we do not have -- we cannot find the fault identified in any of the wells to the south. We see the throw of variable along the data that we have shown here, and this is possibly because of the poor coorelation, give

or take a few feet, maybe some strategraphic changes in these -- in the wells, and it's also conceivable that there may be more faulting in the area. Now, we do not know when we have no control over the faulting or faulting pattern to the southeast. I would presume that a fault of the size should continue and be a major fault in the area.

Q But your structure map, as shown, would not so indicate that, would it, inasmuch as you show only about twelve feet of throw in the southwest portion along Fault A and a lessening in the amount of throw going to the northeast.

A No. It does not indicate that I do not think that the fault dies out, though.

Q Do you believe that fault is an effective seal between the gas well in Section 17 and other wells in that north area and the proposed field under discussion?

A Yes, I do.

Q You have no pressure to justify that, though?

A No. We do not have any positive pressure information that would indicate that it's a sealing fault.

Q In other words, it could be, then, that these wells in Section 13, 18 and 24 would be connected with the wells producing in Section 7 reservoir.

You mean the one well in the Tosoro 17 and also at this case -- let me rephrase my question. Are you familiar

with Well No. 16 in the northeast or northwest of Section 7?

A Yes, I am.

Q Could you tell us what produces from this and when it was completed?

A I do not know when it was completed. It did -- it's producing out of our nomenclature Dakota B zone. Right. I do not know the date of completion.

Q If there is communication across this fault, then you could presume that the B, C, D and A zones would be in communication with each other if there's communication across the fault.

A You mean by the present the fact that they're open only in the Tenneco Wells No. 13 and 10?

Q No. Really what I'm asking is if, in fact, there's communication across this fault as shown, since you had A, B, C and D all in contact with the fault would there, in fact, be communication between A, B, C and D on the north side of the fault and on the south side of the fault?

A Well, I would assume, then, the only way that we could have communication between the north side is for the fault not to be a sealing fault. We find that -- and if it's not a sealing fault, then it's possible for the zones to be in communication. Although it does not

necessarily prove that because one is in communication that all of them are in communication. I seriously doubt because of the magnitude of the fault as indicated where we can find it that a fault of this nature is not a sealing fault.

Q Do you find any evidence of a sealing fault between the north half and the south half or the north Hospah and the south Hospah of the Gallup level? Are there any pressure differences or are you familiar with that?

A No. I'm not familiar with the Gallup.

Q I'll withdraw that question. Your evidence for North Dip from Well No. 6 in Section 13 is based, is it not, on just your opinion of countour? There is no well up there proving north or northwest dip, is there?

A The only basis for the northwest dip is the -- let's go back to our Exhibit No. -- I believe it was 3. 3 is the structure map. All right. 4, which is the long cross section. And this is really one of the things that is the presence of the well or the shallow well, which is Wiggam CTV Hospah A-5. Although it didn't get all the way to Dakota, it does indicate that at a structural datum on the upper Hospah it's lower. Therefore, we do have to honor a reversal back in to the northwest.

Q How much lower is that? Do you have that figure offhand?

A No, I don't. About seventy-five feet.

MR. STEVENS: I don't believe I have anymore questions. Just a moment. Just one point of clarification.

Q Is the three hundred thirty acre tolerance from a forty acre subdivision? In other words, you could locate your well anywhere within that forty acres three hundred thirty feet from any subdivision line; is that correct?

A That was our intent, yes.

Q Yes?

MR. STEVENS: No further questions.

MR. UTZ: Other questions of the witness?

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Rial, looking at Set No. 3, it would indicate to me that Tenneco is the owner of this pool. Is that a correct assumption?

A We're probably the major owners of the pool. The pool limits have not been defined, as yet. The exact size and so forth is going to have to come about as subsequent drilling. But right now I would say, yes, we will probably own in excess of seventy-five percent of the pool.

Q Well, now, you say your pool hasn't been defined. You mean to the southwest?

A The pool has not been defined to the southwest and it has not necessarily been defined to the northeast or to

to the east. We show only a lower limit to define the oil down to or the limits of a proven production at this point. It could be much bigger and extend much farther.

Q In other words, you're saying that you feel that this productive down to your limits shown on Exhibit No. 3 and may extend further?

A Yes. The only -- I need to bring out one point here in clarification of the Lone Pine No. 1. This well, when we made these exhibits up -- we have just recently drilled it and are in the process of completing it. This well, to date, is not productive in the Dakota D reservoir, although we're structurally high. And so it may indicate that we have some separation or separations, but something unusual is happening in this south area or southeast area. We may also have mechanical problems with the well, but I think that it should be brought out at this point.

Q Referring to Exhibit No 8, is the blue square indicated the Santa Fe Pacific Railroad No. 3?

A Yes, it is. Which is located in the northeast of -- I mean -- excuse me. The northwest and northeast of Section 24, 17 north and 9 west.

Q Now, was the pressure taken the first part of November to establish the pressure?

A Yes, it was.

Q And that reads, then, at a thousand and ten pounds?

A Right. A thousand and ten pounds, yes, sir.
Q Now, this exhibit proports to show drainage. Now, what would this late pressure as compared to your initial pressure of a thousand and ten indicate to you?
A It indicates one of two things. Either that we're in an area that has not been affected by drainage that we may be moving into an area of, say, poor rock properties in which transmissability of pressure and we haven't drawn it down as much in this area as we have in the others. Most of the other points here are what we consider as infilled points. And they should logically have been expected to be lower. This is more or less on the edge and had not produced and therefore, we don't really know what the reason is. It could be separated, it could be -- but more likely, it's just probably an area of poor rock properties and has not been affected by the pressure draw down for this part of the reservoir.
Q So you might have a tight area or some other reservoir condition there?
A Yes. It doesn't appear -- the rock does not appear to be necessarily tight, though.
Q According to the logs?
A Right. It's difficult for us to tell, because we find no direct comparison between porosity and permeability in this area.

MR. UTZ: Do you have something?

MR. KENDRICK: In line with that, is this pressure of the Number 5 pressure without production in the well?

THE WITNESS: Yes.

MR. KENDRICK: Right after completion at that time?

THE WITNESS: Right. We completed the -- swabbed it back and kicked off and we ran a bottom low pressure.

MR. KENDRICK: Thank you.

Q (By Mr. Utz) Now, the blue circle is for your Don Ne Pah No. 2 and the No. 6?

A That's right. We have -- we just got the pressure information in yesterday, and we just added on the Don Ne Pah No. 2 was 924 pounds and the Santa Fe Pacific Railroad No. 6 was 920 pounds at this date.

Q Now, what date was that pressure?

A That pressure was taken -- let's see, it was taken this weekend.

Q 11-14? Is that close enough?

A 13, Friday, 11-14, right.

Q Now, your discovery date on your No. 1 Don Ne Pah was what?

A It was 6-2, June the 6th -- June the 2nd, 1970.

Q How much production did you have between those two dates?

A The production between the two dates has been sixty-three thousand -- about five hundred barrels.

Q Now, the pressure dropped -- it's been ninety pounds,

according to your testimony; is that correct?
A Approximately ninety pounds, yes.
Q Okay. Now, are all these pressures shown on Exhibit 8 proported to be stabalized pressures?
A Yes, they are.
Q And how long --
A With -- yes. They are stabalized pressures. Some of the build ups -- okay. They are all -- they all are in excess of seventy-two hours, with the exception of the initial pressure, which is the Don Ne Pah No. 1, which was a drill stem test measurement pressure, and it was shut in ninety-nine minutes. However, it did stabalize.
Q Now, it's your contention that there is a gas capping field?
A Yes, there is.
Q Now, do you propose to complete any of these oils in the gas cap?
A No, sir. We do not.
Q Not perforate it below the gas in all cases?
A In all cases. In the event that sometime down the road we want to consider reinjection, we would probably reinject. Possibly reinjection into the gas cap, we'd have to perforate it then.
Q We reiterate your request here as far as the pool rules are concerned. You're asking for eighty acres spacing

credit for oversized units; is that correct?
A That's correct.
Q And flexible proration units north, south, east or west?
A Yes.
Q Proration factor of two?
A That's correct.
Q GOR two thousand to one?
A With provision for quarterly well tests.
Q Right.
A Okay. Yes, sir.
Q And a spacing within the proration unit of 330 feet from a quarter to quarter section line?
A That's correct.
Q Did I miss anything?

MR. KENDRICK: In line with these proposed lots he asked from the tract line instead of the forty acre line in response to one of my questions where that twelve acre lot would be added to a forty acre tract. He asked for 330 feet from the tract line instead of forty acre line.

Q (By Mr. Utz) Do you know how wide these lots are?

MR. KENDRICK: They're about 300 feet.

A They're about 300 feet, something like that.
Q So that would put them right almost on the quarter section line, wouldn't it?
A Possibly.

Q Is that an indication --

A This does not really present a problem unless it -- because all our wells that have been drilled at this point have been drilled in the normal forty acre location. And as I can see right now, we are the only ones that would be affected. I see no real problem at this point.

Q I think I missed one stipulation that you made in regard to the rules. You want fixed spacing northwest and southeast?

A Yes, sir.

MR. UTZ: Other questions of the witness?

MR. STEVENS: If you do decide to reinject the gas produced into the gas cap do you think that you would be reinjecting all the gas produced in the field at that time?

THE WITNESS: This is one of the considerations that we're now making on what to do with the gas and exactly how to do it, which is most beneficial. I would imagine we -- that one of the things we're considering are reinjecting not only produced gas, but also reinjecting makeup gas from the field. And also from the south Hospah.

MR. UTZ: Further questions?

MR. STEVENS: One more, if I might. In your opinion, would eighty acre spacing be adequate for possible secondary recovery in the future? For example, water floods. For example, the spots. Would there be a considerable amount of

oil left in the cusps on eighty acre spacing as opposed to forty?

THE WITNESS: No. In our opinion -- and this is one of the primary reasons that we're desiring of the eighty acres and of the fixed spacing is that it's probably more desirable for a secondary recovery. We find that the -- say the recovery, percent recovery, for breakthrough is greater than of the -- the greater the distance between the wells. I think our overall efficiency would be much improved with the wider spacing and, yes, I think there's no problem as far as -- we feel that this is the optimum spacing for a secondary or pressure maintenance program at this time.

Q (By Mr. Utz) Do you have any data as to your producing GOR pressure cap?

A Yes, we do. Actually, the field gas oil ratio as of October was probably 2437 to one. Now, that's a total with all the gas produced in the oil. The Don Ne Pah, the current gas oil ratio average during the month of -- 5067 to one.

Q This is Don Ne Pah No. 1?

A Right.

Q 5067?

A Yes, sir. To one. The gigosa was 996 to one. The Santa Fe Pacific Railroad was 2805 to one.

Q That's the No. 1?

A Right. Santa Fe Pacific Railroad No. 1 and the Santa Fe Pacific Railroad No. 3 was 708 to one. And I have no other individual tests on the recent wells other -- specific information other than they are in the 900 to one range. All the rest of the wells are less than a thousand to one, with the exception of No. 6, which we're presently completing and we have mechanical problems with it, and we're still really in the process of completing working it over.

Q Won't your No. 1 be a penalized well?

A It probably would be this month, yes.

Q Is that the highest month that you've already noted on it?

A Yes. We've seen the gradual increase since its completion. During the month of August it was 1112 to one. During the month of September it was 1608 to one. This is based on a very -- this is gross gas versus gross oil.

Q Thank you.

MR. UTZ: Other questions of the witness? You may be excused. Do we have further testimony?

MR. STEVENS: Mr. Examiner, I'd like to ask you a question. We'd like to get in the record the fact that one well was completed on a certain date. Should I call Mr. Williams and ask him to present that evidence? It's in your file, or would you like to send Commission Notice of it?

MR. UTZ: Well, tell us which well it is. We can

take administrative notice of it.

MR. STEVENS: It's Tosoro No. 16, and it's Unit C of Section 7 and it was completed November 25th, 1968 with eighty-one barrels of oil plus eleven barrels of water per day through perforation 2520 to 50 out of the Dakota formation.

MR. UTZ: Completed when, now?

MR. STEVENS: November 25, 1968.

MR. UTZ: What was the location again?

MR. STEVENS: It's C of Section 7.

MR. UTZ: 25 what?

MR. STEVENS: 2521 to 2538.

MR. UTZ: I believe I excused the witness, didn't I? If I didn't, I do so now. No further testimony? I'll have statements in this case, please. Do you have a statement?

MR. STEVENS: I'd like to make a statement.

MR. UTZ: Go right ahead.

MR. STEVENS: Mr. Examiner, I'm representing Alan Antweil. Mr. Antweil has pointed out that Well No. 16 in Section 7 was completed in 1968 as a producer in the Dakota. Testimony of the witness was that it was the Dakota B. Other pools in New Mexico, perhaps many of them, perhaps most of them cover hundreds of feet of vertical section all commingled with various pressures and minor pressure differences. We feel this pool probably should be spaced the same way that the discovery should be considered the same, and that these various

sands come and go. We think also that there's evidence submitted that there's communication of the various A, B, C and D zones of the Dakota and as much as there's no proof that the fault is a sealing fault, plus this is some evidence that the faults northeast and southwest may be in contact sufficient to provide communication and, therefore, pressure interchange. Therefore, in this basis, this well No. 16 was completed by Tosoro in 1968. It, then, would be the discovery well for the Dakota formation, even though it might be different from the Dakota D, it's only a few feet, or a few dozen feet, separated from it vertically.

Mr. Antweil has no objection to eighty acre spacing as long as the usual Commission rule is in that additional wells can be drilled on the eighty, but there would be no increase in the allowable. Other than that the eighty acre spacing would be acceptable to him. But he does feel, however, that the discovery allowable for the field should be considered to be Well No. 16 of Tosoro since it was completed earlier in the Dakota formation.

Alan Antweil's interest in the field, he has bid for a lease in the southwest quarter of Section 18 from the Navajo Tribe and presumably will be issued that lease soon.

MR. UTZ: I've been looking for that name throughout the hearing. I just found it.

MR. STEVENS: That was your question, wasn't it?

MR. UTZ: Are there other statements?

MR. BATEMAN: Mr. Commissioner, I believe that the testimony today strongly indicates that the fault of the sealing fault, there is no evidence of any commingling in the Dakota zones south of the fault. I do not believe that Well No. 16 was completed into the D zone, which would put it in a category with Discovery Well in the D zone. There's also strong evidence of pressure communication and ability to effectively drain the eighty acres south of the fault. And with regard to the rigid well location that's requested by the applicant, I think it was well pointed out that the request that was made with the view toward conservation, particularly with the view toward secondary recovery in this particular situation and that all of the testimony warrants the Commission's granting the application on a temporary basis requested for a year. Nothing further.

MR. UTZ: Any other statements? The case will be taken under advisement. We'll reopen the case. There's a letter to be read in the record.

MR. HATCH: Telegram from Gulf Oil Corporation addressed to the Oil Conservation Commission, dated November the 16th, 1970, regard Case No. 4457, Examiner Hearing November 18, 1970. Gulf Oil Corporation is an offset operator of Tenneco's Don Ne Pah Well No. 1, Unit D Section 18, 17 south, 8 west, McKinley County, New Mexico. And we object to the proposed

field rule providing for fixed well locations. We recommend that a well be located within 150 feet of the center of either quarter section. I think that probably should be either quarter quarter section. We do not object to the eighty acre spacing provision on a temporary basis.

MR. UTZ: Is there a representative of Gulf Oil Company here? The case will be taken under advisement again.

I N D E X

E X H I B I T S

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, LINDA MALONE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings to the best of my knowledge, skill and ability.

Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4457, heard by me on Nov. 18, 1970.

Examiner
New Mexico Oil Conservation Commission