CASE 3913: Application of PAN AM. FOR SALT WATER DISPOSAL, SAN JUAN COUNTY, NEW MEXICO.

Case Number

3913

Application

Transcripts.

Small Exhibits

ETC.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 7, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Pan American Petroleum Corporation for salt water disposal, San Juan County, New Mexico

Case No. 3913

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

(Whereupon, Applicant's Exhibits One, Two, Three, Four, Five A, Five B, Six A, Six B, Six C, Six D, Seven A, Seven B, and Eight were marked for identification.)

MR. UTZ: We'll call case 3913.

MR. HATCH: Case 3913, application of Pan American Petroleum Corporation for salt water disposal, San Juan County, New Mexico.

MR. ROSS: Let the record show that Lewis C. Ross, attorney, Pan American Petroleum Corporation, Denver division represents Pan American and, I think, Mr. Hatch, Atwood and Malone have entered their appearances, have they not, as local counsel?

MR. UTZ: Yes, sir, they did, yesterday.

MR. ROSS: I just wanted the record to show that. We have one witness and I'd like that he be sworn.

(Witness sworn.)

MR. UTZ: Are there any other appearances in this case? You may proceed.

MR. ROSS: Before examining the witness, I'd like to pass out some of these duplicate exhibits that we have so that you can follow it.

FRANK H. HOLLINGSWORTH

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

DIRECT EXAMINATION

BY MR. ROSS:

Q Please state your name, your company, and your occupation in the company?

A My name is Frank H. Hollingsworth. I'm a Petroleum Engineer, Senior Grade, working as a reservoir engineer in Pan American Petroleum's Denver, Colorado office.

Q Have you testified before this Commission before, Mr. Hollingsworth?

A Yes, sir.

Q Are you a qualified engineer in the Commission records?

A Yes, sir.

Q When was the last time you testified?

A I testified on a case concerning the Hogback-Dakota Field this past summer.

Q But you have appeared from time to time during the past few years?

A Yes, sir.

Q Are you familiar with the Tocito Dome Field in this application?

A Yes, sir. I worked in Pan American's Farmington area office from 1957 to 1966 and was very closely associated with the drilling, completion and operation of most of Pan Americans wells in the Tocito Dome-Pennsylvanian "D" Field.

MR. ROSS: Mr. Examiner, I'd like to ask if the witness's qualifications are acceptable to you?

MR. UTZ: Yes, sir. He's qualified to testify in this case.

Q (By Mr. Ross) Very well. Our first Exhibit Number One is a general vicinity location. Would you please explain that, Frank?

A Exhibit Number One just shows the general location of the Tocito Dome field in San Juan County of northwest New Mexico. It's approximately thirty-three miles southwest of Farmington and about forty miles southeast of the Four Corners. There are other Pennsylvanian producing fields out here also shown on Exhibit One, the Rattle Snake Pennsylvanian, Pajarito-Pennsylvanian "D" Field, Tablemesa and Hogback Farmington producing Pennsylvanian.

Q Very good. Exhibit Two shows the detailed structure map for this field, and would you please give us a little bit of background and history of the field?

A Exhibit Two is a structure map on top of the porosity in the Pennsylvanian "D" producing horizon. The Tocito Dome

is a surface anomally, mapped from surface geology many years ago, the first well being drilled back in 1924 by Gypsy Oil Company to test the Dakota-Morrison intervals. This well is located, or it's one of the dry holes shown there in the northeast of the southwest quarter of Section 17, Township 26 North, Range 18 West. This was a dry hole and it has since been completed as a water well for the Navajo Tribe.

The second well to be drilled on the structure was in 1943 by Continental Oil Company, Scanlon Oil and Gas which is now Pan American, Standard of Texas, is a helium test well called Tocito Number One and this is the dry hole shown in the northwest quarter of the southwest quarter of that same Section 17. This well was completed by open hole, about a five or six hundred foot interval, covering the lower Pennsylvanian in the Mississippian and had some helium gas, but it was noncommercial and since has been abandoned.

The actual discovery well for Tocito Dome-Pennsylvanian "D" Field was Pan American's Navajo Tribal "N" Number One which is located in the southwest quarter of the southwest quarter of Section 17. This well was completed April 21, 1963, with five thousand and seventy-seven MCF per day of gas and forty barrels of condensate per day.

The second well drilled of Pan American was the Navajo Tribal "P" Number 1 which was in the southwest quarter southwest

quarter of Section 8. This was recovered water from the Pennsylvanian "D" Horizon and was abandoned as a dry hole.

Subsequent development was in 1964 when Texaco drilled an oil well, there Navajo Tribal AL Number 1 in the southeast quarter of the northeast quarter of Section 28, the same Township and Range, and up until this time, we thought Tocito Dome was essentially a gas field and this proved to be an oil rim accumulation above the gas, and subsequent development for both oil and gas was undertaken.

To date, there's been eighteen oil wells completed, one, which is now shut-in; four gas wells, one salt water disposal well and seventeen dry holes for a total of thirty Pennsylvanian tests. The productive area of the field covered approximately thirty-seven hundred acres of which twelve hundred and fifty acres are considered to be in the gas cap area which is a structural high as shown on the structure map there.

Comulative production to date is 3.7 million barrels of oil, thirty-eight thousand barrels of condensate and approximately seven billion cubic feet of gas.

The field appears to have a water influx in that wells drilled structurally low have experienced early water production and have experienced climbing water production. Due to this water production, one of our dry holes, the Navajo Tribal "U" Number 6, is being used as a salt water disposal well. This

was authorized by Commission Order Number R-2984 dated October the 13th, 1965, and water disposal into it was commenced Nobember the 22nd, 1965.

Current water disposals into it are approximately eighteen hundred barrels a day with a total of approximately 1.2 million barrels of water disposed of to date.

MR. UTZ: How much water was that figure again?

THE WITNESS: Disposals, cumulative disposals?

MR. UTZ: Yes.

THE WITNESS: 1.2 million barrels. The well that we're applying for permission to convert to salt water disposal is our Navajo Tribal "U" Number 1 which is indicated by a red arrow on Exhibit Number Two located in the northwest quarter of the southwest quarter of Section 21, same Township and Range. This well was originally completed as an oil well for four hundred twenty-three barrels of oil per day on August 26, 1964; but in September of 1965, it commenced producing approximately twenty-three barrels of water per day. Water production from this well has continued to decline until now. It's producing ninety-nine plus per cent water and we have shut this well in earlier this year because it was uneconomic to produce this water ratio. This water ratio was in excess of a hundred. For this reason, we would like to now convert this well to a disposal well to reduce the injections on the present

disposal well.

Q In the event the Commission favorably considers this application, how do you propose to -- you may tell us about the casing and your cementing program in the well. This is evidenced by Exhibit Three.

A Exhibit Number Three is a schematic diagram of the well casing and cement program used on the Navajo Tribal "U" Number 1. The well was drilled to a depth of sixty-four forty and four and half inch casing was run and cemented with 2-stage technique, the first stage consisting of five hundred sacks of cement with six per cent gel, two pounds tufplug, that's t-u-f-p-l-u-g, per sack, followed by a hundred sacks of meat cement. Stage cementing tool was set at thirty-six forty-six and the second stage was five hundred sacks cement containing six per cent gel and two pounds tufplug per sack. Both the first stage cement job was more than adequate to fill to the second stage cementing tool, and the second stage cement volume was adequate to fill to approximately eight hundred feet from the surface which brings the cement within the eight and five-eighths inch intermediate casing depth up into it.

Also, in reference to Exhibit Number Three, I want to point out that the interval to be disposed, what will be used for water disposal, will be 6267, 6286. Actually, present perforations are only 6283 to -86, so we're going to reperforate

to open more of the porous interval to the well bore.

Two and three-eighths tubing, coated internally with plastic, will be run on the well set in a Baker Model "D" packer, which is a permanent type packer. We set it within less than a hundred feet of the disposal zone and the casing tubing annulus will be loaded with an inert fluid and pressures on the casing tubing annulus will be checked to insure that the tubing and the packer are both holding satisfactory.

We think that the well is in very good condition for disposal into the Pennsylvanian "D" zone because we have what I would consider a very sufficient cement job outside the pipe, plus the tubing and packer arrangement we're going to use here.

Q I think Exhibit Four is just part of the record, but would you like to comment on this application and say what you've done with it?

A Well, Exhibit Number Four is a for C-108, application for disposal of salt water by injection into a porous formation. It was filed with our letter of application, and it has additional details on the casing and cementing of the well, plus it shows that notices were given to the four operators that were within a two mile radius of the Navajo Tribal "U" Number 1 and, also, notice was sent to the U.S. Geological Survey as representative of the Navajo Tribe, who is the surface owner.

Q Before we pursue this application further, I wish you would discuss proposed Exhibit Five, the logs in the well.

A The logs in the well are, five A is an induction with electrical log; five B is an acoustical log that were run on the subject Navajo Tribal "U" Number 1, and it shows the porous interval on the acoustic log that will be the disposal zone, and these logs correlate fairly well with all other wells in the field.

Q When you say "all other wells", you mean any possible future wells that we might need?

A Yes, any future disposal wells that we will consider, we'll probably put the water into the Pennsylvanian "D" zone correlative to the interval on the Navajo Tribal "U" Number 1 because this will be the most porous interval to put water into.

Referring back to Exhibit Number Two now, there are three wells down in the southern part of the field on Texaco's lease that are not actually completed in the same correlative interval. These are the Navajo Tribal "AL Number 2 which is southeast southeast to Section 28, the "AL" Number 3 which is the northeast to the southwest of Section 28, and the "AU" Number 1 which is in the northwest northwest of Section 34. All of these wells encounter the correlative interval to our disposal zone, structurally low, and they are completed in a real small porosity interval that was developed above this zone.

Q Now, about the conditions of this water, I see that you have proposed Exhibit Number Six which is four water analyses. Would you discuss the type of water this is and how it correlates?

A Exhibit Six A is a water analysis on the well in question, the Navajo Tribal "U" Numberl. Six B is our Navajo Tribal "U" Number 6, the sample water analysis. This is the present disposal well. Six C is our Navajo Tribal "U" Number 2 which was an incomplete or dry holw well. Six "D" is a water analysis on the Navajo Tribal "N" Number 4 which is located up in the northwest part of the field. The reason we included all these analyses, they show that they are generally very similar to one another. They all have total dissolved solids in the range of 84 to 94,000 parts per million, which is unfit for human consumption, stock or any domestic use, irrigation, or anything like that, and is really too, too salty to be disposed of in surface pits.

Q I rather take it from you previous testimony that you anticipate that your water problem will increase.

A Yes. The definite trend has been for increased water production on the edge wells apparently due to water influx, so the water influx seems to be limited.

Q Do uou anticipate that if you do need, the applicant needs any future wells, you're going to encounter practically

the same situation that you have in connection with this application? Is that true?

A Yes. Any future disposal wells that are deemed necessary, we'll have to probably complete in a similar manner to insure that the water being disposed of is adequately confined to the four Pennsylvanian "D" zones.

Q Would you please discuss what reception your application received from other operators in the field area?

A I sent notices of our application to all operators within a two mile radius of the well. The Exhibit Seven are letters; Seven A being a letter from Texaco, Incorporated where they stated they have no objection to Pan American's application. Texaco is the closest operator to the well in question being to the south, there. Exhibit Seven B, being a letter from Mobil Corporation in which they state they have no objection to Pan Merican's application. The only other two operators in the field were Sinclair, which is to the east of the field proper and they have no production in the field, and Southern Gulf Production Company, who has no production in the field proper, though they do have a gas well that is completed outside of the two mile radius up in Section 9, Township 26 North, Range 18 West, This is in the southwest quarter of the northeast quarter of Section 9, this well is apparently in a separate reservoir because it is something like ninety-three feet low to our

water table and it is completed and is a gas well. I don't really consider it being in the field proper.

Q What response did you get from the U.S.G.S.?

A In response to our application being sent to the U.S.G.S as a representative of the Navajo Tribe, the Exhibit Number Eight is a letter from Mr. John A. Anderson, U.S.G.S., Roswell, New Mexico which states that they approve the request, provided like approval is granted by the New Mexico Oil Conservation Commission.

MR. ROSS: At this time, I'd like to propose that the Applicant's Exhibits One through Eight, inclusive, and the respective parts thereof be admitted into the record of this case as evidence.

MR. UTZ: Without objection, Exhibits One through Eight will be entered into the record in this case.

(Whereupon, Applicant's Exhibits One through Eight, inclusive, were admitted in evidence.)

Q (By Mr. Ross) One more question of the witness: If this application is favorably considered, in your opinion, do you believe that it will protect the correlative rights and promote conservation in the field area?

A Yes, sir.

MR. ROSS: I believe that is all I want to ask the witness.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Hollingsworth, did you state as to how you intend to handle the annulus at the surface, put a gauge on it or leave it open?

A I'll put a pressure gauge on it. I wouldn't leave it open because if it did have a tube or anything, then it would start circulating out of the annulus. I'd rather use a pressure gauge on it.

Q You don't think the Indians would like that?

A I don't think so.

MR. UTZ: Are there any other questions of the witness?

MR. NUTTER: Yes.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Hollingsworth, do you know what the water-oil contact is here?

A We estimate -550 subsea depth. This could be five or ten feet leeway and this has been very hard to pin down. Also, the gas-oil contact has also been awfully hard to pin down.

Q It's not clearly defined for either one?

A Well, I think the gas-oil contact is in the neighborhood of -510, but like I say, it's five or ten feet within the estimate, within this number of -510. Minus 550 on the oil-water contact.

Q Now, is the water encroachment from the bottom, or is it from the sides or just where?

A Well, it's from the sides, so-to-speak. Our first water production we experienced was actually in this well up here in the extreme northwest corner of the field, the Navajo Tribal "P" Number 2. This was completed, making water initially in January of '65, and this particular well has a very poor, poorly developed porosity interval and the exact cause of this water, I couldn't say too much, now. The "P" 1 there, the dry hole in the southwest southwest of 8 had a very good porous interval and had a real strong water flow on drillstem test.

Actually, the second well that started producing water was the well that we are making the application for, the Navajo Tribal "U" Number 1. It started producing water thirteen months after it was completed, water free, so there has to be a water influx in that general direction. The strongest water influx appears to be in that vicinity and then all along the east flank of the field.

Q The east side and the west side both have gone to water, then?

A No. The southwest part. Really, what I'd say was the west side is this steeply dipping area to the northwest of the Navajo Tribal "U" NUmber 2 and porosity has become poorly logged in here and there is no clear evidence of water from that direction. In other words, the well produced in the northwest edge of the field just seems to be some sort of continued water production. It hasn't shown the character of increasing water production like the wells on the east.

Q Now, this first water injection well that you got over here, this "U" 6, it was completed as a dry hole originally?

A Yes, sir.

Q It was so low that it was in the water?

A Yes, sir.

Q And you've got a million two hundred thousand barrels in there to date. What about the "U" 5, has the injection of water into the "U" 6 affected the "U" 5?

A I don't really know. I think it may have partially affected it, but I think it's still water influx primarily.

Q How much water does that "U" 5 make now?

A Right now, it makes two hundred sixty-three barrels of water a day as to why we're injecting eighteen hundred barrels of water a day so it --

Q How much oil does it make?

A One hundred and forty-four barrels a day.

Q Now, you mentioned these three Texaco wells down in the south and were completed in a smaller zone of porosity that's up above the main "D" zone, is that correct?

A Correct.

Q What would that be correlative to on the log of this well you've got here?

A Well, it's not there. It's not correlative to our wells. It just seemed to be the character of the southernmost wells that had this low interval on it.

Q How far above the main pay is it?

A Oh, it's about ten feet. It's fairly close. It's awful thin. On the porosity log, it looks like it's two feet thick in some cases.

Q Now, for this administrative procedure for additional wells that you have requested, do you have in mind any particular wells that you'd be using for water disposal?

A No, sir. It would depend on when the well that waters out next, similar to what has happened here on the Navajo Tribal "U" Number 1, I would strictly want one that had a well-developed porosity interval so I won't have to go to higher pressure injections or anything like that.

Q What did this "U" 2 look like when it was completed?

A It had good porosity and was structurally low. It had a show of oil, but it wasn't commercial.

Q Was casing run in that well?

A Yes, casing was run in it.

Q Can it be used for disposal, if necessary?

A Yes, sir, it could. Right now, further status of the well, we've got a cast iron bridge plug set above the Pennsylvanian "D" zone and we opened up a little zone, oh, about two hundred fifty feet up the hole to test, and it was just swabbed dry, so the reason I want to use "U" 1 now is it would just take less money to convert the well and get it in condition for disposal.

Q Does "N" 5 have casing on it?

A No, sir. It was plugged without casing. If it's possible on future wells, I want to kind of keep them spread out over the field area. I want to deep the injection rates in individual wells as low as I can; in other words, just to apread it out, so-to-speak.

Q Now, when you put this well on disposal, you plan to reperforate it and, actually, you'll be perforating up higher in the section than it is presently open?

A Yes, sir.

Q Is there any possiblility you might obtain some oil production when you perforate into that section?

A No. This was where the -- it's the same interval the well was originally completed in.

Q I see.

A And which watered out, I'd say ninety-nine per cent plus water. What we did there on that, we did a diesel oil squeeze on the original perforation. The original perforation was 6267 to 6285 as these proposed perforations, just a foot difference in the bottom there.

Q So it has produced in this interval that you will be disposing into, then?

A Right.

Q Effectively the same lenght interval?

A Yes, sir. The reason we perforated low on this last workover attempt is, the porosity was a little less developed. It's on a lower part, here, and we thought, well, maybe our water had watered out the upper porosity bench, but there may still be oil in the second bench. As it turned out, there apparently was well communication with one another, and I may not even need to reperforate, but I just want to do it now, rather than have to do it at some future date if I find out the well won't take water sufficiently.

Q How about this "U" 4 of Pan American? That's apparently about the highest oil well, structurally speaking, in the pool. Does it make water?

A The field reports on some of the tests show no water, and on others, I've got two barrels of water a day.

Q So it's making a small amount, at any rate?

A It's either making a little bit or just some in the casing comes out occasionally. It's certainly not steady.

Q How about the "U" 7 and the "U" 9 and Texaco's AR 2?

A "U" 7 makes no water. The AR 2 and the "U" 9 both make water. AR 2 makes thirty-eight barrels of water a day. The "U" 9 makes two hundred and twenty-eight barrels of water a day.

I'd like to point out that Texaco's well, the AP Number 1 there, which is the northwest quarter southwest quarter of 27, commenced making water in May of 1965. This is six months before we ever commenced disposal into our disposal well. It was one of the culprits, so-to-speak, that we needed a disposal well at the time. This disposal well is actually a cooperative agreement between us and Texaco where we get most of our waters going into it.

Q Now, where is the Sinclair production in this field?

A Sinclair?

Q Yes.

A They have no production. Their leases are over here in Sections 14 and 23.

Q I see.

A It's just barely within the two mile radius.

Q So you notified them as lease owners and not as

operators of wells?

A Yes, sir.

MR. NUTTER: I believe that's all. Thank you.

MR. UTZ: Are there any other questions?

MR. HINKLE: I'd like to ask a couple.

REDIRECT EXAMINATION

BY MR. HINKLE:

Q Mr. Hollingsworth, you stated that you intend to spread the injection wells through the field. This will have the affect of reducing water to be injected in the present well, is that not correct?

A Yes, sir, that's one of my purposes. We're having a little bit of trouble getting water away satisfactorily on the present well. We've had to reacidize it five times since we initiated disposals. Each one of these jobs cost a little over a thousand dollars each, so I want to reduce injections into it and to keep from having to expend this expense.

Q Now, the question about future wells and administrative approval requests for them came up. You intend, or the applicant intends, to submit the same type of detailed data that we've shown here in our Wxhibits in connection with any future application, did you not?

A Yes, sir. It would be our intention that the

application he made fully with all the detailed schematic drawings, logs, and everything, and the interval to be disposed in would be a correlative interval to the present and the proposed well today.

Cementing and casing programs would be similar and we would adequately notify all operators within a two mile radius and, assuming no objections were received from any of these operators, we would like to be able to get administrative approval on this. We foresee that we're definitely going to need more disposal wells in the future. When, I don't know. I mean, it just depends on the water production rates.

MR. ROSS: I'd like to state to the Commission that we just want the privilege of submitting this information, that's all, and with the possibility of some success to it being favorably received by the Commission, and we don't intend to foreclose the Commission from asking us to come in and explain it if they want to know more about it.

MR. UTZ: Yes, sir. The Commission always reserves that prerogative.

MR. ROSS: Yes, sir. I just want to emphasize that.

MR. UTZ: We can set the case for a hearing if we don't agree with your --

MR. ROSS: Yes. We don't ask anything beyond what the Commission has power to give.

MR. UTZ: Are there any other questions? The witness may be excused. The case will be taken under advisement.

I N D E X

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, Charlotte J. Macias, Court Reporter in and for the County of Bernalillo, State of New Mexico, 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.

Charlotte Macias
Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the hearing of Case No. 3863, heard by me on 11-9, 1960.

New Mexico Oil Conservation Commission

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 2088
SANTA FE

September 18, 1968

Mr. Louis Ross
Pan American Petroleum Corporation
Security Life Building
Denver, Colorado 80202

Re: Case No. 3913
Order No. R-3558
Applicant:
Pan American Petroleum Corp.

Dear Sir:

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC x
Other State Engineer Office

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3913
Order No. R-3558

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR SALT WATER DISPOSAL,
SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on November 7, 1968, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 18th day of November, 1968, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Pan American Petroleum Corporation, is the owner and operator of the Navajo Tribal "U" Well No. 1, located in Unit L of Section 21, Township 26 North, Range 18 West, NMPM, Tocito Dome-Pennsylvanian "D" Pool, San Juan County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the Pennsylvanian "D" formation, with injection into the perforated interval from approximately 6267 feet to 6286 feet.

(4) That the injection should be accomplished through 2 3/8-inch plastic-lined tubing installed in a packer set at approximately 6200 feet; that the casing-tubing annulus should

be filled with an inert fluid; and that a pressure gauge should be attached to the annulus at the surface in order to determine leakage in the casing, tubing, or packer.

(5) That approval of the subject application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights.

(6) That the applicant further seeks the establishment of an administrative procedure whereby additional wells in the Tocito Dome-Pennsylvanian "D" Pool could be placed on salt water disposal.

(7) That an administrative procedure should be established for the approval of additional salt water disposal wells in the Tocito Dome-Pennsylvanian "D" Pool, provided that such additional salt water disposal wells are completed in a manner similar to the subject well.

IT IS THEREFORE ORDERED:

(1) That the applicant, Pan American Petroleum Corporation, is hereby authorized to utilize its Navajo Tribal "U" Well No. 1, located in Unit L of Section 21, Township 26 North, Range 18 West, NMPM, Tocito Dome-Pennsylvanian "D" Pool, San Juan County, New Mexico, to dispose of produced salt water into the Pennsylvanian "D" formation, injection to be accomplished through 2 3/8-inch tubing installed in a packer set at approximately 6200 feet, with injection into the perforated interval from approximately 6267 feet to 6286 feet;

PROVIDED HOWEVER, that the tubing shall be plastic-lined; that the casing-tubing annulus shall be filled with an inert fluid; and that a pressure gauge shall be attached to the annulus at the surface in order to determine leakage in the casing, tubing, or packer.

(2) That the applicant shall submit monthly reports of its disposal operations in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(3) That as an exception to Rule 701 of the Commission Rules and Regulations, the Secretary-Director is hereby authorized to approve additional salt water disposal wells in the Tocito Dome-Pennsylvanian "D" Pool when an application for such authority

has been filed in accordance with the requirements of Rules 701-B and 701-C of the Commission Rules and Regulations and the Secretary-Director determines that approval of the application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights;

PROVIDED HOWEVER, that any such additional salt water well shall be completed in a manner similar to the subject well, and provided further, that such disposal shall be into the Pennsylvanian "D" formation below the oil-water contact.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

A. L. PORTER, Jr., Member & Secretary

esr/

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3414
Order No. R-3079

APPLICATION OF PHILLIPS PETROLEUM
COMPANY FOR SALT WATER DISPOSAL,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on June 8, 1966, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 15th day of June, 1966, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Phillips Petroleum Company, is the owner and operator of the following wells:

Phillips Santa Fe Well No. 97, located in Unit N of Section 33, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico;

Phillips Santa Fe Well No. 86, located in Unit C of Section 26, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico;

Phillips Santa Fe Well No. 58, located in Unit G of Section 35, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico, and

Phillips M.E. Hale Well No. 11, located in Unit K of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico.

(3) That the applicant proposes to utilize the aforesaid Wells Nos. 97, 86, and 58 to dispose of produced salt water from the Vacuum Field area into the lower portion of the San Andres formation, with injection into the following intervals: Well No. 97: from 5092 feet to 5500 feet; Well No. 86: from 5115 feet to 5760 feet; and Well No. 58: from 4970 to 5720 feet.

(4) That the injection should be accomplished through 2 3/8-inch internally plastic-coated tubing installed in a packer set at approximately 5050 feet on the Phillips Santa Fe Well No. 97.

(5) That the injection should be accomplished through 2 3/8-inch internally plastic-coated tubing and under a blanket of oil in the annulus in the Phillips Santa Fe Well No. 58 and the Phillips Santa Fe Well No. 86.

(6) That the applicant, Phillips Petroleum Company, seeks authority to complete its Phillips M.E. Hale Well No. 11, located in Unit K of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, as a dual completion to produce gas from the Vacuum-Yates Gas Pool through the casing-tubing annulus and to dispose of produced salt water into the lower portion of the San Andres formation, with injection into the perforated interval from 5014 feet to 5235 feet through 2 3/8-inch internally plastic-coated tubing installed in a packer set at approximately 4850 feet.

(7) That approval of the subject application will prevent the drilling of unnecessary wells, and will otherwise prevent waste and protect correlative rights.

(8) That the applicant further seeks the establishment of an administrative procedure whereby additional wells could be placed on salt water disposal.

(9) That an administrative procedure should be established for approval of additional disposal wells, provided that the disposal will be into the lower portion of the San Andres formation, and provided further that the disposal interval is between 250 feet below the oil-water contact and 250 feet above the top of the Glorieta formation.

IT IS THEREFORE ORDERED:

(1) That the applicant, Phillips Petroleum Company, is hereby authorized to utilize the following three wells:

Phillips Santa Fe Well No. 97, located in Unit N of Section 33, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico;

Phillips Santa Fe Well No. 86, located in Unit C of Section 26, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico; and

Phillips Santa Fe Well No. 58, located in Unit G of Section 35, Township 17 South, Range 35 East, NMPM, Lea County, New Mexico;

to dispose of produced salt water from the Vacuum Field area into the lower portion of the San Andres formation, injection to be accomplished through 2 3/8-inch internally plastic-coated tubing installed in a packer set at approximately 5050 feet in the Phillips Santa Fe Well No. 97, and through 2 3/8-inch internally plastic-coated tubing and under a blanket of oil in the annulus in the Phillips Santa Fe Well No. 58 and Phillips Santa Fe Well No. 86, with injection into the following perforated intervals: Well No. 97: from 5092 feet to 5500 feet; Well No. 86: from 5115 feet to 5760 feet; and Well No. 58: from 4970 feet to 5720 feet.

(2) That the applicant, Phillips Petroleum Company, is hereby authorized to complete its Phillips M.E. Hale Well No. 11, located in Unit K of Section 35, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, as a dual completion to produce gas from the Vacuum-Yates Gas Pool through the casing-tubing annulus and to dispose of produced salt water into the lower portion of the San Andres formation in the perforated interval from 5014 feet to 5235 feet through 2 3/8-inch internally plastic-coated tubing installed in a packer set at approximately 4850 feet;

PROVIDED HOWEVER, that the applicant shall complete, operate, and produce said well in accordance with the provisions of Rule 112-A of the Commission Rules and Regulations insofar as said rule is not inconsistent with this order;

PROVIDED FURTHER, that the applicant shall take packer-leakage tests upon completion and annually thereafter during the Annual Shut-In Pressure Test Period for the Vacuum-Yates Gas Pool.

(3) That the applicant shall submit monthly reports of its disposal operations in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(4) That as an exception to Rule 701 of the Commission Rules and Regulations, the Secretary-Director is hereby authorized to approve additional salt water disposal wells in the Vacuum Field when an application for such authority has been filed in accordance with the requirements of Rules 701-B and 701-C of the Commission Rules and Regulations and the Secretary-Director determines that approval of the application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights;

PROVIDED HOWEVER, that the disposal is into the lower portion of the San Andres formation between 250 feet below the oil-water contact and 250 feet above the top of the Glorieta formation.

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

GUYTON B. HAYS, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

esr/

3913
Heard 11-7-68
Rec. 11-8-68

1. Grant Pan Am's request for SWD well for their Rabajo 'O' #1, L-21-26-18, Loco Hills Rome-Penn 'D' Pool. Injection shall be down 2 3/8 internally plastic coated tubing set in a packer at approx. 6200 and into Penn 'D' perfs from 6267-6286.
Injection is into water table below oil-water contact.
Grant administrative procedure for other SWD wells in this pool subject to call to hearing if procedure is not satisfactory.

Elvis A. Utz

Docket No. 32-68

DOCKET: EXAMINER HEARING - THURSDAY - NOVEMBER 7, 1968

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

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 3910: (Continued from the October 23, 1968 Examiner Hearing)

Application of Atlantic Richfield Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Bough "C" zone of the Pennsylvanian formation underlying the SW/4 of Section 17, Township 10 South, Range 34 East, Vada-Pennsylvanian Pool, Lea County, New Mexico. Said acreage to be dedicated to a well located in the NE/4 SW/4 of said Section 17.

CASE 3911: (Continued from the October 23, 1968 Examiner Hearing)

Application of Atlantic Richfield Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Bough "C" zone of the Pennsylvanian formation underlying the SE/4 of Section 8, Township 10 South, Range 34 East, Vada-Pennsylvanian Pool, Lea County, New Mexico. Said acreage to be dedicated to a well located in the NW/4 SE/4 of said Section 8. In the alternative applicant seeks approval of a non-standard oil proration unit comprising the E/2 SE/4 of said Section 8 and the W/2 SW/4 of Section 9, said Township and Range, said unit to be dedicated to a well to be drilled in the NE/4 SE/4 of said Section 8.

CASE 3894: (Continued and Readvertised)

Application of Signal Oil and Gas Company for a non-standard oil proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a non-standard oil proration unit comprising the W/2 NE/4 and the N/2 SE/4 of Section 17, Township 10 South, Range 34 East, Vada-Pennsylvanian Pool, Lea County, New Mexico, said unit to be dedicated to its State AP Well No. 1 located 1980 feet from the South line and 660 feet from the East line of said Section 17.

In the alternative, applicant seeks approval of an 80-acre non-standard oil proration unit comprising the N/2 SE/4 of

(Case 3894 continued)

said Section 17 and the assignment of approximately 79% of a standard 160-acre unit allowable for said pool to said 80-acre unit.

CASE 3918: Application of R. R. Morrison for three non-standard proration units, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of three non-standard 80-acre oil proration units in Township 10 South, Range 34 East, Vada-Pennsylvanian Pool, described as follows:

Unit No. 1 comprising the E/2 SW/4 of Section 17, dedicated to applicant's State "17" Well No. 1 located in Unit K of said Section 17;

Unit No. 2 comprising the E/2 NE/4 of Section 17, dedicated to applicant's Atlantic "A" State Well No. 1 located in Unit A of said Section 17;

Unit No. 3 comprising the W/2 SE/4 of Section 8, dedicated to applicant's State "B" Well No. 1 located in Unit J of said Section 8.

Applicant further seeks the assignment of approximately 79% of a standard 160-acre unit allowable for said pool to each of the aforesaid 80-acre units.

CASE 3919: Application of Sunray DX Oil Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Bough "C" zone of the Pennsylvanian formation underlying the SE/4 of Section 17, Township 10 South, Range 34 East, Vada-Pennsylvanian Pool, Lea County, New Mexico. Said acreage to be dedicated to Signal Oil Company's State AP Well No. 1 located in Unit I of said Section 17. In the alternative applicant seeks approval of a non-standard proration unit comprising the S/2 SE/4 of said Section 17 and the N/2 NE/4 of Section 20, said Township and Range, said unit to be dedicated to applicant's New Mexico "AW" Well No. 1 located in the NE/4 NE/4 of said Section 20.

CASE 3912: Application of American Petrofina Company of Texas for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres, Glorieta, and Abo formations in the open-hole interval from approximately 4211 feet to 8690 feet in its Federal "C" Well No. 2 located in

(Case 3912 continued)

Unit E of Section 21, Township 8 South, Range 36 East, South Prairie-Cisco Pool, Roosevelt County, New Mexico.

CASE 3913: Application of Pan American Petroleum Corporation 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 Pennsylvanian "D" formation in the perforated interval from 6267 feet to 6286 feet in its Navajo Tribal "U" Well No. 1 located in Unit L of Section 21, Township 26 North, Range 18 West, Tocito Dome-Pennsylvanian "D" Pool, San Juan County, New Mexico. Applicant further seeks an administrative procedure whereby other wells in said pool may be approved for disposal purposes, if completed in a manner similar to the subject well, without the requirement of notice and hearing.

CASE 3914: Application of Texas Pacific Oil Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Seven Rivers and Queen formations in the open-hole interval from approximately 3721 feet to 3995 feet in its State "A" a/c-2 Well No. 6 located in Unit B of Section 7, Township 22 South, Range 36 East, South Eunice Pool,Lea County, New Mexico.

CASE 3915: Application of Texas Pacific Oil Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Pennsylvanian formation in the perforated interval from approximately 9570 feet to 9972 feet in its State "AH" Well No. 2 located in Unit N of Section 14, Township 12 South, Range 34 East, Ranger Lake Field, Lea County, New Mexico.

CASE 3916: Application of Texas Pacific Oil Company for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Abo formation in the perforated interval from approximately 6686 feet to 6830 in its Woolley Federal No. 1 located in Unit M of Section 21, Township 17 South, Range 30 East, Loco Hills-Abo Pool, Eddy County, New Mexico.

CASE 3917: Application of Agua, Inc., for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres and other formations in the interval from approximately 4530 feet to 6375 feet in its Corbin SWD Well No. G-31 located in the SW/4 NE/4 of Section 31, Township 17 South, Range 33 East, Corbin Field, Lea County, New Mexico.

CASE 3920: Application of Kern County Land Company for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 4158 feet to 4233 feet in its Federal 23 Well No. 11 located in Unit F of Section 23, Township 7 South, Range 33 East, Chaveroo-San Andres Pool, Roosevelt County, New Mexico.

CASE 3921: Application of Kern County Land Company for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 4165 feet to 4291 feet in its Federal 21 Well No. 3 located in Unit O of Section 21, Township 7 South, Range 33 East, Chaveroo-San Andres Pool, Roosevelt County, New Mexico.

CASE 3922: Application of Tenneco Oil Company for salt water disposal, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 4214 feet to 4344 feet in its State "V" Well No. 3 located in Unit K of Section 30, Township 7 South, Range 34 East, Chaveroo-San Andres Pool, Roosevelt County, New Mexico.

CASE 3923: Application of Tenneco Oil Company for salt water injection, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to inject produced salt water into the Wolfcamp formation in the perforated interval from approximately 10642 feet to 10699 feet in its Kemnitz-Wolfcamp Unit Well No. 7 located in Unit O of Section 19, Township 16 South, Range 34 East, Kemnitz-Wolfcamp Pool, Lea County, New Mexico.

ATWOOD & MALONE
LAWYERS

P. O. DRAWER 700
TELEPHONE 505 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

JEFF D. ATWOOD (1883-1960)

CHARLES F. MALONE
RUSSELL D. MANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON
JOHN W. BASSETT

ROBERT E. SABIN

November 4, 1968

Mr. A. L. Porter, Jr.
Oil Conservation Commission
State Land Office
Santa Fe, New Mexico 87501

Re: Examiner Hearing November 7, 1968
Case No. 3913

Dear Mr. Porter:

For Pan American Petroleum Corporation, applicant in the above numbered case, we enclose our Entry of Appearance and request that it be filed.

Thank you and with regards, we are,

Very truly yours,

ATWOOD & MALONE

By: Paul Cooter

PC:bc
Encl.
cc: T. J. Files, Esq. (w/Enc.)
Louis C. Ross, Esq. (w/Enc.)

BEFORE THE OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF PAN AMERICAN PETROLEUM CORPORATION FOR SALT WATER DISPOSAL, SAN JUAN COUNTY, NEW MEXICO.	))))	No. 3913

ENTRY OF APPEARANCE

The undersigned attorneys, duly licensed to practice law in the State of New Mexico, hereby enters their appearance in this case as New Mexico counsel for Pan American Petroleum Corporation.

DATED at Roswell, New Mexico, this 4th day of November, 1968.

(REV. 1966)

VI a

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Applt. EXHIBIT NO. 6A
CASE NO. 3913

CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

OCT 15 1968

MEMBER Pan American Petroleum Corp.
OPERATOR Pan American Petroleum Corp.
WELL NO. Navajo Tribal U-1
FIELD Tocito Dome
COUNTY San Juan
STATE New Mexico

LAB NO. 24896
LOCATION NW SW 21-26N-18W
FORMATION Pennsylvanian "D"
INTERVAL 6383-6386
SAMPLE FROM Production (5-9-68)
DATE October 10, 1968

REMARKS & CONCLUSIONS: Clear water.

Cations	mg/l	meq/l	Anions	mg/l	meq/l
Sodium	26036	1132.49	Sulfate	1181	24.56
Potassium	165	4.22	Chloride	50700	1428.74
Lithium	-	-	Carbonate	-	-
Calcium	4336	216.37	Bicarbonate	610	10.00
Magnesium	1353	111.22	Hydroxide	-	-
Iron	Absent	-	Hydrogen sulfide	Absent	-
Total Cations		1464.30	Total Anions		1464.30

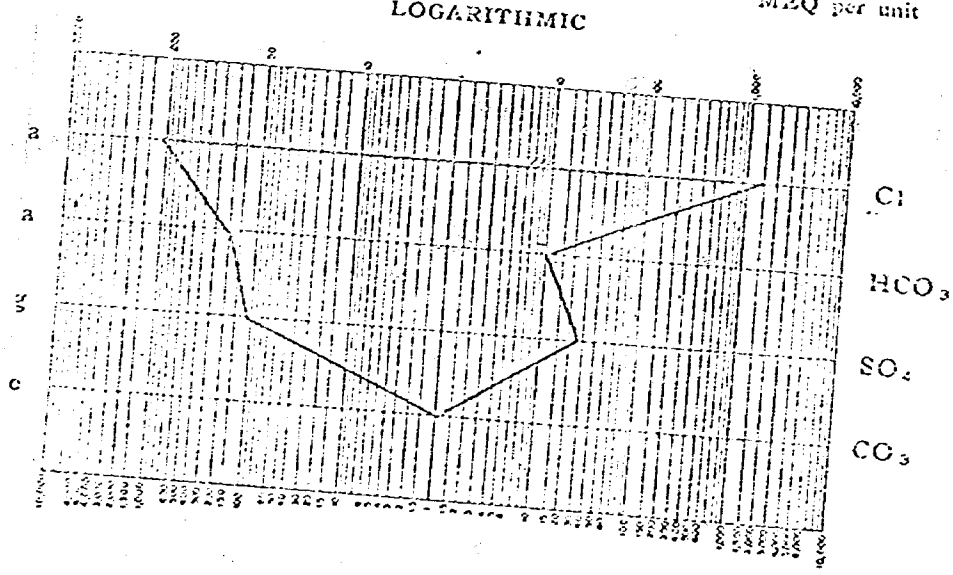
Total dissolved solids, mg/l 84071
NaCl equivalent, mg/l 84481
Observed pH 7.3

Specific resistance @ 68° F.:
Observed 0.110 ohm-meters
Calculated 0.099 ohm-meters

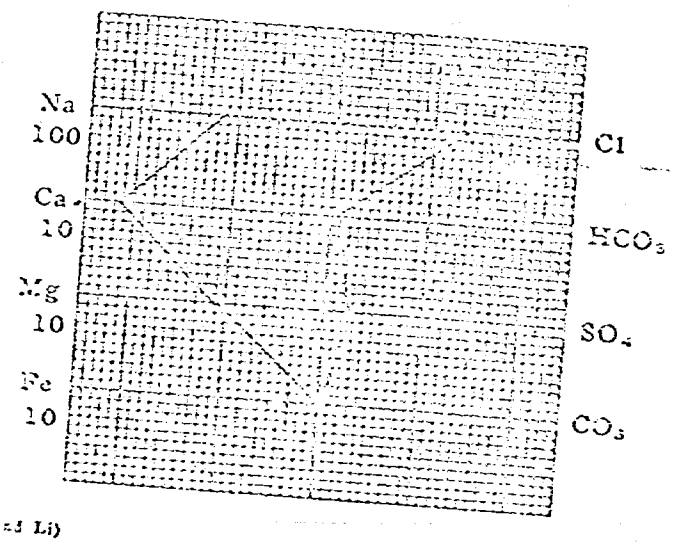
WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC



STANDARD



(Na value in above graphs includes Na, K, and Li)

NOTE: Mg/l = Milligrams per liter Meq/l = Milligram equivalents per liter
Sodium chloride equivalent by Dunlap & Hawthorne calculation from components

FORM 66 7-62

N AMERICAN PETROLEUM CORPOR ON

RESEARCH DEPARTMENT
WATER ANALYSIS

IV b
DFH 535.11 File

Lease Navajo Tribal "U" Well No. 6 Lab. No. T-17,220
Field Tocito Dome Penn. D County San Juan State New Mexico
Quarter or Survey Blk. Section 22 T. 28N R. 18W
Exact Location 660' FNL X 510' FWL Sample Series No. HG-65
Producing Stratum PBTD 6343 Total D th 6386
Stratum Yielding Sample Lower Hermosa From 6238 To 44
Condition of Well
Sample Collected From Flow Line Method Used Direct
Collected by D. R. Hogan Date Collected 6-2-65 Date Received 6-8-65
Transmittal Letter by L. O. Speer, Jr. Date 6-2-65 File N-1063-535.11

Radicle	Per Cent by Analysis	(a) P. P. M.	(b)	(a) X (b)	Per Cent Reacting Value	Calculated Compound	P. P. M.
Na	29.12	26,207	.0435	1,139.97	36.26	Na_2SO_4	
Ca	6.93	6,240	.0499	311.38	9.90	NaCl	66,271
Mg	1.63	1,470	.0822	120.83	3.84	Na_2CO_3	
Fe						$NaHCO_3$	521
						$CaSO_4$	1,020
						$CaCl_2$	16,450
SO_4	.80	720	.0208	14.98	.48	$CaCO_3$	
Cl	61.10	55,000	.0282	1,551.00	49.32	$Ca(HCO_3)_2$	
CO_3	0	0	.0333	0	0	$MgSO_4$	
HCO_3	.42	378	.0164	6.20	.20	$MgCl_2$	5,753
H_2S						$MgCO_3$	
						$Mg(HCO_3)_2$	

Total solids as a summation of radicles	90,015	P.P.M.
Total solids by evaporation and ignition of residue at low red heat	93,480	P.P.M.
Sample as received: Resistivity: ohms/M'M .083 at 77°F.	pH Value 6.2	Specific Gravity 60°/60°F. 1.008

PROPERTIES OF REACTION IN PER CENT

PRIMARY SALINITY: $SO_4 + Cl$ = ... with equal value Na (K) ..... = 72.52 %
SECONDARY SALINITY: If $SO_4 + Cl$ is greater than Na (K) ..... = ... %
Then $SO_4 + Cl$ = ... with equal value of Ca + Mg ..... = 27.08 %
PRIMARY ALKALINITY: Excess Na (K) over $SO_4 + Cl$ = ... with equal value of $CO_3 + S$ ..... = 0 %
SECONDARY ALKALINITY: Excess Ca + Mg over $SO_4 + Cl$ = ... with equal value of $CO_3 +$ ..... = .40 %
CHLORIDE SALINITY: $Cl \div (SO_4 + Cl)$ = ... X 100% ..... = 99.04
SULPHATE SALINITY: $SO_4 \div (SO_4 + Cl$ = ... X 100% ..... = .96

NOTE: Multiply Parts per Million by .0583 to obtain Grains per Gallon.

REMARKS:

J. L. Hoyt, Jr.
W. T. Smith
L. O. Speer, Jr.
G. W. Schmidt

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 6B
CASE NO. 3913

RECEIVED
23
PROD. DEPT.
FORT WORTH

Analyst Jane D Elliott Date 6-17-65

VI c

FORM 66 7-62

AN AMERICAN PETROLEUM CORPORATION

RESEARCH DEPARTMENT
WATER ANALYSIS

Lease Navajo Tribal "U" Well No. 2 Lab. No. T-16,697
Field Tocito Dome Pensylvanian "D" County San Juan State New Mexico
Quarter or Survey SE/4 Blk. Section 21 T. 26N R. 18W
Exact Location Sample Series No. HG-34-1
Producing Stratum PBTD 6388 Total Depth 6425
Stratum Yielding Sample Penn "D" From 6280 To 6284
Condition of Well
Sample Collected From Flow line Method Used
Collected by J. C. Holt Date Collected 10-11-64 Date Received 10-15-64
Transmittal Letter by L. O. Speer, Jr. Date 10-13-64 File N-1182-535.11

Radicle	Per Cent by Analysis	(a) P. P. M.	(b)	(a) X (b)	Per Cent Reacting Value	Calculated Compound	P. P. M.
Na	31.31	26,766	.0435	1,164.26	39.28	Na_2SO_4	
Ca	4.76	4,050	.0499	202.59	6.84	NaCl	67,580
Mg	1.64	1,400	.0822	115.08	3.88	Na_2CO_3	
Fe						$NaHCO_3$	680
						$CaSO_4$	1,274
						$CaCl_2$	10,205
SO_4	1.06	900	.0208	18.72	.63	$CaCO_3$	
Cl	60.55	51,600	.0282	1,455.12	49.10	$Ca(HCO_3)_2$	
CO_3	0	0	.0333	0	0	$MgSO_4$	
HCO_3	.58	493	.0164	8.09	.27	$MgCl_2$	5,480
H_2S						$MgCO_3$	
						$Mg(HCO_3)_2$	

Total solids as a summation of radicles 85,219 P.P.M.
Total solids by evaporation and ignition of residue at low red heat 88,360 P.P.M.
Sample as received: Resistivity: ohms/MM .084 at 77°F. | pH Value 6.4 | Specific Gravity 60°/60°F. 1.063

PROPERTIES OF REACTION IN PER CENT

PRIMARY SALINITY: SO_4 + Cl = ... with equal value Na (K) ..... = 78.56 %
SECONDARY SALINITY: If SO_4 + Cl is greater than Na (K) ..... = %
Then SO_4 + Cl = ... with equal value of Ca + Mg ..... = 20.90 %
PRIMARY ALKALINITY: Excess Na (K) over SO_4 + Cl = ... with equal value of CO_3 + S ..... = %
SECONDARY ALKALINITY: Excess Ca + Mg over SO_4 + Cl = ... with equal value of CO_3 + ... = .54 %
CHLORIDE SALINITY: Cl ÷ (SO_4 + Cl) = ... X 100% ..... = 98.73
SULPHATE SALINITY: SO_4 ÷ (SO_4 + Cl = ... X 100% ..... = 1.27

NOTE: Multiply Parts per Million by .0583 to obtain Grains per Gallon.

REMARKS:

Resistivity ohms/MM = .093 at 70°F
" " " = .054 at 130°F

J. L. Hoyt, Jr.
W. T. Smith
R. M. Curtis
L. O. Speer, Jr.
G. W. Schmidt

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 6c
CASE NO. 3913

Analyst James J Elliott Date 10-23-64

VId 535.11

CL1-51 (REV. 1966)

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Appli. EXHIBIT NO. 6D
CASE NO. 3913

CHEM LAB

WATER ANALYSIS EXCHANGE REPORT

MAR 15 1968

MEMBER	Pan American Petroleum Corp.	LAB NO.	24114
OPERATOR	Pan American Petroleum Corp.	REPORT NO.	
WELL NO.	Navajo Tribal N-4	LOCATION	NE NE 18-26N-18W
FIELD	Tocito Dome	FORMATION	Pennsylvanian "D"
COUNTY	San Juan	INTERVAL	6378 - 6388
STATE	New Mexico	SAMPLE FROM	
		DATE	March 12, 1968

1 CJB
2 FHG
3 HGS

REMARKS & CONCLUSIONS: Rusty water and filtrate

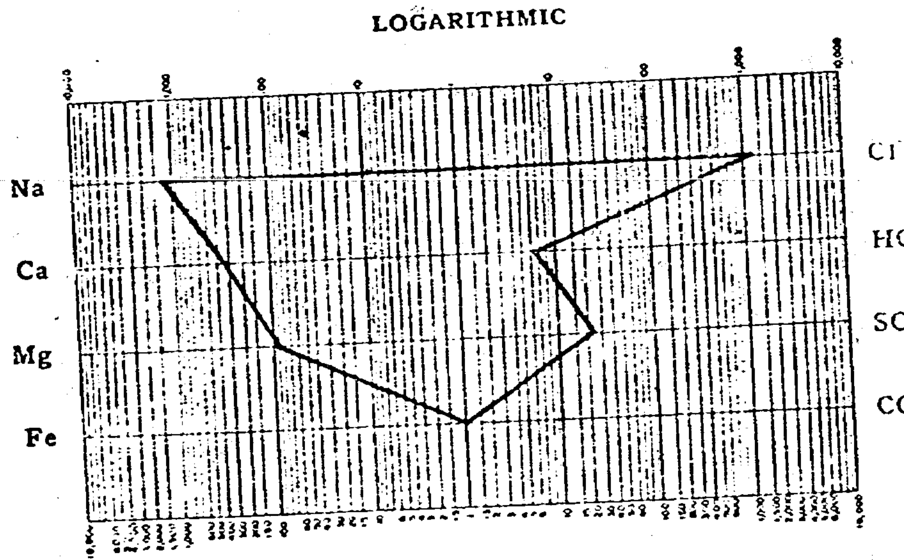
Cations	mg/l	meq/l	Anions	mg/l	meq/l
Sodium	24,488	1065.21	Sulfate	1,132	23.55
Potassium	300	7.68	Chloride	52,000	1466.40
Lithium	-	-	Carbonate	-	-
Calcium	6,561	327.39	Bicarbonate	427	7.00
Magnesium	1,176	96.67	Hydroxide	-	-
Iron	present	-	Hydrogen sulfide	absent	-
Total Cations		1496.95	Total Anions		1496.95

Total dissolved solids, mg/l	85,867	Specific resistance @ 68° F.:		
NaCl equivalent, mg/l	86,054	Observed	0.100	ohm-meters
Observed pH	7.1	Calculated	0.097	ohm-meters

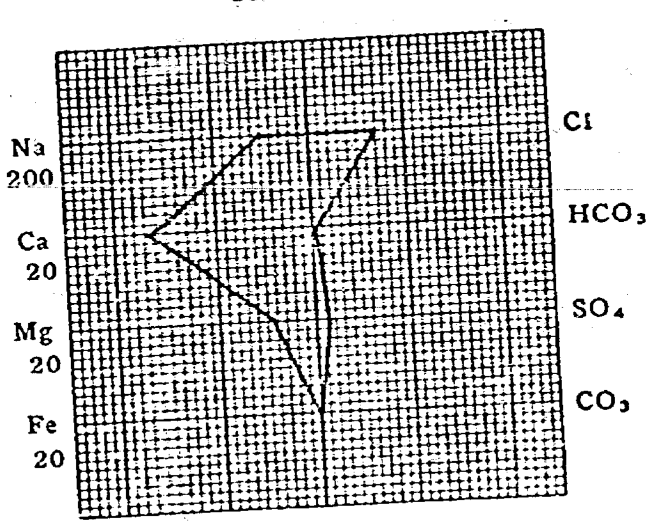
WATER ANALYSIS PATTERNS

MEQ per unit

LOGARITHMIC



STANDARD



(Na value in above graphs includes Na, K, and Li)

NOTE: Mg/l = Milligrams per liter. Meq/l = Milligram equivalents per liter
Sodium chloride equivalent = by Dunlap & Hawthorne calculation from components

VII a

Oct 14 1968

P. O. Box 2100
Denver, Colorado 80201

October 11, 1968

1 R86 P

FILE

APPLICATION TO DISPOSE OF
SALT WATER INTO PENN. "D"
FORMATION - PAN AMERICAN'S
NAVAJO TRIBAL "U" NO. 1
TOCITO DOME FIELD
SAN JUAN COUNTY, NEW MEXICO

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

Reference is made to Pan American's subject Application of October 3, 1963.

Texaco Inc. has no objection to Pan American's proposal to inject salt water into the Pennsylvanian "D" formation in Navajo Tribal "U" No. 1.

Very truly yours,

TWS-SO

cc: Pan American Petroleum Corporation
Security Life Bldg.
Denver, Colorado 80202
Attn: Mr. R. B. Giles

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Applic EXHIBIT NO. 7A
CASE NO. 3913

VII b

Mobil Oil Corporation

P.O. BOX 1652
CASPER, WYOMING 82601

October 11, 1968

Mr. A. L. Porter, Jr.
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

RE: APPLICATION TO DISPOSE OF SALT WATER INTO PENN "D" FORMATION, PAN AMERICAN'S NAVAJO TRIBAL "U" NO. 1 TOCITO DOME - PENN "D" FIELD SAN JUAN COUNTY, NEW MEXICO

Dear Mr. Porter:

Mobil Oil Corporation has no objection to Pan American Petroleum Corporation's Application to dispose of salt water produced from the Tocito Dome - Penn "D" Field into the Pennsylvanian "D" formation at its Navajo Tribal "U" No. 1.

Yours very truly,

J R Puckett

for J. H. McLaughlin
Division Producing Manager

RAFair/fm

cc: Pan American Petroleum Corporation
Security Life Building
Denver, Colorado 80202

VIII

OCT 23 1968

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Drawer 1857
Roswell, New Mexico 88201

October 18, 1968

Pan American Petroleum Corporation
Security Life Building
Denver, Colorado 80202

Attention: Mr. R. B. Giles

Gentlemen:

Your letter of October 3, 1968, with attachments, requests approval to dispose of produced salt water from Tocito Dome field into the Penn "D" formation in well No. 1 Navajo Tribal "U", Navajo tribal lease 14-20-603-5034.

According to the system as outlined in your proposal, the Penn "D" zone would be reperforated from 6267 to 6286 for water disposal similar to the system as approved for disposal of water in the Penn "D" zone of well No. 6 Navajo tribal "U" in sec. 6, T. 26 N., R. 18 W.

The method you propose is hereby approved provided like approval is granted by the New Mexico Oil Conservation Commission. Any change in the system must be approved by this office.

Sincerely yours,

JOHN A. ANDERSON
Regional Oil and Gas Supervisor

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Appli EXHIBIT NO. 8
CASE NO. 3913

PAN AMERICAN PETROLEUM CORPORATION

SECURITY LIFE BUILDING
DENVER, COLORADO 80202

October 3, 1968

File: AMR-2294-986.511

Case 3913

Re: Application to Dispose of Salt Water
Into Penn "D" Formation, Pan American's
Navajo Tribal "U" No. 1
Tocito Dome - Penn "D" Field
San Juan County, New Mexico

Set for Hearing

Mr. A. L. Porter, Jr. (3)
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Note request for administrative procedure.

OCT 7 AM 8

Dear Mr. Porter:

Pan American Petroleum Corporation respectfully requests your approval of this Application, under the provisions of Rule 701, to dispose of salt water produced from the Tocito Dome - Penn "D" Field into the Pennsylvanian "D" formation at its Navajo Tribal "U" No. 1, located in Unit "L" of Section 21, Township 26 North, Range 18 West, San Juan County, New Mexico. In connection with this Application, attached are the following exhibits:

1. Three copies of New Mexico Oil Conservation Commission's Form C-108 entitled "Application to Dispose of Salt Water by Injection into a Porous Formation." A copy of this form is also being sent to the United States Geological Survey as representative of the Navajo Tribe of Indians, the surface and royalty owner, and to all operators within a two (2) mile radius of the proposed disposal well.

2. A map of the field and surrounding area showing in detail the location of all wells and dry holes, the operators of the various leases, and the specific location of the present disposal well and the proposed disposal well.

3. A copy of the Induction Electrolog on the proposed disposal well.

4. A schematic diagram showing particulars of the casing and tubing program on the proposed well. The proposed disposal well, the Navajo Tribal "U" No. 1, was originally completed as an oil well on August 26, 1964, for an initial potential of 423 BOPD with no water, but commenced producing water in September, 1965. Water production has since increased until in July, 1968, the well was producing 99% water and was shut-in due to being uneconomic. Work-over attempts to re-establish commercial production have not been successful.

DOCKET MAILED

Date 10-25-68

5. A copy of various water analyses obtained from wells in the field, which are "typical" analyses of Pennsylvanian "D" zone waters, which are unfit for domestic, stock, irrigation or other general use.

New Mexico Oil Conservation Commission Order No. R-2984, issued October 13, 1965, granted Pan American permission to dispose of Tocito Dome - Penn "D" Field produced water into Pan American's Navajo Tribal "U" No. 6, now named "Tocito Dome Salt Water Disposal Well," located in Unit "D" of Section 22, Township 26 North, Range 18 West. Disposals into this well commenced November 22, 1965, and over one million barrels of produced water from Pan American's and Texaco, Inc.'s leases have been disposed of to date. However, it has been necessary to periodically stimulate the well with acid treatments to continue these disposals so an alternate disposal well is needed.

It is planned to utilize both the new proposed disposal well and the present disposal well if it continues to take water at reasonable pressure. The interval to be utilized for disposal on the proposed Navajo Tribal "U" No. 1 is the same Penn "D" zone used on the present disposal well, and the method of handling this water will be similar. Therefore, it is requested that you approve this Application by administrative order if you are satisfied with the completeness of this Application and receive no objections within 15 days from the attached listed notified parties. In the event you believe this Application should only be considered for approval after a public hearing, please set the matter for hearing on the next scheduled docket. If this matter is set for hearing, it is also requested that provisions be made for administrative approval by the Director, without hearing, of any future Applications for disposal wells in the Tocito Dome - Penn "D" Field, if such wells are completed in a similar manner and no objections are received from any interested parties.

Yours very truly,

R. B. Giles

Attachments

cc: See Attached List

MAILING LIST

Mr. E. C. Arnold
New Mexico Oil Conservation Commission
1000 Rio Brazos Road
Aztec, New Mexico

U. S. Geological Survey
P. O. Box 965
Farmington, New Mexico

U. S. Geological Survey
Drawer 1857
Roswell, New Mexico

Texaco, Inc.
P. O. Box 2100
Denver, Colorado 80201

Texaco, Inc.
P. O. Box 810
Farmington, New Mexico 87401

Mobil Oil Corporation
P. O. Box 1652
Casper, Wyoming 82602

Sinclair Oil & Gas Company
501 Lincoln Tower Building
Denver, Colorado 80203

Southern Gulf Production Company
C & I Building
Houston, Texas

Form C-108
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

Case 3913

APPLICATION TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION

OPERATOR	ADDRESS
Pan American Petroleum Corporation	Security Life Building, Denver, Colorado

LEASE NAME	WELL NO.	FIELD	COUNTY
Navajo Tribal "U"	1	Tocito Dome - Penn. "D"	San Juan

LOCATION

UNIT LETTER L ; WELL IS LOCATED 1980 FEET FROM THE South LINE AND 660 FEET FROM THE West LINE, SECTION 21 TOWNSHIP 26 N RANGE 18 W NMPM.

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING	13-3/8"	87'	100	Surface	Circulated
INTERMEDIATE	8-5/8"	1,510'	350	Surface	Circulated
LONG STRING Stage cementing tool set at 3646	4-1/2"	6,440'	1,100	1st Stage 3646' 2nd Stage 800'	Calculated Calculated
TUBING	2-3/8"	to be set @ approx. 6200	NAME, MODEL AND DEPTH OF TUBING PACKER: Baker Model "D" - to be set about 6200'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
Pennsylvanian "D"	6266'	6292'

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	6267-6286'

IS THIS A NEW WELL DRILLED FOR DISPOSAL?	IF ANSWER IS NO, FOR WHAT PURPOSE WAS WELL ORIGINALLY DRILLED?	HAS WELL EVER BEEN PERFORATED IN ANY ZONE OTHER THAN THE PROPOSED INJECTION ZONE?
No	Oil Well	NO

LIST ALL SUCH PERFORATED INTERVALS AND SACKS OF CEMENT USED TO SEAL OFF OR SQUEEZE EACH

Original perfs 6257-6285 were squeezed off with 100 sacks of diesel oil cement. Present perfs 6283-6286' will be re-perf 6267-6286'.

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
Est. 1300'	None	Not Known

ANTICIPATED DAILY INJECTION VOLUME (BBLS.) MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSI)
500	2500	Closed	As Necessary	150 psi

ANSWER YES OR NO WHETHER THE FOLLOWING WATERS ARE MINERALIZED TO SUCH A DEGREE AS TO BE UNFIT FOR DOMESTIC, STOCK, IRRIGATION, OR OTHER GENERAL USE — WATER TO BE DISPOSED OF	NATURAL WATER IN DISPOSAL ZONE	ARE WATER ANALYSES ATTACHED?
Unfit	Unfit	Yes

NAME AND ADDRESS OF SURFACE OWNER (OR LESSEE, IF STATE OR FEDERAL LAND)

Navajo Tribe c/o U.S. Geological Survey, P. O. Box 965, Farmington, New Mexico

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN two (2) MILE OF THIS INJECTION WELL

Texaco, Inc., P. O. Box 2100, Denver, Colorado 80201
Texaco, Inc., P. O. Box 810, Farmington, New Mexico 87401

Mobil Oil Corporation, P. O. Box 1652, Casper, Wyoming 82602

Sinclair Oil & Gas Company, 501 Lincoln Tower Building, Denver, Colorado 80203

Southern Gulf Production Company, C & I Building, Houston, Texas

HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING? SURFACE OWNER	EACH OPERATOR WITHIN two MILES OF THIS WELL	THE NEW MEXICO STATE ENGINEER
yes	yes	NA

ARE THE FOLLOWING ITEMS ATTACHED TO THIS APPLICATION (SEE RULE 701-B) PLAT OF AREA	ELECTRICAL LOG	DIAGRAMMATIC SKETCH OF WELL
yes	yes	yes

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

R B Giles — Engineering Group Supervisor — 10/3/68

(Signature) (Title) (Date)

NOTE: Should waivers from the State Engineer, the surface owner, and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.

DRAFT

GMH/esr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3913

Order No. R- 3558

APPLICATION OF PAN AMERICAN PETROLEUM
CORPORATION FOR SALT WATER DISPOSAL,
SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on November 7, 1968, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this _____ day of November, 1968, the Commission, a quorum being present, 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 Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Pan American Petroleum Corporation, is the owner and operator of the Navajo Tribal "U" Well No. 1, located in Unit L of Section 21, Township 26 North, Range 18 West, NMPM, Tocito Dome-Pennsylvanian "D" Pool, San Juan County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the Pennsylvanian "D" formation, with injection into the perforated interval from approximately 6267 feet to 6286 feet.

(4) That the injection should be accomplished through 2"-inch plastic-lined tubing installed in a packer set at

approximately 6200 feet; that the casing-tubing annulus should be filled with an inert fluid; and that a pressure gauge should be attached to the annulus ~~or the annulus left open~~ at the surface in order to determine leakage in the casing, tubing, or packer.

(5) That approval of the subject application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights.

(6) That the applicant further seeks the establishment of an administrative procedure whereby additional wells in the Tocito Dome-Pennsylvanian "D" ~~Oil~~ Pool could be placed on salt water disposal.

(7) That an administrative procedure should be established for the approval of additional salt water disposal wells in the Tocito Dome-Pennsylvanian "D" ~~Oil~~ Pool, provided that such additional salt water disposal wells are completed in a manner similar to the subject well.

(SEE UNDER)

PROVIDED HOWEVER, that the tubing shall be plastic-lined; that the casing-tubing annulus shall be filled with an inert fluid; and that a pressure gauge shall be attached to the annulus ~~or the annulus left open~~ at the surface in order to determine leakage in the casing, tubing, or packer.

(2) That the applicant shall submit monthly reports of its disposal operations in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

(3) That as an exception to Rule 701 of the Commission Rules and Regulations, the Secretary-Director is hereby authorized to