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

25 May 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Texaco Producing, Inc for salt water disposal, Eddy County, New Mexico. CASE 9373

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

For the Applicant:

MR. STOGNER: Call next Case Number 9373.

MR. ROYBAL: Case 9373. Application of Texaco Producing, Inc., for salt water disposal, Eddy County, New Mexico.

MR. STOGNER: At the applicant's request this case will be continued to the Examienr's hearing scheduled for June 8th, 1988.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9373, heard by me on 25 May 1988.

Martin E. Stogner, Examiner
Oil Conservation Division

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

11 May 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Texaco Producing Inc. for salt water disposal, Eddy County, New Mexico. CASE 9373

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

MR. CATANACH: Call next Case 9373, application of Texaco Producing, Inc. for salt water disposal, Eddy County, New Mexico.

This case will be continued to May 25th. 1988, and readvertised for June 8th. 1988.

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9373, heard by me on May 11, 1988.

David R. Catanach, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

8 June 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Texaco Producing, Inc. for salt water disposal, Eddy County, New Mexico. CASE 9373

BEFORE: David R. Catanach, Examiner

A P P E A R A N C E S

For the Division: Robert G. Stovall
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico

For Texaco Producing, Inc.: William F. Carr
Attorney at Law
CAMPBELL and BLACK, P.A.
Post Office Box 2208
Santa Fe, New Mexico 87501

For J. C. Williamson, et al: Chad Dickerson
Attorney at Law
DICKERSON, FISK & VANDIVER
Seventh & Mahone/Suite E
Artesia, New Mexico 88210

I N D E X

E X H I B I T S

MR. CATANACH: Okay, let's all Case 9373.

MR. STOVALL: Application of Texaco Producing, Inc. for salt water disposal, Eddy County, New Mexico.

MR. CATANACH: Are there appearances in this case?

MR. CARR: May it please the Examiner, my name is William F. Carr, with the law firm Campbell & Black, P. A., of Santa Fe.

We represent Texaco Producing, Inc. I have one witness.

MR. CATANACH: Are there other appearances?

MR. DICKERSON: Mr. Examiner, I'm Chad Dickerson of Artesia, New Mexico, on behalf of Mr. J. C. Williamson, Midland, Texas, and Ralph Williamson.

I have two witnesses.

MR. CATANACH: Will all of the witnesses please stand and be sworn in?

(Witnesses sworn.)

MR. CATANACH: Mr. Carr?

DENNIS WEHMEYER,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Will you please state your name and place of residence?

A My name is Dennis Wehmeyer. I reside in Hobbs, New Mexico.

Q Mr. Wehmeyer, by whom are you employed and in what capacity?

A I'm employed by Texaco as the District Operations Engineer in New Mexico.

Q Have you previously testified before this Division and had your credentials as a petroleum engineer accepted and made a matter of record?

A Yes, I have.

Q Are you familiar with the application filed in this case and the subject well?

A Yes, I am.

MR. CARR: Are the witness' qualifications acceptable?

MR. CATANACH: They are.

Q Mr. Wehmeyer, will you please state

briefly what Texaco seeks with this application?

A We're asking for the approval to convert our Salt Mountain 36 State Well No. 1 to disposal service.

Q Would you refer to and identify what has been marked as Texaco Exhibit One in this case?

A Exhibit One is the -- on the beginning is the cover letter that was sent to the OCD when we first applied for administrative approval to convert the well to disposal.

And behind it are the C-108 and the various attachments that were sent with it.

Q Initially would you identify the injection interval that you're proposing in this case?

A The injection interval that we're proposing is from -- a gross interval from 5417 down to 6170.

Q And what formation is that?

A This is the Delaware. It's in the Brushy Draw Delaware Pool.

Q When was this well originally drilled?

A This well was drilled at the end of 1982. It was first completed on December 30th, 1982.

Q And what is the present status of the well?

A Presently the well is producing from the Delaware.

Q And at what rate?

A Current rate on the well is 7 barrels of oil per day, 48 barrels of water, and 18 MCF per day.

Q Is this well at its economic limit?

A Yes, it is. The economic limit on this well. on this lease, is calculated at 8.8 barrels per day, so it is currently below its economic limit.

MR. CARR: Mr. Examiner, we have Exhibit Number One, which is, as Mr. Wehmeyer indicated, the C-108 that was originally filed with the Division.

We also have Exhibit Number Two, which is some additional information. I've numbered the pages in each and we're going to sort of work back and forth with these two exhibits at the same time as we go forward.

Q Mr. Wehmeyer, would you refer to page 4 of Exhibit Number One, identify this and explain what it shows?

A Page Four is a map, a lease plat, showing all the wells surrounding our Salt Mountain 36 State No. 1.

The first line you see is a half mile radius drawn in and the larger circle, semicircle is the 2-mile radius.

Q And this shows the ownership in this particular area?

A Yes, it shows the ownership.

Q And the location of the subject well.

A Yes. The subject well is right in the middle of the small circle. It's marked Well No. 1 and it's in Section 36 there, in the small circle; right there.

Q And why did you not include the lower portion of those circles?

A At the time we applied for administrative approval we only applied -- we only sent in the New Mexico map. To the south is Texas, and that's why we didn't send it in at that time.

Q Was -- was notice given to the Railroad Commission concerning this application?

A Yes, it was.

Q Is there a full copy of the plat also showing the acreage in Texas in your exhibits?

A Yeah, in Exhibit Two, page 5, we have a -- we attached the Texas side of the map with it there.

Q Now, Mr. Wehmeyer, would you refer to refer to page 6 of Exhibit Number One, identify that, and review the information contained on that plat?

A Page 6 shows the ownership offsetting our lease. As you can see by that, we're offset by

ourselves and J. C. Williamson.

Q How close to the nearest producing wells in the injection interval is this disposal well?

A There are two wells that are offsetting us that are in our proposed disposal interval; J. C. Williamson's MWJ No. 2, which is 2610 feet from our well, and their MWJ No. 3, which is 2670 feet. A half mile is 2640, so one well is within 30 feet inside a half mile and the other one's 30 feet outside the half mile radius.

Q Will you now go to page 7 of this exhibit and identify that for Mr. Catanach?

A Okay. Page 7 is a tabulation as required by the C-108 requirements, showing all wells within a half mile of the proposed disposal well that penetrate the proposed injection interval.

I'll go column by column and summarize it.

The first column shows the -- the operator and the well that offsets us. All the wells that are offset and penetrated our injection zone are operated by J. C. Williamson.

The next column shows the formation they're producing from. They're all producing from the Brushy Draw Delaware.

The next column indicates a total depth

of wells.

The next column is the date drilled; when they were completed.

The next status -- the next column is the current status of the well. They all are producing wells.

The next column shows the hole size that was drilled.

The next one's casing size that was run in the hole.

The next one's the depth that they were set at.

The next one is the -- next couple are the cementing records, the volume of cement that they were cemented with, the top of cement, and how the top of cement was determined. It should be noted that all the top of cements are well above our proposed disposal interval. In fact the lowest top of cement is at 2956.

Q Are there any plugged and abandoned wells in the area of review?

A No, there are not.

Q Would you now go to page 5 of Exhibit Number One and review that? First identify what this shows and then review the -- the pertinent information.

A Okay. Well, page 5 just shows a

schematic of the proposed -- or of the well as to the current status of it.

Of course, it shows the casing setting depths and the cementing records. Surface casing at 8-5/8ths, and then the production string, which is 5-1/2.

The -- I'll go over the perfs that was perforated in the well.

The Ramsey was perforated at 3014 to 3088. Marginal production was obtained and that zone was squeezed off with 400 sacks of cement.

We perforated some squeezed holes at 4800 and squeezed that with 200 sacks to get a better bond.

We have some Bell perfs; originally it was perforated from 5077 to 5160. Those perfs are squeezed with 200 sacks; subsequently broke down with acid and resqueezed again with another 200 sacks of cement.

Currently in the wellbore we have two basic zones that are open. We've got Delaware perfs at 5080 down to 5120. There's two sets of perfs there and the lower set is at 6152 to 6170. Those are currently open at the moment.

Q Will you now refer to page 8 of Exhibit Number One, the injection well data sheet, and review the information on that that you haven't already covered when reviewing the schematic.

A Additional information, what we plan on doing is to squeeze the Upper Delaware perfs, which is the main pay out there. Those are the perfs at 5080 to 5120. They will be squeezed with 100 sacks, pressure tested, to make sure the integrity is there, and of course if it doesn't hold we will resqueeze to make sure it's squeezed off.

What we plan on doing then is to -- we'll acidize the lower perfs, that's the ones at 6100, with 1000 gallons 7-1/2 percent NEFEHCL; attempt a test or disposal test into those lower perfs. If the rate is insufficient we will then perforate the upper set of perfs at 5417 down to 50 -- I think it's 5731, I believe it is, and we will run tubing, 2-7/8ths cement lined tubing in the hole with a Baker Model TSN-2 packer. We'll fill the annulus with an inert fluid with a pressure gauge at surface.

Q Mr. Wehmeyer, will you now refer to Exhibit Number Two, page 4 of that exhibit, which is another schematic drawing, identify that and review it for Mr. Catanach?

A Okay, this is our proposed well sketch. As I previously said, we've done -- most of the things we're going to do I've already said

We're going to, like I said, test the lower interval to see if sufficient injection can be ob-

tained. If not, which we don't anticipate, the well perforate the upper -- not the upper -- it's the upper from where we're at, additional intervals from 5417 down to 5931.

Those additional intervals from 5417 to 5931 will be acidized in three different sets with a total of 3500 gallons of 15 percent NEFEHCL to open hole perfs, and as I previously said, we'll set the packer at 5375 on 2-7/8ths cement lined tubing.

Q Okay, so the tubing is lined.

Q Yes, it is.

Q And the annular space will be filled with an inert fluid and there'll be a gauge at the surface as required by the Underground Injection Control program?

A That is correct.

Q What is the source of the water you propose to inject into the subject well?

A The source of the water is Delaware water, produced water. It's from two of our offsetting leases, the Salt Mountain 25 Federal Lease and the our BD Federal leases, plus the other two wells that are on the Salt Mountain 36 State Lease.

Q And what are you presently doing with this water?

A Currently we are disposing the water

into the State Line Salt Water Disposal System, which is operated by Williamson.

Q And what volume of water are you disposing through the Williamson system?

A Texaco is disposing of approximately 700 barrels per day. It will vary.

Q And are you being charged a fee for that?

A Yes, we are.

Q And what are you being charged?

A We are being charged approximately 36 cents per barrel.

Q And what does that compute on a monthly basis?

A Approximately $7500 per month.

Q And if this application is approved you will be disposing of that water in your own well instead of through the Williamson's system?

A That is correct.

Q Now what volumes do you propose to inject into this well if you receive approval to do so?

A We are asking for a minimum rate of 600 barrels per day with a maximum rate of 2000 barrels per day. The reason for the maximum rate of 2000, we have additional locations that can be drilled. We will need

that additonal capacity to dispose of produced water from those future wells.

Q Will this system be an opened or a closed system?

A It will be a closed system.

Q Now, Mr. Wehmeyer, you discussed the proximity of the disposal well to the Williamson wells.

A Uh-huh.

Q Have you been able to compute any time-frame within which the water being injected in these various volumes would actually reach either of the Williamson wells?

A Yes, I have. My calculations indicate at a 600 barrel per day rate it would take 135 years of radial flow to get to his wells.

At a 2000 barrel per day rate it would take 40-1/2 years to get his well.

Q In your opinion will the injection of the water as Texaco proposes result in damage to the offsetting wells?

A I don't see how it could. If anything, I feel like it would help. Like I said, like I mentioned before, the main pay is around 5051 hundred. I think these zones below that we want to dispose into are more marginal. If anything, it would give a push or help in the future to

recover some additional reserves.

Q Are you aware of any plans to institute waterflooding in this formation?

A I've heard that Sun is looking at implementing a flood in the Brushy Draw Delaware but it's -- that's all I've heard. I do not have any details on that at all.

Q Do you know what the reservoir drive mechanism is in this reservoir?

A Basically I feel it's solution gas, maybe some water drive, too.

Q If I -- is it your testimony that -- that the injection of the water could benefit offsetting production?

A Yes.

Q Does Texaco have any additional wells in this area that might benefit?

A We've got two wells just immediately offsetting the proposed disposal well. We are considering, or we are looking at those two existing wells that would have to be deepened in order to obtain any benefit from disposal in this well. We are currently reviewing those two wells and will deepen them to see if we can obtain any additional -- additional production from them.

Q Are you proposing to inject by gravity or under pressure?

A We're proposing to inject under pressure.

Q And what is the maximum injection pressure that you are now proposing?

A We are proposing a maximum injection pressure of 1080 pounds.

MR. CARR: Now, Mr. Examiner, I'd like to point out that the cover letter that transmitted the original C-108 to the Oil Commission had a higher figure in it of something in the neighborhood of 2000 pounds. That is in excess of a pressure limitation of .2 pound per foot to the depth of the top of the perforations and therefore we are proposing to reduce that figure to be in line with that .2 pound per foot limitation, and that's why there is a discrepancy between what we originally submitted and that figure.

Q Mr. Wehmeyer, will you now refer to page 15 of Exhibit Number One and identify that?

A Page 15 is a water analysis from our Salt Mountain 25 Lease, which is a representative Delaware produced water sample.

Q And you're going to be reinjecting Delaware water back into the Delaware.

A That is correct.

Q Are there fresh water zones in the area?

A Yes, there's the alluvium which is from zero to 400 feet; Rustler, redbeds, I think they're called also. That is the known fresh water in the area.

Q Are there any fresh water wells within a mile of the injection well?

A There is one known fresh water well within a mile of our proposed well.

Q And from what interval is this one producing?

A From the 400 on up. I don't have the exact depths but the (inaudible.)

Q In information previously filed with the Division you indicated there were possibly three fresh water wells in the area? Is that not -- is that incorrect?

A That is incorrect. What happened, there is three fresh water analyses that we submitted with the C-108, not three fresh water wells.

Q And all of these analyses are from the well located in Unit I of Section 26?

A That is correct.

Q Would you refer to pages 12 through 14 of Exhibit Number One and identify those for Mr. Catanach?

A These are the analyses from that fresh

water well. Like I said, they're located in Unit Letter I, Section 26, Township 26 South, Range 29 East.

Page 12, the first sample is dated 2 -- February 5th, 1985, when it was sampled.

Page 13, that sample was taken on April the 3rd, 1985.

And on page 14, that sample was taken on April the 4th, 1985.

Q Mr. Wehmeyer, would you now refer to Texaco Exhibit Number Three, which is the log on the well, and review that with Mr. Catanach, please?

A Okay. Exhibit Three is the compensated neutron log on this well. Open hole logs were not run on the well when it was drilled.

If you page down to, oh, approximately 5100 on down, I've marked in the middle the perfs that we want to perforate in the well. They are indicated by the pencil marks on the right, righthand side. Those perfs start at 5417 and go down to 5931.

Q And how are they indicated?

A They're indicated by the pencil marks with arrows on them.

Q Now they're blue and red pencil marks. Are they the same?

A No, the blue and the red are the two

offset wells of Williamson. Their MWJ No. 2 is indicated in red. Their MWJ No. 3 is indicated in blue. I correlated the logs and -- to collate the -- my proposed disposal interval against what they are currently producing from.

Q And it is not Texaco's contention that the zones in the Williamson wells are -- do anything but correlate with the injection interval.

A They do correlate, yes.

Q Now I'd like you to review in Exhibit Two pages 1, 2, and 3.

First, if you would identify those for the Examiner.

A Okay. What this is, page 1 is more of a summary than pages 2 and 3. These are all the wells that penetrate our proposed disposal well. They're all operated by Williamson. Their MWJ Federal wells, MCDHWW Federal wells and Howard Federal wells.

On page 1, of course, we indicate the well number, the total depth the well was drilled, and the current perforations that are open.

As you can see there, Well No. 2 and Well No. 3 on their MWJ Federal Lease are completed in what we will open up in our disposal well.

Pages 2 and 3 are a little more detail of the same wells as page 1. This indicates the location

of the well, section, township, range, and footage; total depth the well was drilled and where they were completed and the dates they were completed into.

Q Now if I can ask you to jump back again to Exhibit Number One and just identify what page 9 is.

A Page 9 is the list of the offset operator and surface owner. Of course, like I said, the offset operator is J. C. Williamson and the surface owner is Robert Bohling.

Q Are pages 10 an 11 copies of letters that were sent to Williamson and to Mr. Bohling?

A Yes, they are.

Q And page 17 are the return receipts on those letters?

A Yes, they are.

Q Would you identify Exhibit Number Four for Mr. Catanach?

A Exhibit Number Four is the notice to Mr. Bohling and Mr. Williamson again.

Q And these are notices of today's hearing?

A Yes.

Q Are you aware of similar applications which have been granted for injection in this same general area?

A The only one I know of is the Williamson well, the disposal well which is located two or three miles to the east.

Q And that you're currently using.

A Yes.

Q Have you examined available geologic and engineering data and as a result of this examination, have you found -- found any evidence of open faults or any other hydrologic connections between the disposal zone and any underground source of drinking water?

A I've not found any evidence of that.

Q In your opinion will granting this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, it will.

Q Were Exhibits One through Four prepared by you or compiled under your direction?

A Yes, they were.

MR. CARR: At this time, Mr. Catanach, we would offer Texaco Exhibits One through Four.

MR. CATANACH: Exhibits One through Four will be admitted as evidence.

MR. CARR: That concludes my direct examination of Mr. Wehmeyer and I pass the witness.

CROSS EXAMINATION

BY MR. DICKERSON:

Q Mr. Wehmeyer, did you personally prepare the C-108 submitted as Exhibit Number One?

A It was prepared under my direction.

Q Did you personally review the information shown by that C-108 at or before the time it was originally submitted to the Division?

A I reviewed at one time or another, yes.

Q You have reviewed it at the present time so that you stand behind the information as being correct?

A Other than the corrections that we indicated, yes.

Q So all -- let me ask you, do you testify of your own personal knowledge as to the matters which you've sworn to here today?

A Yes.

Q In your review of the C-108, your examination of this data, Mr. Wehmeyer, I understood you to have calculated the distance from Texaco's Salt Mountain 36 proposed injection well to the MWJ No. 2 and No. 3 Wells operated by Mr. J. C. Williamson as 2610 feet and 2670 feet respectively.

A That's correct.

Q And then you performed the calculation

as to how long water from your injection interval under your assumed rate of injection would take to migrate from your injection wellbore to the zone presently open in their well.

A That's correct.

Q For purposes of making that calculation, what precise interval, injection interval, in Texaco's well did you assume?

A I assumed the overall interval from 5417 to 6170.

Q And in -- if my map is correct, that is the gross interval 753 feet, approximately, is it not?

A Approximately, I haven't calculated it.

Q Assuming 753 feet as that gross interval as being correct, then your calculation of 135 years or 40-1/2 years made some further assumptions or contained some further assumptions within it, did it not?

A Yes.

Q It assumed that there were no other prospective zones in the Williamson offsetting wells, among other things, did it not?

A Well, I -- all I assumed was the inter- that I was perforating to use in my calculations.

Q And you only, for the purposes of calculating the migration of that water to the Williamson wells,

assumed that their wells only produced from the current perforated intervals that you show in Exhibit Number Two?

A Well, I didn't take that into consideration. Like I said, the only thing I used to calculate that migration was the intervals that I was perforating in our proposed disposal well. I didn't take into account what was open in the offsets, other than what I've got proposed to perf and what is open currently.

Q And you did not also take into account in the offsetting eight wells within your one-half mile radius circle other prospective zones within the Delaware Brushy Canyon formation, did you?

A For what? For my calculations, you mean?

Q Yes, sir, for your examination and your opinion here today as to the lack of any adverse impact upon the operations conducted by Mr. Williamson in his eight wells within your one-half mile radius circle.

A I calculated it from our proposed well to the two existing wells that are both currently open.

Q And that calculation was based on an assumption that Texaco injected water throughout that entire 753 foot interval.

A Well, I didn't assume that. I assumed, like I said, only the perforated interval. I didn't assume

753 foct net pay. The net pay figure is much lower. That's the way I calculated it.

Q Okay, let me ask you a few questions and ask you to be a little more precise with us as to the exact intervals within the that gross 5417 feet to 5931 -- or 5170 foot -- 6170 foot interval.

What are Texaco's intentions as regards the precise interval to be initially tested for the injection of water?

A The initial interval, as I previously mentioned, is at 6152 to 6170.

As I said, we'll initially, you know, inject approximately 6-to-700 barrels a day. What we would do would be to acidize those perfs and pump into it, get a pump in rate to see if the volumes would be sufficient.

We do not anticipate the rates to be sufficient and that's why we're adding the additional perfs up the hole in order to obtain rates high enough to -- where we can dispose into.

Q So at this time you do not believe that interval, 6152 feet to 6170 feet, will in fact accept the water that Texaco desires to dispose of.

A We believe it will not accept the volume that we want it to accept.

Q Okay, and if it does not, what precise

interval does Texaco then propose to perforate and open to injection?

A You can see on Exhibit Three, the log, I've marked individually every perf that we're going to perforate. Would you like for me to go through those, or -- that's the best thing I can do is to give you the right -- correct figures.

Basically I've got three additional zones. I broke it down to three additional zones that we will be perforating besides the lower zone at 6100, the first one being at 5417 down to 5532. The next zone at 5738 down to 57 -- looks like 84. And the last zone at 5900 to 5931.

Q Mr. Wehmeyer, have you examined the logs in the offsetting wells within your area of review and correlated any prospective zones that appear in those logs within the Delaware Brushy Canyon formation with your proposed injection intervals?

A What I've done, what we did -- what I've done, I should say, is we looked at the zones that we want to perforate and deemed them perspective. Other than that, that's the main thing we did. We didn't look any further. We're looking for the best porosity of anything that, really, we felt like wouldn't be productive, and that's the ones propose for -- for (not clearly understood.)

As far as how productive these other zones are, I couldn't give you any real good answer. We feel they're marginal at best.

Q Now you made that decision for Williamson, did you not?

A Say it again, I --

Q You feel his zones, as I understood your testimony, are marginal and therefore Texaco feels free to pump salt water into them.

A We don't feel free. I feel they're marginal. They haven't been tested individually. I have no proof that they are anything better than marginal.

Q Have you talked about Mr. Williamson's concerns with him, about -- on that question?

A I talked to him last Friday and he was concerned with us injecting into those intervals.

I tried to get a better understanding from what he was saying but it was a little hard on the phone. He started telling me some various zones that he though were productive. Of course I couldn't correlate them. He named them off, the Getty zone, MWJ zone, et cetera, from what I remember, but I, of course, in conversation over the phone I could not tell which zone he was talking about and that's as far as the conversation went.

Q Let me ask you to look at the map that

you attached as the last page to your Exhibit Number Two, Mr. Wehmeyer.

A Okay.

Q Point out to us, if you would, and tell us where they are, the wells that you referred to and calculated as open in the correlative zones in your injection zone. The --

A Okay, the Williamson MWJ No. 2 is located in Section 35. It's just -- the half mile circle just runs right over the dot there, you can see it.

Q The westernmost well on the -- on the west side of that circle?

A Well, it's on the west side of that circle, that's right. It's No. 2, you can see it there marked.

The No. 3 Well is located right next to the Texas line on this map, just inside the half mile circle there, in Section 35, also.

Q So if we look at the -- there are eight Williamson wells within the half mile circle, are there not?

A I believe that's correct, if I remember right.

Q And those two wells that you picked to calculate the distance to are the most extreme wells within

that circle, are they not, that are operated by Mr. Williamson?

A They may be the most extreme wells but I didn't just pick them. I picked them because they're the only wells that are open in the proposed injection interval.

Q But it's apparent from the map that the other -- most, if not every single one of the other wells within the circle, are considerably closer to your injection well than those two wells.

A That's true.

Q If Texaco pressures up to 1,080 pounds in whatever interval that it has open in your Salt Mountain 36 Well, and those zones will not accept water at that pressure, what would Texaco anticipate doing at that point?

A Well, we haven't got to it. I've had a few ideas in the back of my head. I have not discussed it with any of my supervisors. It would be pure conjecture on my part, and it you'd like that, I'll give that to you, if you want to know that.

Q Well, it would be most likely, would it not? I can guess for myself that you --

A Most likely we would probably come up the hole, stay away from the main pay zone and come up the hole further into the Delaware.

And if the rate was just totally insufficient, we would probably squeeze off those lower perfs and come up the hole in the Upper Delaware.

Q Now your references to the main pay zone, are you -- are you --

A The main pay zone is the one I refer to as the zone at 5,051 foot.

Q One of the upper -- more upper zones within the Brushy Draw --

A It's the most productive zone, more productive zone, the Brushy Draw Delaware Pool.

Q So from your numerous references to that zone, I assume that you and Texaco have taken into account the possibility of -- of damage, or threat of damage, however remote you might think it has been within that most productive zone.

A Well, I don't feel we're going to damage it. We've had the well squeezed behind the casing. We've been -- we're trying to protect it. We're squeezing off that main pay zone so no fluids will enter that zone.

Q Let me ask you to look at page 5 of your Exhibit Number One.

A Okay.

Q As I understand on the righthand side of the page, roughly in the middle of the information given,

that describes the cementing program for the production string in your well, does it not?

A That is correct.

Q Can you just briefly summarize that for us, as to how it was cemented and what information you have about that?

A All right. The 9-5/8ths surface casing was set at 485 with 525 sacks. Cement did not circulate it. They dumped 200 sacks down the annulus. They dumped three quarters of a yard of ready mix, got cement to surface, hole size of 12-1/4 inch.

5-1/2 casing is 15.5 pound K-55, set at 6256 with 1000 sacks in two stages. The first stage was 700 sacks cement, it did not circulate; top of cement at 5208 by cement bond log. We had a DV tool at 2088. The second stage was cemented with 300 sacks of cement, did not circulate; top of cement was 2960 by cement bond log.

Q Okay.

A Bottom of the cement was at 3650; cement apparently went down on that second stage through the DV tool.

Q Now have you -- do you know what amount of cement would have been necessary, assuming you had not lost any, to have totally filled the annulus behind that production string? Was it Texaco's intention to circulate

cement behind that pipe?

A Yes, it was. I did not calculate it and I have not calculated it.

Q But you pumped 1000 sacks of cement in attempting to cement that pipe.

A That is correct.

Q Would 1000 sacks have been in excess of that required to cement from top to bottom?

A Well, like I said, I haven't calculated, and I hate to say yes or no. I would assume it would be but I have not calculated it, so I couldn't give you a -- I couldn't give you a yes or no to be sure of an answer.

Q But you lost some cement as I understood your description of the program in connection with that production string, did you not?

A Well, like I said, on that second stage the cement went down. I wouldn't say I lost it. You could interpret it that way.

Q Your cement bond logs that you referred to, do they show a continuous interval of -- of that pipe with cement behind it?

A From bottom up to approximately, oh, I want to say, I looked at the log once, 5 -- 5100, it's a good bond. From there it starts to get ratty up the hole and I did not look all the way up the hole at the log.

Q Ratty above 5500 feet?

A No, I said 5100 foot.

Q 51, meaning that you have --

A We have competent cement --

Q (Not clearly understood).

A We have competent cement on bottom according to the bond log. It does get rattier up the hole but it -- any more than that, I'd have to get the log out to really give you a good analysis on it.

Q Would Texaco be willing to furnish us and this Division with a copy of your cement bond log?

A I don't see any problem with it. I don't have it available but I could sure get it for you.

Q Well, within a few days after the conclusion of this hearing?

MR. CARR: Yes, we'll do that.

Q You made one statement, Mr. Wehmeyer, and I was not sure when you made it, you had referred to the fact that you had heard, certainly were not certain, that Sun, I think you said, was contemplating a waterflood operation in the general area that we are concerned with?

A That's correct.

Q And then at some point shortly after that you said some thing to the effect that the injection of water could possible benefit offsetting production, and

I was not clear on whether you were talking about injection of water under an approved waterflood conducted by Sun or something, or whether you were speculating on benefits offsetting production from injection of produced water into your well.

A I was referring to the disposal into our well. As I previously said, also, we are looking at the workover possibilities of deepening our own offset wells in our Salt Mountain 36 State No. 1 to obtain some benefit from this disposal.

Q Okay. So you and Texaco have given credence to the fact that your production offsettng may be aided by the injection of water into this well?

A That's correct.

Q Are you aware, Mr. Wehmeyer, that the injection of water for secondary recovery purposes is -- is a different operation from injection of water for disposal purposes?

A Yes, I am.

Q Your C-108 seeks permission only to dispose of water, does it not?

A That's correct, but I didn't say we're going to deepen our wells yet. We are looking at it, I said.

It's a side benefit. It's for now, and

maybe forever, for all we know, it could be just disposal, though, too.

Q Have you personally examined the logs for the purpose of your testimony here in the eight J. C. Williamson wells within the one-half mile area of review?

A I've not personally examined all of them, no.

Q Have you personally examined any of them?

A I primarily concentrated on No. 2 and 3. I did look at No. 1 on the MWJ Lease.

Q I notice your advertisement that you filed with the initial submittal to the OCD, Mr. Wehmeyer, stated in it that maximum injection pressure is 3000 pounds per square inch. Had you noticed that?

A I believe I've seen it before and like I said, as we previously said, that is incorrect. It -- we're correcting that to 1080 to comply with the OCD requirements.

Q Right. I mean at the time that was advertised, Texaco was simply unaware of the limitation?

A It was a -- it was a mistake. We're not unaware. It was a mistake. It was an oversight on my part. I should have caught it and I didn't.

Q I mean it was a human error, unaware of

the .2 per vertical foot limitation.

A Well, I'm aware of it. I'm aware of it. Like I said, it was an oversight on my part.

Q But what I'm asking you is, is it an oversight, your C-108, I think, and the letters, pages in your letter to the OCD, page 1 of the C-108, stated maximum pressure 2000 psi.

A Yes.

Q And your advertisement stated 3000. Is your advertisement merely a typographical error or was it simply different information?

A It's an error every which way, either way I look at it. Both are incorrect. Both should be 1080.

Q Let me ask it one more way. Has Texaco anticipated problems with pressuring up in your proposed injection interval and foreseeing these problems, and made assumptions or calculations forecast as to what likely pressure will be required to inject the volume of water that you want to dispose of?

A No, we have not.

Q Was your Exhibit Number Two, the specific notations of the perforated intervals in the offsetting wells, was that prepared subsequent to the C-108 in preparation for this hearing?

A That's correct.

MR. DICKERSON: I have no further questions for Mr. Wehmeyer.

MR. CATANACH: Mr. Carr?

MR. CARR: We have no further redirect.

MR. CATANACH: I don't have any questions of the witness.

He may be excused.

MR. CARR: That concludes our direct case.

MR. DICKERSON: I'll call Mr. J. C. Williamson, briefly, Mr. Examiner.

(Thereupon a recess was taken.)

J. C. WILLIAMSON,

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

DIRECT EXAMINATION

BY MR. DICKERSON:

Q Mr. Williamson, will state your name, your occupation, and by whom you're employed, please?

A J. C. Williamson. I'm an Earth

Scientist; been one for a long time, and been in the Midland District as a geologist for 51 years this June, which is today, something like that. I've spent most of the time concentrating on geology and I have qualified before this board several times before.

Q Okay. Mr. Williamson, tell us just enough about your experience in the Delaware and your knowledge of the Delaware so that Mr. Catanach can see the experience behind the formation of the opinions that you have here today.

Q Well, to my way of thinking, I get very enthusiastic about the Delaware Sands. They are our easiest and most sure reservoir to be productive and that they will be our main source in New Mexico for some time to come. I predict maybe 3000 wells before it's over, or maybe more found in this Delaware formation.

There is approximately in this area in question about 30 sands that are present and there are about -- well, we have proven about 7.

Q Let me ask you, Mr. Williamson, just to clarify this for us, when you're -- when you're talking about the Delaware formation, you are speaking of a more encompassing term than you are when you speak of the Brushy Canyon formation --

A Yes.

Q -- are you not?

A Yes. We're speaking of the -- of the Brushy Canyon at the bottom, the Cherry Canyon, and the Bell Canyon, which is the top.

Q Roughly in this area of southern Eddy County, if you're talking about the entire Delaware Zone, how much vertical interval are we talking about in essence?

A Somewhere over 3000 feet, and it would be about 3200 feet in this particular area.

Q And --

A Now, other places it may extend farther down, but below this lower sand over there, in this area it gets shaley and dense and is not effective as far as -- as producing zones are concerned.

Q So when you're talking about the Delaware -- or the Brushy Canyon zone within that 3000-foot Delaware interval, you are speaking of a more isolated and restricted interval.

A Yes, the Delaware -- the Brushy Canyon is rcughly effective on those zones on this cross section here.

Q And when you referred to approximately 30 sands, you were talking about --

A From top to bottom.

Q -- somewhere within the entire Delaware

Section.

A Yes.

Q So there is a more limited number of sands, as I understand it, within the Brushy Canyon zone of that Delaware.

A Yes, there's about, oh, effective zones out there, I figure 6, maybe 7.

Q Does all of the production to your knowledge, or the majority of it, within the Brushy Canyon formation in this area, come from sandstone deposits?

A Yes.

Q Are there sandstone deposits continuous from bottom to top of that Brushy Canyon or are they isolated and separated from each other in some manner?

A Well, they're separated by impervious shales and limes, streaks of lime.

Q And what is it within that gross interval that we're calling the Brushy Canyon, Mr. Williamson, that determines whether or not a particular part of that interval will or will not produce in your opinion?

A It depends on permeability and porosity mostly. Now, each one of these sands, and I'm speaking of the 30, will almost invariably, sometimes they don't, can't find them yet, but they extend up into the west/northwest and they will likely be productive in here, wherever they

come out and are dense.

Now, that is where the -- well, for example, it may last over a period -- over an area of several, several miles, this lower sand over there, which we refer to as MWJ, is, oh, I expect it's productive over 20 square miles, and it's productive and we have wells in it over in -- in the Ross Draw, and we have wells that are produced -- have produced and are producing in it over here in the Brushy Draw.

Q Mr. Williamson, if we restricted our inquiry for the purpose of talking about the Brushy Canyon to an interval, and I'll pick it and you correct me if I'm wrong, --

A Okay.

Q -- approximately 5000 feet subsurface to 6200 feet subsurface, would that be a fair approximation of the Brushy Canyon interval?

A The -- what's called the Williamson Zone, I do not consider -- it's kind of the base of the Cherry Canyon. The first good zone that we have is the Getty. That's really, that's considered in the Brushy Canyon in my estimation, and that Getty zone is a big, broad zone there.

Q To your knowledge, Mr. Williamson, approximately how many wells produce from this zone in the

Brushy Canyon that you're speaking of?

A Now are you talking about over here? I think that would be -- we -- let me, let me say this.

These zones have to be studied. The Getty zone, for example, broad and big here, is almost -- well, it is as good-looking as it is over in the -- in the Ross Draw, and we didn't know what potential it had till we got over there and we found out that by a method of fracing, getting a little bigger and a lot of things, we found out -- engineers found out about, that it was as near as productive as it is, that is the main production -- producing zone at the present time, that only means at the present time, because these zones have to be studied, they're extensive, just like that lower zone there, that MWJ, it is productive clear across there and when we have other methods, this is going to be one of the main zones of production.

Q Mr. Williamson, a few minutes ago you mentioned that the presence or absence of porosity and the associated permeability --

A Yes.

Q -- seemed to you to determine whether or not a given interval will or won't produce.

When we're talking of porosity, what ranges of porosity do you consider necessary to have a

commercial production possibility?

A The Brushy Canyon will produce from less porosity than the Cherry Canyon, and from about 15 up to -- up to -- the Cherry Canyon -- or the Brushy Canyon appears to have about 15 up to 20, 21 in places, but then it has pretty good permeability. Comparatively speaking, it has better permeability with that type of porosity than the Cherry Canyon has in most cases.

Q Okay.

A The Cherry Canyon ranges up from about 18 or 17 to, oh, 22 or 3, and then the Bell Canyon gets up to as high as 31 and, well, of course, there's all these ranges. Some sands are just fine and dense and they won't produce, but then there's some main sands here that you can list continuous that will produce and are producing and look very good, with gas kicks, the sands are stained, we get a little on the bits as we go through these things, and we regard those yellow zones as prospective pay zones in this field over here.

Going on west those zones pinch out and they're not present five or six miles over there, but east they are and they go way back down.

Q Mr. Williamson, now back to the porosity --

A Yes.

Q -- a maximum of 30 percent is commonly found?

A Well, a maximum of 30 percent, I'd say in that range.

Q What is -- do you use as a minimum necessary porosity to give a reasonable chance --

A Well, as I stated, the Cherry -- the Brushy Canyon will produce at less porosity than the other, because it's more compacted, it's deeper, but not much, so I'd say we have to hold that from, oh, 15 to half of 16, anything below that is not any good and it's just hard to do anything with it at all.

Q Mr. Williamson, let me direct your attention to the map that we have hung on the wall and marked Exhibit Number One, and ask you to step up to that map, if you would, and briefly tell us what you show on that and how you prepared that map.

A Well, this is a map of the Williamson Zone. This is a map of Williamson Zone and these are the -- are the contours on the top of the pay.

Q Orient us -- show us the Texaco proposed injection well just so we'll see where we're at.

A Right here. Now, here are the injection wells we have over here and thee two wells, for example, over in here we -- we've finished those in (not clearly

understood) over there, and these wells, this well is producing and this one has made oil from it, and this one has, too. This one's open and this one, and I-- we still have this one open, don't we, Ralph, this No. 2?

MR. RALPH WILLIAMSON: Yes.

A And this one, we held it down there for a good long while but I wanted more production and we came up to the Williamson and then we opened it up for what we (unclear.)

Now, this we -- it's a money situation and you always open what we think is the best but that doesn't eliminate the others, however.

This well here made 6-or-700 barrels a day in the Williamson pay. It wasn't doing but, oh, 30 or 40 down there, and we came up with this well right over here, but we are not -- have not really applied our technology to these sands in the Brushy Canyon because we haven't had to. It's the best think in the world just to go right down to and drill down to, and we fine that's a pretty good way, to drill down to one main pay, cement your casing, and get right after it, and the whole well will perform better.

Q Mr. Williamson, you're -- you're pointing to another exhibit, and what not, and that won't show up on our record. Let me ask you to -- there are a large

number of wells indicated on your Exhibit Number One, are there not?

A Yes.

Q Are those all Brushy Canyon wells or the majority of them, or approximately what number --

A No, the majority of them are Cherry Canyon on here and the Cherry Canyon at the present time appears easier and better and we have not yet ever really explored these over here, but then we have gone down in them and set pipe through them, and those six pays will make oil under different circumstances.

Now, for example, if oil was $30.00 a barrel, easily you could drill any number of those MWJ wells and a number of the Getty wells clear across here, because I believe the statistics show that about a pretty good, high percent of our oil in the United States is produced from wells that don't make but 10 barrels a day.

Now 10 barrels a day wells of this Cherry Canyon, or Brushy Canyon, would cover clear across here; it pinches out over in here; however, it come clear along here. We produce some from the MWJ and some from the Getty in some wells right along here.

Q Mr. Williamson, approximately when, if you know, was the first production established in the Brushy Canyon formation in the general area of the Texaco

proposed well?

A About '82, wasn't that -- yes, about '82. May 5th about '82 is when we ran the log, I believe, and that was that well right there and the first thing we opened was the MWJ, and that's this old one, that's this one right here.

Q Indicating the lower zone.

A Right here.

Q Okay, and you operated that well, drilled that well, Mr. Williamson?

A Yes, we did.

Q How many wells, approximately, do you operate in this area of Eddy County and the present time?

A Oh, there's about 50 wells, something like that. Ralph, how many are there?

MR. RALPH WILLIAMSON: Well, we have 50 wells --

A Yes.

MR. RALPH WILLIAMSON: -- plus or minus; some of them are a little weak. The main wells that make oil is 50 wells.

MR. DICKERSON: I have no further questions of Mr. Williamson.

CROSS EXAMINATION

BY MR. CARR:

Q Mr. Williamson, let me see if I can understand something.

A Yes, move right ahead, sir.

Q All right. On this exhibit which you've marked as Exhibit Three, there are six intervals shaded in yellow.

A Yes.

Q And as I understand your testimony, these are the six zones that are productive in the Brushy Canyon, or is that incorrect?

A No, those other two -- upper two are not.

Q Okay.

A We didn't list all of the prospective zones. In addition to those 4, as 1, 2, 3, 4, there is two more down there.

Q Are there two more below --

A No, they're right among those, what we call the Pioneer, which is producing, Exxon discovered over there about two miles, two and a half miles northeast, which is all over this area, and it's -- it's just down there in among them, and it just wasn't mapped on there.

Q Are they continuous across the entire

area or do they appear and disappear and then reappear?

A Not particularly. They -- these are continucus zones and they don't continue, however, much beyond the scope of this Brushy Draw Pool, and when you get across the Pecos River, they don't appear to be there, because these things are laid down by sub -- water, where there have been -- oh, there's a lot of discussion about how it happened, but they're the end of streams and the stream builds up and they come sometimes all of a sudden, come way out in that heavy salt water, and gradually lay down among the shales, and they lay down right among these -- sometimes they cut channels in those shales, and they lay down through there, and as soon as they're buried in those black, rich, carbonated shales, why they start and they get some depth, some pressure, they start generating some oil in there. The process is still going on down there. It's -- it's -- they've not been down deep enough and hot enough to get it all out, and the shales are still -- still look juicy, and -- and they still haven't had time to separate because they still have the water.

Q If I understand this exhibit, we're talking about Brushy Canyon being these four plus a couple others.

A Yes, that's right, sir.

Q All right, can you tell me, is this and

-- I guess it is, it's the third one from the top and it's marked Getty, that is the --

A That's right. That's -- I consider that the top of the Brushy Canyon.

Q And that is the best zone, would that be fair to say?

A Well, it's about equal between those two zones over in this part of the country.

Q When you say those two zones, do you mean the --

A The lower one.

Q -- Getty and the MWJ Zone?

A Yes, sir.

Q Okay. You have on this cross section the third well from the left, fourth, fifth, sixth, eighth and ninth are wells which you operate, isn't that correct?

A Yes.

Q And if I come over --

A And some of those we don't. We have -- we have this Salt Mountain Well over there.

Q And some of the wells on the cross section, true, you don't, you don't operate.

A Well --

Q Do you operate the J. C. Williamson MWJ Federal No. 1?

A Federal MWJ, yes.

Q Yes, sir, and that is open, is it, in the Getty Zone?

A No, it's -- that one's open in the Williamson up there.

Q Okay, and when you say the Williamson, it was tested in the Getty?

A No, I don't think it was ever tested in the Getty. We went down and set pipe to the bottom, though if I remember right.

Q What does POT/33 mean, Mr. Williamson?

A POT.

Q Is that a potential test? I don't know.

MR. DICKERSON: The next witness is going to testify and --

MR. CARR: Okay, if I'm getting ahead -- I'm trying to figure out what this shows and I'm not trying to take you into something you didn't say or --

A Well, I know that. I feel that's potential test but -- (some dialogue lost due to turning tape).

Q -- about the -- what you have mapped on your Exhibit Number One, is it actually on the top of the Getty? Is that -- is that about -- am I oriented right on

this?

A It's on that upper one up there.

Q So it's up here --

A It's the top of the -- top of the Williamson pay.

Q So that's slightly above Brushy Canyon.

A Yes, but you can see stay pretty close to each other.

Q Okay.

A They move around, 30 or 40 feet, but essentially, you have this -- this is sitting here like this. It's suffered two, since it was a flat (not clearly understood), it suffered two uplifts, one of the first Rockies jacked this part of the Basin up about 40 feet and then it had to readjust again, and this accounts for the waters largely and the porosity, and then another one that the present Rockies were jacked up, another. So you have about 80 foot per mile of up-turn, which has caused the mixing and it's still in the process of trying to un-mix water and oil and gas.

Q I look at the wells on this cross section, are you primarily producing the blue ones right now?

A Yes, sir, that's the easiest and the best, I think.

Q All right, and then early in your testimony you made this statement, and I hope this is correct, it may not be, but you said, below the lower sand it gets shaley and dense.

A Below the --

Q That's below -- below this exhibit altogether.

A Yes, sir.

Q Okay.

A It goes down to about, oh, close to -- right around 7000 down there before it gets into what we call the Bone Spring formation.

Q When you talk about additional technology being applied and ultimately producing other -- other sand stringers in here --

A Yes. sir.

Q What additional technology are you talking about?

A Well, there's a great deal of talking about drilling out thisaway.

Q Horizontal drilling?

A Yes, and the sands in here are ideal for that, especially in the Getty and the MWJ, and we have never really gotten down and fraced either one of those zones up there to nail down and frac it and see what it

would have done, like we have over here, and if we do, it looks like that Getty might respond as well as over here, and the last Getty well we went up there and hit, Getty don't look as good over here as it does over there; it's not as big. Why, we've got, for several days it flowed over 100 barrels a day, and it goes a long way towards paying those things out when they're going to do that.

Q Will Ralph Williamson talk about any enhanced recovery that might be applied to these zones?

MR. DICKERSON: Not in our part.

MR. CARR: Okay, well, I'm not planning to ask him. I don't want to be asking this Mr. Williamson something that should be --

MR. DICKERSON: No.

Q Had you looked at the economics of doing that as opposed to -- in these zones?

A Other than only -- you know, since oil has gone down, we only picked out the best and easiest to try to stay on the top of things and if and when the oil goes up, these zones are going to come into style.

Q And it will depend on the improved overall economics of the wells.

A Yes, it will. Yes, it will, sir.

Q That's all I have. Thank you.

MR. DICKERSON: I have no further questions.

I would move admission of Exhibit Number One.

MR. CARR: We have no objection.

MR. CATANACH: Exhibit Number One will be admitted into evidence.

MR. DICKERSON: And I'll call Mr. Ralph Williamson at this time.

RALPH E. WILLIAMSON,

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

DIRECT EXAMINATION

BY MR. DICKERSON:

Q Mr. Williamson, will you state your name, your occupation, and by whom you're employed?

A Well, my name is Ralph E. Williamson. I'm a petroleum engineer by professional training. I'm an independent oilman and partner with my dad in what is generally called Williamson and Williamson. It's not a formal partnership but we are actually engaged in the exploitation of oil and gas.

Q And you have previously testified as a petroleum engineer before this Division and your --

A Yes, I have.

Q -- credentials are a matter of record. You have studied, have you not, the available geological and engineering data and are familiar with the area that we're concerned with here today?

A Yes, I am.

MR. DICKERSON: Tender Mr. Williamson as an expert petroleum engineer, Mr. Catanach.

MR. CATANACH: He is so qualified.

Q Mr. Williamson, will you refer to what we have marked and submitted to Mr. Catanach as our Exhibit Number Two, and review that for us briefly?

A Well, I need to have one first. I've got -- our Exhibit Number Two is a listing of the current cumulatives through April of 1988 and of all the wells that we have in the reasonable vicinity of the proposed salt water injection well.

And the -- some of the wells are better than others and you can see that the cumulative productions among some of the wells that are in the immediate proximity of the Salt Mountain State are running up to 30 and 40 and 50,000 barrels. Much of that production is coming from

zones that Texaco is proposing to inject water into.

Q Let me ask you to limit your testimony for the purpose of this next question to the closest wells to the proposed Texaco injection zone.

Based on current economics and based on what production history you have in this relatively young field, are those economic wells from your standpoint at this time?

A The overall wells are certainly economic. Many of them have already paid out and are doing -- we have an on-going field production situation and it has been a very nice field for us.

Q In -- in a field such as this, and based on your experience and your knowledge of this field, would you classify the life of this field in the terms of years as being relatively short lived or relatively long lived?

A Historically Delaware fields will last as long as the equipment will last, and there are Delaware wells that were drilled in 1919 that are still producing in this -- down in Texas, but it's not that far from this.

Q And if I understood Mr. J. C. Williamson's testimony correctly, the earliest of the Brushy Canyon or the deeper Delaware formation wells shown on your production map was established in 1982?

A Yes, that's correct.

Q So all of the production history that you have developed to the current time is in a very young field, relatively speaking.

A Well, we certainly had a lot of learning to do when we developed this field. There was nothing like this out there, and this is one of the reasons that many of these wells were tried in various zones; we really didn't know what was going to be productive. We had to have a learning experience well by well to try to sort out the ones that we thought were going to be better than others.

Q Let me ask you to pick out one well. Let's pick the discovery well that Mr. J. C. Williamson testified to. Orient us, tell us which well that is on your production map just so we can see it.

A That is the well immediately to the north of the proposed salt water injection well.

Q And what is the cumulative production to this date for that well?

A 57,751 barrels.

Q Have you made any review, Mr. Williamson, so that you can in any way estimate the total reserves within that well?

A Well, reserves in this area, you can take a primary reserve in the formations that you have productive, and if you have a well there and the equipment

is maintained, as soon as you get down to a certain level, you go get another one of these sands and boost the production back up, and in fact, in that well and the well immediately to the west of it, we did exactly that in one of the zones that Texaco is proposing to put water into.

Q And so by saying that, you are recognizing the fact, are you not, that some of these separate sand bodies within this Brushy Canyon formation may not have in themselves or may not in themselves justify the drilling of a well solely for that sand body.

A Well, when these were drilled the economics were a lot different. Oil was $27 to $30 a barrel, but the costs were high. Relatively speaking, the Delaware formation, as my dad said, is a series of sands. We have looked at a lot of them, and that's why all these wells, instead of stopping at 5000 feet were drilled to the 6200 and 6250 foot level because we wished to take the wells through all of the sands that we thought were productive, so that we could go with the main one; when that got a little weak we'd go get another one, and we have done that and have done it successfully.

Q Go get another one, you're talking about a zone that would not have justified the drilling of a well --

A That is correct.

Q -- totally for that zone.

A That is correct.

Q And yet from zones such as that, based on your experience, additional oil can be recovered?

A Well, certainly an aggregate, when you put all the sands together, there's a tremendous potential for oil and gas production.

There is a massive body of sand down there and you -- once you have your well drilled, you don't have to have that strong a sand to make a commercial well.

Q Every barrel of oil you get from a zone such as that is a barrel of oil that would not otherwise be produced.

A Very definitely.

Q Okay. Mr. Williamson, let me ask you to step up to the cross section that we have marked on the wall as Exhibit Number Three and review that for us. If you would, first of all point to the legend down in the lower righthand corner and tell us -- show us the trace of your cross section so we can get an idea of the wells shown on it.

A Well, the wells shown go from east to west. They go from our UCBH WW Federal No. 3 to the No. 1 in the same lease, to the Texaco proposed injection well to our Holley Federal No. 1, to our MWJ Federal No. 1, 2, and

3. Then we go over further west to a State Line Federal No. 1 and a Yates Federal No. 1 that I did not drill but we've bought the well and I personally operate the last two wells on this cross section.

Q Now, Mr. Williamson, six of the eight Williamson wells within the one-half mile radius are reflected on this cross section, are they not?

A Yes, that's correct.

Q Okay, review that for us, if you would.

A Well, this was the are that was initially developed when we first started drilling the field and this is the area in which we did the most of our investigating in these secondary or alternative or at the time we were investigating we didn't know what they were going to do, but the bottom zone, which we have termed our MWJ zone, has been tried in five of these wells and is open in all five, and this is one of the proposed intervals in which Texaco proposes to inject water.

Q Now indicate by pointing, if you would, exactly where you're speaking of.

A It's open in the MWJ 3, 2, 1, UCBH WW Federal 1 and 3, five wells.

Q Open in the interval that Texaco now has testified it proposes to inject into?

A One of the, I believe, four zones that

they propose to inject water into, yes, sir.

Now, continuing up the hole, when we came here today we did not have the exact interval, intervals that Texaco had proposed to inject in and I put them on the map and they correspond almost exactly to the next three sands up the list that we consider to be these augmentive (sic) or extra zones that you get when the wells draw down and you can afford to go down and pick up another zone to pick up another 10 or 12 or 15 barrels a day.

Q Now, Mr. Williamson, let me interrupt you and ask, you heard your father testify that the productiveness of the various zones within this area that we're speaking of is determined largely by porosity.

A Yes.

Q It would follow, would it not, that the receptivity of that same formation to the injection of water would also have some thing to do with the porosity and permeability --

A Well, if you have --

Q -- of the formation?

A -- this 15 percent porosity that my dad talked about, we have tried other zones with less that and we didn't get anything. If you don't have the 15 percent in this Getty zone and down, you're just kidding yourself, it just -- just won't make it, and consequently, if

concurrently, I think the word is, if you -- if you want to put water into it, you've got to have that same amount of porosity, so that the obvious picks when you go to injecting water is in your most porous zones. Unfortunately, the ones that are to be selected, there's no question in my mind, they're not going to be tremendous wells, but we thought enough of each of them in one place in this cross section, to perforate, acidize and frac, and try it on a production test.

And I just -- just -- well, that's why we're here today to protest the salt water disposal in these zones.

Q You made some notes, did you not, on Mr. Wehmeyer's testimony as to what precise intervals Texaco proposed to inject --

A Yes, sir.

Q -- into?

A Uh-huh.

Q And you have now noted those on your cross section?

A Yes, I have.

Q Or some of them? Would you point out a few examples so Mr. Catanach can see what you're saying?

A Well, it's just -- it corresponds, they didn't miss a zone here.

They wanted to go in the Getty zone; next over here in our Kingry (sic) zone, which we haven't explored all that well but we had one well that flowing good oil and gas and a lot of water, picked right down in the next zone, that's a porosity zone, that's our Beasley B zone, and then right into our MWJ zone above, which is already open.

We did not have their intervals and we did not color this cross section to correspond to them, but it's -- well, they just picked up our best zones.

Q Pretty good correlation.

A Yes, it is.

Q Mr. Williamson, the fact that your wells, or some of them, are not open in any or all of these other and secondary objective type zones, salvage zones, whatever we might call them, does that mean in any way that you have abandoned or have no further hopes of establishing some additional recovery of oil from those zones?

A Certainly not. The only thing that's been abandoned, the Arabs have abandoned, so when the oil price went down we started trying to gather up money to pay bills, and we just haven't gathered up enough money to try some of these, but they're just -- they're just waiting there to be tried and at 16.75, do you want to spend your money doing it? We don't know, but there is definitely oil

in all of those zones.

Q You're here in opposition to Texaco's application. Can you -- can you briefly state for us, Mr. Williamson, what you're afraid of? What are you afraid adversely will affect --

A Well, when you start putting water down in the ground, unlike a waterflood where the water is forced to go in a particular area by water injection wells around producers, you go to inject water, you get a random spread of where the water is going to go, and normally, in these type of things, it's -- most of the water is going to go and fill in the most porous zone, and when it goes in the most porous zone, it's going to be directed to where the porosity and permeability takes it, or it could be directed to a well, such as our MWJ Federal 3 that has been open and producing in some of these zones, has the bottom hole pressure lowered, and the water that's injected will naturally gravitate toward the lower pressure area and any computer model that I've ever seen of that type of thing, the water will just go directly to that well, flood out the well, and by-pass whatever oil it went by on the way.

I really don't agree with the fact that you would get a benefit from the injection of water unless it was controlled and forced like a waterflood; just a random injection, I just -- I can't see how that would

benefit anything and it will go to the place where the lowest pressure and the highest porosity and permeability takes it.

Q So, Mr. Williamson, you are concerned, are you not, with the risk, whatever degree we wanted to put on it, the degree of risk of the permanent loss of some oil and gas reserves in those zones?

A Oh, I definitely -- that's why we're here and I definitely -- there's just no question in my mind that this will result in a lot of oil being left in the ground that could otherwise be recovered.

Q You heard Mr. Wehmeyer testify, Mr. Williamson, that he had performed some calculations and it was going to be 135 years before one of your wells currently open in there, in that upper zone, would be reached by the water.

Do you have an opinion on the --

A Well, I don't agree with that. There is a lot of reservoir space there but these are fairly young wells and that reservoir space has not been vacated. If you were just pumping into empty porosity, it could easily take that long to fill up, but the oil and gas are relatively incompressible substances and when you put that water in there it's going to shove things ahead of it. The water itself might not get there but the migration will be

felt long before those actual molecules get there and a detrimental effect will be felt long before those molecules get there.

Q Would the injection of water in a program such as this one proposed by Texaco, necessarily be at uniform rates and uniform volume --

A No.

Q - and strictly limited to exactly the perforations that that water is limited to?

A If you have four sets of perforations here, in all likelihood the water will go in the uppermost perforation set until it either gets clogged up with reservoir -- surface reservoir damage, or if there happened to be a higher porosity zone lower down that it would go into, and in my opinion if all these were open, all the water would go in this -- in this one interval (unclear).

It's hard to definitely say that, but it's going to go where the porosity and permeability takes it.

Q Let me ask you, Mr. Williamson, you're familiar with various zones, both depicted on your cross section and otherwise in this area.

Excepting Texaco's statement that it ha a need to dispose of water, does it have any other alternatives that it might find worthwhile to pursue?

A In the area if they want to find a disposal sand, there are sands available above this interval that will take (unclear) floods. I think they have one in their well about 4000 feet, and there well known and a lot of injection wells that are currently going into that zone and if they want to dispose of water in this well, that's the zone they ought to go for.

Q And I'm not asking you to agree to their injection into that zone ahead of time or anything like that, but in your opinion, based on your knowledge of the zone that you're talking about, would that avoid the problems if Texaco were to inject that you're concerned with here and talked about on your cross section?

A It's an extremely broad, well known, water-bearing, high porosity sand, two of them, in the -- my dad was call them in the Cherry Canyon. They can be mapped all over the basin. They go for miles and the -- available reservoir space is massive. And if you're going to do it, that's where it needs to go in my opinion.

MR. J. C. WILLIAMSON: And even those produce over seven miles from here.

Q Mr. Williamson, can you briefly kind of give us an overview or a short summary of the reason that we're here opposing Texaco in this case?

A Well, we have a lot of wells in this

area, and I personally have been -- spent most of my time out there since '82 drilling and completing these wells.

Of the J. C. Williamson wells listed here, I've personally drilled all of them and completed, completed all of them but one. I do the -- keep the field in shape, get the production reports, and I'm intimately familiar with this area and we just do not want to see these zones ruined because we know that there's oil there.

Q Is there anything else, Mr. Williamson, that I've neglected to ask you that you would like to say with reference to that exhibit?

A Nothing that I can think of.

Q Were Exhibits Two and Three prepared by you?

A Yes, they were.

MR. DICKERSON: Mr. Catanach, move admission of Williamson Exhibits Two and Three and I have no further questions or Mr. Williamson.

MR. CATANACH: Exhibits Two and Three will be admitted into evidence.

Mr. Carr?

CROSS EXAMINATION

BY MR. CARR:

Q Mr. Williamson, Exhibit Two shows cumu-

lative production by well in the immediate area of the disposal well. This is not broken down by zone, is it?

A No, it's not.

Q This is just the total from those wells.

Now, if I look at your map again, and I don't want to just go over what I tried to talk to your father about, but some of it was passed to you, the top two zones are above the Brushy Canyon.

In fact the top two zones are what is mapped on Exhibit Number One, isn't that correct?

A It's actually -- this line goes across the top of Exhibit Three.

Q And so this is actually a map above the interval into which Texaco want to dispose.

A That's true.

Q Now Texaco's well was actually in the bottom zone on this, that they now want to use. They actually produce from this lowermost zone, isn't that correct?

A Well, we did not have very good information on Texaco's well and the information we were furnished did not show exactly what Texaco had open, and the zones that they proposed to inject into, we did not know that, either.

Q And this is the zone, though, they do

propose to now use for injection.

A Right, yes, this is the zone.

Q And if they have been producing that, that would be one of the zones in a well which they now consider to be marginal.

A Right, that's true.

Q Now, as you've been drilling since 1982 out in this area, in fact your primary objective is this uppermost zone on Exhibit Number Three, isn't that correct?

A It is now, and when we started we did not know that that was our main objective.

Q But you've known that since you got into this and since '82. It's clear now that if you were to drill today that would be the primary objective, would it not?

A This would be the most productive, immediately productive zone.

Q And that's in the area that Texaco proposes to squeeze off.

A Yes.

Q Now if we go down to your Getty zone and we come over to the J. C. Williamson Brushy Draw MWJ Federal No. 1 Well, and we come down and we look in the Getty, this is where that symbol is, POT/33. What is POT?

A That stands for potential. This well was produced in this zone by itself for several weeks and months.

Q And you established an initial flow rate on that well.

A Yes, and this is what we submitted to the Bureau of Land Management in Carlsbad, when we potentialed the well and put it on production.

Q When you drill a well and complete in a zone like this, isn't it typical out here for a well to decline fairly rapidly early in its life from the initial potential --

A It depends on the quality of the zone. This one did.

Q Let's talk about the two wells that are approximately a half mile from the disposal well, the No. 2 and the No. 3 and I don't think I can help you beyond that.

A MWJ Federal.

Q Okay, in those wells what was the initial potential on those wells, do you have that?

A Potential on the No. 2 is 250 oil, 350 water.

Potential on the No. 3 was 247 oil, 297 water.

Q And is that in that uppermost zone?

A No, these were combined between all of these zones together initially.

Q And do you have it broken down by zone?

A In the Delaware when you -- you are allowed to commingle zones, you don't differentiate by zones in the Delaware like you do in some other zones.

Q You don't have an initial potential on the lowermost zone shown on Exhibit Number Three.

A Not in these wells; however, we do in other wells that are on this cross section. We have two of them.

Q Do you have any idea how that lower zone performs, initial potential versus sustained production?

A This one here?

Q Yes, sir.

A I have some evidence, decline curves, and production history of our UCBH WW Federal No. 1 and No. 3, where we had the No. 3 several months of this zone by itself, and then in the No. 1 we initially came in and treated the well in that, put a retrievable bridge plug, and came back to the upper zone.

At a later date we pulled the plug and put them together. If you look at the production data, you can see a substantial increase in production when that was done. And we have that here and we would be perfectly

willing to submit that.

Q If in the Texaco well the lower zone had an initial potential and then it quickly dropped off --

A Uh-huh.

Q -- would that surprise you? Would that be atypical for that lower zone?

A When you have Delaware Sands of this nature, the manner in which it drops off is dependent on the quality of your cement and the quality of your frac job.

Now, Mr. Wehmeyer testified that they had some question about their cement or they wouldn't have gone in and squeezed and resqueezed and shot squeeze holes. That's reflected in the problem with the cement bond log, and if you have a zone like this and you don't put a big enough frac, it will come roaring in and 90 days later it will be gone. It won't be making much. The Delaware doesn't know it's supposed to produce; you've got to make it produce; that's why you frac a well.

Q Even if you've done a proper cement job, couldn't that also happen in the well because of the nature of this formation?

A We have had wells that we initially put like 20,000 gallons of frac that came in very well and declined. We went back and put 60,000 gallons of frac and

got the production back and it seems to be staying.

Q In the lower zone in the five wells that you have open in the lower zone on Exhibit Number Three, do you know what those lower zones are in fact producing as opposed to the total cumulative production?

A It is --

Q Total production from the well?

A What you have to do is your Delaware has a very definite decline trend once you establish it. If you add another zone the decline trend of the old zone will continue and your incremental has got to be allocated to your new zone.

But we have two wells that are only in two zones so you can project the decline and you can -- you can -- with a reasonable mathematical certainty establish what's coming from where. You don't have to do that for the government reporting purposes but for reservoir purposes or planning purposes you need to do that.

Q Do you know what's coming from those five wells in that lowermost zone?

A In these -- in these two wells, UCBH No. 1 and No. 3, we have an excellent idea.

In our MWJ with five zones open we really don't know that closely.

Q Okay. On the two wells on the righthand

end of this cross section, you said you had a pretty good idea. About how much production is coming from that lower zone?

A These wells today, after (unclear) making approximately 50,000 barrels, both wells are making about 30 barrels of oil total today. In my estimation 20 is coming from the upper zone, 10 is coming from our lower zone, and this can be substantiated with our decline curves and our production history.

Q Do you know, how long have those lower zones been open?

A Well, this particular well, UCBH No. 1, that was the first zone that we opened. We put it behind pipe, tried this one, and that's been open again and producing since '86.

Q When you first opened it, what did it potential at?

A It came in very well. I have the -- I had the daily drilling report on that well and as I remember, when we did the well, we didn't potential it there. We were still looking for something that would carry the cost of the well.

We came up here and potentialed this well solely in this zone and when you add a zone like that in a Delaware series, you don't re-potential the well.

Q But you opened the lower zone first, did you not?

A Yes, that's correct.

Q And what did it do when you opened it? How did it produce?

A It came in, I would say, 40 to 50 barrels a day with a substantial amount of water and quite a bit of gas.

Q And when was that?

A That was in the summer of 1982.

Q So then it's dropped down to 10 since that time and you've opened other zones in the well.

A Well, the reason we didn't go with that zone at the time, is that there was no water disposal available in the area. We were forced to trucking out 2-or-300 barrels of water a day and that cleaned out any chance we had at that time to make any money with that volume of oil.

Q Now you have disposal wells yourself.

A Yes.

Q Does anyone else in the area have disposal wells?

A Currently there are two other disposal facilities to the north of this.

Q And how far away are those?

A They are, I would say, I have to look on that, about 4 miles north of this well.

Q There are a number of other operators listed on the top of these logs. Are you disposing -- are they disposing water in your disposal wells?

A Yes, I take care of a variety of customers throughout that area, including Texaco.

Q And this is -- so these are -- is it right to characterize this as a commercial disposal service?

A Yes.

Q And so you charge a fee to those people for disposing of water.

A That's correct.

Q And if Texaco had it's own well it would no longer need, I would assume, need your services, is that right?

A Well, I would hope that they -- that they are going to take a look at this and then decide that they don't want to do that any more, but I can use the money that they're paying me right now.

Q Let me ask you this: Wells four miles to the north, what zone are they disposing in, do you know?

A They're disposing in the Upper Delaware; Ramsey Sand.

Q And is that the -- is that above the two sands in the Cherry Canyon that could take Noah's flood?

A Yes, it's probably 6-or-700 feet above that.

Q Now Mr. Dickerson was being very careful, he doesn't want you to commit on whether or not you'd object to a disposal interval up above, where we could put Noah's flood (not clearly understood.) Do you know exactly what intervals those are?

A I can show them on the log that they have submitted. I think it is their Exhibit Three.

Q Could you give me the footage on those? Or the depths?

MR. J. C. WILLIAMSON: You want them on the offset well?

Q If you can identify them for my purposes, that's all, it would be fine, in any particular well.

MR. J. C. WILLIAMSON: In the offset well, the No. 1 UCBH WW, it's in the -- it's about, I'd say, 1500 from this well that they're injecting in.

The main one comes in at 3950, I'll say, and it's 10, 20, 30, 40, 45 feet.

The other one right here comes in at 40 -- 4,010 and it's 10, 20, 30, 32, 34 feet. You

can have this one because it's a pretty good one here and it will get into there and that is the -- (unclear) down there, there's a big pool down there in it, but it displaces water, and it comes in at 4080 and it's about -- no, 4075, and it's about 25 feet.

This one may be productive down here. We have never tested these wells. All this group in here, I think, will eventually be productive. We sure need to keep the water out of it, if you're going to inject into it, and keep the water from going up because there's production in all those (unclear).

Q Now the question I have for you is, are you in a position today to waive objection to Texaco disposing into those zones?

A Well, I can't, you know I can't commit to that. Your paperwork you submitted in here, we'll have to take it under advisement to make that decision at that time.

Q It's a good suggestion for today but not good enough to commit; can't sign up on this one.

A Can't sign up but we're here to defend what -- what we're here to stand by.

MR. J. C. WILLIAMSON: Well, one thing you've got to watch, the cement is much weaker up in that part of the country than you're going to get out

somewhere else, because cement gets worse as it goes up, you know.

Q Now, if I understand the testimony that you've presented today, down here in the Brushy Canyon, the Getty is probably the best zone.

A In my personal opinion in this area, nothing can touch this MWJ down here.

Q That's the lowest zone.

A The lowest zone.

Q And then the second best zone would be the Getty.

A That's correct.

Q And in your wells, how many of the -- of them actually have the Getty open in it to date?

A We have four of them open in that Getty zone.

Q Thank you, Mr. Williamson, that's all I have.

MR. DICKERSON: I have no questions.

MR. CATANACH: I have no questions of the witness. He may be excused.

Would you gentlemen like to make closing statements or dispense with it, or --

MR. J. C. WILLIAMSON: Well,

all I would like to say is (thereupon comments were made off the record.)

MR. DICKERSON: I think the problem is clear. If Mr. Carr makes a statement, well, I'm going to make one, too.

MR. CARR: Go to it.

MR. DICKERSON: If he shuts up, so will I.

MR. CARR: I think it would be worth while for Mr. Dickerson to make his statement, because I won't be long but I'm going to say something.

MR. DICKERSON: Okay. Mr. Examiner, I have done a considerable number of cases involving an application for permission to dispose of water and in my experience I have never seen anyone waltz in with a situation such as Texaco has here today.

We have eight wells within the one-half mile circle. The zones of porosity in those wells, which gives some indication of the recovery of additional hydrocarbons at some point in time, are the same zones that Texaco necessarily has to look to in which to choose a zone to inject.

I would submit that Texaco has given virtually no consideration to the rights of the Williamsons in their offsetting wells and I'm limiting my

argument to those within the one-half mile area of review. We have a large number slightly outside that one-half mile area.

I think it's clear from the record what's going on here; that Texaco wants to get rid of its water but they want to get rid of this water without regard to the rights, the correlative rights of its offsetting working interest owners, specifically Mr. Williamson, and I would submit that this would be a proper case not to limit Texaco in any way, simply to deny outright its application and let them find another place to get rid of water.

MR. CATANACH: Mr. Carr.

MR. CARR: Texaco comes before you today with two things: A need to dispose of some water and a well that's at depletion, and they propose to use it for the purpose of disposal.

They want to squeeze off the zone that's the basic producing zone in the area. That's the zone that is depicted in Exhibit Number One.

In response to this what we have is a lot of maybe, what if, if the oil price comes back, maybe we can get something out here, there, or elsewhere, and yet they're saying, oh, you're going to hurt the bottom zone and when we look at the bottom zone, it's

gone from maybe 50 barrels down to 10 by their estimates, and we submit that the whole bottom zone is marginal.

We're prepared to come in, squeeze off the upper zones that are producing, and put water into this reservoir at rates which we submit during any reasonable time frame will have no impact on the off-setting properties.

The people who are opposing us today are the people who run the disposal well who once a month get a check for about $7000 from Texaco that will terminate if in fact you grant this application. We submit that it is sound from the technical point of view and that the only reason we're being opposed is that they do need the revenue until the oil prices come back again.

MR. CATANACH: All right, there being nothing further in this case, it will be taken under advisement and this hearing is adjourned.

C E R T I F I C A T E

I, SALLY W. BOYD, C. S. R. DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9333, heard by me on June 8 19 81.

David R. Catanach, Examiner
Oil Conservation Division