CASE 6477: SUN OIL COMPANY FOR A WATER-FLOOD PROJECT, EDDY COUNTY, NEW MEXICO

Continued to March 14

CASE NO.

6477

Application,

Transcripts,

Small Exhibits,

ETC.

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico.

CASE 6477

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Lynn Teschendorf, Esq.
Legal Counsel for the Division
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Santa Fe, New Mexico 87503

For the Applicant: Jason Kellahin, Esq.
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Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: We'll call next Case 6477.

MS. TESCHENDORF: Case 6477. Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, appearing on behalf of the applicant, and we have one witness to be sworn.

(Witness sworn.)

GARY MILLER

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you state your name, please?

A. My name is Gary Miller.

Q. By whom are you employed and in what position, Mr. Miller?

A. I work for Sun Oil Company as Production Engineer.

Q. And have you ever testified before the Oil Conservation Division or one of its Examiners and made your qualifications a matter of record?

A. No, I haven't.

Q. For the benefit of the Examiner, would you briefly outline your education and experience as an engineer?

A. I graduated from the University of Texas in 1975 with a Bachelor's degree in petroleum engineering. Then I joined Sun and I've been working as a production engineer for the past four years.

Q. Where have you worked for Sun Oil Company?

A. In Midland.

Q. And does that area include the area involved in this application?

A. Yes, sir, it does.

Q. And have you personally investigated the situation as to this particular project?

A. Yes, that's correct.

Q. And was it done under your direction?

A. Yes, it was.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q. (Mr. Kellahin continuing.) Mr. Miller, what does Sun Oil Company propose in Case 6477?

A. Sun is requesting permission to initiate a waterflood in the East Millman Queen-Grayburg Pool on our unit.

Q Now the acreage has already been unitized, is that correct?

A We had a hearing here approximately a month ago for permission to unitize and I haven't heard the results of that hearing yet, but we have -- we do have --

MR. KELLAHIN: Excuse me, I think that's already been approved, has it not?

MR. NUTTER: I couldn't say right offhand. I think it has, but I'm not sure.

MR. KELLAHIN: For your information, it has been approved.

Q Now, referring to what's been marked as Exhibit Number One, would you identify that exhibit, please?

A Exhibit Number One is a map of the unit area, showing location of the unit and the proposed injection wells. These wells are the ones outlined in green there.

It also shows all other wells within two miles of the unit and identifies the producing formations and the operators of these wells.

Q That's shown by the legend in the lower lefthand corner of the exhibit?

A Yes, sir, that is correct.

Q Now, to the west of your unit is there another waterflood project in operation?

A. To the west, that's correct. Depco operates their East Millman Queen-Grayburg waterflood, and they've been injecting since approximately 1964. This is a direct west offset to our proposed waterflood.

Q. Now the exhibit substantially covers the entire East Millman Pool, does it not?

A. Yes, sir, it does.

Q. So that would really be practically all the wells in the pool?

A. That's correct. We're on the east end and Depco's on the west end.

Q. Do you have anything to add in connection with that exhibit?

A. Nothing further.

Q. Now, referring to Exhibit Number Two, would you identify that, please?

A. Exhibit Two, titled Tabular Summary of Surrounding Wells, is a tabulation of wells located within one-half mile of the unit area. It shows wells, operators, location, size and setting depth of all casing strings, sacks of cement, cement tops, total depth, and producing interval.

Now in this tabulation there are approximately seven wells that show some indication of some possible problems, either in the way that the well was plugged

to satisfy the existing requirements, or that the top of the cement behind the different casings strings is not adequate to provide protection for the fresh water zone and also to isolate the injection zone.

I'll quickly point out these wells. The first one is on the fifth page, Depco Well No. 181. There is a fresh water zone in this area at approximately 200 feet and in this particular well there is no cement across this fresh water zone.

Another one on the next page is the Donnelly Drilling Company Kenny State No. 1. This particular well has a surface setting depth of 230 feet, which might not possibly cover all of the fresh water zone.

Same thing on the next one, casing set at 250 feet.

Those tops of cement shown on those two wells is calculated and not measured.

Here's one that's kind of interesting on the next page. It's John Yates, the Campbell Gwaltney No. 1. This particular well originally was producing from Queen-Grayburg. They went in there and they found that the well had bridged at 1300 feet and at that time they went in there and perforated the Seven Rivers. I don't know what bridged means, but there is no cement across the Queen-Grayburg zone. There would be a possible chance of

communication there.

Also on the next page there's an M. Yates the third NNC State Well No. 1. It has a calculated top of cement behind the surface string of 170 foot, which would indicate that the fresh water zone is not protected.

The next one is Nix & Curtis R&B State No. 2. We calculated the cement plugs in this P&A'd well, and there is no cement across the unitized interval; however, there is a plug between the fresh water zone and the unitized interval.

The next one, the Ohio Oil Company New Mexico Merchant No. 1, we have practically no information on it. It was drilled and plugged in 1925. About all that we do have on it is a TD. As far as any -- there were shown two casing strings, one was -- the deepest one at 400 feet. There wasn't any indication of cement and we couldn't come up with any procedure as to how the well was plugged. That's a north offset to our proposed unit.

We're trying to see if we can't check into the records further or possibly contact some of these operators and see if we can't clear up some of these -- information that we're not too sure on.

Q. Will supply the Commission with any information you do obtain in that effort?

A. Yes, we will.

Q. Now you say some of them the fresh water zone is not protected. By that you mean that there is no cement across that interval, is that what you mean?

A. That is what I mean, yes.

Q. It is cased.

A. The wells are cased.

Q. You don't have any information on the condition of the casing?

A. No.

Q. Now referring to what has been marked as Exhibit Number Three, would you identify that exhibit, please?

A. Exhibit Number Three includes well schematics of all plugged and abandoned wells in one-half mile of the unit area, and here again you can see what I was talking about on the Ohio Oil Company well. We didn't show anything in the wellbore because we were unable to find any information as to how it was drilled and plugged, and also the Nix & Curtis R&B State No. 2. There was no plug across the unitized interval, which is approximately 1700 to 2100 feet.

Q. Those are the only two that you have a problem with, those plugged and abandoned wells?

A. Yes, sir, that's correct.

Q. Now referring to what has been marked as

Exhibit Number Four, would you identify that exhibit please.

A. Exhibit Number Four includes well schematics of the proposed injection wells in the proposed configuration.

There are currently in the unit area, there is one classified as a water disposal well that is in the Queen-Grayburg zone, and we propose eleven additional injectors, which will be a total of twelve.

These diagrams show that the wells do have adequate cement protection opposite the unitized interval with the possible exception of the Kersey Bass No. 1, which is the second one. On this particular well we calculated the top of the cement behind the production casing at 1720 feet, and this is approximately 70 foot above the unitized interval, so if our calculations were a little bit off there, we wouldn't have cement opposite this interval.

We plan to monitor all casing strings on these injection wells and also the producers, to be sure that we don't have any injection going out of zone.

Q. Now in each instance on your injection wells, would you inject through tubing and under the packer?

A. Yeah, the injection will be through cement lined tubing under packers. Now, half of these wells we're

showing two strings of tubing. This is to better isolate isolate the water into the Queen and the Grayburg zones in the proportion that we desire to proportion it, we'd like to inject into them.

The other half of the well's injection is through a single tubing string. This is due to the fact that casing in these wells is 4-1/2 inch and we're unable to locate any dual packers of this size, this small a size.

Q. Now will the casing tubing annulus be filled with an inert fluid?

A. Yes, sir, that is correct.

Q. And of course with the two strings of tubing, why, that can't be done clear to the lower end, can it?

A. No. Between the packers.

Q. Between the packers?

A. It cannot be protected; there'll be injection in that area. Between the packers the annulus will not be protected with corrosion inhibited inert fluid.

Q. But that will be entirely within the unitized formation.

A. Yes, it will.

Q. Now referring to what has been marked as Exhibit Number Five, will you identify that exhibit, please?

A. Exhibit Number Five, titled Miscellaneous

Injection Information, shows the injection zones that we're planning to use.

The first one is the Queen zone, the top of which is at 1700 feet, and the Grayburg zone, which is 1950 feet.

The next section identifies the injection fluid we'll be using. It will be approximately 90 percent fresh water and the remaining 10 percent will be produced water from the same Grayburg zone.

The fresh water will be obtained from the Double Eagle Corporation, which supplied the drinking water for the City of Carlsbad, and the salt water will be produced right in the same Grayburg.

Anticipated injection pressure will be 1300 pounds and the injection volume will be approximately 400 barrels a day per well.

Q. Now as the flood progresses will you re-inject produced water?

A. Yes, we will.

Q. So the proportion of 90 percent to 10 percent fresh water will change?

A. Yes, it will, as the life of the flood progresses.

Q. Now referring to Exhibit Number Six, would you identify that exhibit?

A. Exhibit Number Six, titled Fracture Gradients, is a tabulation of all the wells in the unit, showing the top perforation and date of the fracture treatment, the instantaneous shut-in pressure after the fracture treatment, the fluid gradient that was in the well at the time, and from this data formation fracture gradient was calculated, and the average fracture gradient for all these wells was .887 psi per foot.

I'd like to bring up the fact that this average instant shut-in pressure here of 968 pounds is quite a bit lower than the injection pressure we were proposing, and it would seem to indicate that we'd be injecting above the fracture pressure, but we do plan to run step-rate tests on all the injection wells to determine exactly what this fracture pressure is, and we plan to stay underneath this pressure.

This data here, some of it is twenty years old, and we just don't know really what it is in the current conditions.

Q. Now as these tests are made, will you be willing to furnish the Commission with information?

A. Yes, we will.

Q. Now referring to what has been marked as Exhibit Number Seven, would you identify that exhibit, please?

A. Exhibit Number Seven is titled East Millman

Queen-Grayburg Waterflood, Depco Operator. It shows all of Depco's injection wells and just some tests from October and November of last year, showing the volume of water that they're injecting and the pressure.

This is the reason for the 1300 pounds pressure we're requesting. It's based on the history we've seen in Depco's flood.

Q Have there been any indications of the fromation breakdown in the Depco flood?

A Not that I'm aware of.

Q To your knowledge? Now, referring to what has been marked as Exhibit Number Eight, would you identify that exhibit, please?

A Exhibit Number Eight is a letter from the State Engineer's Office of New Mexico, stating that fresh water in the East Millman area is produced from the Artesia Group formation at a depth of approximately 200 feet. This is surface water.

Q And that's the water you're referring to in those instances where there was no cement.

A Yes, that's correct.

Q Now referring to Exhibit Number Nine, would you identify that, please?

A Exhibit Number Nine is a type log showing the zones that we will be injecting into and these zones

are marked in yellow. The top one is the Queen zone. The top is at 1690 feet.

The next one is the Grayburg with the top at 1958 feet, and again, the injection zones are marked in yellow.

Q With the two strings of tubing you will be able to control the injection rates in the two different formations?

A Yes, we will.

Q Now referring to Exhibit Number Ten, would you identify that, please?

A Exhibit Number Ten contains some water analyses from both the fresh water that we will be getting from Double Eagle and also the Queen-Grayburg produced water, two water analyses there, and a letter is also attached, stating that these two waters are compatible from our service laboratory.

Q Now Exhibit Number Eleven?

A Exhibit Number Eleven, title East Millman Queen-Grayburg Pool Salt Water Disposal Well Data, shows some salt water disposal wells in the area and some tests, injection volumes and pressures for September and October of '78. These particular wells, the Bass No. 3 is the direct north offset to our unit, and the Eddy "AN" State No. 5 is inside of our unit. Both of these wells are dis-

posing into the Queen-Grayburg Pool.

Q Do you know which of the formations they're disposing in, whether Queen or Grayburg, or is it open in both?

A One of them is open in both, but I couldn't tell you which one, right now.

Q Now referring to Exhibit Number Twelve, would you identify that exhibit?

A Exhibit Number Twelve, titled proposed East Millman Unit Projected Performance, shows our study of the base case of what this unit would do with the continued current operations without any water injection.

It shows the years that we project this thing would produce and the amount of oil and gas, down to an economic limit. We calculated the remaining primary was approximately 184,000 barrels.

Q And that is based on current production?

A That is based on current production, for straight decline.

Q Refer to Exhibit Thirteen, would you identify that?

A Exhibit Number Thirteen shows the same information in the case that we do install this 80-acre 5-spot waterflood.

It shows the years, the expected oil pro-

duction and gas production. It shows the total remaining reserves of 1,735,000 barrels. Operating expenses.

Q. Now referring to Exhibit Number Fourteen, would you identify that?

A. Exhibit Number Fourteen shows the additional recovery we expect to gain from the waterflood and this is the difference between the two previous lists. It shows the years and additional recovery expected. This total is 1,550,000 barrels.

If you'll note in the first -- in the second and third year, we expect a drop in production. This is due to converting the current producers to water injection, and then in the fourth year we expect response.

Q. Now referring to Exhibit Number Fifteen, would you discuss that exhibit?

A. Exhibit Number Fifteen, titled Investment Cost, is a breakdown of the costs required to install this flood, conversion work, facilities and lines, et cetera, and that total is $677,000.

Q. Against which you will recover $1,550,000.

A. That's correct.

Q. So, in summary, approval of this waterflood project will result in the recovery of oil that would not otherwise be recovered, is that correct?

A. Yes, sir, that's correct.

Q. And the unit could be operated at a profit?

A. Yes, it can.

Q. Were Exhibits One through Fifteen either prepared by you or under your supervision?

A. Yes, they were.

MR. KELLAHIN: At this time I'd offer Exhibits One through Fifteen, inclusive.

MR. NUTTER: Sun's Exhibits One through Fifteen will be admitted in evidence.

MR. KELLAHIN: That's all I have, Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Miller, on Exhibit Number Six, your fracture gradient exhibit, the average here is 968 pounds for the instantaneous shut-in pressures.

Now we only have instantaneous shut-ins on about 10 wells there, or twelve. Are any of those wells injection wells that are proposed?

A. The injection well is the Eddy State "A" No. 5, and the data wasn't available on that well.

The wells where the data is shown are all producers.

Q. I see. So this exhibit doesn't show instantaneous shut-in pressures on any of the injection wells.

A. No, sir.

Q. That you're proposing?

A. It does not.

Q. And while the instantaneous shut-in averages 968, it does go as low as 400 pounds on one well there.

A. Yes, sir, it does.

Q. Why do you think that running step rate tests is going to show a higher indicated reservoir fracture pressure than these instantaneous shut-ins?

A. Due to change of conditions in the reservoir.

Q. You don't think the rock has changed, do you?

A. The fluid reservoir pressure has changed.

Q. Yeah.

A. But as I said, we plan to run step rate tests to precisely determine what it is in every well, and we will use this to limit our injection pressure.

Q. Now you're proposing an injection pressure on one of these exhibits of something like 1300 pounds, I think.

A. Yes, sir.

Q. This Exhibit Number Thirteen, which shows recoveries over the years would be your calculation of recoveries based on a 1300-pound injection pressure, I presume.

A. That's assuming we can get this approximately 400 barrels of water per day into each well.

Now if we go in there and find out we are not able to do this volume of water in there, then this recovery would be less and it would be extended over a longer length of time.

Q. Now you in other exhibits show that the injection pressure in the Depco flood to the west, is something like 1100 pounds, is that right? What exhibit number was that, that you have the Depco pressures on?

Okay, it's Exhibit Number Seven. It averages 1117 pounds. Now, have you made any study of the Depco project to the west?

A. We've looked at it, yes, sir.

Q. Are you aware that millions and millions of barrels of water have been injected into that project and a certain amount of oil has been recovered but the volume of water that's been injected doesn't seem to add up to the original reservoir voidage and the amount of oil that's been produced?

A. No, sir, I wasn't aware of that, but what I have looked at on Depco's flood is their response, and as I said, they've been injecting since '64, and they have seen a flat decline, approximately flat, since that time, so they have seen a lot of additional oil due to this flood.

Now, as far as their injection volumes and cumulative, I'm not aware of that, no.

Q. Do you know if this 1100 pound pressure that they were operating under when this exhibit -- on the date that this exhibit was prepared, has been typical of their injection pressures throughout the life of the flood?

A. I can't answer that.

It's what their flood is doing at this time. Now their initial injection pressures, I don't know what they were.

Q. And yet you're proposing an injection pressure some 200 pounds higher than what they're using in here.

A. Yes, sir. 1300 was chosen because it -- one of the wells' range was 1300, and they were ranging between 1300 and 1200 and 1100.

Q. If my quick analysis of your well schematics on the injection well is correct, I believe that your most shallow injection depth in any of these wells would be 1723 pounds, Mr. Miller, based on -- 1723 feet, I'm sorry, and based on the Commission's or Division's arbitrary, admittedly, injection pressure limitation of .2 of a pound, the maximum pressure to be injected into that well would be some 345 pounds.

A. I wasn't aware of that, sir.

Q. You hadn't calculated what .2 of a foot --

.2 of a pound per foot would give you?

A. No, I hadn't, but --

Q. You don't think it would go over 345 pounds?

A. There's no way we could flood at that pressure.

Q. I see.

MR. NUTTER: Are there any further questions of Mr. Miller? He may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: That's all I have, Mr. Nutter, thank you.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 6477?

We'll take the case under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
1000 Plaza Blanca (505) 471-2463
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

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

Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6437 heard by me on 3/14 1979.

Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
1000 Plaza Blanca (505) 471-8469
Santa Fe, New Mexico 87501

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	Southwest Prod. Corp.	Southwest Prod. Corp.	DEPCO
Lease	Lowe State	Lowe State	Eddy State "BN"
Well Number	1	2	1
LOCATION			
Unit	G	H	P
Section	11	11	11
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	7	7	7-5/8
Setting Depth (Ft.)	624	640	602
Sacks Cement	150	150	450
Cement Top (Ft.)	Surface*	Surface*	Surface
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2294	2235	2246
Sacks Cement	100	100	265
Cement Top (Ft.)	1400*	1400*	Surface
TOTAL DEPTH (Ft.)	2302	2254	2246
PRODUCING INTERVAL (Ft.)	P&A	P&A	Queen-Grayburg (1813-2194)

*Theoretical calculation based on hole size, sacks of cement used and a yield of 1.32 cubic feet of fill per sack of cement.

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 2

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	Eddy ST "BN"	Eddy ST "BN"	Eddy ST "BN"
Well Number	2	3	4
LOCATION			
Unit	O	I	J
Section	11	11	11
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	7-5/8	7-5/8	7-5/8
Setting Depth (Ft.)	604	596	575
Sacks Cement	225	375	273
Cement Top (Ft.)	Surface	Surface	Surface
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2225	2234	2230
Sacks Cement	250	250	250
Cement Top (Ft.)	Surface	Surface*	Surface*
TOTAL DEPTH (Ft.)	2225	2235	2230
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1815-2200) WIW	Queen-Grayburg (1806-2114)	Queen-Grayburg (1816-2199)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	St. 648
Well Number	148	149	184
LOCATION			
Unit	A	B	G
Section	14	14	14
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	10-3/4	10-3/4	10-3/4
Setting Depth (Ft.)	327	423	386
Sacks Cement	75	75	100
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2175	2287	2210
Sacks Cement	250	300	225
Cement Top (Ft.)	790*	630*	970*
TOTAL DEPTH (Ft.)	2175	2288	2563
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1740-2096)	Queen-Grayburg (1818-2112)	Queen (1756-1909) WIW

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	St. 648
Well Number	185	161	178
LOCATION			
Unit	H	I	P
Section	14	14	14
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	10-3/4	8-5/8	10-3/4
Setting Depth (Ft.)	339	344	430
Sacks Cement	75	100	75
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2201	2280	2388
Sacks Cement	225	125	275
Cement Top (Ft.)	960*	1090*	870*
TOTAL DEPTH (Ft.)	2201	2285	2389
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1738-2136)	Queen-Grayburg (1718-2199)	Grayburg (2092-2264)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	Malco St. Tr. 1
Well Number	181	182	6
LOCATION			
Unit	J	O	B
Section	14	14	23
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	10-3/4
Setting Depth (Ft.)	290	290	393
Sacks Cement	None	50	125
Cement Top (Ft.)	-	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	7	5½	None
Setting Depth (Ft.)	1760	1715	
Sacks Cement	50	50	
Cement Top (Ft.)	830*	828*	
LONG STRING		Liner	
Size (In.)	4½	3½	4½
Setting Depth (Ft.)	2317	1643-2385	2361
Sacks Cement	75	50	235
Cement Top (Ft.)	1430*	1640*	1060*
TOTAL DEPTH (Ft.)	2317	2385	2364
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1738-2268)	Queen-Grayburg (1712-2090) WIW	Grayburg (2172-2198)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	KERSEY CO.	DONNELLY DRLG CO.	TEJAS PETRO. CO.
Lease	State A	Kinney St.	Sinclair St."A"
Well Number	2	1	1-E
LOCATION			
Unit	D	L	E
Section	24	18	18
Township	19S	19S	19S
Range	28E	29E	29E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	9-5/8
Setting Depth (Ft.)	340	230	258
Sacks Cement	175	100	50
Cement Top (Ft.)	Surface*	Surface*	50*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	5½	4½
Setting Depth (Ft.)	2278	2414	2344
Sacks Cement	175	185	200
Cement Top (Ft.)	1260*	1010*	1420*
TOTAL DEPTH (Ft.)	2282	3010	2851
PRODUCING INTERVAL (Ft.)	Grayburg (2165-2222)	P&A	P&A

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	JOHN A. YATES	JOHN A. YATES	JOHN A. YATES
Lease	Campbell-Gwaltney	Elizabeth Dundas	Elizabeth Dundas
Well Number	1	1	2
LOCATION			
Unit	D	M	N
Section	18	7	7
Township	19S	19S	19S
Range	29E	29E	29E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	7
Setting Depth (Ft.)	262	283	309
Sacks Cement	80	50	50
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2314	2163	2199
Sacks Cement	300	125	100
Cement Top (Ft.)	650*	1110*	660*
TOTAL DEPTH (Ft.)	2314	2227	2348
PRODUCING INTERVAL (Ft.)	**Seven Rivers (1258-1266)	P&A	P&A

** Originally produced from Queen-Grayburg Zone (1810-2194) - Well "Bridged" @ 1300' and was subsequently perforated in the Seven Rivers Zone. Queen-Grayburg zone was never plugged with cement.

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	M. YATES III	NIX & CURTIS	OHIL OIL CO.
Lease	N&C State	R&B State	Merchant N. M.
Well Number	1	2	1
LOCATION			
Unit	M	G	N
Section	6	12	1
Township	19S	19S	19S
Range	29E	28E	28E
SURFACE CASING			
Size (In.)	8-5/8	None	6-5/8
Setting Depth (Ft.)	433		464
Sacks Cement	50		+
Cement Top (Ft.)	170*		+
INTERMEDIATE CSG			
Size (In.)	None	None	+
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	5½	None	+
Setting Depth (Ft.)	2795		
Sacks Cement	300		
Cement Top (Ft.)	1300		
TOTAL DEPTH (Ft.)	2839	2580	3055
PRODUCING INTERVAL (Ft.)	P&A	P&A (Dry)	P&A (Dry)

1925

+ Required data not available. Insufficient data available to permit estimation.

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION		
Operator	PERRY R. BASS	KERSEY & CO.
Lease	Seltzer - St.	Bass
Well Number	2	3
LOCATION		
Unit	D	F
Section	12	12
Township	19S	19S
Range	28E	28E
SURFACE CASING		
Size (In.)	8-5/8	8-5/8
Setting Depth (Ft.)	323	420
Sacks Cement	300	50
Cement Top (Ft.)	Surface *	Surface *
INTERMEDIATE CSG		
Size (In.)	None	None
Setting Depth (Ft.)		
Sacks Cement		
Cement Top (Ft.)		
LONG STRING		
Size (In.)	4½	5
Setting Depth (Ft.)	2365	1900
Sacks Cement	410	100
Cement Top (Ft.)	610*	1340*
TOTAL DEPTH (Ft.)	2370	1900
PRODUCING INTERVAL (Ft.)	P&A	Queen (1836-1869) WIW

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SOUTHWEST PROD. CORP.
LOWE STATE NO. 1
SEC. 11, T.-19-S., R.-28-E.
UNIT G
ELEV. 3440' KB

TOP OF CMT. @ SURFACE

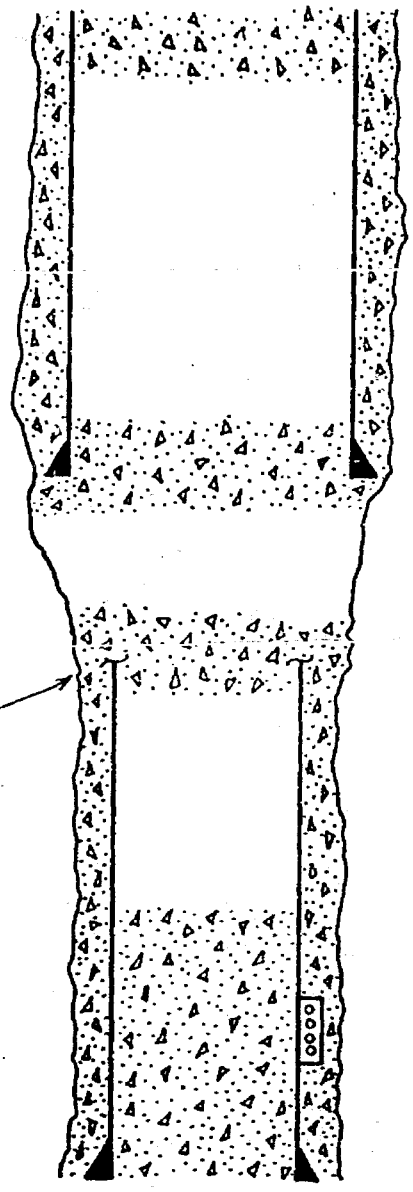
7" 20# CSG. @ 624'
W/ 150 SX CMT.

4 1/2" CSG. CUT @ 1400'
& PULLED

TOP OF CMT. @ 1400'
(CALCULATED)

4 1/2" 9# CSG. @ 2294'
W/ 100 SX CMT.

T.D. 2302'



10 SX CMT. PLUG @ SURFACE

100' CMT. PLUG 575' - 675'

100' CMT. PLUG @ 4 1/2"
CSG. STUB

60 SX CMT. PLUG 1750-2294'

QUEEN-GRAYBURG PERFS
1803 - 2183'

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 3

NOTE: MUD LADEN FLUID PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SOUTHWEST PROD. CORP.
LOWE STATE NO. 2
SEC. 11, T.-19-S., R.-28-E.
UNIT H
ELEV. 3430' KB

TOP OF CMT. @ SURFACE

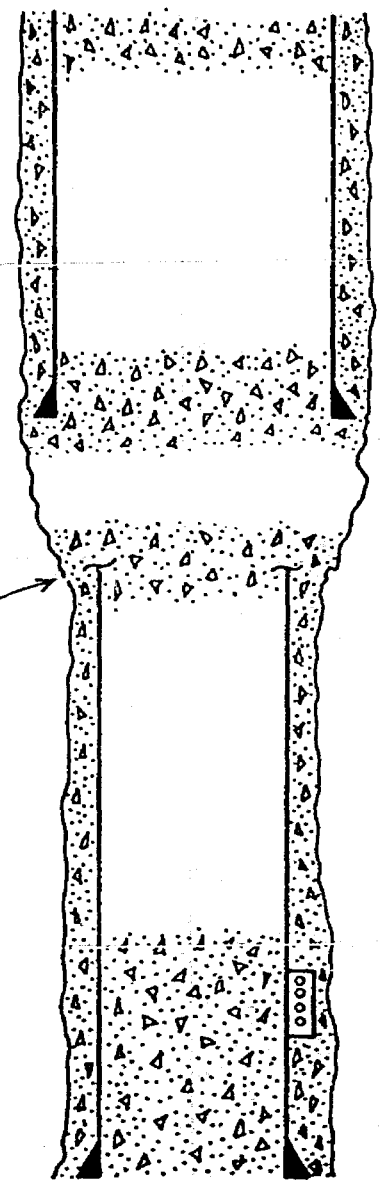
7" 20# CSG. @ 640'
W/150 SX CMT.

4 1/2" CSG. CUT @ 1400'
& PULLED

TOP OF CMT. @ 1400'
(CALCULATED)

4 1/2" 9.5# CSG. @ 2235'
W/100 SX CMT.

T.D. 2254'



10 SX CMT. PLUG @ SURFACE

100' CMT. PLUG 575 - 675'

100' CMT. PLUG @ 4 1/2"
CSG. STUB

50 SX CMT. PLUG 1800 - 2235'

QUEEN-GRAYBURG PERFS
1840 - 2178'

NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

OHIO OIL CO.

MERCHANT NEW MEXICO NO. 1

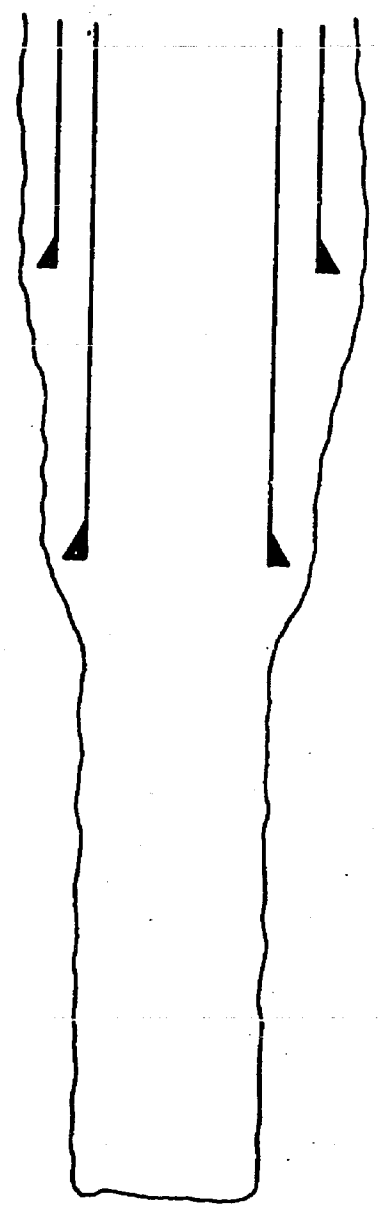
SEC. 1, T.-19-S., R.-28-E.

UNIT N

ELEV. 3391' GL

12 1/2" @ 59' – NO RECORD OF ANY CMT.

6 5/8" @ 464' – NO RECORD OF ANY CMT.



T.D. 3055'

NOTE: NO RECORD OF PLUGGING PROCEDURE USED. WELL DRILLED & PLUGGED IN 1925.

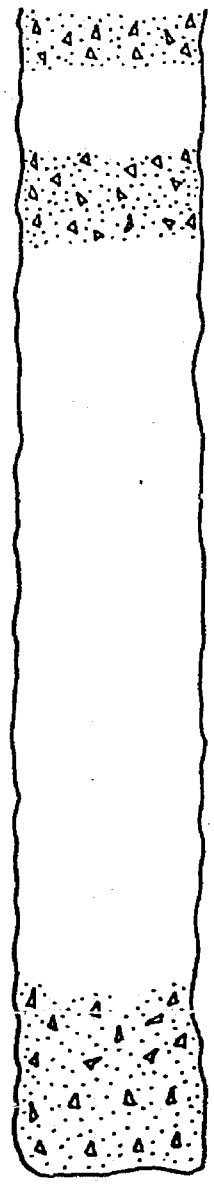
SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

NIX & CURTIS
R & B ST. NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT G
ELEV. 3364' G.L.

NO CASING IN WELL



5 SX CMT. PLUG @ SURFACE

10 SX CMT. PLUG 345-370'
(CALCULATED)

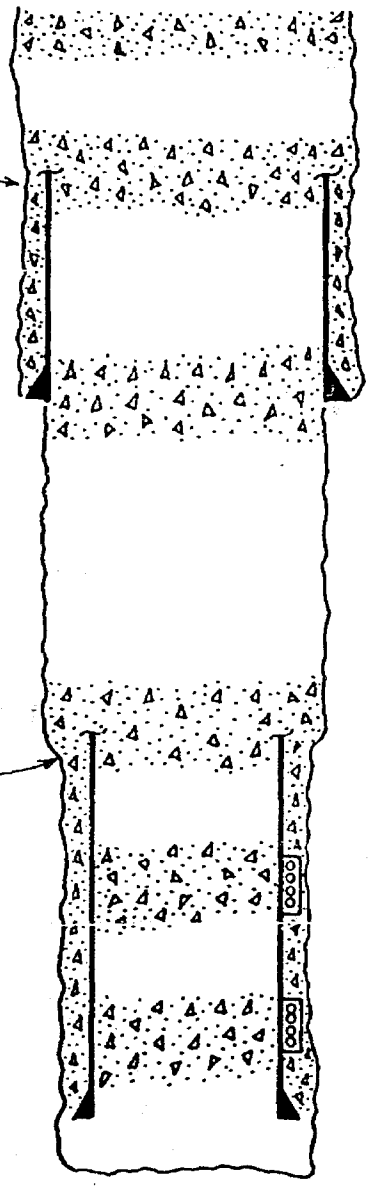
20 SX CMT. PLUG ON BOTTOM.
TOP OF PLUG @ 2480'
(CALCULATED)

T.D. 2580'

NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

M. YATES III
N & C STATE NO. 1
SEC. 6, T.-19-S., R.-29-E.
UNIT M
ELEV. 3380' GL



10 SX CMT. PLUG @ SURFACE

25 SX CMT. PLUG ON 8 5/8" CSG. STUB

TOP OF CMT. @ 269' (CALCULATED)

8 5/8" CSG. CUT @ 269' & PULLED

8 5/8" 24 # CSG. @ 433' W/50 SX CMT.

25 SX CMT. PLUG @ BASE OF 8 5/8" CSG.

5 1/2" CSG. CUT @ 1331' & PULLED

TOP OF CMT. @ 1331' (CALCULATED)

25 SX CMT. PLUG IN & OUT OF 5 1/2" CSG. STUB

15 SX CMT. PLUG OVER PERFS @ 2612 - 25'
SAN ANDRES PERFS 2612 - 25'

5 1/2" 14# CSG. @ 2795' W/300 SX CMT.

SAN ANDRES PERFS 2676 - 82', SQZD W/25 SX CMT. TOP OF CMT. PLUG 2658'

T.D. 2839'

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

PERRY R. BASS
SELTZER - STATE NO.2
SEC. 12, T.-19-S., R.-28-E.
UNIT D
ELEV. 3407' KB

TOP OF CMT. @ SURFACE
(CALCULATED)

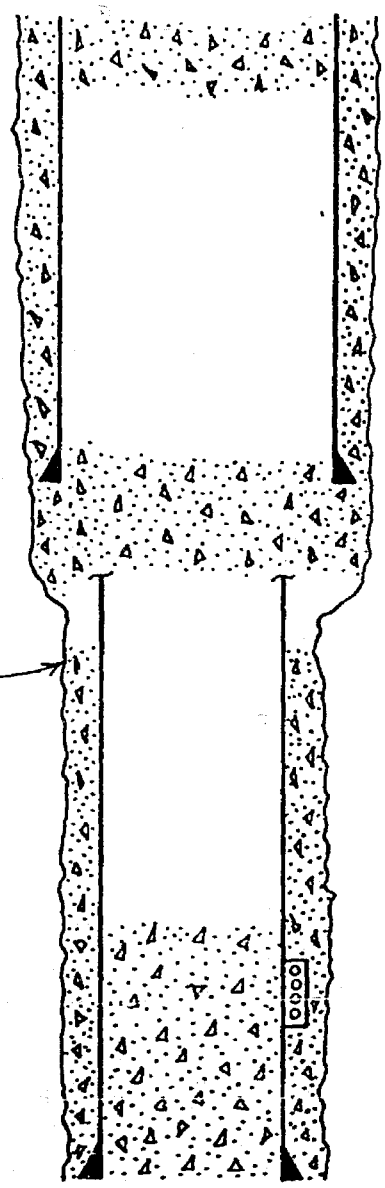
8 5/8" 24# CSG @ 323'
W/ 300 SX. CMT.

4 1/2" CSG. CUT @ 444'
& PLUGGED

TOP OF CMT. @ 610'

4 1/2" 9.5 # CSG. @ 2365'
W/410 SX CMT.

T. D. 2370'



10 SX CMT. PLUG @ SURFACE

30 SX CMT. PLUG 311 - 440'

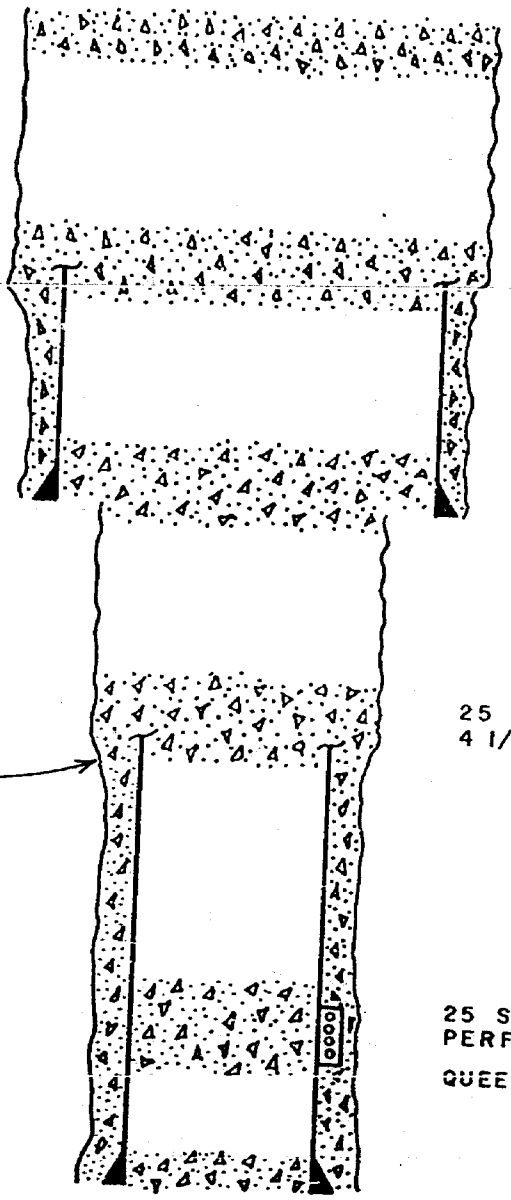
30 SX CMT. PLUG 1978 - 2340'

QUEEN - GRAYBURG PERFS
2050 - 2314'

NOTE: MUD LADEN FLUID PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELIZABETH DUNDAS NO. 1
SEC. 7, T.-19-S., R.-29-E.
UNIT M
ELEV. 3378' DF



10 SX CMT. PLUG @ SURFACE

CUT 8 5/8" CSG. @ 124' & PULLED

TOP OF CMT. @ 124' (CALCULATED)

25 SX CMT. PLUG ACROSS 8 5/8" CSG. STUB

8 5/8" 24# CSG. @ 283' W/50 SX CMT.

25 SX CMT. PLUG ACROSS 8 5/8" CSG. SHOE

CUT 4 1/2" CSG. @ 1510' & PULLED

TOP OF CMT. @ 1510' (CALCULATED)

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS PERFS 1773-96'

QUEEN PERFS 1773 - 1796'

4 1/2" 9.5 # CSG. @ 2163' W/125 SX CMT.

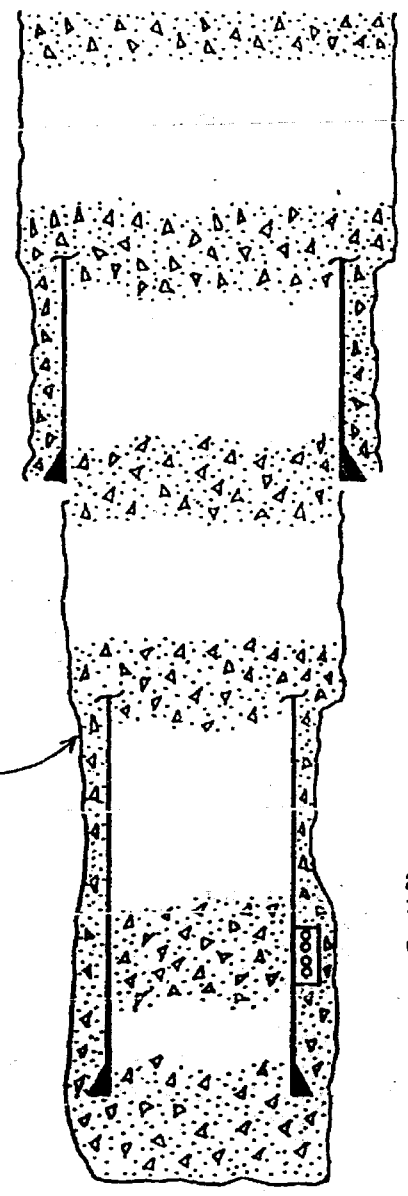
T.D. 2227'

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELIZABETH DUNDAS NO. 2
SEC. 7 , T.-19-S., R.-29-E.
UNIT N
ELEV. 3382' DF



CUT 7" CSG. @ 142' & PULLED

TOP OF CMT. @ 142' (CALCULATED)

7" CSG. @ 309' W/50 SX CMT.

CUT 4 1/2" CSG. @ 1421' & PULLED

TOP OF CMT. @ 1421' (CALCULATED)

4 1/2" 9.5# CSG. @ 2199' W/100 SX CMT.

T.D. 2348'

10 SX CMT. PLUG @ SURFACE

25 SX CMT. PLUG ACROSS 7" CSG. STUB

25 SX CMT. PLUG ACROSS 7" CSG. SHOE

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS PERFS 2080-2101'

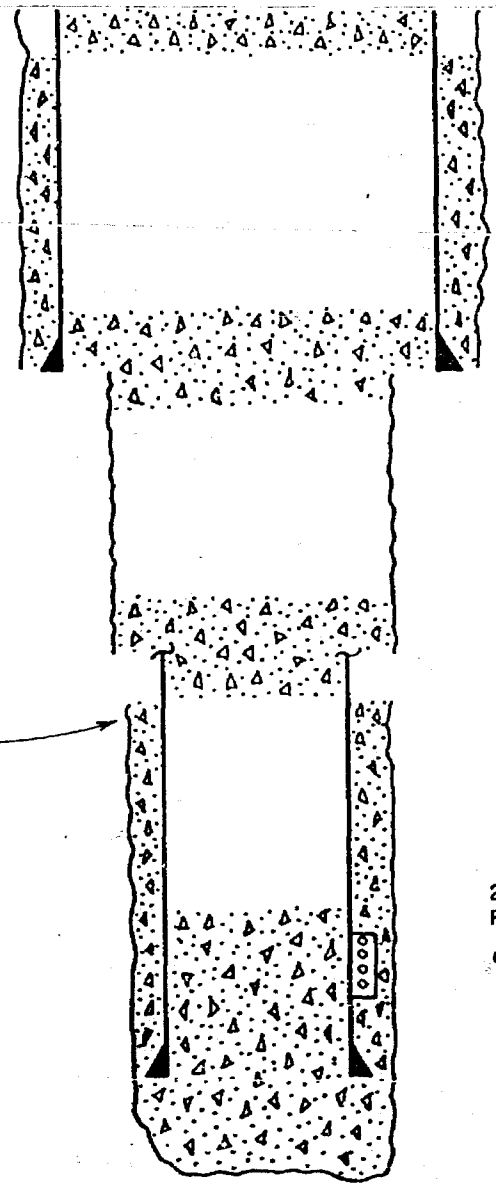
GRAYBURG PERFS 2080-2101'

NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

TEJAS PETR. CO.
SINCLAIR ST. "A" NO. 1-E
SEC. 18, T.-19-S., R.-29-E.
UNIT E
ELEV. 3382'



TOP OF CMT. @ 47'
(CALCULATED)

9 5/8" 32.3# CSG. @ 285' W/50 SX CMT.

CUT 4 1/2" CSG. @ 1100' & PULLED

TOP OF CMT. @ 1420'
(CALCULATED)

4 1/2" 9.5# CSG. @ 2349' W/200 SX CMT.

T.D. 2581'

5 SX CMT. PLUG @ SURFACE

20 SX CMT. PLUG ACROSS 9 5/8" CSG. SHOE

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS PERFS 1849 - 2140'

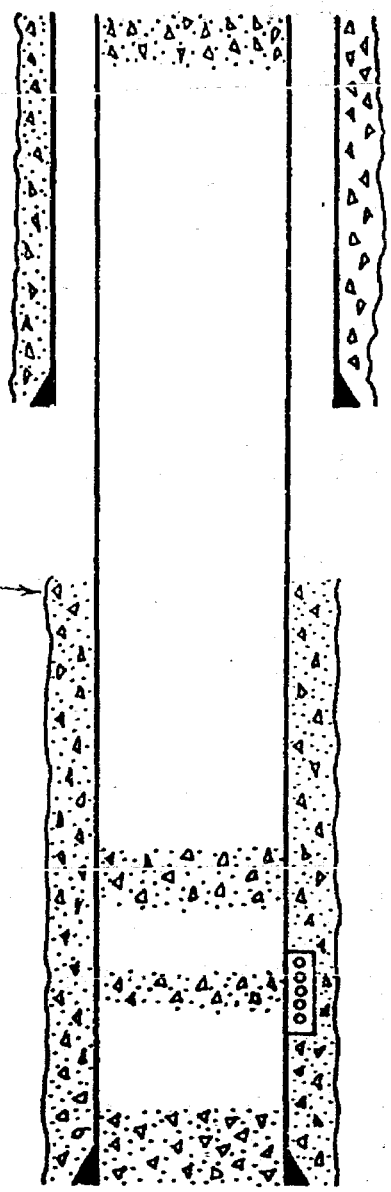
QUEEN - GRAYBURG PERFS 1849 - 2140'

NOTE! MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

DONNELLY DRLG. CO.
KINNEY ST. NO. 1
SEC. 18, T.-19-S., R.-29-E.
UNIT L
ELEV. 3380'

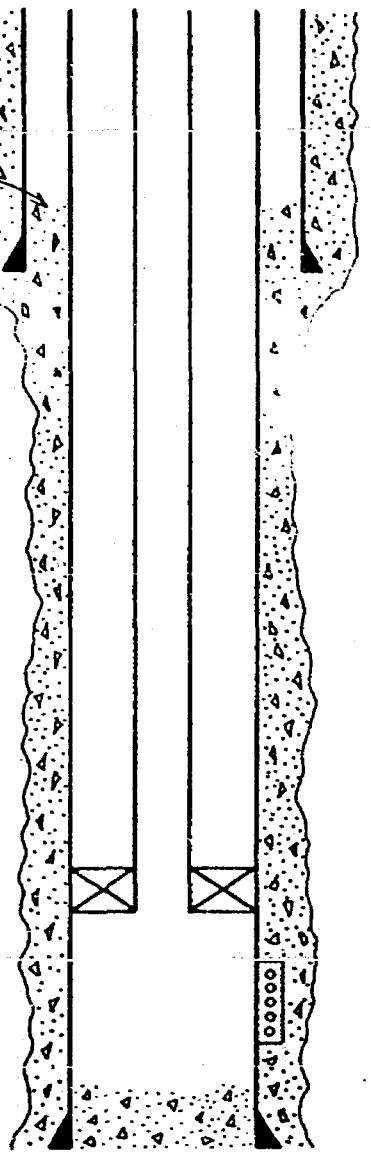


NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SUN OIL COMPANY
NEW MEXICO SELTZER STATE NO. 1
SEC. 12, T.-19-S., R.-28-E.
UNIT E
ELEV. 3414'



SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 4

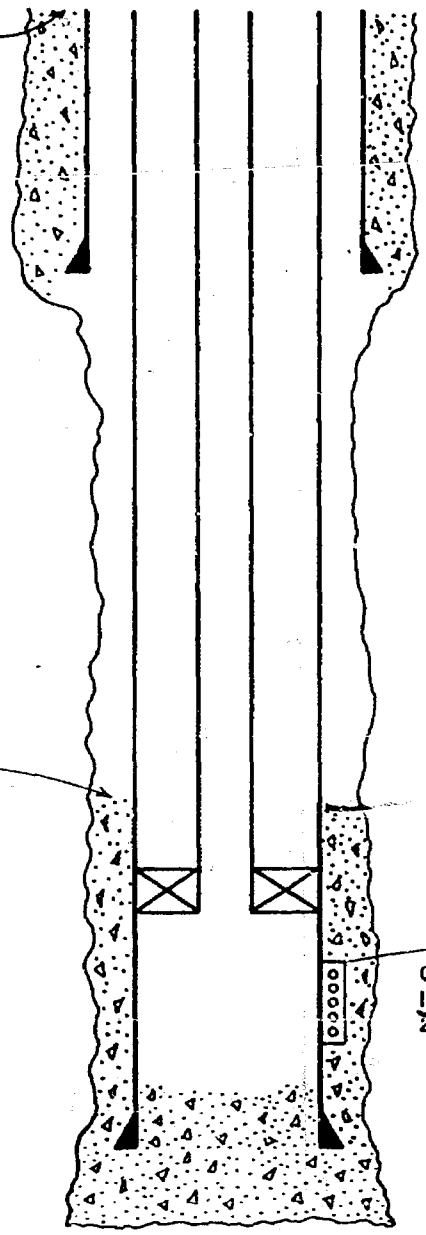
PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

KERSEY OIL COMPANY
BASS NO. 1
SEC. 12, T.-19-S., R.-28-E.
UNIT I
ELEV. UNKNOWN



PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

MARALO OIL CO.
STATE "OG 272" NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT M
ELEV. 3410' DF

TOP OF CMT. @ SURFACE

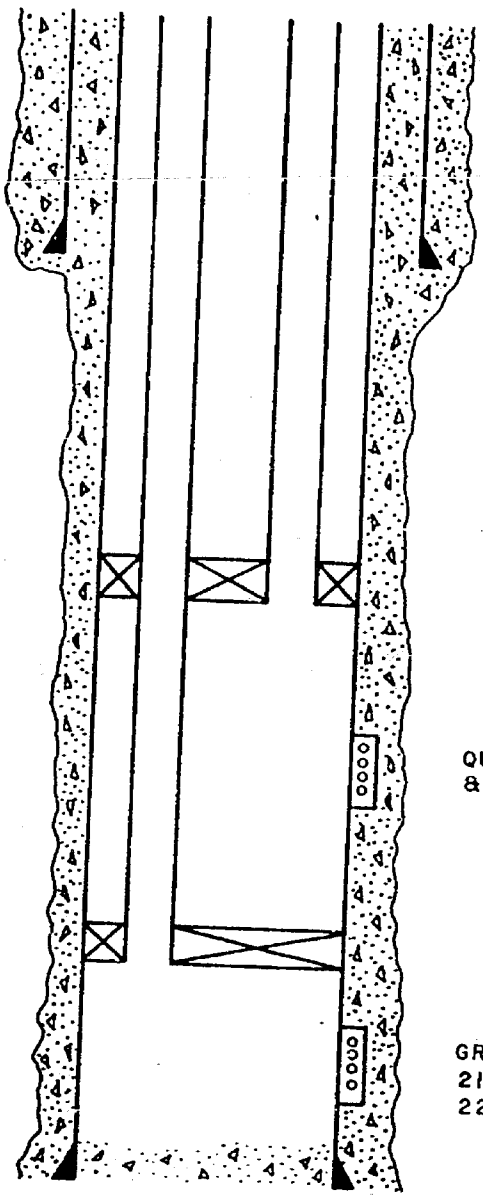
8 5/8" 24# J-55 CSG.
@ 632' W/ 350 SX CMT.

UPPER TUBING: 2 1/16" CMT LINED TBG. ON DUAL PACKER @ 1780'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 2000'. TBG. EXTERNALLY COATED BETWEEN PKRS.

5 1/2" 14 # J-55 CSG.
@ 2232' W/ 350 SX

P.B.T.D. 2226'
T.D. 2232'



TBG. CSG. ANNULUS PROTECTED W/ CORROSION INHIBITED INERT FLUID

QUEEN PERFS 1758'-66' & 1820'-26'

GRAYBURG PERFS 2084'-90', 2100'-06', 2138'-44', & 2203'-12'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

MARALO OIL COMPANY
STATE "OG 272" NO. 3
SEC. 12, T.-19-S., R.-28-E.
UNIT K
ELEV. 3402' DF

TOP OF CMT. @ SURFACE
(CALCULATED)

TOP OF CMT. @ 260'

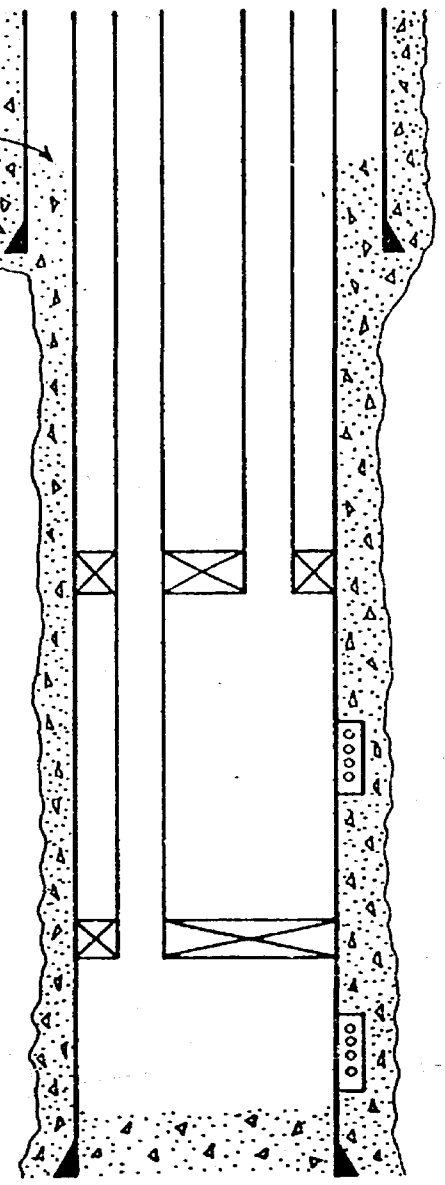
8 5/8" 24# J-55 CSG.
@ 635' W/300 SX CMT.

UPPER TUBING : 2 1/16" CMT.
LINED TBG. ON DUAL PACKER
@ 1740'

LOWER TUBING: 2 1/16" CMT.
LINER TBG ON SINGLE PACKER
@ 2050' TBG. EXTERNALLY
COATS BETWEEN PKRS.

5 1/2" 14# J-55 CSG. @
2300' W/375 SX CMT.

P. B. T. D. 2294'
T. D. 2302'



TBG. - CSG. ANNULUS PROTECTED
W/CORROSION INHIBITED INERT
FLUID

QUEEN PERFS 1778-94'
& 1821-25'

GRAYBURG PERFS 2105-08',
2120-30', 2158-64', 2170-74',
2204-08' & 2224-30'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

GULF OIL COMPANY
EDDY STATE "AN" NO. 2
SEC. 13, T.-19-S., R.-28-E.
UNIT E
ELEV. 3392'

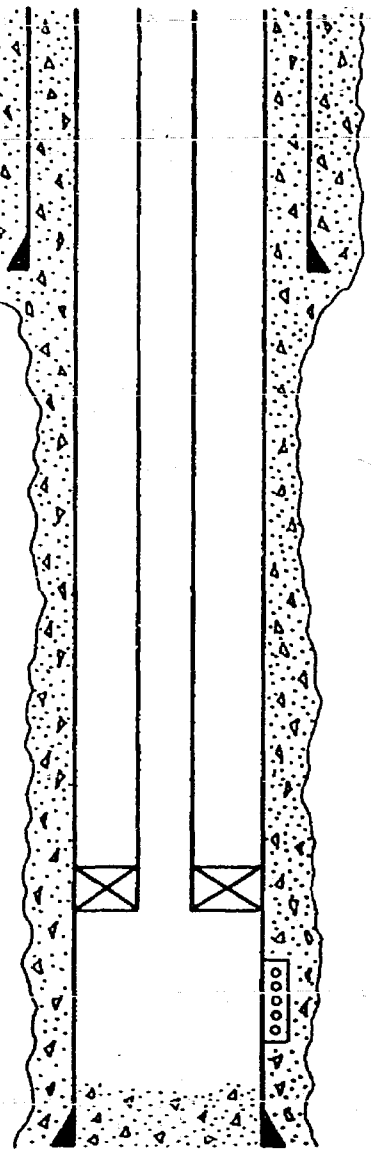
TOP OF CMT @ SURFACE

7 5/8" 26.4# J-55 CSG. @ 598' W/ 325 SX CMT.

2 3/8" CMT LINED TUBING ON TENSION PKR SET @ 1700'

4 1/2" 9.5# J-55 CSG. @ 2197' W/330 SX CMT.

P.B.T.D. 2195'
T.D. 2200'



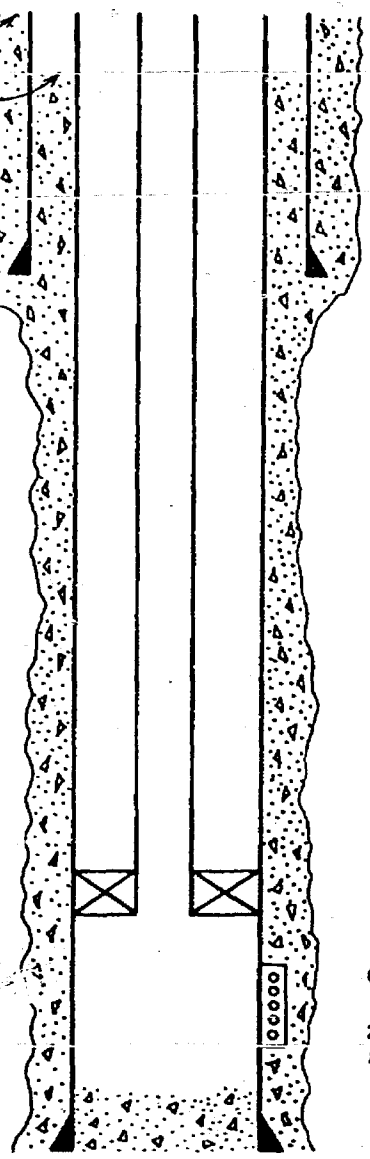
TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN - GRAYBURG PERFS
1733'-43', 1789'-1803', 2084'-86', 2095'-97', 2107'-09', 2116'-26' 2149'-51' & 2165'-85'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY
EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

GULF OIL COMPANY
EDDY STATE "AN" NO. 3
SEC. 13, T.-19-S., R.-28-E.
UNIT K
ELEV. 3376'



PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

GULF OIL CO.
EDDY ST. "AN" NO.5
SEC.13, T.-19-S., R.-28-E.
UNIT J
ELEV. 3376' DF

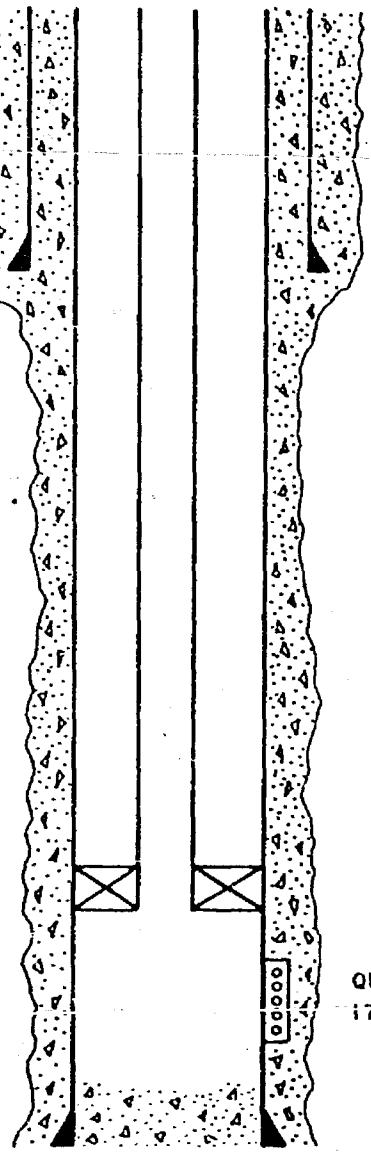
TOP OF CMT. @ SURFACE
(CALCULATED)

8 5/8" 24# CSG @ 620'
W/150 SX CMT.

2 3/8" CMT. LINED TUBING ON
TENSION PKR @ 1730'

5 1/2" 14# CSG. @ 2240'
W/400 SX CMT.

P.B.T.D. 2195'
T.D. 2240'



TBG.-CSG. ANNULUS PROTECTED
W/CORROSION INHIBITED INERT
FLUID

QUEEN-GRAYBURG PERFS
1773-85', 2033-43', 2136-42'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

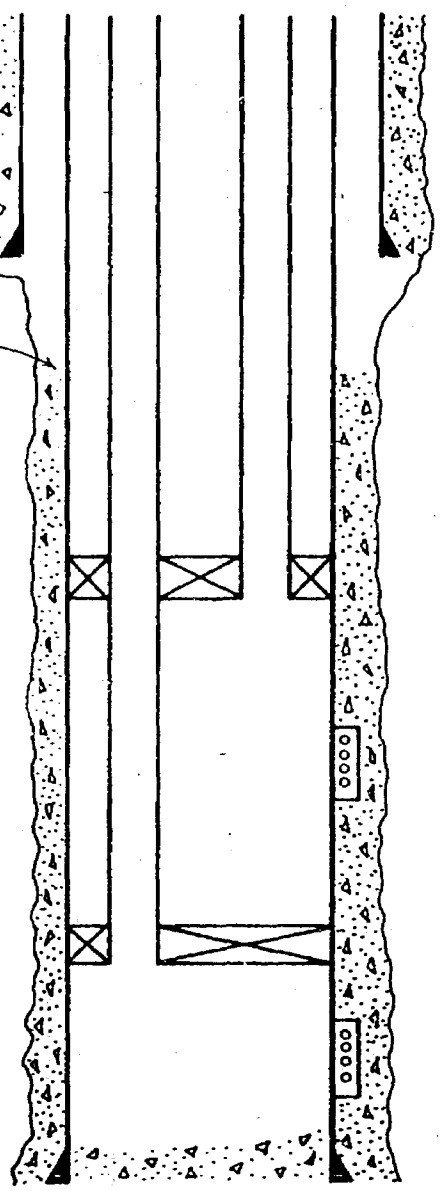
SUN OIL COMPANY

NEW MEXICO "O" STATE NO. 1

SEC. 13, T.-19-S., R.-28-E.

UNIT C

ELEV. 3377'



TOP OF CMT. @ SURFACE

10 3/4" 32.75# H-40 CSG. @ 359' W/125 SX CMT.

TOP OF CMT. @ 1295'

UPPER TUBING: 2 1/16" CMT. LINED TBG. ON DUAL PACKER @ 1720'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 1900' TBG. EXTERNALLY COATED BETWEEN PKRS.

7" 20# J-55 CSG. @ 2167' W/ 250 SX CMT.

P.B.T.D. 2162'
T.D. 2168'

TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN PERFS
1741 - 60' & 1802 - 18'

GRAYBURG PERFS
1956 - 72', 2026 - 68', 2078 - 83', 2098 - 2124', 2125 - 30' & 2136 - 50'

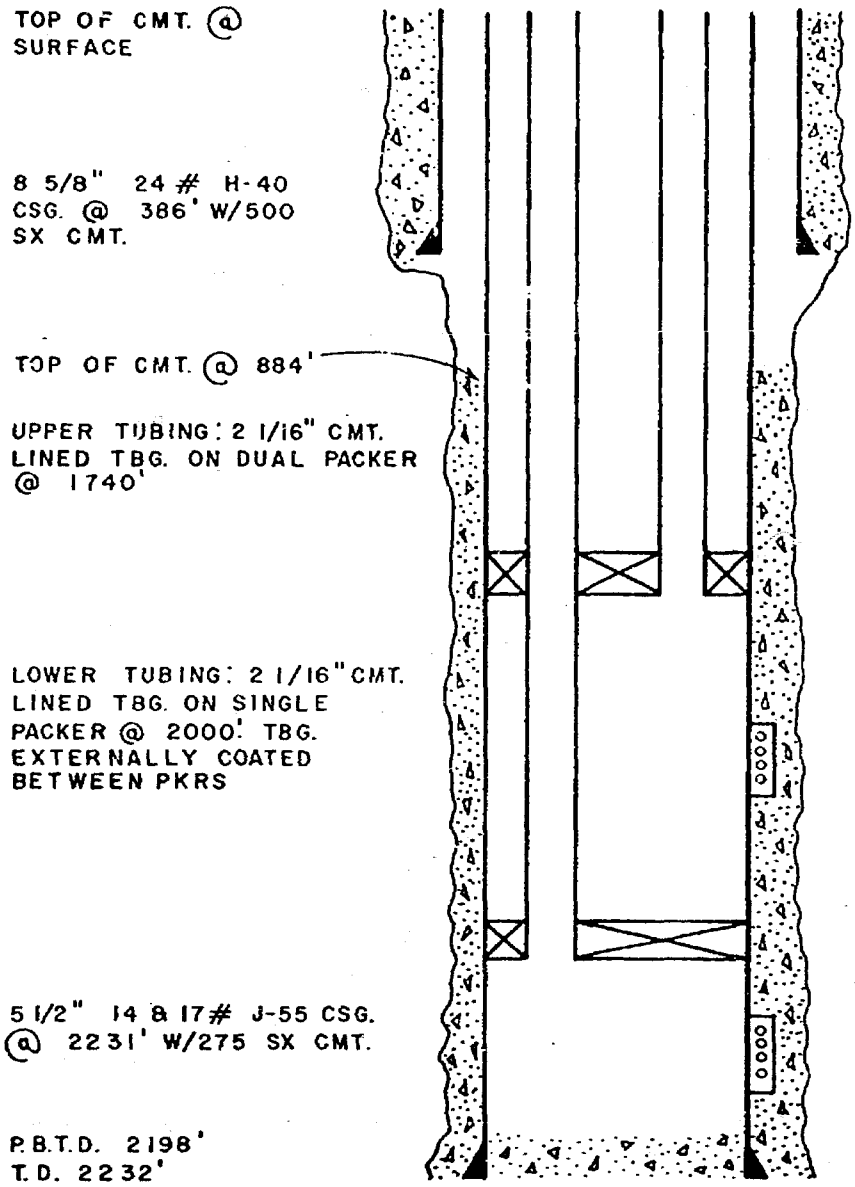
PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SUN OIL COMPANY
NEW MEXICO "O" STATE NO. 3
SEC. 12, T.-19-S., R.-28-E.
UNIT O
ELEV. 3381'



PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

SUN OIL COMPANY

NEW MEXICO "O" STATE NO. 4

SEC. 13, T.-19-S, R.-28-E.

UNIT M

ELEV. 3376'

TOP OF CMT. @ SURFACE

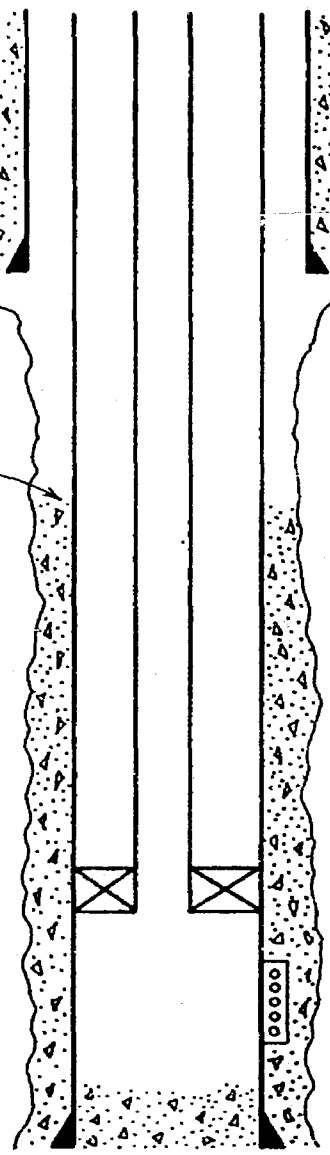
8 5/8" 24# J-55 CSG @ 422' W/250 SX CMT

TOP OF CMT. @ 1115'

2 3/8" CMT. LINED TUBING ON TENSION PKR SET @ 1700'

4 1/2" 9.5# J-55 CSG @ 2280' W/250 SX CMT

P.B.T.D. 2251'
T.D. 2280'



TBG.- CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID.

QUEEN - GRAYBURG PERFS
1743-51', 1793-1800', 2091', 2102', 2113', 2131', 2140', 2150', 2175-77', 2184-86', 2198-2200' & 2212-14'

PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELLIOTT & PARCELL NO. 1
SEC. 13, T-19-S., R-28-E.
UNIT G
ELEV. 3373' DF

TOP OF CMT. @ SURFACE (CALCULATED)

TOP OF CMT. @ 130' (CALCULATED)

8 5/8" 24# CSG. @ 600' W/ 50 SX CMT.

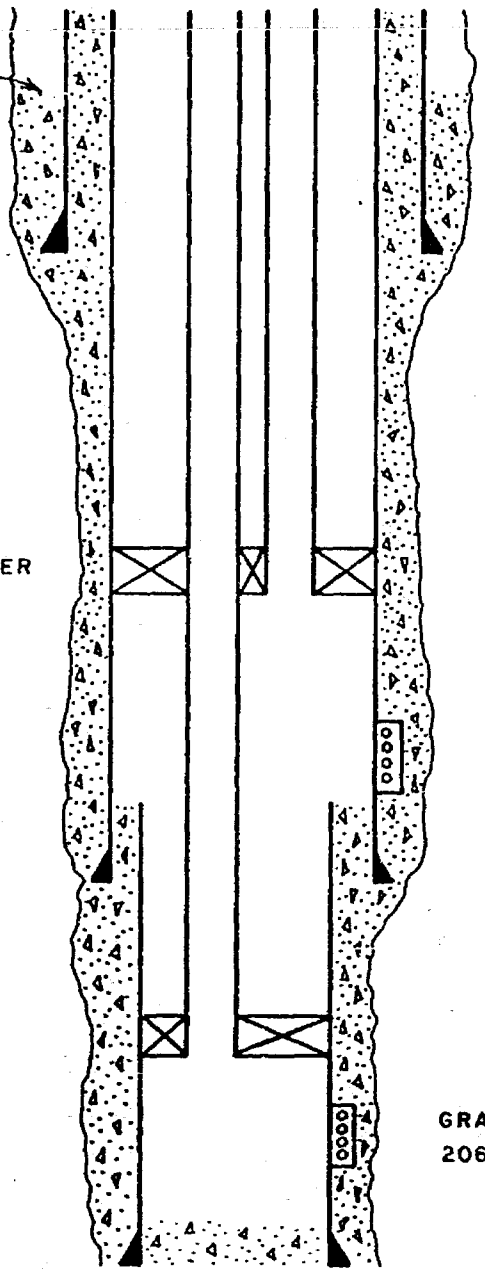
UPPER TUBING: 2 1/16" CMT. LINED TBG. ON DUAL PACKER @ 1680'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 2010' TBG. EXTERNALLY COATED BETWEEN PKRS

7" 23# CSG. @ 1790' W/ 200 SX CMT.

5 1/2" 14# LINER SET 1750 - 2145' CEMENTED W/18 SX (ALL IT WOULD TAKE)

T.D. 2147'



TBG. - CSG. ANNULUS PROTECTED W/ CORROSION INHIBITED INERT FLUID

QUEEN PERFS 1723 - 40'

GRAYBURG PERFS 2064 - 82', 2127 - 2132'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELLIOTT & PARCELL NO. 4
SEC. 13, T.-19-S., R.-28-E.
UNIT A
ELEV. 3368'

TOP OF CMT. @ SURFACE
(CALCULATED)

8 5/8" CSG. @ 277'
W/ 50 SX CMT.

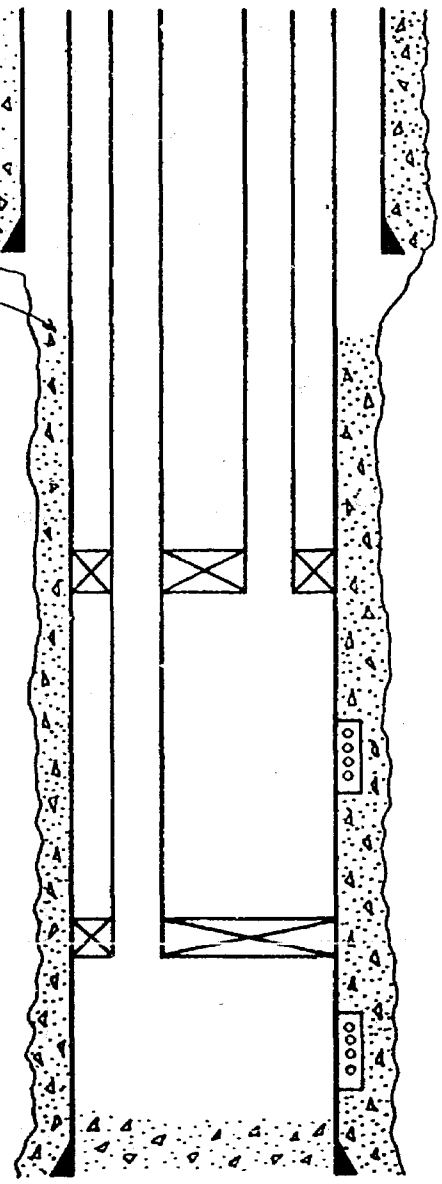
TOP OF CMT. @ 840'
(CALCULATED)

UPPER TUBING: 2 1/16" CMT.
LINED TBG. ON DUAL PACKER
@ 1700'

LOWER TUBING: 2 1/16" CMT
LINED TBG. ON SINGLE PACKER
@ 2040' TBG. EXTERNALLY
COATED BETWEEN PKRS

5 1/2" 15# CSG. @ 2285'
W/190 SX CMT.

T.D. 2285'



TBG. - CSG. ANNULUS PROTECTED
W/ CORROSION INHIBITED
INERT FLUID

QUEEN PERFS
1742 - 48' & 1803 - 17'

GRAYBURG PERFS
2019 - 97', 2132 - 38', 2167 - 73'
& 2190 - 2200'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

MISCELLANEOUS INJECTION
INFORMATION

I. Injection Zones

Name:	Queen	Grayburg
Depth:	1700'	1950'

II. Injection Fluid

Type: Fresh water (90%) and salt water (10%)

Source: 1. Fresh water - Double Eagle Corp. (City of Carlsbad)

2. Salt Water - Produced water from Queen and Grayburg formations.

III. Injection Data

Anticipated injection pressure: 1300 psig

Anticipated injection volume: 400 BWPD per well

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 5

MISCELLANEOUS INJECTION
INFORMATION

I. Injection Zones

Name:	Queen	Grayburg
Depth:	1700'	1950'

II. Injection Fluid

Type: Fresh water (90%) and salt water (10%)

Sources: 1. Fresh water - Double Eagle Corp. (City of Carlsbad)

2. Salt Water - Produced water from Queen and Grayburg formations.

III. Injection Data

Anticipated injection pressure: 1300 psig

Anticipated injection volume: 400 BWPD per well

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 5

FRACTURE GRADIENTS - QUEEN/GRAYBURG FORMATION
EAST MILLMAN - QUEEN - GRAYBURG POOL
EDDY COUNTY, NEW MEXICO

WELL NAME	TOP PERFORATION	DATE OF FRACTURE TREATMENT	ISI PRESSURE	FLUID GRADIENT	FORMATION FRACTURE GRADIENT
Seltzer State #1	2248'	9-17-61	1450	.360	1.005
Bass #1	--	*	*	*	--
Bass #2	--	*	*	*	--
R & B St #1	--	*	*	*	--
ST OG 272 #1	--	*	*	*	--
ST OG 272 #2	--	*	*	*	--
ST OG 272 #3	--	*	*	*	--
ST OG 272 #4	--	*	*	*	--
New Mex "O" ST #1	2026'	4-22-76	600	.450	.746
New Mex "O" ST #2	2046'	1-6-65	1300	.360	.995
New Mex "O" ST #3	1763'	3-16-59	1600	.360	1.268
New Mex "O" ST #4	2091'	6-24-65	950	.360	.814
New Mex "O" ST #5	1759'	12-27-61	1000	.360	.929
New Mex "O" ST #6	2115'	3-1-64	1300	.360	.975
Elliott & Parcell #1	1717'	2-14-59	650	.360	.739
Elliott & Parcell #2	1758'	9-6-58	650	.433	.803
Elliott & Parcell #3	2186'	4-8-69	400	.433	.616
Elliott & Parcell #4	1742'	10-3-68	750	.433	.864
Eddy State "AN" #1	--	*	*	*	--
Eddy State "AN" #2	--	*	*	*	--
Eddy State "AN" #3	--	*	*	*	--
Eddy State "AN" #4	--	*	*	*	--
Eddy State "AN" #5	--	*	*	*	--
AVERAGE	1950	--	968	--	.887

* Information Not Available

through out the high pressure and the low pressure

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6977
Exhibit # #6

EAST MILLMAN-QUEEN-GRAYBURG WATERFLOOD*
DEPCO OPERATOR
INJECTION WELL DATA

WELL	OCTOBER VOLUME (BWPD)	OCTOBER PRESSURE	NOVEMBER VOLUME (BWPD)	NOVEMBER PRESSURE
State "648" #143	103	1225	109	1260
State "648" #145	140	1225	397	1260
State "648" #147	16	1100	99	1200
State "648" #151	231	1125	316	1150
State "648" #153	0	-	0	-
State "648" #160	177	1150	176	1174
State "648" #184	108	1250	136	1300
State "648" #189	186	1130	263	1175
State "E 5003" #1	95	1200	207	1250
State "BN" #2	118	650	198	650
Average	130	1117	211	1158

*East offset to proposed East Millman Pool Waterflood

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 7

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ROSWELL

S. E. REYNOLDS
STATE ENGINEER

ADDRESS CORRESPONDENCE TO:
P. O. BOX 1717
ROSWELL, NEW MEXICO
88201

February 20, 1979

Sun Oil Company
P. O. Box 1861
Midland, Texas 79702

Attention: Bill Thomas

Tentlemen:

As per your telephone request submitted is the information that we have regarding groundwater in Township 19 South, Range 28 East of Eddy County, New Mexico.

Most of the water in the East Millman area is produced from the Artesia Group formation at depths of around 200 feet.

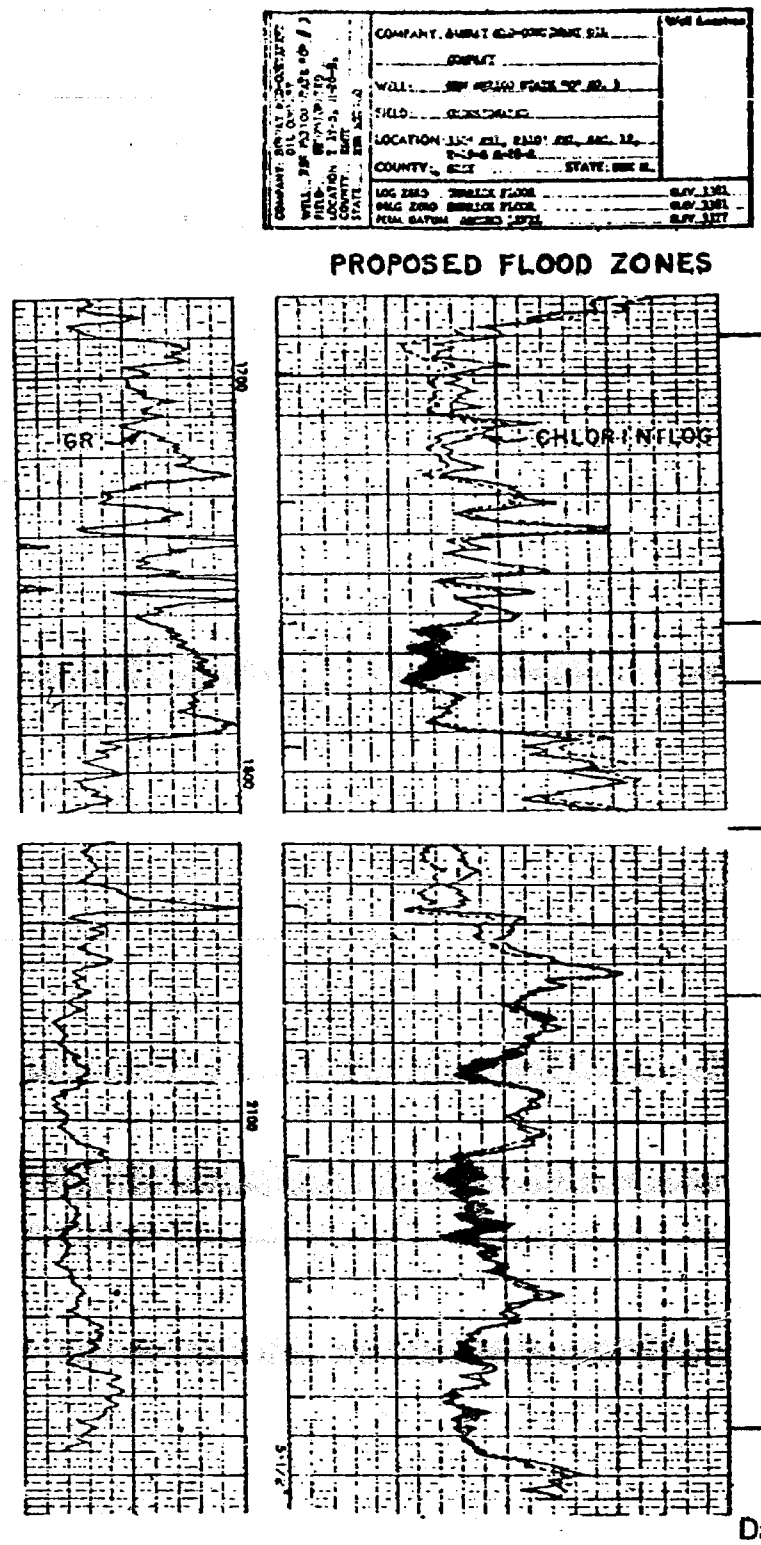
The static water level ranges from 80 feet to 160 feet and production is probably on the order of 5 GPM.

Very truly yours,

James I Wright
Field Engineer

JIW:ffc
cc: Santa Fe

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # # 8



SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 9

INTER-OFFICE CORRESPONDENCE

SUBJECT: Water Compatibility: Millman Field, Southwestern District

DATE: February 21, 1979

OFFICE: Richardson

FROM: Production Service Laboratory

TO: Mr. Gary Miller
Southwestern District, Midland

Water samples representing San Andres Formation water and supply water collected from the New Mexico State lease and Double Eagle lease, respectively, were submitted to the lab for compatibility tests to determine if the supply water would be suitable for the planned injection program in the Millman Field.

The enclosed water analyses indicate the two waters are compatible and mixing the waters prior to injection would present no gross incompatibility problems.

Gary, as I suggested during our telephone conversation, for good injection performance, a good quality fresh water must be used for the proposed program. Specifications pertaining to the quality of the water purchased from Double Eagle should be part of the contract. The fresh supply water to be mixed with the produced San Andres Formation water should have an oxygen content of less than 1 ppm, a bacteria count of less than 10 colonies per milliliter and a suspended solids content of less than 2 ppm.

Since a ratio of approximately 90% fresh water and 10% produced water will be injected initially, a mineralogy study should be made on available core material to determine the presence of swelling clays. The presence of these clays in a fresh water environment could cause plugging problems.

If the above suggestions need further clarification, please contact me at the lab.

Johnny M Reinschmidt

Johnny Reinschmidt
Chemical Engineering Section

JR:cs
cc: C. L. Dickson
S. Whitaker
S. Gillett
Bill Hensel
D. Inglish
Danny Rawson
Corrosion Eng.
File 23-360

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 10

SUN-7900-B

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO. B-7756

FILE 23-360

Operator Sun Production Company
Lease or Well Double Eagle
Formation OGALLALA
Depth ____ To ____ ; T.D. ____
Method of collecting sample From main line
Treatment None
Date and amount of last acid job ____
Prod. ____ BOPD ____ BWPD ____ MCFPD
Description This sample consists of one pint clear water.

Region ____
District S.W. District
Field Millman
County Eddy
State New Mexico
Collected by ____
Date 1-30-79 Collected 2-16-79 Analyzed
Sample No. 3171
Analyst SII

CONSTITUENTS	ppm
Sodium	60
Calcium	30
Magnesium	10
Barium	0
Strontium	
Potassium	
Iron	0
Chloride	41
Sulfate	39
Carbonate	0
Bicarbonate	178
TOTAL DISSOLVED SOLIDS	358

OTHER PROPERTIES	
pH	8.2
Specific Gravity	1.0001
Resistivity ohm-mtr. @75°F	19.788
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	ABSENT
Mixed Oxides (Qualitative)	
Fluoride	
Silico	
Total Iron, ppm	0
Nitrates	
Phosphate	

REMARKS:

____ NORMAL FORMATION WATER
____ PROBABLY NORMAL FORMATION WATER
____ UNABLE TO CLASSIFY
____ ____% FORMATION ____% INJ. WATER
____ INDICATES A CASING LEAK
X OTHER

Supply water for possible injection.

REPORTED BY:

CHEMICAL ENGINEERING SECTION
Copies to:

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO. B-7755

FILE 23-360

Operator: Sun Production Company
Lease or Well: New Mexico St. O # 4
Formation: QUEEN - GRAYBURG
Depth: 1,780 To 2,150 : T.D. 2,280
Method of collecting sample: Wellhead

Treatment: See remarks
Date and amount of last acid job:

Prod 6 BOPD 28 BWPD MCFPD

Description: This sample consists of one pint cloudy yellow water with an oil film.

Region:
District: Southwestern
Field: Millman
County: Eddy
State: New Mexico
Collected by:
Date: 1-30-79 Collected; 2-16-79 Analyzed
Sample No. 3166
Analyst: SII

CONSTITUENTS	ppm
Sodium	41000
Calcium	1960
Magnesium	628
Barium	0
Strontium	
Potassium	
Iron	11
Chloride	66300
Sulfate	2220
Carbonate	0
Bicarbonate	923

OTHER PROPERTIES	
pH	7.7
Specific Gravity	1.0831
Resistivity ohm-mtr. @75°F	.079
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	PRESENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	12
Nitrates	
Phosphate	

TOTAL DISSOLVED SOLIDS 113042

Treatment: 1-1/2 gal. Sun and 1 gal OW - 77 per week

REMARKS:

_____ NORMAL FORMATION WATER
_____ PROBABLY NORMAL FORMATION WATER
_____ UNABLE TO CLASSIFY
_____ _____% FORMATION _____% INJ. WATER
_____ INDICATES A CASING LEAK
__X__ OTHER

This is the first water sample received from this well and field. Unable to classify at this time.

REPORTED BY:
Johnny Reinschmidt
CHEMICAL ENGINEERING SECTION
Copies to:

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY

WATER ANALYSIS REPORT

ANALYSIS NO B-7757

FILE 23-360

Operator: Sun Production Company
Lease or Well: New Mexico St. O # 5
Formation: QUEEN - GRAYBURG
Depth: 1,759 To 2,156 : T.D. 2,230
Method of collecting sample: Wellhead

Treatment: See remarks
Date and amount of last acid job:

Prod. 2 BOPD 27 BWPD ____ MCFPD
Description: This sample consists of one pint cloudy yellow water with an oil film.

Region:
District: Southwest
Field: Millman
County: Eddy
State: New Mexico
Collected by:
Date: 1-30-79 Collected; 2-16-79 Analyzed
Sample No. 10525
Analyst: SII

CONSTITUENTS	ppm
Sodium	34200
Calcium	1390
Magnesium	592
Barium	0
Strontium	
Potassium	
Iron	11
Chloride	55700
Sulfate	984
Carbonate	0
Bicarbonate	1020
TOTAL DISSOLVED SOLIDS	93897

OTHER PROPERTIES	
pH	7.1
Specific Gravity	1.0669
Resistivity ohm-mtr. @75°F	.091
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	PRESENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	11
Nitrates	
Phosphate	

Treatment: 1-1/2 gal Sun 9 and 1 gal OW-77 per week.

REMARKS:

____ NORMAL FORMATION WATER
____ PROBABLY NORMAL FORMATION WATER
____ UNABLE TO CLASSIFY
____ ____% FORMATION ____% INJ. WATER
____ INDICATES A CASING LEAK
__X__ OTHER

This is the first water sample received from this well and field Unable to classify at this time.

REPORTED BY:

CHEMICAL ENGINEERING SECTION
Copies to:

EAST MILLMAN-QUEEN-GRAYBURG POOL

SALT WATER DISPOSAL WELL DATA

WELL	SEPTEMBER VOLUME (BWPD)	SEPTEMBER PRESSURE	OCTOBER VOLUME (BWPD)	OCTOBER PRESSURE
Eddy "AN" State #5 (Gulf Operator)	78	1275	68	1275
Bass #3 (Kersey Operator)	205	1000	208	1000

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 11

PROPOSED EAST MILLMAN UNIT

PROJECTED PERFORMANCE

Base Case

Year	Gross Bbls Oil	Gross Gas MCF	Operating Expense $	Operating Cash Flow $
1979	34500	77	194900	114893
1980	31100	73	206600	99384
1981	27900	68	219000	82793
1982	22700	65	232000	48913
1983	20100	61	246100	31215
1984	17900	57	260900	14609
1985	15900	54	276500	-2258
1986	14000	50	293100*	-20310
	184100	505	1929300	369200

Summary

Remaining primary oil, gross bbls	184,100
Remaining primary oil, net bbls	161,100

* Includes P&A costs

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 12

EAST MILLMAN POOL UNIT

PROPOSED 80 ACRE 5-SPOT PATTERN

Year	Gross Oil Bbls	Gross Gas MCF	Operating Expenses
1979	34500	77	212300
1980	21800	61	225000
1981	19700	51	238500
1982	52100	113	252900
1983	75900	160	268000
1984	81000	164	284100
1985	81300	154	301200
1986	75900	142	319200
1987	67900	128	338400
1988	64100	102	338400
1989	54400	90	338400
1990	51400	71	338400
1991	49200	62	338400
1992	47100	54	338400
1993	45000	47	338400
1994	42900	41	338400
1995	40900	34	338400
1996	38800	29	338400
1997	38800	23	338400
1998	38800	19	338400
1999	38800	18	338400
2000	38800	16	338400
2001	38800	15	338400
2002	38800	14	338400
2003	38800	14	338400
2004	38800	14	338400
2005	38800	13	338400
2006	38800	13	338400
2007	38800	13	338400
2008	*363600	*173	**2788000
	1735400	1925	11995600

* Includes Reserves for Years 31 - 40

** Includes P&A Expenses

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 13

EAST MILLMAN POOL UNIT

ADDITIONAL RECOVERY

DUE TO WATERFLOOD

Year	Gross Oil Bbls	Gross Gas MCF
1979	0	0
1980	-9300	-12
1981	-8200	-17
1982	29400	48
1983	55800	99
1984	63100	107
1985	65400	100
1986	61900	92
1987	67900	128
1988	64100	102
1989	54400	90
1990	51400	71
1991	49200	62
1992	47100	54
1993	45000	47
1994	42900	41
1995	40900	34
1996	38800	29
1997	38800	23
1998	38800	19
1999	38800	18
2000	38800	16
2001	38800	15
2002	38800	14
2003	38800	14
2004	38800	14
2005	38800	13
2006	38800	13
2007	38800	13
2008	363600	173
TOTALS	1550200	1420

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 14

EAST MILLMAN POOL UNIT

PROPOSED 80 ACRE 5-SPOT PATTERN

Investment Costs

	Intangible	Tangible
Convert 11 wells to water injection	$ 81000	$ 150000
Injection lines	37000	65000
Production and Text Facilities	30000	60000
Injection Plant - 5000 BWPD @ 1500 psi	10000	60000
Water supply line, est. 5000 ft.	5000	9000
Pumping Units		170000
TOTAL	$163000	$514000

TOTAL INVESTMENT COST $677000

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 15

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6477
Order No. R-6177

APPLICATION OF SUN OIL COMPANY FOR A WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 14, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 14th day of November, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Sun Oil Company, seeks authority to institute a waterflood project on its East Millman Pool Unit Area by the injection of water into the Queen and Grayburg formations through eleven injection wells in Township 19 South, Range 28 East, East Millman Pool, NMPM, Eddy County, New Mexico, described as follows:

WELL NAME	NO.	UNIT LETTER	SEC.
Sun Felzer State	1	E	12
Sun State "O"	1	C	13
Sun State "O"	3	O	12
Sun State "O"	4	M	13
Maralo State 272	3	K	12
Maralo State 272	2	M	12
Kersey Bass	1	I	12
Yates E. Parcell	1	G	13
Yates E. Parcell	4	A	13
Gulf Eddy State AN	2	E	13
Gulf Eddy State AN	3	K	13

(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(6) That there are certain wells in and near the proposed waterflood project which had casing and cementing or plugging programs which are of doubtful integrity, and which may reasonably be assumed to be capable of providing avenues of escape whereby waters injected into the Queen-Grayburg formations could migrate to other formations and possibly into the fresh water sands in the area.

(7) That the applicant should consult with the Supervisor of the Artesia district office of the Division to determine what remedial work, if any, should be performed on the following described wells prior to commencement of water injection operations in the subject waterflood project:

Kersey Bass Well No. 1	Unit I, Section 28
Ohio Merchant Well No. 1	Unit N, Section 1
Nix and Curtis R & B State Well No. 2	Unit G, Section 12
Donnelly Kinney State Well No. 1	Unit L, Section 18
Depco State 648 Well No. 181	Unit J, Section 14
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Section 18

all in Township 19 South, Range 28 East, NMPM.

(8) That injection into each of the wells described in Finding No. (2) above should be through cement-lined tubing set in a packer, said packer being installed as near as is practicable to the uppermost perforation; that the casing-tubing annulus in each injection well should be loaded with an inert fluid and equipped with an approved pressure gauge or other attention-attracting leak detection device.

(9) That the injection wells or injection pressurization system should be so equipped as to limit injection pressure at the wellhead to no more than 900 psi, but the Division Director should have authority to increase said pressure limitation, should circumstances warrant.

(10) That the subject waterflood project should be known as the Sun East Millman Q-GB Waterflood Project.

(11) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sun Oil Company, is hereby authorized to institute a waterflood project on its East Millman Pool Unit Area, by the injection of water into the Queen and Grayburg formations through the following-described wells in Township 19 South, Range 28 East, East Millman Pool, NMPM, Eddy County, New Mexico:

WELL NAME	NO.	UNIT LETTER	SEC.
Sun Felzer State	1	E	12
Sun State "O"	1	C	13
Sun State "O"	3	O	12
Sun State "O"	4	M	13
Maralo State 272	3	K	12
Maralo State 272	2	M	12
Kersey Bass	1	I	12
Yates E. Parcell	1	G	13
Yates E. Parcell	4	A	13
Gulf Eddy State AN	2	E	13
Gulf Eddy State AN	3	K	13

(2) That injection into each of said wells shall be through internally coated tubing, set in a packer which shall be located as near as practicable to the uppermost perforation; that the casing-tubing annulus of each injection well shall be loaded with an inert fluid and equipped with an approved pressure gauge or attention-attracting leak detection device.

(3) That the operator shall immediately notify the Supervisor of the Artesia district office of the Division of the failure of the tubing or packer in any of said injection wells, the leakage of water or oil from or around any producing well, or the leakage of water or oil from or around any plugged and

abandoned well within the project area and shall take such timely steps as may be necessary or required to correct such failure or leakage.

(4) That the injection wells herein authorized and/or the injection pressurization system shall be so equipped as to limit injection pressure at the wellhead to no more than 900 psi, provided however, that the Division Director may authorize a higher surface injection pressure upon satisfactory showing that such pressure will not result in fracturing of the confining strata.

(5) That the subject waterflood project is hereby designated the Sun East Millman Q-GB Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

(6) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 704 and 1115 of the Division Rules and Regulations.

IT IS FURTHER ORDERED:

(1) That the operator shall consult with the Supervisor of the Artesia district office of the Division and determine what, if any, remedial action must be taken on the following described wells prior to initiation of injection into the Sun East Millman Q-GB Waterflood Project:

Kersey Bass Well No. 1	Unit I, Section 28
Ohio Merchant Well No. 1	Unit N, Section 1
Nix and Curtis R & B State Well No. 2	Unit G, Section 12
Donnelly Kinney State Well No. 1	Unit L, Section 18
Depco State 648 Well No. 181	Unit J, Section 14
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Section 18

all in Township 19 South, Range 28 East, NMPM.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

CASE NO. 6477
Order No. R-6177-A

APPLICATION OF SUN OIL COMPANY FOR A WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE DIVISION:

It appearing to the Division that Order No. R-6177, dated November 14, 1979, does not correctly state the intended order of the Division,

IT IS THEREFORE ORDERED:

(1) That Finding No. (7) on Page 2 of Order No. R-6177 be and the same is hereby corrected to read in its entirety as follows:

"(7) That the applicant should consult with the Supervisor of the Artesia district office of the Division to determine what remedial work, if any, should be performed on the following described wells prior to commencement of water injection operations in the subject waterflood project:

Kersey Bass Well No. 1	Unit I, Sec. 12, T-19-S, R-28-E
Ohio Merchant Well No. 1	Unit N, Sec. 1, T-19-S, R-28-E
Nix and Curtis R & B State Well No. 2	Unit G, Sec. 12, T-19-S, R-28-E
Donnelly Kinney State Well No. 1	Unit L, Sec. 18, T-19-S, R-29-E
Depco State 648 Well No. 181	Unit J, Sec. 14, T-19-S, R-28-E
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Sec. 18, T-19-S, R-29-E"

(2) That Order No. (1) of "IT IS FURTHER ORDERED" on Page 4 of Order No. R-6177 be and the same is hereby corrected to read in its entirety as follows:

"(1) That the operator shall consult with the Supervisor of the Artesia district office of the Division and determine what, if any, remedial action

must be taken on the following described wells prior to initiation of injection into the Sun East Millman Q-GB Waterflood Project:

Kersey Bass Well No. 1	Unit I, Sec. 12, T-19-S, R-28-E
Ohio Merchant Well No. 1	Unit N, Sec. 1, T-19-S, R-28-E
Nix and Curtis R & B State Well No. 2	Unit G, Sec. 12, T-19-S, R-28-E
Donnelly Kinney State Well No. 1	Unit L, Sec. 18, T-19-S, R-29-E
Depco State 648 Well No. 181	Unit J, Sec. 14, T-19-S, R-28-E
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Sec. 18, T-19-S, R-29-E"

(3) That the corrections set forth in this order be entered nunc pro tunc as of November 14, 1979.

DONE at Santa Fe, New Mexico, on this 29th day of November, 1979.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

dr/

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	Southwest Prod. Corp.	Southwest Prod. Corp.	DEPCO
Lease	Lowe State	Lowe State	Eddy State "BN"
Well Number	1	2	1
LOCATION			
Unit	G	H	P
Section	11	11	11
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	7	7	7-5/8
Setting Depth (Ft.)	624	640	602
Sacks Cement	150	150	450
Cement Top (Ft.)	Surface*	Surface*	Surface
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2294	2235	2246
Sacks Cement	100	100	265
Cement Top (Ft.)	1400*	1400*	Surface
TOTAL DEPTH (Ft.)	2302	2254	2246
PRODUCING INTERVAL (Ft.)	P&A	P&A	Queen-Grayburg (1813-2194)

*Theoretical calculation based on hole size, sacks of cement used and a yield of 1.32 cubic feet of fill per sack of cement.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 2
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 2

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	Eddy ST "BN"	Eddy ST "BN"	Eddy ST "BN"
Well Number	2	3	4
LOCATION			
Unit	O	I	J
Section	11	11	11
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	7-5/8	7-5/8	7-5/8
Setting Depth (Ft.)	604	596	575
Sacks Cement	225	375	273
Cement Top (Ft.)	Surface	Surface	Surface
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2225	2234	2230
Sacks Cement	250	250	250
Cement Top (Ft.)	Surface	Surface*	Surface*
TOTAL DEPTH (Ft.)	2225	2235	2230
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1815-2200) WIW	Queen-Grayburg (1806-2114)	Queen-Grayburg (1816-2199)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	St. 648
Well Number	148	149	184
LOCATION			
Unit	A	B	G
Section	14	14	14
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	10-3/4	10-3/4	10-3/4
Setting Depth (Ft.)	327	423	386
Sacks Cement	75	75	100
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2175	2287	2210
Sacks Cement	250	300	225
Cement Top (Ft.)	790*	630*	970*
TOTAL DEPTH (Ft.)	2175	2288	2563
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1740-2096)	Queen-Grayburg (1818-2112)	Queen (1756-1909) WIW

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	St. 648
Well Number	185	161	178
LOCATION			
Unit	H	I	P
Section	14	14	14
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	10-3/4	8-5/8	10-3/4
Setting Depth (Ft.)	339	344	430
Sacks Cement	75	100	75
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2201	2280	2388
Sacks Cement	225	125	275
Cement Top (Ft.)	960*	1090*	870*
TOTAL DEPTH (Ft.)	2201	2285	2389
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1738-2136)	Queen-Grayburg (1718-2199)	Grayburg (2092-2264)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	Malco St. Tr. 1
Well Number	181	182	6
LOCATION			
Unit	J	O	B
Section	14	14	23
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	10-3/4
Setting Depth (Ft.)	290	290	393
Sacks Cement	None	50	125
Cement Top (Ft.)	-	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	7	5½	None
Setting Depth (Ft.)	1760	1715	
Sacks Cement	50	50	
Cement Top (Ft.)	830*	828*	
LONG STRING		Liner	
Size (In.)	4½	3½	4½
Setting Depth (Ft.)	2317	1643-2385	2361
Sacks Cement	75	50	235
Cement Top (Ft.)	1430*	1640*	1060*
TOTAL DEPTH (Ft.)	2317	2385	2364
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1738-2268)	Queen-Grayburg (1712-2090) WIW	Grayburg (2172-2198)

fresh wtr zone
② 200 - no cement across this zone

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	KERSEY CO.	DONNELLY DRLG CO.	TEJAS PETRO. CO.
Lease	State A	Kinney St.	Sinclair St. "A"
Well Number	2	1	1-E
LOCATION			
Unit	D	L	E
Section	24	18	18
Township	19S	19S	19S
Range	28E	29E	29E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	9-5/8
Setting Depth (Ft.)	340	230 ← may not be deep enough	258 → 50
Sacks Cement	175	100	50
Cement Top (Ft.)	Surface*	Surface*	50*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	5½	4½
Setting Depth (Ft.)	2278	2414	2344
Sacks Cement	175	185	200
Cement Top (Ft.)	1260*	1010*	1420*
TOTAL DEPTH (Ft.)	2282	3010	2851
PRODUCING INTERVAL (Ft.)	Grayburg (2165-2222)	P&A	P&A

230' may not be deep enough to cover the wtr zone

258' may not be deep enough to cover the wtr zone

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	JOHN A. YATES	JOHN A. YATES	JOHN A. YATES
Lease	Campbell-Gwaltney	Elizabeth Dundas	Elizabeth Dundas
Well Number	1	1	2
LOCATION			
Unit	D	M	N
Section	18	7	7
Township	19S	19S	19S
Range	29E	29E	29E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	7
Setting Depth (Ft.)	262	283	309
Sacks Cement	80	50	50
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2314	2163	2199
Sacks Cement	300	125	100
Cement Top (Ft.)	650*	1110*	660*
TOTAL DEPTH (Ft.)	2314	2227	2348
PRODUCING INTERVAL (Ft.)	**Seven Rivers (1258-1266)	P&A	P&A

** Originally produced from Queen-Grayburg Zone (1810-2194) - Well "Bridged" @ 1300' and was subsequently perforated in the Seven Rivers Zone. Queen-Grayburg zone was never plugged with cement.

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	M. YATES III	NIX & CURTIS	OHIL OIL CO.
Lease	N&C State	R&B State	Merchant N. M.
Well Number	1	2	1
LOCATION			
Unit	M	G	N
Section	6	12	1
Township	19S	19S	19S
Range	29E	28E	28E
SURFACE CASING			
Size (In.)	8-5/8	None	6-5/8
Setting Depth (Ft.)	433		464
Sacks Cement	50		+
Cement Top (Ft.)	170*		+
INTERMEDIATE CSG			
Size (In.)	None	None	+
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	5½	None	+
Setting Depth (Ft.)	2795		
Sacks Cement	300		
Cement Top (Ft.)	1300		
TOTAL DEPTH (Ft.)	2839	2580	3055 P&A
PRODUCING INTERVAL (Ft.)	P&A	P&A (Dry)	(Dry)

+ Required data not available. Insufficient data available to permit estimation.

cmt on surf csg not may not be high enough to cover the wtr zone

no cmt across interval to be flood'd. chk to see if there is a cmt plug across wtr zone

drilled in 1925 practically no info available

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION		
Operator	PERRY R. BASS	KERSEY & CO.
Lease	Seltzer - St.	Bass
Well Number	2	3
LOCATION		
Unit	D	F
Section	12	12
Township	19S	19S
Range	28E	28E
SURFACE CASING		
Size (In.)	8-5/8	8-5/8
Setting Depth (Ft.)	323	420
Sacks Cement	300	50
Cement Top (Ft.)	Surface *	Surface *
INTERMEDIATE CSG		
Size (In.)	None	None
Setting Depth (Ft.)		
Sacks Cement		
Cement Top (Ft.)		
LONG STRING		
Size (In.)	4½	5
Setting Depth (Ft.)	2365	1900
Sacks Cement	410	100
Cement Top (Ft.)	610*	1340*
TOTAL DEPTH (Ft.)	2370	1900
PRODUCING INTERVAL (Ft.)	P&A	Queen (1836-1869) WIW

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

3

SOUTHWEST PROD. CORP.
LOWE STATE NO. 1
SEC. 11, T.-19-S., R.-28-E.
UNIT G
ELEV. 3440' KB

TOP OF CMT. @ SURFACE

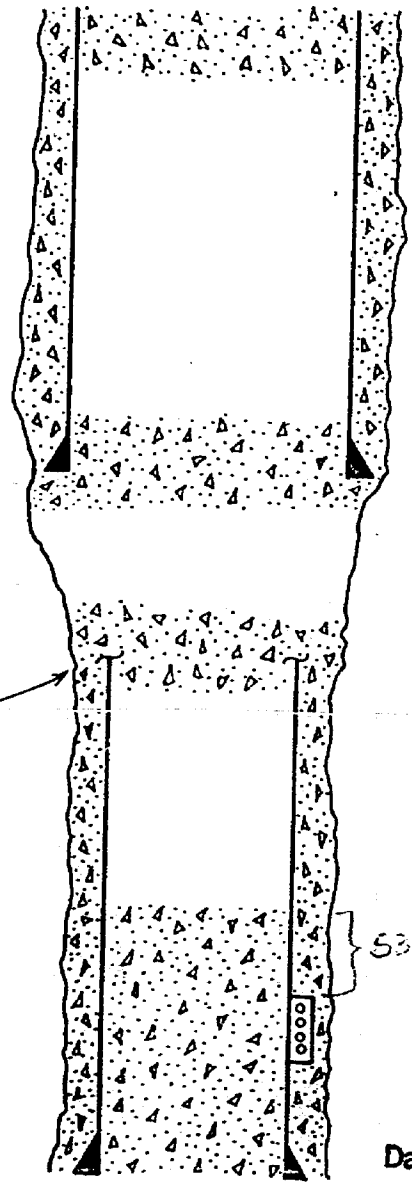
7" 20# CSG. @ 624'
W/ 150 SX CMT.

4 1/2" CSG. CUT @ 1400'
& PULLED

TOP OF CMT. @ 1400'
(CALCULATED)

4 1/2" 9# CSG. @ 2294'
W/ 100 SX CMT.

T.D. 2302'



10 SX CMT. PLUG @ SURFACE

100' CMT. PLUG 575' - 675'

100' CMT. PLUG @ 4 1/2"
CSG. STUB

60 SX CMT. PLUG 1750 - 2294'

QUEEN-GRAYBURG PERFS
1803 - 2183'

NOTE: MUD LADEN FLUID PLACED
BETWEEN ALL CMT. PLUGS.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 3
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit #: 3

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

SOUTHWEST PROD. CORP.
LOWE STATE NO. 2
SEC. 11, T.-19-S., R.-28-E.
UNIT H
ELEV. 3430' KB

TOP OF CMT. @ SURFACE

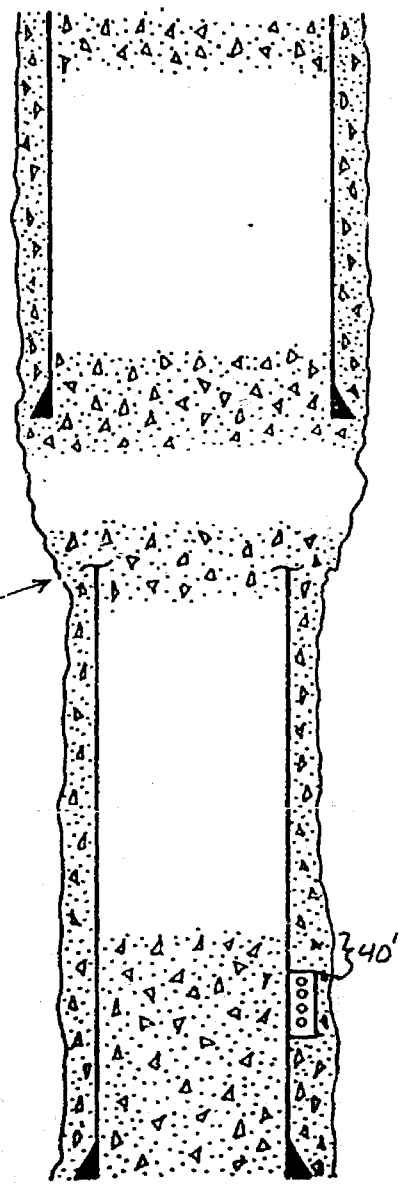
7" 20# CSG. @ 640'
W/150 SX CMT.

4 1/2" CSG. CUT @ 1400'
& PULLED

TOP OF CMT. @ 1400'
(CALCULATED)

4 1/2" 9.5# CSG. @ 2235'
W/100 SX CMT.

T.D. 2254'



10 SX CMT. PLUG @ SURFACE

100' CMT. PLUG 575 - 675'

100' CMT. PLUG @ 4 1/2"
CSG. STUB

50 SX CMT. PLUG 1800 - 2235'

QUEEN - GRAYBURG PERFS
1840 - 2176'

NOTE: MUD LADEN FLUID PLACED BETWEEN
ALL CMT. PLUGS.

3

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

OHIO OIL CO.

MERCHANT NEW MEXICO NO. 1

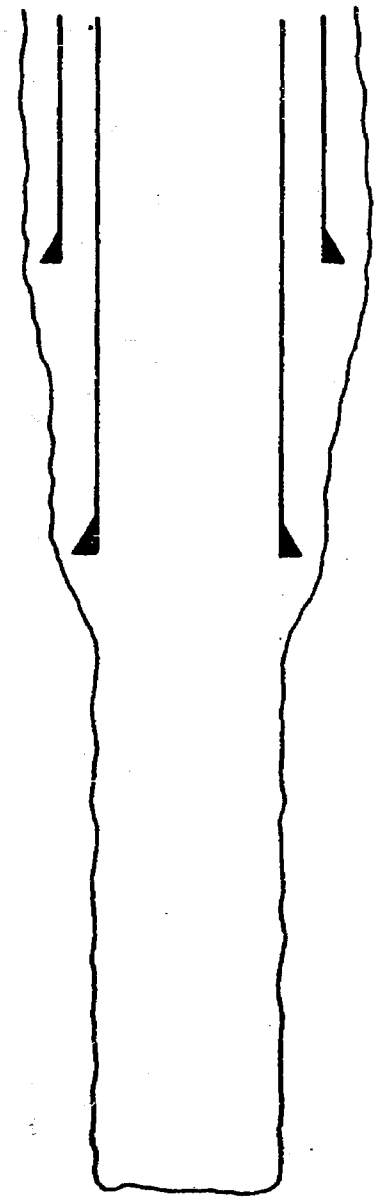
SEC. 1, T.-19-S., R.-28-E.

UNIT N

ELEV. 3391' GL

12 1/2" @ 59' – NO RECORD OF ANY CMT.

6 5/8" @ 464' – NO RECORD OF ANY CMT.



T.D. 3055'

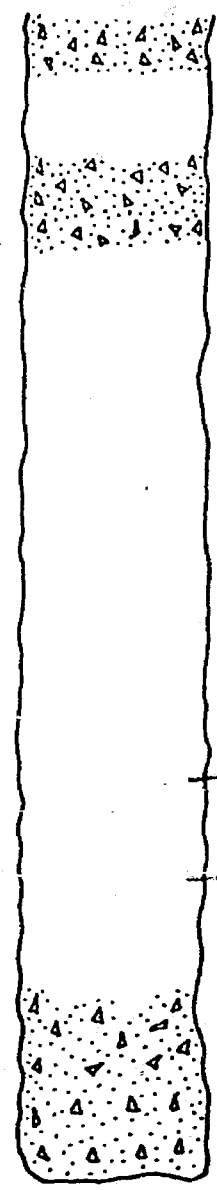
NOTE: NO RECORD OF PLUGGING PROCEDURE USED. WELL DRILLED & PLUGGED IN 1925.

no plugging info

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

3

NIX & CURTIS
R & B ST. NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT G
ELEV. 3364' G.L.



5 SX CMT. PLUG @ SURFACE

10 SX CMT. PLUG 345-370'
(CALCULATED)

NO CASING IN WELL

no plug across prod int.

20 SX CMT. PLUG ON BOTTOM.
TOP OF PLUG @ 2480'
(CALCULATED)

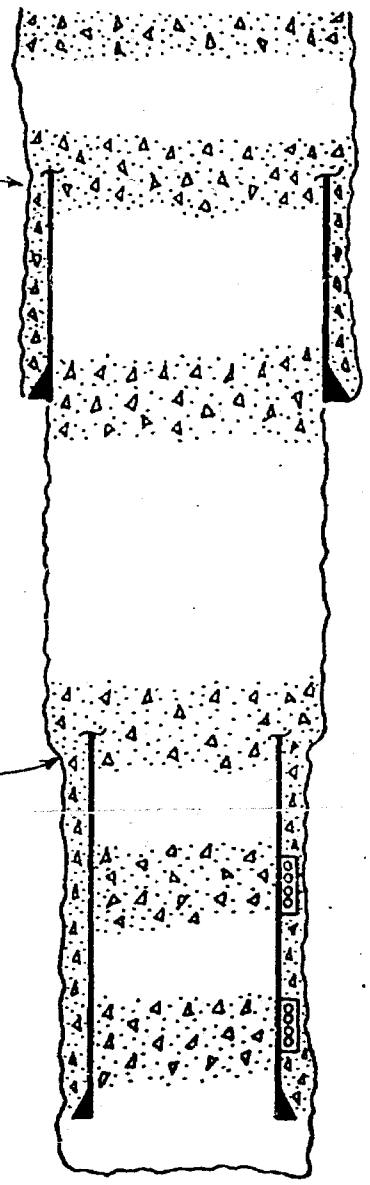
T.D. 2580'

NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

3

M. YATES III
N & C STATE NO. 1
SEC. 6, T.-19-S., R.-29-E.
UNIT M
ELEV. 3380' GL



TOP OF CMT. @ 269' (CALCULATED)

8 5/8" CSG. CUT @ 269' & PULLED

8 5/8" 24 # CSG. @ 433' W/50 SX CMT.

5 1/2" CSG. CUT @ 1331' & PULLED

TOP OF CMT. @ 1331' (CALCULATED)

5 1/2" 14# CSG. @ 2795' W/300 SX CMT.

T.D. 2839'

10 SX CMT. PLUG @ SURFACE

25 SX CMT. PLUG ON 8 5/8" CSG. STUB

25 SX CMT. PLUG @ BASE OF 8 5/8" CSG.

25 SX CMT. PLUG IN & OUT OF 5 1/2" CSG. STUB

15 SX CMT. PLUG OVER PERFS @ 2612 - 25'
SAN ANDRES PERFS 2612 - 25'

SAN ANDRES PERFS 2676 - 82', SQZD W/25 SX CMT. TOP OF CMT. PLUG 2658'

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

3

PERRY R. BASS
SELTZER - STATE NO.2
SEC. 12, T.-19-S., R.-28-E.
UNIT D
ELEV. 3407' KB

TOP OF CMT. @ SURFACE
(CALCULATED)

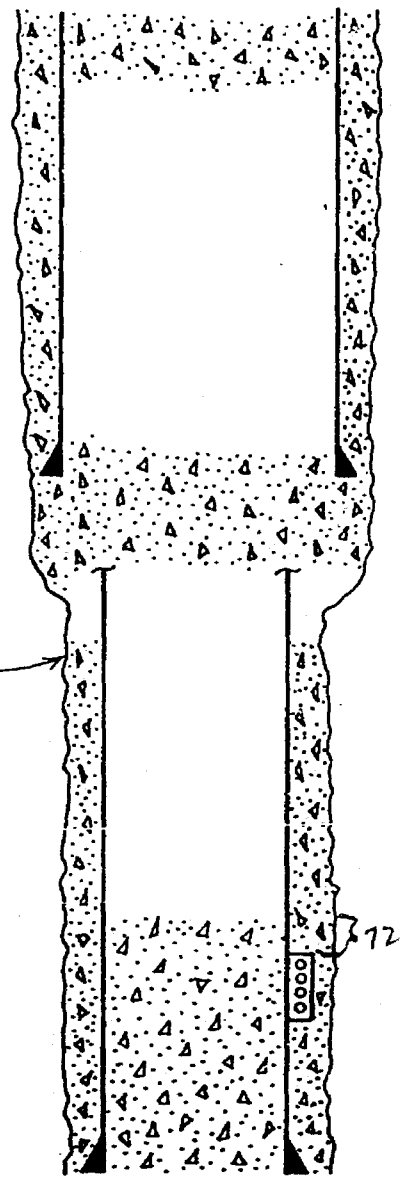
8 5/8" 24# CSG @ 323'
W/ 300 SX. CMT.

4 1/2" CSG. CUT @ 444'
& PLUGGED

TOP OF CMT. @ 610'

4 1/2" 9.5 # CSG. @ 2365'
W/410 SX CMT.

T. D. 2370'



10 SX CMT. PLUG @ SURFACE

30 SX CMT. PLUG 311 - 440'

30 SX CMT. PLUG 1978 - 2340'

QUEEN - GRAYBURG PERFS
2050 - 2314'

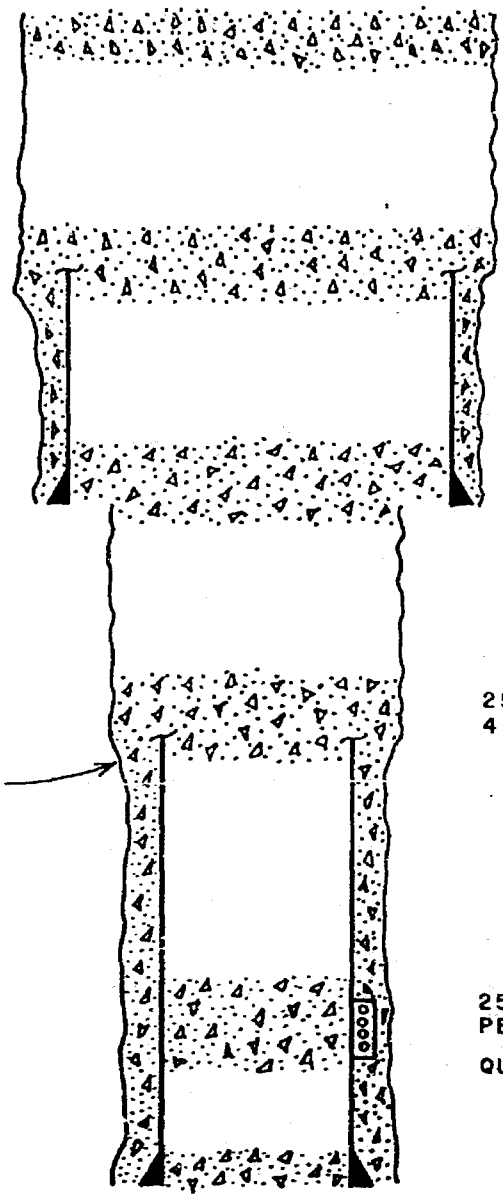
NOTE: MUD LADEN FLUID PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

·3

JOHN A. YATES
ELIZABETH DUNDAS NO. 1
SEC. 7 , T.-19-S., R.-29-E.
UNIT M
ELEV. 3378' DF



10 SX CMT. PLUG @ SURFACE

CUT 8 5/8" CSG. @ 124'
& PULLED

TOP OF CMT. @ 124'
(CALCULATED)

25 SX CMT. PLUG ACROSS
8 5/8" CSG. STUB

8 5/8" 24# CSG. @ 283'
W/50 SX CMT.

25 SX CMT. PLUG ACROSS
8 5/8" CSG. SHOE

CUT 4 1/2" CSG. @ 1510' &
PULLED

TOP OF CMT. @ 1510'
(CALCULATED)

25 SX CMT. PLUG ACROSS
4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS
PERFS 1773 - 96'

QUEEN PERFS 1773 - 1796'

4 1/2" 9.5 # CSG. @ 2163'
W/125 SX CMT.

T.D. 2227'

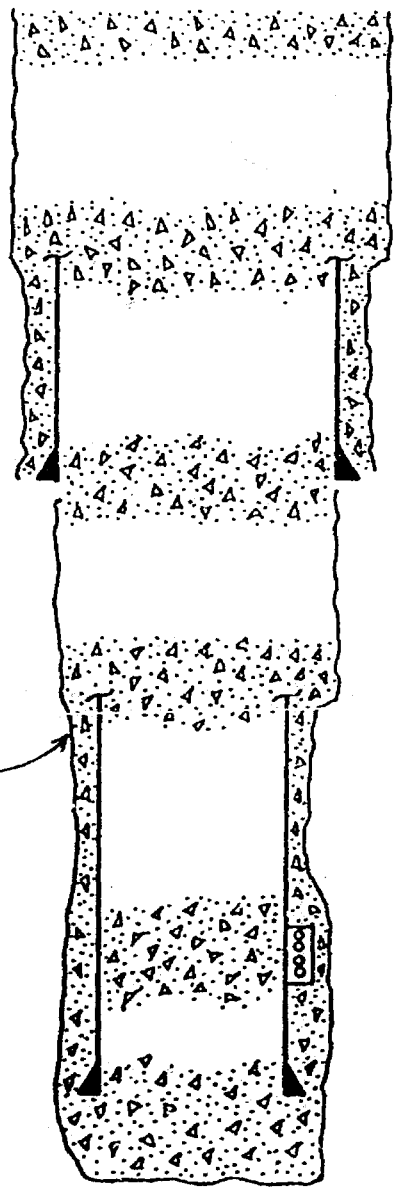
CK

NOTE: MUD LADEN FLUID WAS PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELIZABETH DUNDAS NO. 2
SEC. 7, T.-19-S., R.-29-E.
UNIT N
ELEV. 3382' DF



10 SX CMT. PLUG @ SURFACE

CUT 7" CSG. @ 142' & PULLED

TOP OF CMT. @ 142' (CALCULATED)

25 SX CMT. PLUG ACROSS 7" CSG. STUB

7" CSG. @ 309' W/50 SX CMT.

25 SX CMT. PLUG ACROSS 7" CSG. SHOE

CUT 4 1/2" CSG. @ 1421' & PULLED

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

TOP OF CMT. @ 1421' (CALCULATED)

25 SX CMT. PLUG ACROSS PERFS 2080-2101'

GRAYBURG PERFS 2080-2101'

4 1/2" 9.5# CSG. @ 2199' W/100 SX CMT.

T.D. 2348'

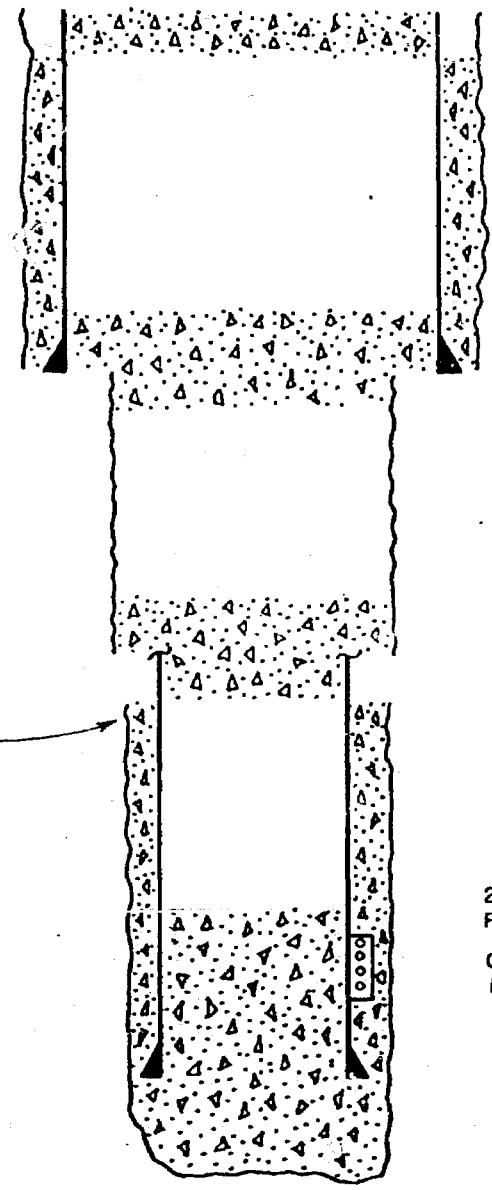
NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

TEJAS PETR. CO.
SINCLAIR ST. "A" NO. 1-E
SEC. 18, T.-19-S., R.-29-E.
UNIT E
ELEV. 3382'



TOP OF CMT. @ 47'
(CALCULATED)

9 5/8" 32.3# CSG. @ 285' W/50 SX CMT.

CUT 4 1/2" CSG. @ 1100' & PULLED

TOP OF CMT. @ 1420'
(CALCULATED)

4 1/2" 9.5# CSG. @ 2349' W/200 SX CMT.

T.D. 2581'

5 SX CMT. PLUG @ SURFACE

20 SX CMT. PLUG ACROSS 9 5/8" CSG. SHOE

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS PERFS 1849 - 2140'

QUEEN - GRAYBURG PERFS 1849 - 2140'

OK

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

DONNELLY DRLG. CO.
KINNEY ST. NO. 1
SEC. 18, T.-19-S., R.-29-E.
UNIT L
ELEV. 3380'

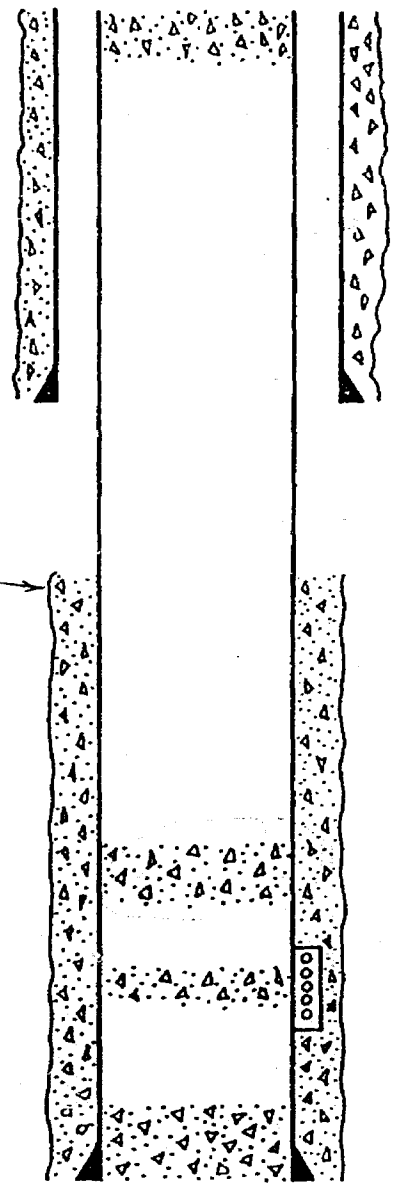
TOP OF CMT. @ SURFACE

8 5/8" 24# CSG. @ 230'
W/100 SX CMT.

TOP OF CMT. @ 1010'
(CALCULATED)

5 1/2" 14# CSG. @ 2414'
W/185 SX CMT.

T.D. 3010'



2 SX CMT. PLUG @ SURFACE

10 SX CMT. PLUG 1700 - 1780'

9 SX CMT. PLUG 2038 - 2110'
QUEEN-GRAYBURG PERFS
1859 - 2258'

OK

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

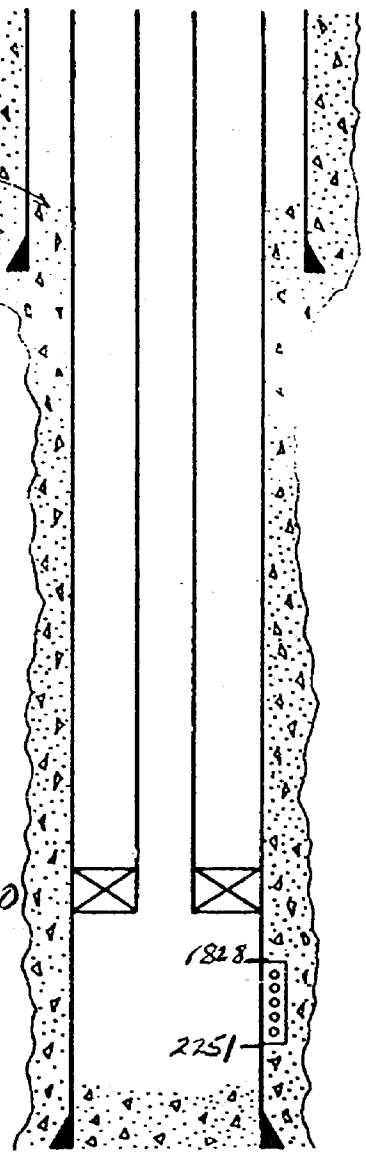
SUN OIL COMPANY

NEW MEXICO SELTZER STATE NO. 1

SEC. 12, T.-19-S., R.-28-E.

UNIT E

ELEV. 3414'



TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN - GRAYBURG PERFS
1828 - 48', 2076 - 82', 2107 - 30'
& 2248 - 51'

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

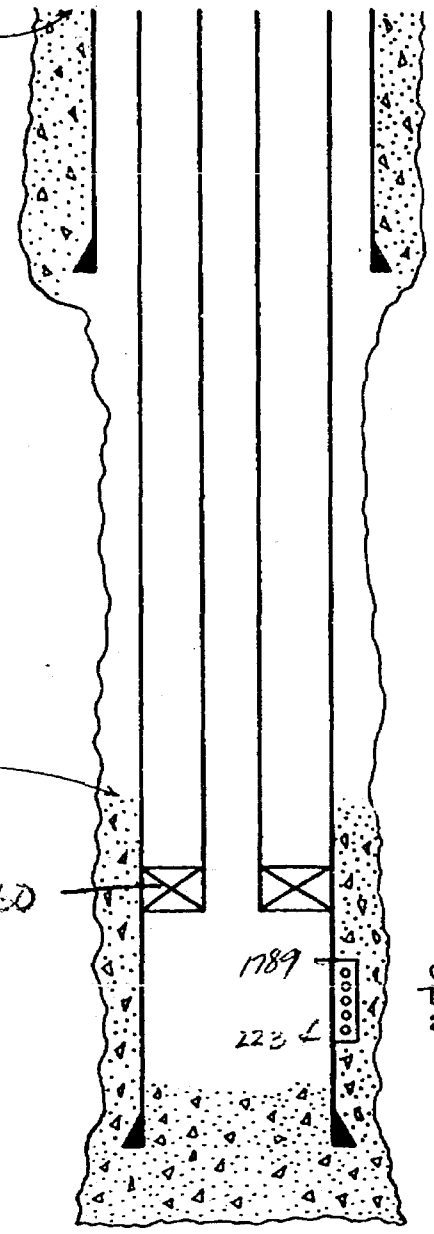
Exhibit # 4

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 4
CASE NO. 6477

PROPOSED WATER INJECTION WELL
~~(SHOWN IN INJECTION CONFIGURATION)~~

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

KERSEY OIL COMPANY
BASS NO. 1
SEC. 12, T.-19-S., R.-28-E.
UNIT I
ELEV. UNKNOWN



TOP OF CMT. @ SURFACE
(CALCULATED)

8 5/8" 9.5# J-55 CSG. @
401' W/50 SX CMT.

2 3/8" CMT. LINED TBG.
ON TENSION PKR SET @
1760'

TBG.-CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

TOP OF CMT @ 1720'
(CALCULATED)

Perf @ 1760

4 1/2" 9.5# J-55 CSG @
2270' W/100 SX CMT.

QUEEN-GRAYBURG PERFS
1789-1800', 1834-46', 2156-58',
2166-74' & 2230-34'

P.B.T.D. 2270'
T.D. 2318'

calc cmt top @ 1720

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

MARALO OIL CO.
STATE "OG 272" NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT M
ELEV. 3410' DF

TOP OF CMT. @ SURFACE

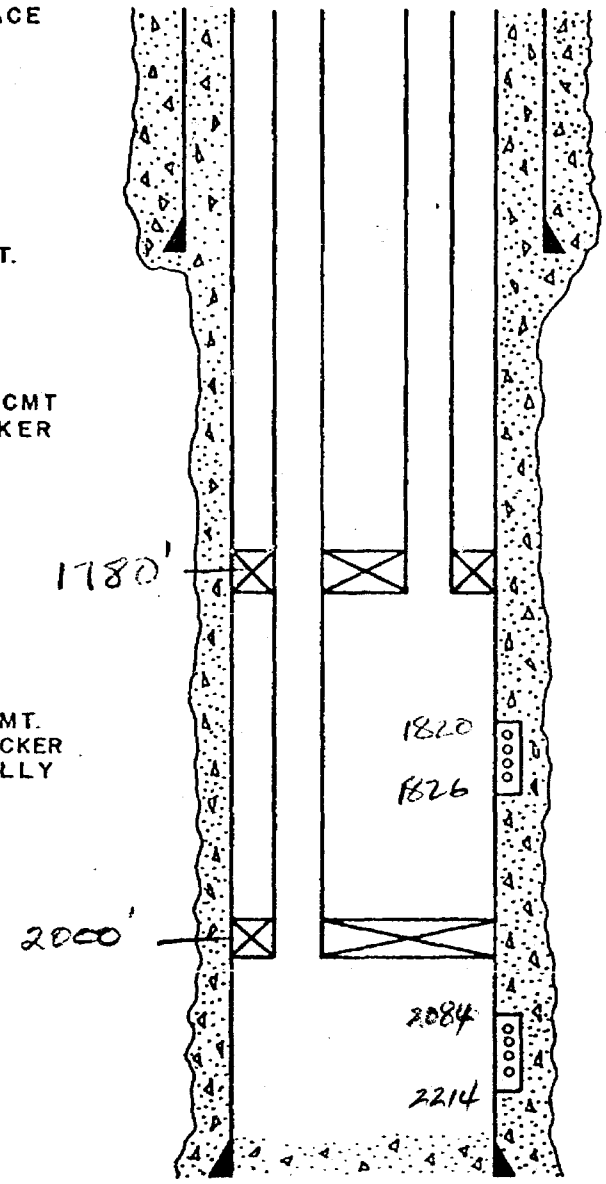
8 5/8" 24# J-55 CSG.
@ 632' W/ 350 SX CMT.

UPPER TUBING: 2 1/16" CMT
LINED TBG. ON DUAL PACKER
@ 1780'

LOWER TUBING: 2 1/16" CMT.
LINED TBG. ON SINGLE PACKER
@ 2000'. TBG. EXTERNALLY
COATED BETWEEN PKRS.

5 1/2" 14 # J-55 CSG.
@ 2232' W/ 350 SX

P.B.T.D. 2226'
T.D. 2232'



TBG. CSG. ANNULUS
PROTECTED W/ CORROSION
INHIBITED INERT FLUID

dual injection

QUEEN PERFS 1758' - 66'
& 1820' - 26'

GRAYBURG PERFS 2084'-90',
2100'-06', 2138'-44', &
2203' - 12'

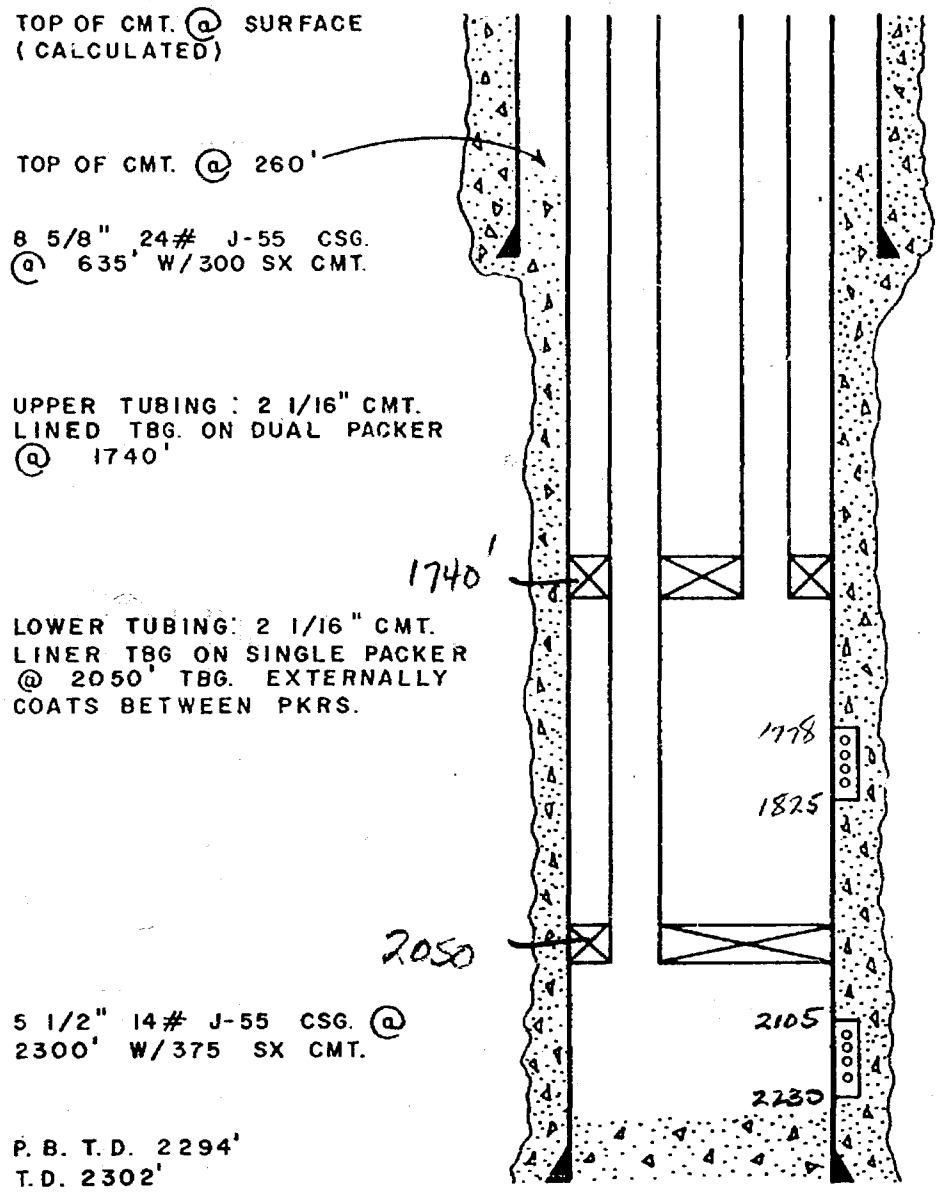
PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

MARALO OIL COMPANY
STATE "OG 272" NO. 3
SEC. 12, T.-19-S., R.-28-E.
UNIT K
ELEV. 3402' DF



PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

GULF OIL COMPANY

EDDY STATE "AN" NO. 2

SEC. 13, T.-19-S., R.-28-E.

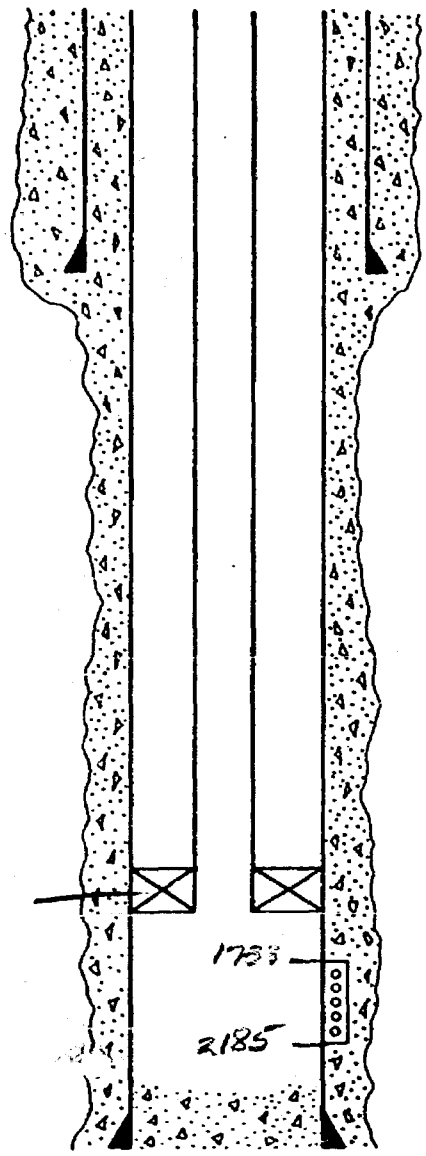
UNIT E

ELEV. 3392'

TOP OF CMT @ SURFACE

7 5/8" 26.4# J-55 CSG. @ 598' W/ 325 SX CMT.

2 3/8" CMT LINED TUBING ON TENSION PKR SET @ 1700'



TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

4 1/2" 9.5# J-55 CSG. @ 2197' W/330 SX CMT.

QUEEN - GRAYBURG PERFS
1733'-43', 1789'-1803', 2084'-86', 2095'-97', 2107'-09', 2116'-26' 2149'-51' & 2165'-85'

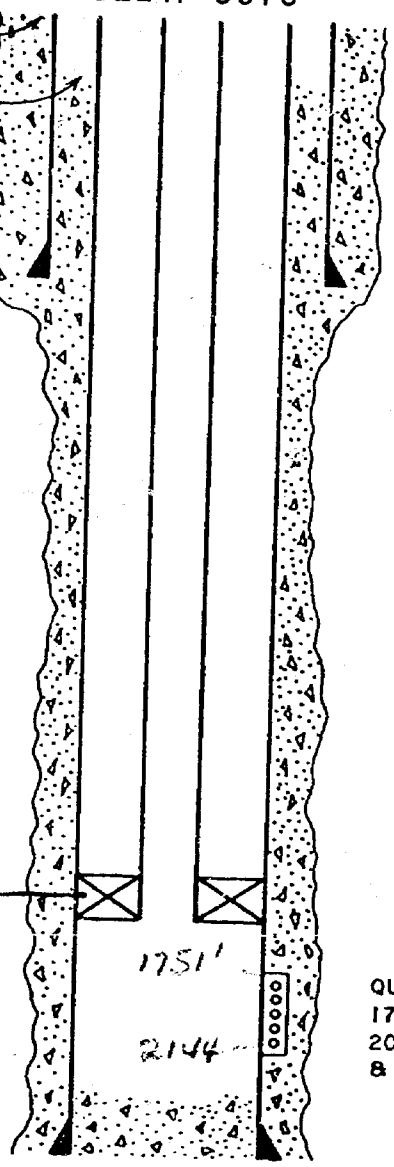
P.B.T.D. 2195'
T.D. 2200'

PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

GULF OIL COMPANY
EDDY STATE "AN" NO.3
SEC.13, T.-19-S., R.-26-E.
UNIT K
ELEV. 3376'



TOP OF CMT @ SURFACE

TOP OF CMT @ 20'

7 5/8" 26.4# J-55 CSG @ 605' W/443 SX CMT.

2 3/8" CMT. LINED TUBING ON TENSION PKR SET @ 1710'

4 1/2" 9.5# J-55 CSG. @ 2200' W/375 SX CMT

P.B.T.D. 2164'
T.D. 2200'

TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN-GRAYBURG PERFS
1751'-57', 1806'-24', 2064'-71', 2089'-94', 2102'-10', 2124'-30' & 2140'-44'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

GULF OIL CO.

EDDY ST. "AN" NO.5
SEC.13, T.-19-S., R.-28-E.
UNIT J
ELEV. 3376' DF

TOP OF CMT. @ SURFACE
(CALCULATED)

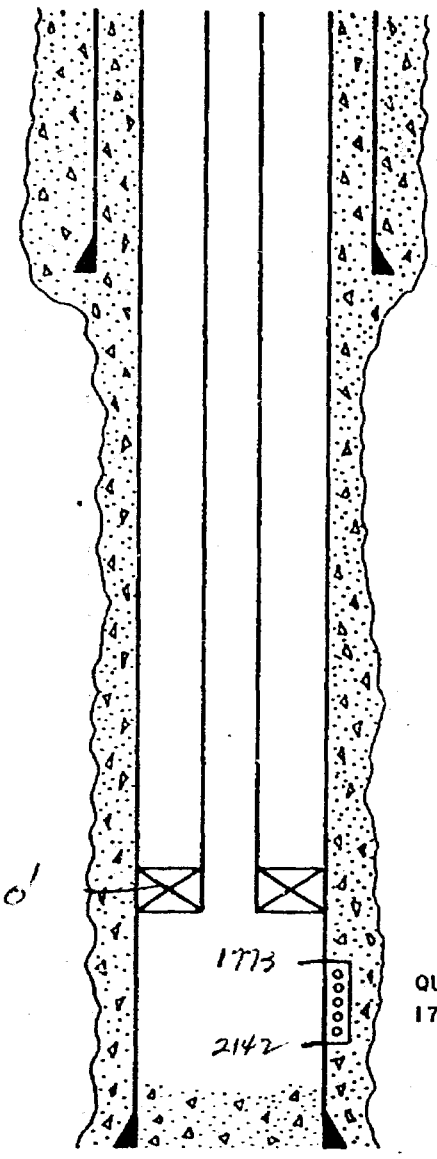
8 5/8" 24 # CSG @ 620'
W/150 SX CMT.

2 3/8" CMT. LINED TUBING ON
TENSION PKR @ 1730'

1730'

5 1/2" 14# CSG. @ 2240'
W/400 SX CMT.

P.B.T.D. 2195'
T.D. 2240'



TBG.-CSG. ANNULUS PROTECTED
W/CORROSION INHIBITED INERT
FLUID

QUEEN-GRAYBURG PERFS
1773-85', 2033-43', 2136-42'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

SUN OIL COMPANY

NEW MEXICO "O" STATE NO. 1

SEC. 13, T.-19-S., R.-28-E.

UNIT C

ELEV. 3377'

TOP OF CMT. @ SURFACE

10 3/4" 32.75# H-40
CSG. @ 359' W/125 SX CMT.

TOP OF CMT. @ 1295'

UPPER TUBING: 2 1/16" CMT.
LINED TBG. ON DUAL PACKER
@ 1720'

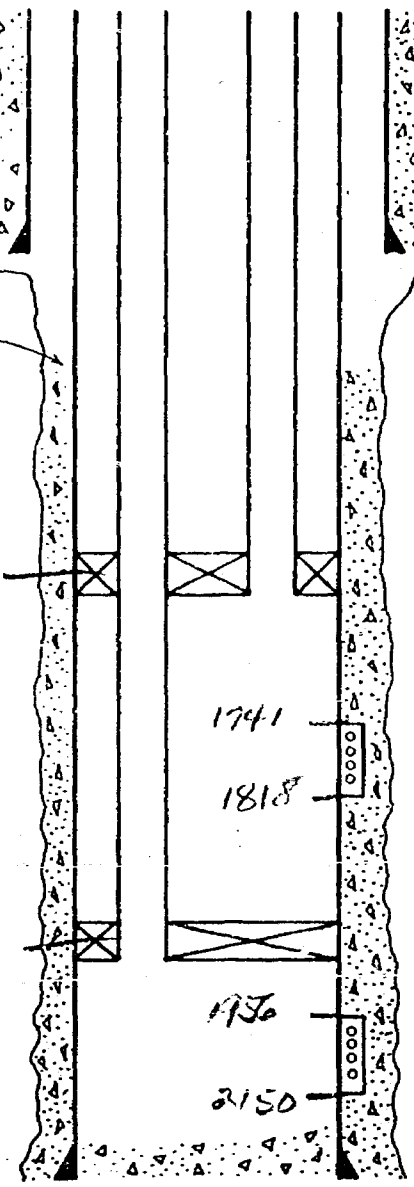
1720

LOWER TUBING: 2 1/16" CMT.
LINED TBG. ON SINGLE PACKER
@ 1900' TBG. EXTERNALLY
COATED BETWEEN PKRS.

1900

7" 20# J-55 CSG. @ 2167'
W/250 SX CMT.

P.B.T.D. 2162'
T.D. 2168'



TBG. – CSG. ANNULUS PROTECTED
W/CORROSION INHIBITED INERT
FLUID

Dual
injection

QUEEN PERFS
1741 – 60' & 1802 – 18'

GRAYBURG PERFS
1956 – 72', 2026 – 68', 2078 – 83',
2098 – 2124', 2125 – 30' &
2136 – 50'

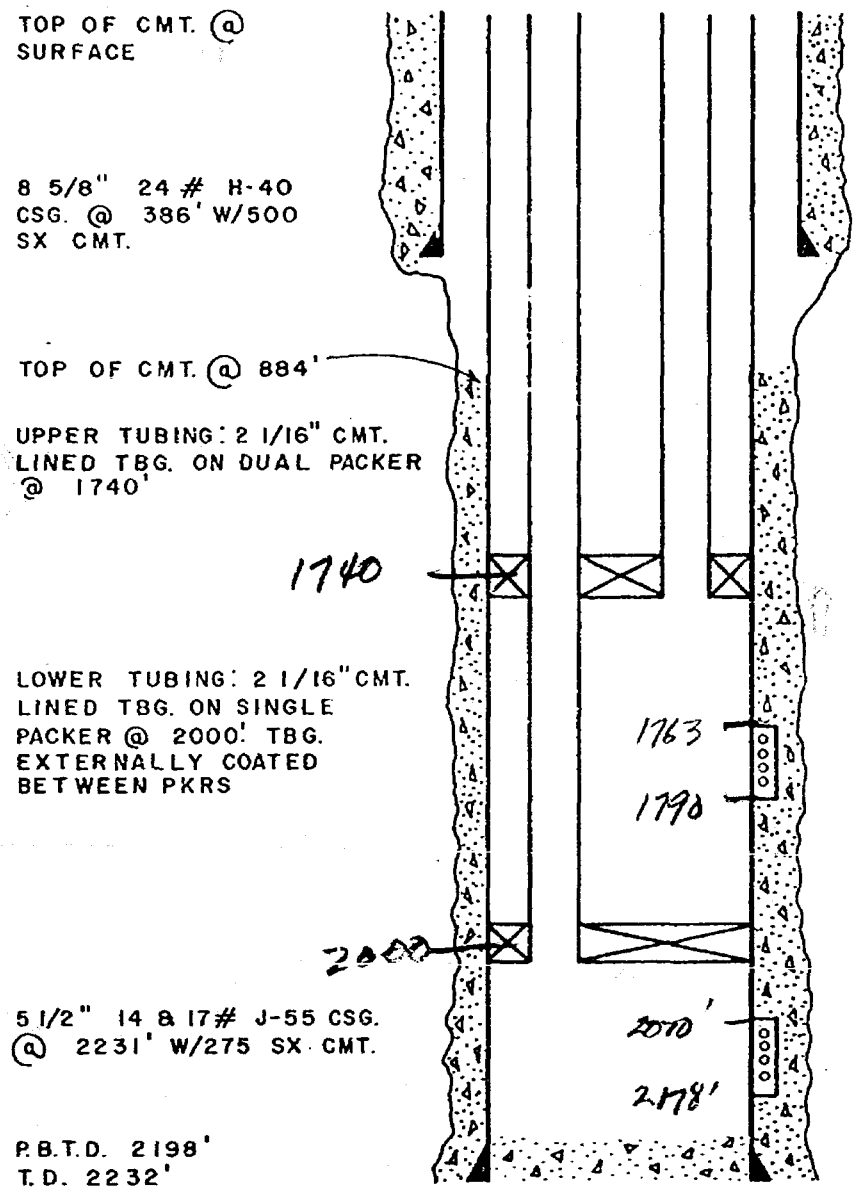
PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

SUN OIL COMPANY
NEW MEXICO "O" STATE NO. 3
SEC. 12, T.-19-S., R.-28-E.
UNIT O
ELEV. 3381'



PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

SUN OIL COMPANY

NEW MEXICO "O" STATE NO. 4

SEC. 13, T.-19-S, R.-28-E.

UNIT M

ELEV. 3376'

TOP OF CMT. @ SURFACE

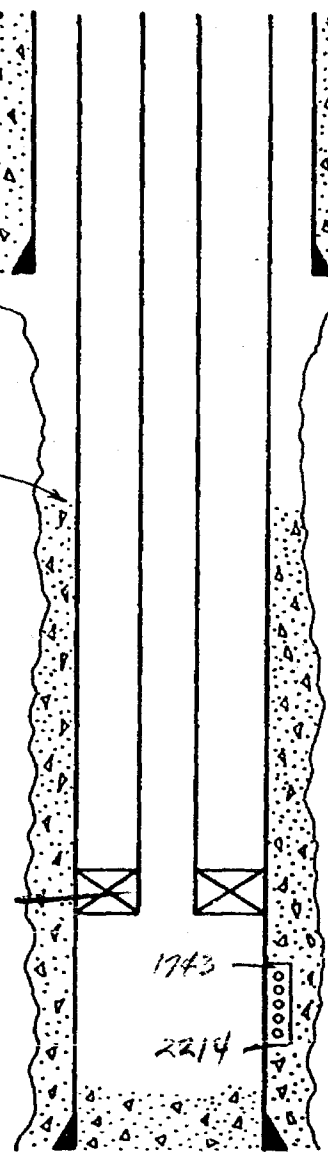
8 5/8" 24# J-55 CSG @ 422' W/250 SX CMT

TOP OF CMT. @ 1115'

2 3/8" CMT. LINED TUBING ON TENSION PKR SET @ 1700'

4 1/2" 9.5# J-55 CSG @ 2280' W/250 SX CMT

P.B.T.D. 2251'
T.D. 2280'



TBG.-CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID.

QUEEN-GRAYBURG PERFS
1743-51', 1793-1300', 2091', 2102', 2113', 2131', 2140', 2150', 2175-77', 2184-86', 2198-2200' & 2212-14'

PROPOSED WATER INJECTION WELL

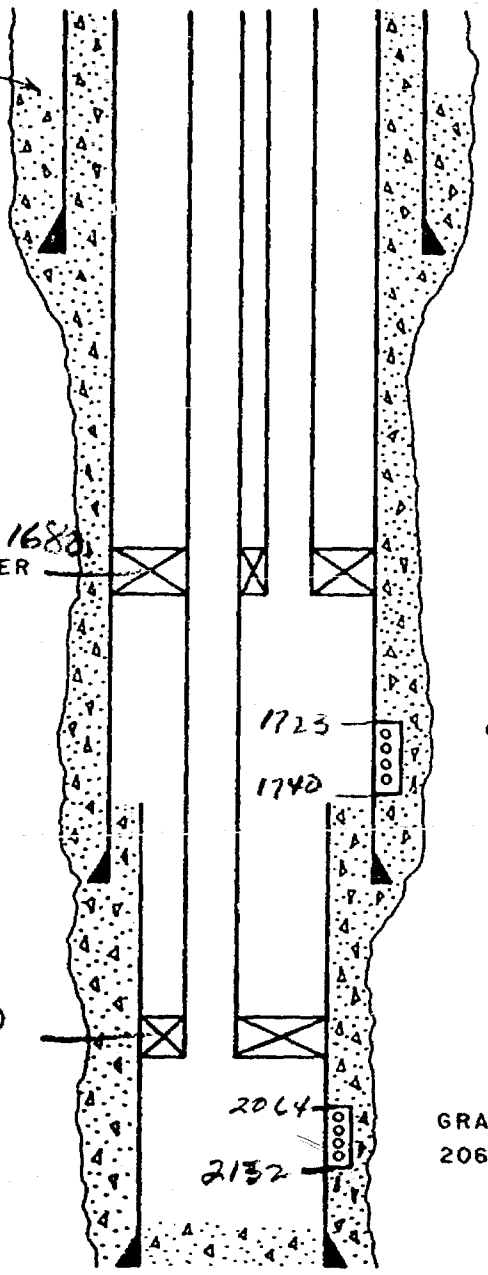
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

JOHN A. YATES
ELLIOTT & PARCELL NO. 1
SEC. 13, T.-19-S., R.-28-E.
UNIT G
ELEV. 3373' DF



TOP OF CMT. @ SURFACE (CALCULATED)

TOP OF CMT. @ 130' (CALCULATED)

8 5/8" 24# CSG. @ 600' W/ 50 SX CMT.

UPPER TUBING: 2 1/16" CMT. LINED TBG. ON DUAL PACKER @ 1680'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 2010' TBG. EXTERNALLY COATED BETWEEN PKRS

7" 23# CSG. @ 1790' W/ 200 SX CMT.

5 1/2" 14# LINER SET 1750 - 2145' CEMENTED W/ 18 SX (ALL IT WOULD TAKE)

T.D. 2147'

TBG. - CSG. ANNULUS PROTECTED W/ CORROSION INHIBITED INERT FLUID

Dual
injection

QUEEN PERFS
1723 - 40'

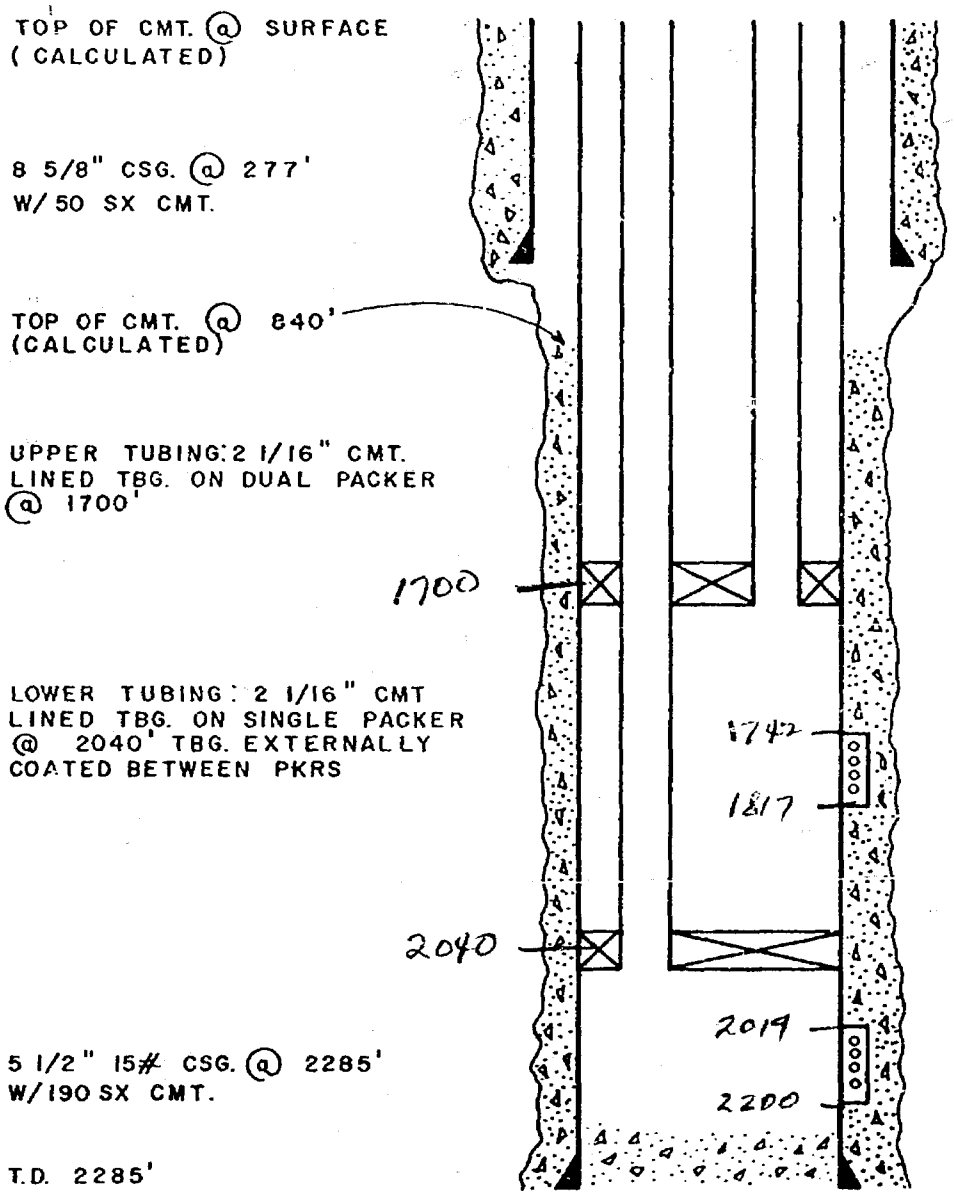
GRAYBURG PERFS
2064 - 82', 2127 - 2132'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELLIOTT & PARCELL NO. 4
SEC. 13, T.-19-S., R.-28-E.
UNIT A
ELEV. 3368'



PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

5

MISCELLANEOUS INJECTION INFORMATION

I. Injection Zones

Name:	Queen	Grayburg
Depth:	1700'	1950'

II. Injection Fluid

Type: Fresh water (90%) and salt water (10%)

Sources: 1. Fresh water - Double Eagle Corp. (City of Carlsbad)

2. Salt Water - Produced water from Queen and Grayburg formations.

III. Injection Data

Anticipated injection pressure: 1300 psig

Anticipated injection volume: 400 BWPD per well

1723.2
344.6

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 5
CASE NO. 6977

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 5

FRACTURE GRADIENTS - QUEEN/GRAYBURG FORMATION
EAST MILLMAN - QUEEN - GRAYBURG POOL
EDDY COUNTY, NEW MEXICO

WELL NAME	TOP PERFORATION	DATE OF FRACTURE TREATMENT	ISI PRESSURE	FLUID GRADIENT	FORMATION FRACTURE GRADIENT
Seltzer State #1	2248'	9-17-61	1450	.360	1.005
Bass #1	--	*	*	*	--
Bass #2	--	*	*	*	--
R & B St #1	--	*	*	*	--
ST OG 272 #1	--	*	*	*	--
ST OG 272 #2	--	*	*	*	--
ST OG 272 #3	--	*	*	*	--
ST OG 272 #4	--	*	*	*	--
New Mex "O" ST #1	2026'	4-22-76	600	.450	.746
New Mex "O" ST #2	2046'	1-6-65	1300	.360	.995
New Mex "O" ST #3	1763'	3-16-59	1600	.360	1.268
New Mex "O" ST #4	2091'	6-24-65	950	.360	.814
New Mex "O" ST #5	1759'	12-27-61	1000	.360	.929
New Mex "O" ST #6	2115'	3-1-64	1300	.360	.975
Elliott & Parcell #1	1717'	2-14-59	650	.360	.739
Elliott & Parcell #2	1758'	9-6-58	650	.433	.803
Elliott & Parcell #3	2186'	4-8-69	400	.433	.616
Elliott & Parcell #4	1742'	10-3-68	750	.433	.864
Eddy State "AN" #1	--	*	*	*	--
Eddy State "AN" #2	--	*	*	*	--
Eddy State "AN" #3	--	*	*	*	--
Eddy State "AN" #4	--	*	*	*	--
Eddy State "AN" #5	--	*	*	*	--
AVERAGE	1950	--	968	--	.887

* Information Not Available

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 6
CASE NO. 6477

would run ... rates on all inj wells and ... under frac pres.

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit #: 6

EAST MILLMAN-QUEEN-GRAYBURG WATERFLOOD*
DEPCO OPERATOR
INJECTION WELL DATA

WELL	OCTOBER VOLUME (BWPD)	OCTOBER PRESSURE	NOVEMBER VOLUME (BWPD)	NOVEMBER PRESSURE
State "648" #143	103	1225	109	1260
State "648" #145	140	1225	397	1260
State "648" #147	16	1100	99	1200
State "648" #151	231	1125	316	1150
State "648" #153	0	-	0	-
State "648" #160	177	1150	176	1174
State "648" #184	108	1250	136	1300
State "648" #189	186	1130	263	1175
State "E 5003" #1	95	1200	207	1250
State "BN" #2	118	650	198	650
Average	130	1117	211	1158

*East offset to proposed East Millman Pool Waterflood

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 7
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 7

8

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

ROSWELL

S. E. REYNOLDS
STATE ENGINEER

ADDRESS CORRESPONDENCE TO:
P. O. BOX 1717
ROSWELL, NEW MEXICO
88201

February 20, 1979

Sun Oil Company
P. O. Box 1861
Midland, Texas 79702

Attention: Bill Thomas

Tentlemen:

As per your telephone request submitted is the information that we have regarding groundwater in Township 19 South, Range 28 East of Eddy County, New Mexico.

Most of the water in the East Hillman area is produced from the Artesia Group formation at depths of around 200 feet.

The static water level ranges from 80 feet to 160 feet and production is probably on the order of 5 GPM.

Very truly yours,

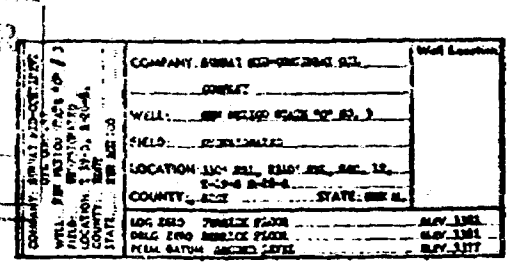
James I Wright
Field Engineer

JIW:ffc
cc: Santa Fe

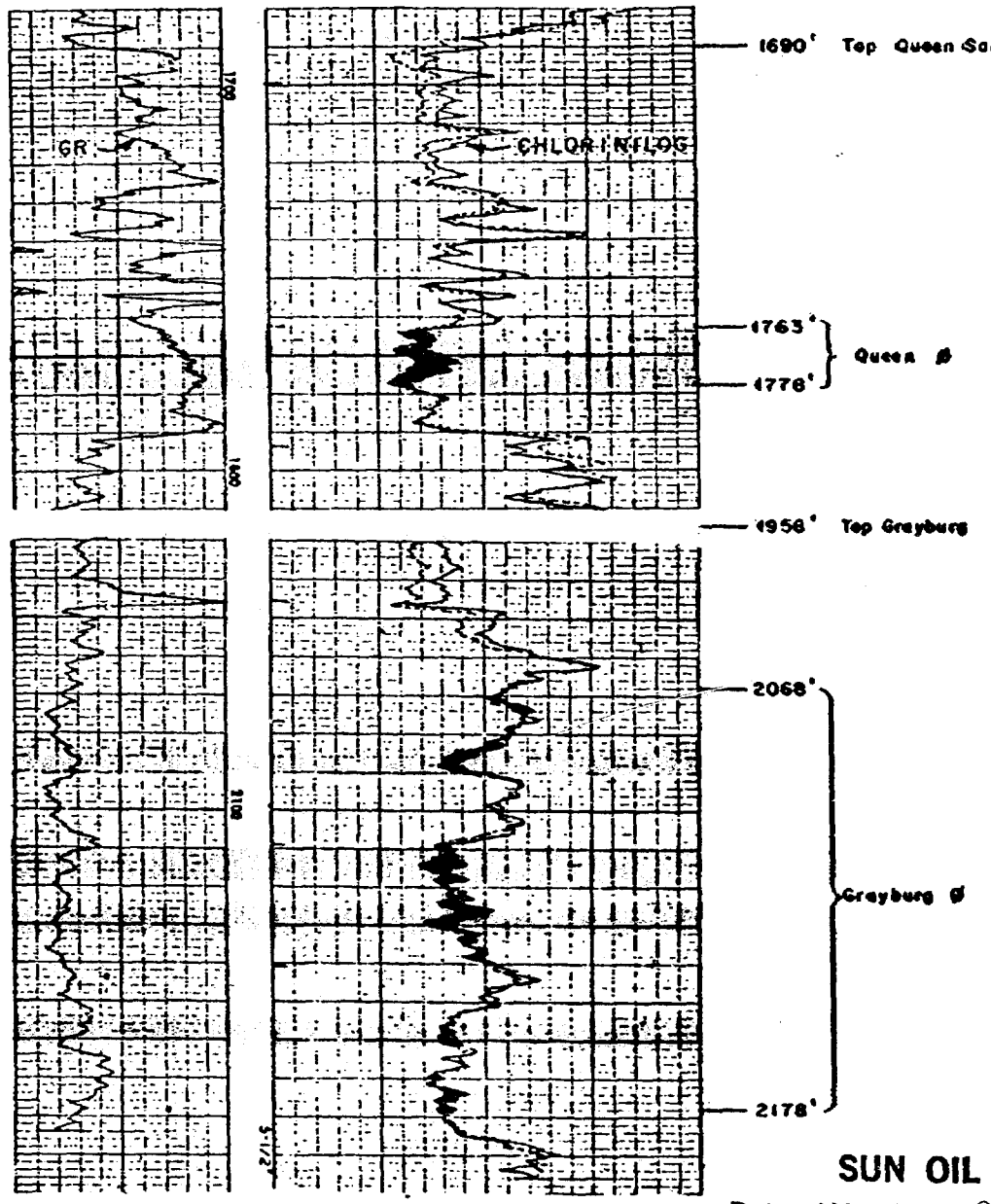
BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 8
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 8

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 9
CASE NO. 6477



PROPOSED FLOOD ZONES



SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 9

10

INTER-OFFICE CORRESPONDENCE

SUBJECT: Water Compatibility: Millman Field, Southwestern District

DATE: February 21, 1979

OFFICE: Richardson

FROM: Production Service Laboratory

TO: Mr. Gary Miller
Southwestern District, Midland

Water samples representing San Andres Formation water and supply water collected from the New Mexico State lease and Double Eagle lease, respectively, were submitted to the lab for compatibility tests to determine if the supply water would be suitable for the planned injection program in the Millman Field.

The enclosed water analyses indicate the two waters are compatible and mixing the waters prior to injection would present no gross incompatibility problems.

Gary, as I suggested during our telephone conversation, for good injection performance, a good quality fresh water must be used for the proposed program. Specifications pertaining to the quality of the water purchased from Double Eagle should be part of the contract. The fresh supply water to be mixed with the produced San Andres Formation water should have an oxygen content of less than 1 ppm, a bacteria count of less than 10 colonies per milliliter and a suspended solids content of less than 2 ppm.

Since a ratio of approximately 90% fresh water and 10% produced water will be injected initially, a mineralogy study should be made on available core material to determine the presence of swelling clays. The presence of these clays in a fresh water environment could cause plugging problems.

If the above suggestions need further clarification, please contact me at the lab.

Johnny M Reinschmidt

Johnny Reinschmidt
Chemical Engineering Section

JR:cs
cc: C. L. Dickson
S. Whitaker
S. Gillett
Bill Hensel
D. Inglish
Danny Rawson
Corrosion Eng.
File 23-360

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 10
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-19-79
Docket No.: 6477
Exhibit # 10

SUN-7900-B

10

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO. B-7756

FILE 23-360

Operator Sun Production Company
Lease or Well Double Eagle
Formation OGALLALA
Depth ' To ; T.D.
Method of collecting sample From main line

Treatment None
Date and amount of last acid job

Prod. BOPD BWPD MCFPD
Description This sample consists of one pint clear water.

Region
District S.W. District
Field Millman
County Eddy
State New Mexico
Collected by
Date 1-30-79 Collected 2-16-79 Analyzed
Sample No. 3171
Analyst SII

CONSTITUENTS	ppm
Sodium	60
Calcium	30
Magnesium	10
Barium	0
Strontium	
Potassium	
Iron	0
Chloride	41
Sulfate	39
Carbonate	0
Bicarbonate	178
TOTAL DISSOLVED SOLIDS	358

OTHER PROPERTIES	
pH	8.2
Specific Gravity	1.0001
Resistivity ohm-mtr. @75°F	19.788
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	ABSENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	0
Nitrates	
Phosphate	

REMARKS:

_____ NORMAL FORMATION WATER
_____ PROBABLY NORMAL FORMATION WATER
_____ UNABLE TO CLASSIFY
_____ _____% FORMATION _____% INJ. WATER
_____ INDICATES A CASING LEAK
__X__ OTHER

Supply water for possible injection.

REPORTED BY:

CHEMICAL ENGINEERING SECTION
Copies to:

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 10

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO. B-7755

FILE 23-360

Operator: Sun Production Company
Lease or Well: New Mexico St. O # 4
Formation: QUEEN - GRAYBURG
Depth: 1,780 To 2,150 T.D. 2,280
Method of collecting sample: Wellhead

Treatment: See remarks
Date and amount of last acid job:

Prod. 6 BOPD 28 BWPD MCFPD
Description: This sample consists of one pint cloudy yellow water with an oil film.

Region:
District: Southwestern
Field: Millman
County: Eddy
State: New Mexico
Collected by:
Date: 1-30-79 Collected 2-16-79 Analyzed
Sample No. 3166
Analyst: SII

CONSTITUENTS	ppm
Sodium	41000
Calcium	1960
Magnesium	628
Barium	0
Strontium	
Potassium	
Iron	11
Chloride	66300
Sulfate	2220
Carbonate	0
Bicarbonate	923

OTHER PROPERTIES	
pH	7.7
Specific Gravity	1.0831
Resistivity ohm-mtr. @75°F	.079
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	PRESENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	12
Nitrates	
Phosphate	

TOTAL DISSOLVED SOLIDS 113042

Treatment: 1-1/2 gal. Sun and 1 gal OW - 77 per week

REMARKS:

____ NORMAL FORMATION WATER
____ PROBABLY NORMAL FORMATION WATER
____ UNABLE TO CLASSIFY
____ ____% FORMATION ____% INJ. WATER
____ INDICATES A CASING LEAK
__X__ OTHER

This is the first water sample received from this well and field. Unable to classify at this time.

REPORTED BY:
Johnny Reinschmidt
CHEMICAL ENGINEERING SECTION
Copies to:

10

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO. B-7757
FILE 23-360

Operator: Sun Production Company
Lease or Well: New Mexico St. O # 5
Formation: QUEEN - GRAYBURG
Depth: 1,759 To 2,156 : T.D. 2,230
Method of collecting sample: Wellhead

Treatment: See remarks
Date and amount of last acid job:

Prod. 2 BOPD 27 BWPD MCFPD
Description: This sample consists of one pint cloudy yellow water with an oil film.

Region:
District: Southwest
Field: Millman
County: Eddy
State: New Mexico
Collected by:
Date: 1-30-79 Collected; 2-16-79 Analyzed
Sample No. 10525
Analyst: SII

CONSTITUENTS	ppm
Sodium	34200
Calcium	1390
Magnesium	592
Barium	0
Strontium	
Potassium	
Iron	11
Chloride	55700
Sulfate	984
Carbonate	0
Bicarbonate	1020

OTHER PROPERTIES	
pH	7.1
Specific Gravity	1.0669
Resistivity ohm-mtr. @75°F	.091
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	PRESENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	11
Nitrates	
Phosphate	

TOTAL DISSOLVED SOLIDS 93897

Treatment: 1-1/2 gal Sun 9 and 1 gal OW-77 per week.

REMARKS:

_____ NORMAL FORMATION WATER
_____ PROBABLY NORMAL FORMATION WATER
_____ UNABLE TO CLASSIFY
_____ _____% FORMATION _____% INJ. WATER
_____ INDICATES A CASING LEAK
__X__ OTHER

This is the first water sample received from this well and field Unable to classify at this time.

REPORTED BY:

CHEMICAL ENGINEERING SECTION
Copies to:

EAST MILLMAN-QUEEN-GRAYBURG POOL

SALT WATER DISPOSAL WELL DATA

WELL	SEPTEMBER VOLUME (BWPD)	SEPTEMBER PRESSURE	OCTOBER VOLUME (BWPD)	OCTOBER PRESSURE
Eddy "AN" State #5 (Gulf Operator)	78	1275	68	1275
Bass #3 (Kersey Operator)	205	1000	208	1000

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 11
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 11

(12)

PROPOSED EAST MILLMAN UNIT

PROJECTED PERFORMANCE based on current performance w/ no flood.

Base Case

Year	Gross Bbls Oil	Gross Gas - MCF	Operating Expense $	Operating Cash Flow $
1979	34500	77	194900	114893
1980	31100	73	206600	99384
1981	27900	68	219000	82793
1982	22700	65	232000	48913
1983	20100	61	246100	31215
1984	17900	57	260900	14609
1985	15900	54	276500	-2258
1986	14000	50	293100*	-20310
	184100	505	1929300	369200

Summary

Remaining primary oil, gross bbls	184,100
Remaining primary oil, net bbls	161,100

* Includes P&A costs

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 12
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 12

B

EAST MILLMAN POOL UNIT

PROPOSED 80 ACRE 5-SPOT PATTERN

Year	Gross Oil Bbls	Gross Gas MCF	Operating Expenses
1979	34500	77	212300
1980	21800	61	225000
1981	19700	51	238500
1982	52100	113	252900
1983	75900	160	268000
1984	81000	164	284100
1985	81300	154	301200
1986	75900	142	319200
1987	67900	128	338400
1988	64100	102	338400
1989	54400	90	338400
1990	51400	71	338400
1991	49200	62	338400
1992	47100	54	338400
1993	45000	47	338400
1994	42900	41	338400
1995	40900	34	338400
1996	38800	29	338400
1997	38800	23	338400
1998	38800	19	338400
1999	38800	18	338400
2000	38800	16	338400
2001	38800	15	338400
2002	38800	14	338400
2003	38800	14	338400
2004	38800	14	338400
2005	38800	13	338400
2006	38800	13	338400
2007	38800	13	338400
2008	*363600	*173	**2788000
	1735400	1925	11995600

* Includes Reserves for Years 31 - 40

** Includes P&A Expenses

w/ floats

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 13
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 13

14

EAST MILLMAN POOL UNIT

ADDITIONAL RECOVERY

DUE TO WATERFLOOD

Year	Gross Oil Bbls	Gross Gas MCF
1979	0	0
1980	-9300	-12
1981	-8200	-17
1982	29400	48
1983	55800	99
1984	63100	107
1985	65400	100
1986	61900	92
1987	67900	128
1988	64100	102
1989	54400	90
1990	51400	71
1991	49200	62
1992	47100	54
1993	45000	47
1994	42900	41
1995	40900	34
1996	38800	29
1997	38800	23
1998	38800	19
1999	38800	18
2000	38800	16
2001	38800	15
2002	38800	14
2003	38800	14
2004	38800	14
2005	38800	13
2006	38800	13
2007	38800	13
2008	363600	173
TOTALS	1550200	1420

Back before Exhibit 13 and Exhibit 12

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 14
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 14

EAST MILLMAN POOL UNIT

PROPOSED 80 ACRE 5-SPOT PATTERN

Investment Costs

	Intangible	Tangible
Convert 11 wells to water injection	$ 81000	$ 150000
Injection lines	37000	65000
Production and Text Facilities	30000	60000
Injection Plant - 5000 BWPD @ 1500 psi	10000	60000
Water supply line, est. 5000 ft.	5000	9000
Pumping Units		170000
TOTAL	$163000	$514000

TOTAL INVESTMENT COST $677000

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Sun EXHIBIT NO. 15
CASE NO. 6477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 15

Docket No. 10-79

Dockets Nos. 11-79 and 12-79 are tentatively set for hearing on March 14 and 28, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - WEDNESDAY - MARCH 7, 1979

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

CASE 6489: Application of J. V. Fritts and Wm. B. Barnhill for review of Order No. R-4831, Eddy County, New Mexico. Applicants, in the above-styled cause, seek the review and interpretation of Order No. R-4831 to permit them the opportunity to join in the drilling of the Federal "B" Well No. 1 located in Unit P of Section 1, Township 18 South, Range 26 East, Atoka-Pennsylvanian Pool, Eddy County, New Mexico, and to determine the applicability of the 200% risk factor.

CASE 6398: (DE NOVO)

Application of Texas Oil & Gas Corporation for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location for the Wolfcamp and Pennsylvanian formations of its State Com Well No. 1, to be located 660 feet from the South and West lines of Section 18, Township 21 South, Range 26 East, Catclaw Draw Field, Eddy County, New Mexico, all of said Section 18 to be dedicated to the well in the Morrow formation.

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

****

Docket No. 11-79

DOCKET: EXAMINER HEARING - WEDNESDAY - MARCH 14, 1979

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

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

ALLOWABLE: (1) Consideration of the allowable production of gas for April, 1979, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for April, 1979, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 6490: Application of L. C. Harris for a unit agreement, Chaves and Eddy Counties, New Mexico. Applicant, in the above-styled cause, seeks approval for his Walnut Draw Unit Area comprising 9,797 acres, more or less, of Federal, state and fee lands in Townships 15 and 16 South, Ranges 23 and 24 East, Chaves and Eddy Counties, New Mexico.

CASE 6491: Application of C & E Operators, Inc. for an unorthodox well location and a non-standard proration unit, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval of an 80-acre non-standard gas proration unit comprising the E/2 SW/4 of Section 10, Township 30 North, Range 11 West, Aztec-Pictured Cliffs Pool, San Juan County, New Mexico, to be dedicated to a well to be located 1700 feet from the South line and 1760 feet from the West line of said Section 10.

CASE 6477: (Continued from February 28, 1979, Examiner Hearing)

Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project on its East Millman Pool Unit Area by the injection of water into the Queen and Grayburg formations through eleven wells located in Sections 12 and 13 of Township 19 South, Range 28 East, East Millman Pool, Eddy County, New Mexico.

CASE 6492: Application of Yates Petroleum Corporation for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the NE/4 NW/4 of Section 13, Township 17 South, Range 25 East, Eddy County, New Mexico, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6072: (Reopened and Readvertised)

In the matter of Case 6072 being reopened pursuant to the provisions of Order No. R-5643 which order created the Travis-Upper Pennsylvanian Pool, Eddy County, New Mexico, with provisions for 80-acre spacing. All interested parties may appear and show cause why the Travis-Upper Pennsylvanian Pool should not be developed on 40-acre spacing units.

CASE 6493: Application of Merrion & Bayless for gas well commingling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval for the surface commingling, prior to measurement, of Pictured Cliffs production from the Hi Roll Wells Nos. 1 and 2 located in Units O and K of Section 35, Township 27 North, Range 13 West, San Juan County, New Mexico.

CASE 6494: Application of Morris R. Antweil for an unorthodox gas well location and simultaneous dedication, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of his Mesa Macho Well No. 1 located in Unit O of Section 24, Township 20 South, Range 27 East, Morrow formation, Eddy County, New Mexico; the E/2 of said Section 24 to be simultaneously dedicated to the aforesaid well and to applicant's Macho Norte Well No. 1 located in Unit G of Section 24.

CASE 6495: Application of Amax Chemical Corporation for the amendment of Order No. R-111-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area by the inclusion of certain lands in Sections 23 and 24, Township 19 South, Range 29 East, Sections 1, 4, 5, 6, 7, 11, 12, 13, 14, 19, 20, 23, 24, and 29, Township 19 South, Range 30 East, and Sections 7, 8, 17, 18, and 19, Township 19 South, Range 31 East, all in Eddy County, New Mexico.

CASE 6496: Application of Llano, Inc. for rescission of pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of Order No. R-3006, which promulgated 640-acre spacing for the Grama Ridge-Morrow Gas Pool, Lea County, New Mexico. Applicant proposes that said pool be developed and operated under 320-acre spacing and well location requirements.

CASE 6497: Application of Llano, Inc. for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be located 1650 feet from the South line and 660 feet from the East line of Section 34, Township 21 South, Range 34 East, Grama Ridge-Morrow Gas Pool, Lea County, New Mexico, the E/2 of said Section 34 to be dedicated to the well.

CASE 6498: Application of Pogo Producing Company to limit application of pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks to limit the application of the Grama Ridge-Morrow Gas Pool Rules to the horizontal limits of said pool, being all of Sections 2, 3, 4, and 10, Township 22 South, Range 34 East and Sections 33 and 34, Township 21 South, Range 34 East, Lea County, New Mexico.

CASE 6499: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending horizontal limits and contracting vertical limits of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico:

(a) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Antelope Sink-Morrow Gas Pool. The discovery well is Maddox Energy Corporation State 32 Well No. 1 located in Unit I of Section 32, Township 18 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 18 SOUTH, RANGE 24 EAST, NMPM
Section 32: E/2

(b) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Baldridge Canyon-Morrow Gas Pool. The discovery well is W. A. Moncrief, Jr., Baldridge Canyon Com Well No. 1 located in Unit G of Section 13, Township 24 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 24 SOUTH, RANGE 24 EAST, NMPM
Section 13: E/2

(c) CREATE a new pool in Eddy County, New Mexico, classified as an oil pool for Delaware production and designated as the Burton Flat-Delaware Pool. The discovery well is Yates Petroleum Corporation Stonewall EP State Well No. 3 located in Unit N of Section 19, Township 20 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 20 SOUTH, RANGE 28 EAST, NMPM
Section 19: SW/4

(d) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for San Andres production and designated as the East Crossroads-San Andres Pool. The discovery well is MGF Oil Corporation Santa Fe Railway Well No. 1 located in Unit A of Section 13, Township 10 South, Range 36 East, NMPM. Said pool would comprise:

TOWNSHIP 10 SOUTH, RANGE 36 EAST, NMPM
Section 13: NE/4

(e) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the South Culebra Bluff-Atoka Gas Pool. The discovery well is Delta Drilling Company South Culebra Bluff Unit Well No. 1 located in Unit G of Section 23, Township 23 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 14: E/2
Section 23: All
Section 26: All

(f) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Dublin Ranch-Morrow Gas Pool. The discovery well is J. C. Barnes Oil Company Big Chief Com Well No. 1 located in Unit F of Section 22, Township 22 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 28 EAST, NMPM
Section 22: All
Section 27: N/2

(g) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Gardner Draw-Morrow Gas Pool. The discovery well is Phoenix Resources Company Gardner Draw Unit Well No. 1 located in Unit C of Section 20, Township 19 South, Range 21 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 21 EAST, NMPM
Section 17: W/2
Section 19: N/2
Section 20: N/2

(h) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Pennsylvanian production and designated as the Jubilee-Pennsylvanian Gas Pool. The discovery well is Tom L. Ingram Jubilee Well No. 1 located in Unit E of Section 28, Township 10 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 10 SOUTH, RANGE 29 EAST, NMPM
Section 28: W/2

(i) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Mississippian production and designated as the King-Mississippian Gas Pool. The discovery well is Cabot Corporation J. L. Reed Well No. 1 located in Unit H of Section 35, Township 13 South, Range 37 East, NMPM. Said pool would comprise:

TOWNSHIP 13 SOUTH, RANGE 37 EAST, NMPM
Section 35: NE/4

(j) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Atoka production and designated as the Lone Wolf-Atoka Gas Pool. The discovery well is Depco, Inc. Sundance A Federal Well No. 1 located in Unit J of Section 25, Township 12 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 12 SOUTH, RANGE 29 EAST, NMPM
Section 25: S/2

(k) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Strawn production and designated as the Lost Lake-Strawn Gas Pool. The discovery well is Texas Oil & Gas Corporation O'Brien Well No. 1 located in Unit I of Section 11, Township 9 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 9 SOUTH, RANGE 29 EAST, NMPM
Section 2: S/2
Section 11: All
Section 14: N/2

(l) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the West Mescalero-Morrow Gas Pool. The discovery well is Natomas North America, Inc. New Mexico State Well No. 1 located in Unit M of Section 19, Township 10 South, Range 32 East, NMPM. Said pool would comprise:

TOWNSHIP 10 SOUTH, RANGE 32 EAST, NMPM
Section 19: W/2

(m) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Permo-Penn production and designated as the Penasco Draw Permo-Penn Gas Pool. The discovery well is Yates Petroleum Corporation La Cama Com Well No. 1 located in Unit F of Section 20, Township 18 South, Range 25 East, NMPM. Said pool would comprise:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 18: S/2
Section 19: All
Section 20: All
Section 21: W/2
Section 30: All
Section 31: All

(n) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Siegrest Draw-Morrow Gas Pool. The discovery well is Yates Petroleum Corporation Siegrest JS State Com Well No. 1 located in Unit C of Section 30, Township 19 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 30: N/2

(o) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the North Turkey Track-Atoka Gas Pool. The discovery well is Amoco Production Company State ER Com Well No. 1 located in Unit G of Section 6, Township 19 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 6: N/2

(p) EXTEND the Angell Ranch-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 27 EAST, NMPM
Section 35: E/2

(q) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 28 EAST, NMPM
Section 17: S/2

(r) EXTEND the Cato-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 31 EAST, NMPM
Section 5: NW/4 SW/4

(s) EXTEND the Cedar Lake-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 30 EAST, NMPM
Section 25: W/2
Section 26: E/2
Section 36: NW/4

(t) EXTEND the East Chisum-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 11 SOUTH, RANGE 28 EAST, NMPM
Section 9: E/2 NE/4
Section 10: W/2 NW/4

(u) EXTEND the South Corbin-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 33 EAST, NMPM
Section 20: SW/4

(v) EXTEND the Double L Queen Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 29 EAST, NMPM
Section 24: NW/4 and E/2 SW/4
Section 36: NW/4 NW/4, S/2 NW/4 and SW/4

(w) EXTEND the Drinkard Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 18: SE/4

(x) EXTEND the East Eagle Creek Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 26 EAST, NMPM
Section 7: N/2

(y) EXTEND the Grama Ridge-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 35: All

(z) REDEFINE the vertical limits of the Monument Tubb-Drinkard Pool in Lea County, New Mexico, to include only the Tubb formation and redesignate said pool as the Monument-Tubb Pool.

(aa) EXTEND the West Indian Basin-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 22 EAST, NMPM
Section 23: E/2

(bb) EXTEND the Millman-Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 27 EAST, NMPM
Section 12: E/2

(cc) EXTEND the South Prairie-Wolfcamp Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 36 EAST, NMPM
Section 20: N/2

(dd) EXTEND the Querecho Plains-Bone Spring Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 32 EAST, NMPM
Section 34: NW/4

(ee) EXTEND the Richard Knob Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 7: All
Section 18: N/2

(ff) EXTEND the Round Tank-Queen Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 29 EAST, NMPM
Section 30: NE/4

(gg) EXTEND the South Salt Lake-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 32 EAST, NMPM
Section 5: Lots 11, 12, 13, 14 and SW/4

(hh) EXTEND the North Teague-Devonian Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 37 EAST, NMPM
Section 22: NW/4

(ii) EXTEND the Tomahawk-San Andres Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 32 EAST, NMPM
Section 30: SW/4

(jj) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 36: NE/4

****

Docket No. 12-79

DOCKET: COMMISSION HEARING - THURSDAY - MARCH 15, 1979

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

CASE 6222: (Rehearing) (Continued from March 2, 1979, Commission Hearing)

Application of Paul Hamilton for salt water disposal well shut-in, Lea County, New Mexico. Upon application of Paul Hamilton there will be a rehearing of Case No. 6222, Order No. R-5753. This case involves the application of Paul Hamilton for an order shutting down salt water disposal operations in the Texaco Inc., New Mexico State "BO" SWD Well No. 3, located in Unit D of Section 24, Township 11 South, Range 32 East, Moore-Devonian Pool, Lea County, New Mexico. Pursuant to Commission Order No. R-5753-A, evidence at said rehearing shall be limited to evidence relating to data regarding water quality and water level obtained from an observation well completed next to the aforesaid SWD Well No. 3, and to other new evidence unavailable at the time of the original hearing of this case on May 31, 1978.

BEFORE THE NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

FEB 15 1979

IN THE MATTER OF THE APPLICATION OF SUN OIL COMPANY FOR APPROVAL OF A SECONDARY RECOVERY PROJECT, EAST MILLMAN POOL, EDDY COUNTY, NEW MEXICO.

Case 6477

APPLICATION

Comes now Sun Oil Company and applies to the Oil Conservation Division of New Mexico for approval of a secondary recovery project for its East Millman Pool Unit, Eddy County, New Mexico and in support thereof would show the Division:

1. Applicant has formed its East Millman Pool Unit, approval of which is presently pending before the Division.

2. Purpose of the unit is for the institution of a secondary recovery project in the East Millman Pool, pursuant to the unit operating agreement.

3. Applicant proposes to institute the secondary recovery project by means of water injection in the Queen and Grayburg formations in the Millman Pool through eleven existing wells to be converted to injection, as follows:

(1). Gulf Oil Co., Eddy "AN" State No. 2 Unit E, Section 13, Township 19 South, Range 28 East.

(2). Gulf Oil Co., Eddy State "AN" Well No. 3, Unit K, Section 13, Township 19 South, Range 28 East.

(3). Kersey Bass Well No. 1, Unit I, Section 12, Township 19 South, Range 28 East.

(4). Maralo State OG 272 Well No. 2, Unit M, Section 12, Township 19 South, Range 28 East.

(5). Maralo State OG 272 Well No. 3, Unit K, Section 12, Township 19 South, Range 28 East.

(6). Sun Oil Co. Felzer State Well No. 1, Unit E, Section 12, Township 19 South, Range 28 East.

(7). Sun Oil Co. N.M. State O Well No. 1, Unit C, Section 13, Township 19 South, Range 28 East.

(8). Sun Oil State O, Well No. 3, Unit O, Section 12, Township 19 South, Range 28 East.

(9). Sun Oil Co. State O, Well No. 4, Unit M, Section 13, Township 19 South, Range 28 East.

(10). John A. Yates' Elliot Parcell Well No. 1, Unit G, Section 13, Township 19 South, Range 28 East.

(11). John A. Yates' Elliot Parcell Well No. 4, Unit A, Section 13, Township 19 South, Range 28 East.

4. Applicant proposes to initially inject approximately 400 barrels of water per day in each of the above injection wells. Initially fresh Ogalala water will be obtained for this purpose from Double Eagle Water Co., Loco Hills, N.M. As the flood progresses, produced water will probably be reinjected under controlled conditions.

5. At or prior to the hearing applicant will submit the exhibits and technical information required by Oil Conservation Division Rule 701, as amended, together with other data in support of the proposed secondary recovery project.

6. Approval of this secondary recovery project for the East Millman Pool Unit area will result in the production of hydrocarbons that would not otherwise be recovered, will result in the prevention of waste and premature abandonment of the project area, and will protect correlative rights.

WHEREFORE Applicant prays that this application be set for hearing before the Division's duly appointed examiner and that after notice and hearing as required by law, the Division enter its order approving the secondary recovery project as

prayed for, together with provision for administrative approval of the conversion of other wells to injection, and the drilling of further wells for either injection or production, at standard and non-standard locations, and assignment of allowables as provided by Division rules, together with such other and further provision as may be proper.

SUN OIL COMPANY

By _____

Kellahin & Kellahin
P. O. Box 1769
Santa Fe, New Mexico 87501

ATTORNEYS FOR APPLICANT

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico. CASE 6477

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:	Lynn Teschendorf, Esq. Legal Counsel for the Division State Land Office Bldg. Santa Fe, New Mexico 87503
For the Applicant:	W. Thomas Kellahin, Esq. KELLAHIN & KELLAHIN 500 Don Gaspar Santa Fe, New Mexico 87501

MR. STAMETS: Call next Case 6477, application of Sun Oil Company for a waterflood project, Eddy County, New Mexico.

MR. KELLAHIN: Tom Kellahin of Santa Fe, appearing on behalf of Sun Oil Company.

We request that that case be continued to the hearing on March 14.

MR. STAMETS: Case 6477 will be so continued.

(Hearing concluded.)

SALLY WALTON BOYD
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REPORTER'S CERTIFICATE

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

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

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6473 heard by me on 2-28, 1979.

Richard L. Stamets, Examiner
Oil Conservation Division

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico.

CASE 6477

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

For the Applicant: Jason Kellahin, Esq.
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I N D E X

E X H I B I T S

MR. NUTTER: We'll call next Case 6477.

MS. TESCHENDORF: Case 6477. Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, appearing on behalf of the applicant, and we have one witness to be sworn.

(Witness sworn.)

GARY MILLER

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you state your name, please?

A. My name is Gary Miller.

Q. By whom are you employed and in what position, Mr. Miller?

A. I work for Sun Oil Company as Production Engineer.

Q. And have you ever testified before the Oil Conservation Division or one of its Examiners and made your qualifications a matter of record?

A. No, I haven't.

Q. For the benefit of the Examiner, would you briefly outline your education and experience as an engineer?

A. I graduated from the University of Texas in 1975 with a Bachelor's degree in petroleum engineering. Then I joined Sun and I've been working as a production engineer for the past four years.

Q. Where have you worked for Sun Oil Company?

A. In Midland.

Q. And does that area include the area involved in this application?

A. Yes, sir, it does.

Q. And have you personally investigated the situation as to this particular project?

A. Yes, that's correct.

Q. And was it done under your direction?

A. Yes, it was.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q. (Mr. Kellahin continuing.) Mr. Miller, what does Sun Oil Company propose in Case 6477?

A. Sun is requesting permission to initiate a waterflood in the East Millman Queen-Grayburg Pool on our unit.

Q. Now the acreage has already been unitized, is that correct?

A. We had a hearing here approximately a month ago for permission to unitize and I haven't heard the results of that hearing yet, but we have -- we do have --

MR. KELLAHIN: Excuse me, I think that's already been approved, has it not?

MR. NUTTER: I couldn't say right offhand. I think it has, but I'm not sure.

MR. KELLAHIN: For your information, it has been approved.

Q. Now, referring to what's been marked as Exhibit Number One, would you identify that exhibit, please?

A. Exhibit Number One is a map of the unit area, showing location of the unit and the proposed injection wells. These wells are the ones outlined in green there.

It also shows all other wells within two miles of the unit and identifies the producing formations and the operators of these wells.

Q. That's shown by the legend in the lower lefthand corner of the exhibit?

A. Yes, sir, that is correct.

Q. Now, to the west of your unit is there another waterflood project in operation?

A. To the west, that's correct. Depco operates their East Millman Queen-Grayburg waterflood, and they've been injecting since approximately 1964. This is a direct west offset to our proposed waterflood.

Q. Now the exhibit substantially covers the entire East Millman Pool, does it not?

A. Yes, sir, it does.

Q. So that would really be practically all the wells in the pool?

A. That's correct. We're on the east end and Depco's on the west end.

Q. Do you have anything to add in connection with that exhibit?

A. Nothing further.

Q. Now, referring to Exhibit Number Two, would you identify that, please?

A. Exhibit Two, titled Tabular Summary of Surrounding Wells, is a tabulation of wells located within one-half mile of the unit area. It shows wells, operators, location, size and setting depth of all casing strings, sacks of cement, cement tops, total depth, and producing interval.

Now in this tabulation there are approximately seven wells that show some indication of some possible problems, either in the way that the well was plugged

to satisfy the existing requirements, or that the top of the cement behind the different casings strings is not adequate to provide protection for the fresh water zone and also to isolate the injection zone.

I'll quickly point out these wells. The first one is on the fifth page, Depco Well No. 181. There is a fresh water zone in this area at approximately 200 feet and in this particular well there is no cement across this fresh water zone.

Another one on the next page is the Donnelly Drilling Company Kenny State No. 1. This particular well has a surface setting depth of 230 feet, which might not possibly cover all of the fresh water zone.

Same thing on the next one, casing set at 250 feet.

Those tops of cement shown on those two wells is calculated and not measured.

Here's one that's kind of interesting on the next page. It's John Yates, the Campbell Gwaltney No. 1. This particular well originally was producing from Queen-Grayburg. They went in there and they found that the well had bridged at 1300 feet and at that time they went in there and perforated the Seven Rivers. I don't know what bridged means, but there is no cement across the Queen-Grayburg zone. There would be a possible chance of

communication there.

Also on the next page there's an M. Yates the third NNC State Well No. 1. It has a calculated top of cement behind the surface string of 170 foot, which would indicate that the fresh water zone is not protected.

The next one is Nix & Curtis R&B State No. 2. We calculated the cement plugs in this P&A'd well, and there is no cement across the unitized interval; however, there is a plug between the fresh water zone and the unitized interval.

The next one, the Ohio Oil Company New Mexico Merchant No. 1, we have practically no information on it. It was drilled and plugged in 1925. About all that we do have on it is a TD. As far as any -- there were shown two casing strings, one was -- the deepest one at 400 feet. There wasn't any indication of cement and we couldn't come up with any procedure as to how the well was plugged. That's a north offset to our proposed unit.

We're trying to see if we can't check into the records further or possibly contact some of these operators and see if we can't clear up some of these -- information that we're not too sure on.

Q. Will supply the Commission with any information you do obtain in that effort?

A. Yes, we will.

Q. Now you say some of them the fresh water zone is not protected. By that you mean that there is no cement across that interval, is that what you mean?

A. That is what I mean, yes.

Q. It is cased.

A. The wells are cased.

Q. You don't have any information on the condition of the casing?

A. No.

Q. Now referring to what has been marked as Exhibit Number Three, would you identify that exhibit, please?

A. Exhibit Number Three includes well schematics of all plugged and abandoned wells in one-half mile of the unit area, and here again you can see what I was talking about on the Ohio Oil Company well. We didn't show anything in the wellbore because we were unable to find any information as to how it was drilled and plugged, and also the Nix & Curtis R&B State No. 2. There was no plug across the unitized interval, which is approximately 1700 to 2100 feet.

Q. Those are the only two that you have a problem with, those plugged and abandoned wells?

A. Yes, sir, that's correct.

Q. Now referring to what has been marked as

Exhibit Number Four, would you identify that exhibit please.

A. Exhibit Number Four includes well schematics of the proposed injection wells in the proposed configuration.

There are currently in the unit area, there is one classified as a water disposal well that is in the Queen-Grayburg zone, and we propose eleven additional injectors, which will be a total of twelve.

These diagrams show that the wells do have adequate cement protection opposite the unitized interval with the possible exception of the Kersey Bass No. 1, which is the second one. On this particular well we calculated the top of the cement behind the production casing at 1720 feet, and this is approximately 70 foot above the unitized interval, so if our calculations were a little bit off there, we wouldn't have cement opposite this interval.

We plan to monitor all casing strings on these injection wells and also the producers, to be sure that we don't have any injection going out of zone.

Q. Now in each instance on your injection wells, would you inject through tubing and under the packer?

A. Yeah, the injection will be through cement lined tubing under packers. Now, half of these wells we're

showing two strings of tubing. This is to better isolate isolate the water into the Queen and the Grayburg zones in the proportion that we desire to proportion it, we'd like to inject into them.

The other half of the well's injection is through a single tubing string. This is due to the fact that casing in these wells is 4-1/2 inch and we're unable to locate any dual packers of this size, this small a size.

Q. Now will the casing tubing annulus be filled with an inert fluid?

A. Yes, sir, that is correct.

Q. And of course with the two strings of tubing, why, that can't be done clear to the lower end, can it?

A. No. Between the packers.

Q. Between the packers?

A. It cannot be protected; there'll be injection in that area. Between the packers the annulus will not be protected with corrosion inhibited inert fluid.

Q. But that will be entirely within the unitized formation.

A. Yes, it will.

Q. Now referring to what has been marked as Exhibit Number Five, will you identify that exhibit, please?

A. Exhibit Number Five, titled Miscellaneous

Injection Information, shows the injection zones that we're planning to use.

The first one is the Queen zone, the top of which is at 1700 feet, and the Grayburg zone, which is 1950 feet.

The next section identifies the injection fluid we'll be using. It will be approximately 90 percent fresh water and the remaining 10 percent will be produced water from the same Grayburg zone.

The fresh water will be obtained from the Double Eagle Corporation, which supplied the drinking water for the City of Carlsbad, and the salt water will be produced right in the same Grayburg.

Anticipated injection pressure will be 1300 pounds and the injection volume will be approximately 400 barrels a day per well.

Q. Now as the flood progresses will you re-inject produced water?

A. Yes, we will.

Q. So the proportion of 90 percent to 10 percent fresh water will change?

A. Yes, it will, as the life of the flood progresses.

Q. Now referring to Exhibit Number Six, would you identify that exhibit?

A. Exhibit Number Six, titled Fracture Gradients, is a tabulation of all the wells in the unit, showing the top perforation and date of the fracture treatment, the instantaneous shut-in pressure after the fracture treatment, the fluid gradient that was in the well at the time, and from this data formation fracture gradient was calculated, and the average fracture gradient for all these wells was .887 psi per foot.

I'd like to bring up the fact that this average instant shut-in pressure here of 968 pounds is quite a bit lower than the injection pressure we were proposing, and it would seem to indicate that we'd be injecting above the fracture pressure, but we do plan to run step-rate tests on all the injection wells to determine exactly what this fracture pressure is, and we plan to stay underneath this pressure.

This data here, some of it is twenty years old, and we just don't know really what it is in the current conditions.

Q. Now as these tests are made, will you be willing to furnish the Commission with information?

A. Yes, we will.

Q. Now referring to what has been marked as Exhibit Number Seven, would you identify that exhibit, please?

A. Exhibit Number Seven is titled East Millman

Queen-Grayburg Waterflood, Depco Operator. It shows all of Depco's injection wells and just some tests from October and November of last year, showing the volume of water that they're injecting and the pressure.

This is the reason for the 1300 pounds pressure we're requesting. It's based on the history we've seen in Depco's flood.

Q. Have there been any indications of the fromation breakdown in the Depco flood?

A. Not that I'm aware of.

Q. To your knowledge? Now, referring to what has been marked as Exhibit Number Eight, would you identify that exhibit, please?

A. Exhibit Number Eight is a letter from the State Engineer's Office of New Mexico, stating that fresh water in the East Millman area is produced from the Artesia Group formation at a depth of approximately 200 feet. This is surface water.

Q. And that's the water you're referring to in those instances where there was no cement.

A. Yes, that's correct.

Q. Now referring to Exhibit Number Nine, would you identify that, please?

A. Exhibit Number Nine is a type log showing the zones that we will be injecting into and these zones

are marked in yellow. The top one is the Queen zone. The top is at 1690 feet.

The next one is the Grayburg with the top at 1958 feet, and again, the injection zones are marked in yellow.

Q. With the two strings of tubing you will be able to control the injection rates in the two different formations?

A. Yes, we will.

Q. Now referring to Exhibit Number Ten, would you identify that, please?

A. Exhibit Number Ten contains some water analyses from both the fresh water that we will be getting from Double Eagle and also the Queen-Grayburg produced water, two water analyses there, and a letter is also attached, stating that these two waters are compatible from our service laboratory.

Q. Now Exhibit Number Eleven?

A. Exhibit Number Eleven, title East Millman Queen-Grayburg Pool Salt Water Disposal Well Data, shows some salt water disposal wells in the area and some tests, injection volumes and pressures for September and October of '78. These particular wells, the Bass No. 3 is the direct north offset to our unit, and the Eddy "AN" State No. 5 is inside of our unit. Both of these wells are dis-

posing into the Queen-Grayburg Pool.

Q. Do you know which of the formations they're disposing in, whether Queen or Grayburg, or is it open in both?

A. One of them is open in both, but I couldn't tell you which one, right now.

Q. Now referring to Exhibit Number Twelve, would you identify that exhibit?

A. Exhibit Number Twelve, titled proposed East Millman Unit Projected Performance, shows our study of the base case of what this unit would do with the continued current operations without any water injection.

It shows the years that we project this thing would produce and the amount of oil and gas, down to an economic limit. We calculated the remaining primary was approximately 184,000 barrels.

Q. And that is based on current production?

A. That is based on current production, for straight decline.

Q. Refer to Exhibit Thirteen, would you identify that?

A. Exhibit Number Thirteen shows the same information in the case that we do install this 80-acre 5-spot waterflood.

It shows the years, the expected oil pro-

duction and gas production. It shows the total remaining reserves of 1,735,000 barrels. Operating expenses.

Q. Now referring to Exhibit Number Fourteen, would you identify that?

A. Exhibit Number Fourteen shows the additional recovery we expect to gain from the waterflood and this is the difference between the two previous lists. It shows the years and additional recovery expected. This total is 1,550,000 barrels.

If you'll note in the first -- in the second and third year, we expect a drop in production. This is due to converting the current producers to water injection, and then in the fourth year we expect response.

Q. Now referring to Exhibit Number Fifteen, would you discuss that exhibit?

A. Exhibit Number Fifteen, titled Investment Cost, is a breakdown of the costs required to install this flood, conversion work, facilities and lines, et cetera, and that total is $677,000.

Q. Against which you will recover $1,550,000.

A. That's correct.

Q. So, in summary, approval of this waterflood project will result in the recovery of oil that would not otherwise be recovered, is that correct?

A. Yes, sir, that's correct.

Q. And the unit could be operated at a profit?

A. Yes, it can.

Q. Were Exhibits One through Fifteen either prepared by you or under your supervision?

A. Yes, they were.

MR. KELLAHIN: At this time I'd offer Exhibits One through Fifteen, inclusive.

MR. NUTTER: Sun's Exhibits One through Fifteen will be admitted in evidence.

MR. KELLAHIN: That's all I have, Mr. Nutter.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Miller, on Exhibit Number Six, your fracture gradient exhibit, the average here is 968 pounds for the instantaneous shut-in pressures.

Now we only have instantaneous shut-ins on about 10 wells there, or twelve. Are any of those wells injection wells that are proposed?

A. The injection well is the Eddy State "A" No. 5, and the data wasn't available on that well.

The wells where the data is shown are all producers.

Q. I see. So this exhibit doesn't show instantaneous shut-in pressures on any of the injection wells.

A. No, sir.

Q. That you're proposing?

A. It does not.

Q. And while the instantaneous shut-in averages 968, it does go as low as 400 pounds on one well there.

A. Yes, sir, it does.

Q. Why do you think that running step rate tests is going to show a higher indicated reservoir fracture pressure than these instantaneous shut-ins?

A. Due to change of conditions in the reservoir.

Q. You don't think the rock has changed, do you?

A. The fluid reservoir pressure has changed.

Q. Yeah.

A. But as I said, we plan to run step rate tests to precisely determine what it is in every well, and we will use this to limit our injection pressure.

Q. Now you're proposing an injection pressure on one of these exhibits of something like 1300 pounds, I think.

A. Yes, sir.

Q. This Exhibit Number Thirteen, which shows recoveries over the years would be your calculation of recoveries based on a 1300-pound injection pressure, I presume.

A. That's assuming we can get this approximately 400 barrels of water per day into each well.

Now if we go in there and find out we are not able to do this volume of water in there, then this recovery would be less and it would be extended over a longer length of time.

Q. Now you in other exhibits show that the injection pressure in the Depco flood to the west, is something like 1100 pounds, is that right? What exhibit number was that, that you have the Depco pressures on?

Okay, it's Exhibit Number Seven. It averages 1117 pounds. Now, have you made any study of the Depco project to the west?

A. We've looked at it, yes, sir.

Q. Are you aware that millions and millions of barrels of water have been injected into that project and a certain amount of oil has been recovered but the volume of water that's been injected doesn't seem to add up to the original reservoir voidage and the amount of oil that's been produced?

A. No, sir, I wasn't aware of that, but what I have looked at on Depco's flood is their response, and as I said, they've been injecting since '64, and they have seen a flat decline, approximately flat, since that time, so they have seen a lot of additional oil due to this flood.

Now, as far as their injection volumes and cumulative, I'm not aware of that, no.

Q. Do you know if this 1100 pound pressure that they were operating under when this exhibit -- on the date that this exhibit was prepared, has been typical of their injection pressures throughout the life of the flood?

A. I can't answer that.

It's what their flood is doing at this time. Now their initial injection pressures, I don't know what they were.

Q. And yet you're proposing an injection pressure some 200 pounds higher than what they're using in here.

A. Yes, sir. 1300 was chosen because it -- one of the wells' range was 1300, and they were ranging between 1300 and 1200 and 1100.

Q. If my quick analysis of your well schematics on the injection well is correct, I believe that your most shallow injection depth in any of these wells would be 1723 pounds, Mr. Miller, based on -- 1723 feet, I'm sorry, and based on the Commission's or Division's arbitrary, admittedly, injection pressure limitation of .2 of a pound, the maximum pressure to be injected into that well would be some 345 pounds.

A. I wasn't aware of that, sir.

Q. You hadn't calculated what .2 of a foot --

.2 of a pound per foot would give you?

A. No, I hadn't, but --

Q. You don't think it would go over 345 pounds?

A. There's no way we could flood at that pressure.

Q. I see.

MR. NUTTER: Are there any further questions of Mr. Miller? He may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: That's all I have, Mr. Nutter, thank you.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 6477?

We'll take the case under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3020 Plaza Blanca (505) 471-2463
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

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

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

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

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6477 heard by me on 3/14 19 79.

_____, Examiner
Oil Conservation Division

FRACTURE GRADIENTS - QUEEN/GRAYBURG FORMATION
EAST MILLMAN - QUEEN - GRAYBURG POOL
EDDY COUNTY, NEW MEXICO

WELL NAME	TOP PERFORATION	DATE OF FRACTURE TREATMENT	ISI PRESSURE	FLUID GRADIENT	FORMATION FRACTURE GRADIENT
Seltzer State #1	2248'	9-17-61	1450	.360	1.005
Bass #1	--	*	*	*	--
Bass #2	--	*	*	*	--
R & B St #1	--	*	*	*	--
ST OG 272 #1	--	*	*	*	--
ST OG 272 #2	--	*	*	*	--
ST OG 272 #3	--	*	*	*	--
ST OG 272 #4	--	*	*	*	--
New Mex "O" ST #1	2026'	4-22-76	600	.450	.746
New Mex "O" ST #2	2046'	1-6-65	1300	.360	.995
New Mex "O" ST #3	1763'	3-16-59	1600	.360	1.268
New Mex "O" ST #4	2091'	6-24-65	950	.360	.814
New Mex "O" ST #5	1759'	12-27-61	1000	.360	.929
New Mex "O" ST #6	2115'	3-1-64	1300	.360	.975
Elliott & Parcell #1	1717'	2-14-59	650	.360	.739
Elliott & Parcell #2	1758'	9-6-58	650	.433	.803
Elliott & Parcell #3	2186'	4-8-69	400	.433	.616
Elliott & Parcell #4	1742'	10-3-68	750	.433	.864
Eddy State "AN" #1	--	*	*	*	--
Eddy State "AN" #2	--	*	*	*	--
Eddy State "AN" #3	--	*	*	*	--
Eddy State "AN" #4	--	*	*	*	--
Eddy State "AN" #5	--	*	*	*	--
AVERAGE	1950	--	968	--	.887

* Information Not Available

7477

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # 6

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	Southwest Prod. Corp.	Southwest Prod. Corp.	DEPCO
Lease	Lowe State	Lowe State	Eddy State "BN"
Well Number	1	2	1
LOCATION			
Unit	G	H	P
Section	11	11	11
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	7	7	7-5/8
Setting Depth (Ft.)	624	640	602
Sacks Cement	150	150	450
Cement Top (Ft.)	Surface*	Surface*	Surface
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2294	2235	2246
Sacks Cement	100	100	265
Cement Top (Ft.)	1400*	1400*	Surface
TOTAL DEPTH (Ft.)	2302	2254	2246
PRODUCING INTERVAL (Ft.)	P&A	P&A	Queen-Grayburg (1813-2194)

*Theoretical calculation based on hole size, sacks of cement used and a yield of 1.32 cubic feet of fill per sack of cement.

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # #2

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	Eddy ST "BN"	Eddy ST "BN"	Eddy ST "BN"
Well Number	2	3	4
LOCATION			
Unit	O	I	J
Section	11	11	11
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	7-5/8	7-5/8	7-5/8
Setting Depth (Ft.)	604	596	575
Sacks Cement	225	375	273
Cement Top (Ft.)	Surface	Surface	Surface
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2225	2234	2230
Sacks Cement	250	250	250
Cement Top (Ft.)	Surface	Surface*	Surface*
TOTAL DEPTH (Ft.)	2225	2235	2230
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1815-2200) WIW	Queen-Grayburg (1806-2114)	Queen-Grayburg (1816-2199)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	St. 648
Well Number	148	149	184
LOCATION			
Unit	A	B	G
Section	14	14	14
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	10-3/4	10-3/4	10-3/4
Setting Depth (Ft.)	327	423	386
Sacks Cement	75	75	100
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2175	2287	2210
Sacks Cement	250	300	225
Cement Top (Ft.)	790*	630*	970*
TOTAL DEPTH (Ft.)	2175	2288	2563
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1740-2096)	Queen-Grayburg (1818-2112)	Queen (1756-1909) WIW

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	St. 648
Well Number	185	161	178
LOCATION			
Unit	H	I	P
Section	14	14	14
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	10-3/4	8-5/8	10-3/4
Setting Depth (Ft.)	339	344	430
Sacks Cement	75	100	75
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2201	2280	2388
Sacks Cement	225	125	275
Cement Top (Ft.)	960*	1090*	870*
TOTAL DEPTH (Ft.)	2201	2285	2389
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1738-2136)	Queen-Grayburg (1718-2199)	Grayburg (2092-2264)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	DEPCO	DEPCO	DEPCO
Lease	St. 648	St. 648	Malco St. Tr. 1
Well Number	181	182	6
LOCATION			
Unit	J	O	B
Section	14	14	23
Township	19S	19S	19S
Range	28E	28E	28E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	10-3/4
Setting Depth (Ft.)	290	290	393
Sacks Cement	None	50	125
Cement Top (Ft.)	-	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	7	5½	None
Setting Depth (Ft.)	1760	1715	
Sacks Cement	50	50	
Cement Top (Ft.)	830*	828*	
LONG STRING		Liner	
Size (In.)	4½	3½	4½
Setting Depth (Ft.)	2317	1643-2385	2361
Sacks Cement	75	50	235
Cement Top (Ft.)	1430*	1640*	1060*
TOTAL DEPTH (Ft.)	2317	2385	2364
PRODUCING INTERVAL (Ft.)	Queen-Grayburg (1738-2268)	Queen-Grayburg (1712-2090) WIW	Grayburg (2172-2198)

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	KERSEY CO.	DONNELLY DRLG CO.	TEJAS PETRO. CO.
Lease	State A	Kinney St.	Sinclair St."A"
Well Number	2	1	1-E
LOCATION			
Unit	D	L	E
Section	24	18	18
Township	19S	19S	19S
Range	28E	29E	29E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	9-5/8
Setting Depth (Ft.)	340	230	258
Sacks Cement	175	100	50
Cement Top (Ft.)	Surface*	Surface*	50*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	5½	4½
Setting Depth (Ft.)	2278	2414	2344
Sacks Cement	175	185	200
Cement Top (Ft.)	1260*	1010*	1420*
TOTAL DEPTH (Ft.)	2282	3010	2851
PRODUCING INTERVAL (Ft.)	Grayburg (2165-2222)	P&A	P&A

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	JOHN A. YATES	JOHN A. YATES	JOHN A. YATES
Lease	Campbell-Gwaltney	Elizabeth Dundas	Elizabeth Dundas
Well Number	1	1	2
LOCATION			
Unit	D	M	N
Section	18	7	7
Township	19S	19S	19S
Range	29E	29E	29E
SURFACE CASING			
Size (In.)	8-5/8	8-5/8	7
Setting Depth (Ft.)	262	283	309
Sacks Cement	80	50	50
Cement Top (Ft.)	Surface*	Surface*	Surface*
INTERMEDIATE CSG			
Size (In.)	None	None	None
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	4½	4½	4½
Setting Depth (Ft.)	2314	2163	2199
Sacks Cement	300	125	100
Cement Top (Ft.)	650*	1110*	660*
TOTAL DEPTH (Ft.)	2314	2227	2348
PRODUCING INTERVAL (Ft.)	**Seven Rivers (1258-1266)	P&A	P&A

** Originally produced from Queen-Grayburg Zone (1810-2194) - Well "Bridged" @ 1300' and was subsequently perforated in the Seven Rivers Zone. Queen-Grayburg zone was never plugged with cement.

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION			
Operator	M. YATES III	NIX & CURTIS	OHIL OIL CO.
Lease	N&C State	R&B State	Merchant N. M.
Well Number	1	2	1
LOCATION			
Unit	M	G	N
Section	6	12	1
Township	19S	19S	19S
Range	29E	28E	28E
SURFACE CASING			
Size (In.)	8-5/8	None	6-5/8
Setting Depth (Ft.)	433		464
Sacks Cement	50		+
Cement Top (Ft.)	170*		+
INTERMEDIATE CSG			
Size (In.)	None	None	+
Setting Depth (Ft.)			
Sacks Cement			
Cement Top (Ft.)			
LONG STRING			
Size (In.)	5½	None	+
Setting Depth (Ft.)	2795		
Sacks Cement	300		
Cement Top (Ft.)	1300		
TOTAL DEPTH (Ft.)	2839	2580	3055
PRODUCING INTERVAL (Ft.)	P&A	P&A (Dry)	P&A (Dry)

+ Required data not available. Insufficient data available to permit estimation.

TABULAR SUMMARY OF SURROUNDING WELLS

WELL IDENTIFICATION		
Operator	PERRY R. BASS	KERSEY & CO.
Lease	Seltzer - St.	Bass
Well Number	2	3
LOCATION		
Unit	D	F
Section	12	12
Township	19S	19S
Range	28E	28E
SURFACE CASING		
Size (In.)	8-5/8	8-5/8
Setting Depth (Ft.)	323	420
Sacks Cement	300	50
Cement Top (Ft.)	Surface *	Surface *
INTERMEDIATE CSG		
Size (In.)	None	None
Setting Depth (Ft.)		
Sacks Cement		
Cement Top (Ft.)		
LONG STRING		
Size (In.)	4½	5
Setting Depth (Ft.)	2365	1900
Sacks Cement	410	100
Cement Top (Ft.)	610*	1340*
TOTAL DEPTH (Ft.)	2370	1900
PRODUCING INTERVAL (Ft.)	P&A	Queen (1836-1869) WIW

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SOUTHWEST PROD. CORP.
LOWE STATE NO. 1
SEC. 11, T.-19-S., R.-28-E.
UNIT G
ELEV. 3440' KB

TOP OF CMT. @ SURFACE

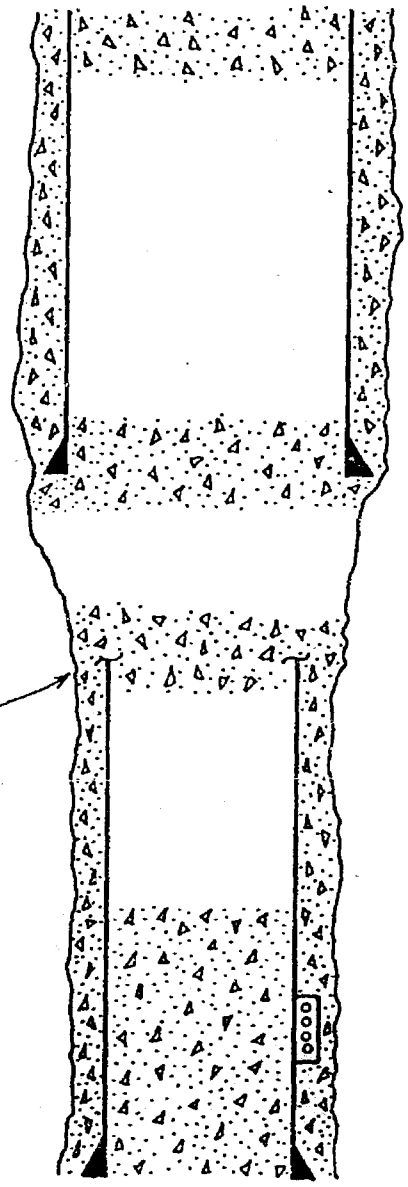
7" 20# CSG. @ 624'
W/ 150 SX CMT.

4 1/2" CSG. CUT @ 1400'
& PULLED

TOP OF CMT. @ 1400'
(CALCULATED)

4 1/2" 9# CSG. @ 2294'
W/ 100 SX CMT.

T.D. 2302'



10 SX CMT. PLUG @ SURFACE

100' CMT. PLUG 575' - 675'

100' CMT. PLUG @ 4 1/2"
CSG. STUB

60 SX CMT. PLUG 1750-2294'

QUEEN-GRAYBURG PERFS
1803 - 2183'

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # #3

NOTE: MUD LADEN FLUID PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SOUTHWEST PROD. CORP.
LOWE STATE NO. 2
SEC. 11, T.-19-S., R.-28-E.
UNIT H
ELEV. 3430' KB

TOP OF CMT. @ SURFACE

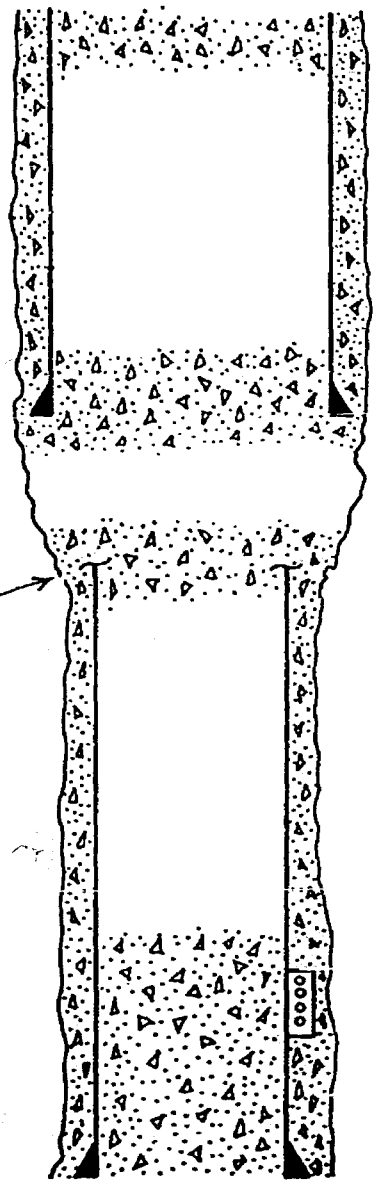
7" 20# CSG. @ 640'
W/150 SX CMT.

4 1/2" CSG. CUT @ 1400'
& PULLED

TOP OF CMT. @ 1400'
(CALCULATED)

4 1/2" 9.5# CSG. @ 2235'
W/100 SX CMT.

T.D. 2254'



10 SX CMT. PLUG @ SURFACE

100' CMT. PLUG 575-675'

100' CMT. PLUG @ 4 1/2"
CSG. STUB

50 SX CMT. PLUG 1800-2235'

QUEEN-GRAYBURG PERFS
1840-2176'

NOTE: MUD LADEN FLUID PLACED BETWEEN
ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

OHIO OIL CO.

MERCHANT NEW MEXICO NO. 1

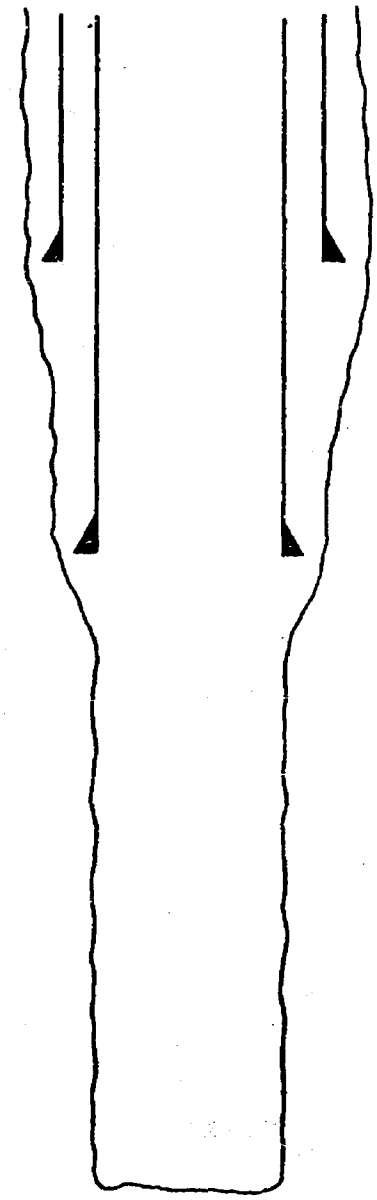
SEC. 1, T.-19-S., R.-28-E.

UNIT N

ELEV. 3391' GL

12 1/2" @ 59' – NO RECORD OF ANY CMT.

6 5/8" @ 464' – NO RECORD OF ANY CMT.



T.D. 3055'

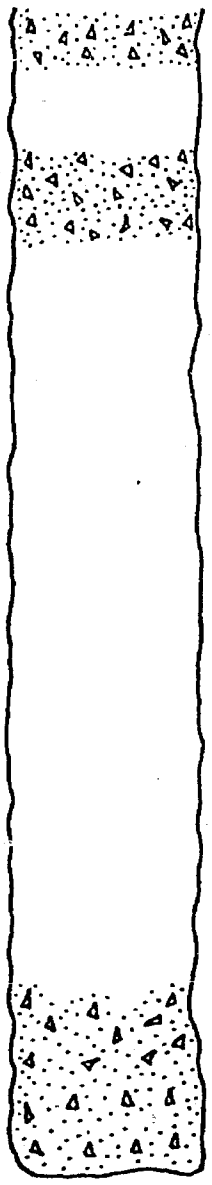
NOTE: NO RECORD OF PLUGGING PROCEDURE USED. WELL DRILLED & PLUGGED IN 1925.

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

NIX & CURTIS
R & B ST. NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT G
ELEV. 3364' G.L.



5 SX CMT. PLUG @ SURFACE

10 SX CMT. PLUG 345 - 370'
(CALCULATED)

NO CASING IN WELL

20 SX CMT. PLUG ON BOTTOM.
TOP OF PLUG @ 2480'
(CALCULATED)

T.D. 2580'

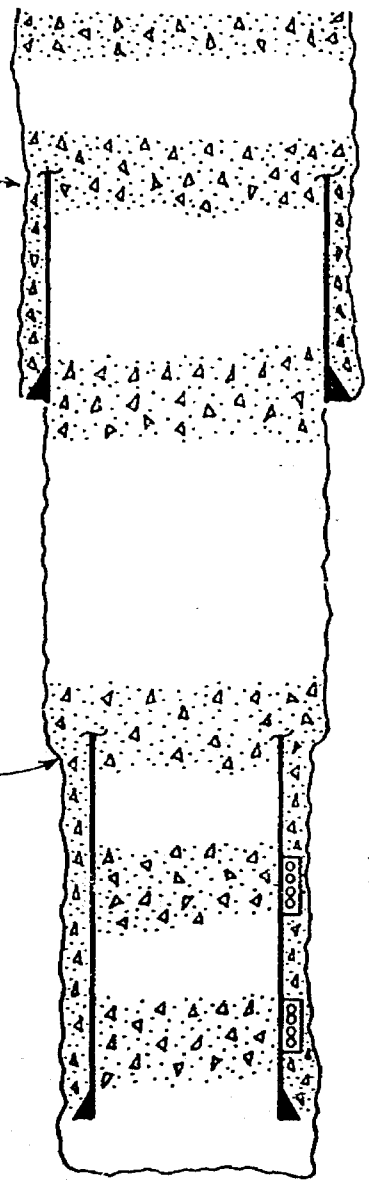
NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

M. YATES III
N & C STATE NO. 1
SEC. 6, T.-19-S., R.-29-E.
UNIT M
ELEV. 3380' GL



10 SX CMT. PLUG @ SURFACE

25 SX CMT. PLUG ON 8 5/8" CSG. STUB

TOP OF CMT. @ 269' (CALCULATED)

8 5/8" CSG. CUT @ 269' & PULLED

8 5/8" 24 # CSG. @ 433' W/50 SX CMT.

25 SX CMT. PLUG @ BASE OF 8 5/8" CSG.

5 1/2" CSG. CUT @ 1331' & PULLED

TOP OF CMT. @ 1331' (CALCULATED)

25 SX CMT. PLUG IN & OUT OF 5 1/2" CSG. STUB

15 SX CMT. PLUG OVER PERFS @ 2612 - 25'
SAN ANDRES PERFS 2612 - 25'

5 1/2" 14# CSG. @ 2795' W/300 SX CMT.

SAN ANDRES PERFS 2676 - 82', SQZD W/25 SX CMT. TOP OF CMT. PLUG 2658'

T.D. 2839'

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

PERRY R. BASS
SELTZER - STATE NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT D
ELEV. 3407' KB

TOP OF CMT. @ SURFACE
(CALCULATED)

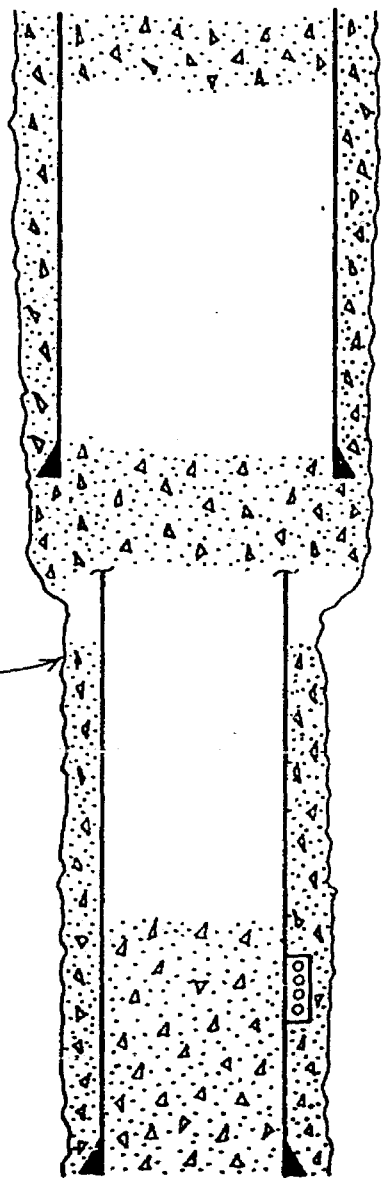
8 5/8" 24# CSG @ 323'
W/ 300 SX. CMT.

4 1/2" CSG. CUT @ 444'
& PLUGGED

TOP OF CMT. @ 610'

4 1/2" 9.5 # CSG. @ 2365'
W/410 SX CMT.

T. D. 2370'



10 SX CMT. PLUG @ SURFACE

30 SX CMT. PLUG 311 - 440'

30 SX CMT. PLUG 1978 - 2340'

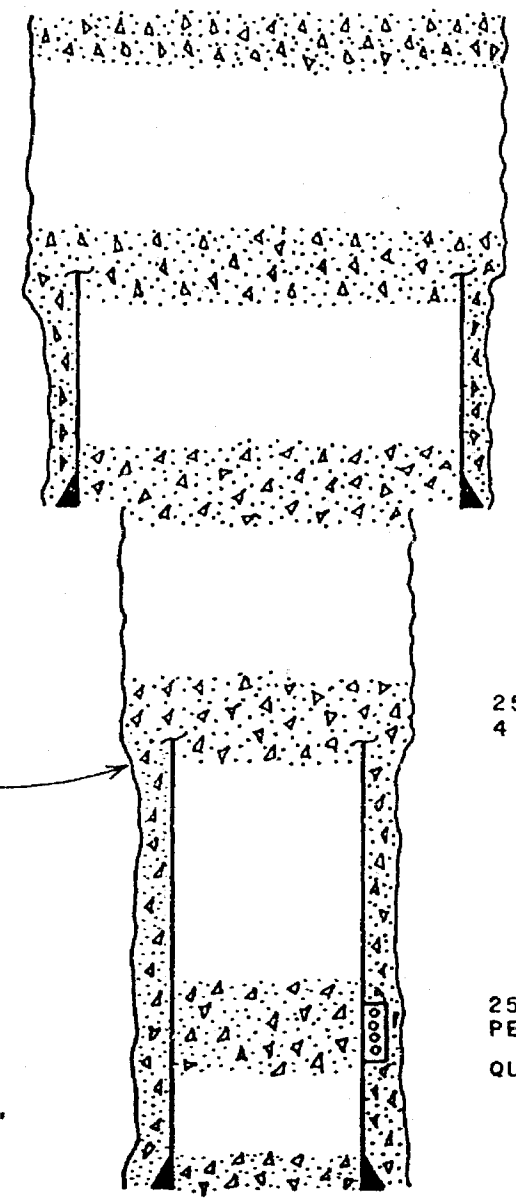
QUEEN - GRAYBURG PERFS
2050 - 2314'

NOTE: MUD LADEN FLUID PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELIZABETH DUNDAS NO. 1
SEC. 7, T.-19-S., R.-29-E.
UNIT M
ELEV. 3378' DF



10 SX CMT. PLUG @ SURFACE

CUT 8 5/8" CSG. @ 124'
& PULLED

TOP OF CMT. @ 124'
(CALCULATED)

25 SX CMT. PLUG ACROSS
8 5/8" CSG. STUB

8 5/8" 24# CSG. @ 283'
W/50 SX CMT.

25 SX CMT. PLUG ACROSS
8 5/8" CSG. SHOE

CUT 4 1/2" CSG. @ 1510' &
PULLED

TOP OF CMT. @ 1510'
(CALCULATED)

25 SX CMT. PLUG ACROSS
4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS
PERFS 1773 - 96'

QUEEN PERFS 1773 - 1796'

4 1/2" 9.5 # CSG. @ 2163'
W/125 SX CMT.

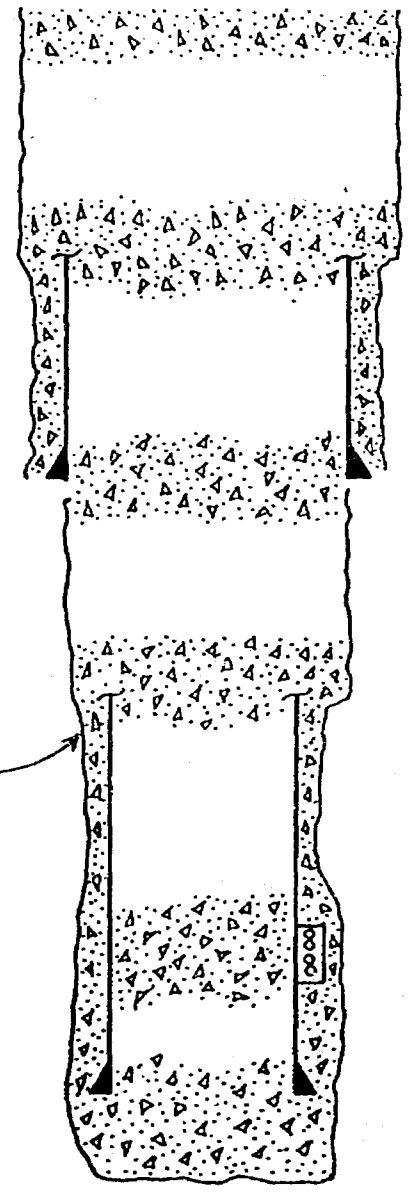
T.D. 2227'

NOTE: MUD LADEN FLUID WAS PLACED
BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELIZABETH DUNDAS NO. 2
SEC. 7 , T.-19- S., R.-29-E.
UNIT N
ELEV. 3382' DF



10 SX CMT. PLUG @ SURFACE

CUT 7" CSG. @ 142' & PULLED

TOP OF CMT. @ 142' (CALCULATED)

25 SX CMT. PLUG ACROSS 7" CSG. STUB

7" CSG. @ 309' W/50 SX CMT.

25 SX CMT. PLUG ACROSS 7" CSG. SHOE

CUT 4 1/2" CSG. @ 1421' & PULLED

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

TOP OF CMT. @ 1421' (CALCULATED)

25 SX CMT. PLUG ACROSS PERFS 2080 - 2101'

GRAYBURG PERFS 2080 - 2101'

4 1/2" 9.5# CSG. @ 2199' W/100 SX CMT.

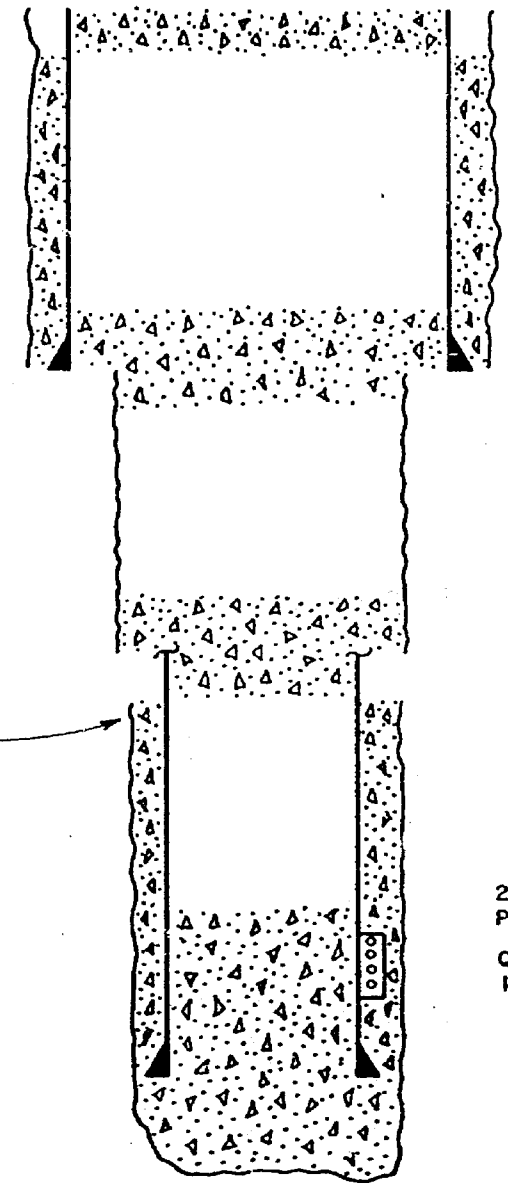
T.D. 2348'

NOTE: MUD LADEN FLUID PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

TEJAS PETR. CO.
SINCLAIR ST. "A" NO. 1-E
SEC. 18, T.-19-S., R.-29-E.
UNIT E
ELEV. 3382'



TOP OF CMT. @ 47'
(CALCULATED)

9 5/8" 32.3# CSG. @ 285' W/50 SX CMT.

CUT 4 1/2" CSG. @ 1100' & PULLED

TOP OF CMT. @ 1420'
(CALCULATED)

4 1/2" 9.5# CSG. @ 2349' W/200 SX CMT.

T.D. 2581'

5 SX CMT. PLUG @ SURFACE

20 SX CMT. PLUG ACROSS 9 5/8" CSG. SHOE

25 SX CMT. PLUG ACROSS 4 1/2" CSG. STUB

25 SX CMT. PLUG ACROSS PERFS 1849 - 2140'

QUEEN - GRAYBURG PERFS 1849 - 2140'

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL.

WELL SCHEMATICS

DONNELLY DRLG. CO.
KINNEY ST. NO. 1
SEC. 18, T.-19-S., R.-29-E.
UNIT L
ELEV. 3380'

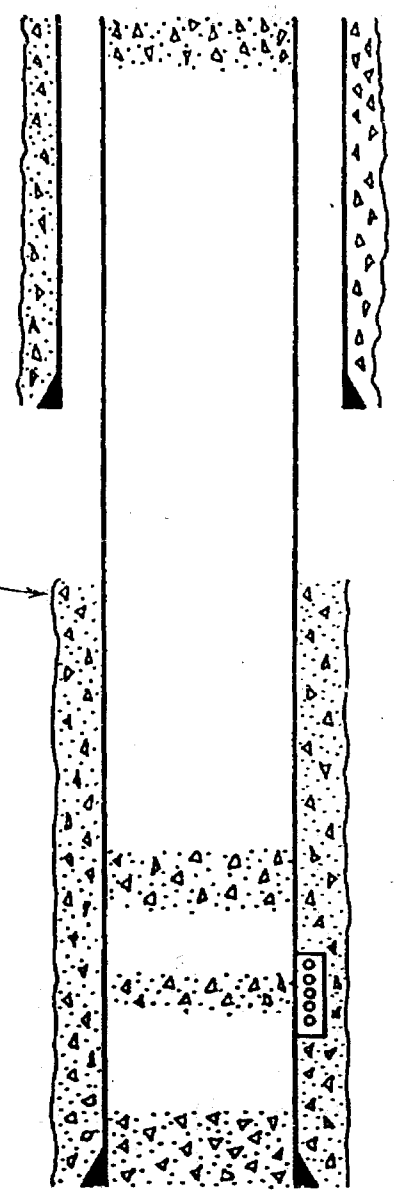
TOP OF CMT. @ SURFACE

8 5/8" 24# CSG. @ 230'
W/100 SX CMT.

TOP OF CMT. @ 1010'
(CALCULATED)

5 1/2" 14# CSG. @ 2414'
W/185 SX CMT.

T.D. 3010'



2 SX CMT. PLUG @ SURFACE

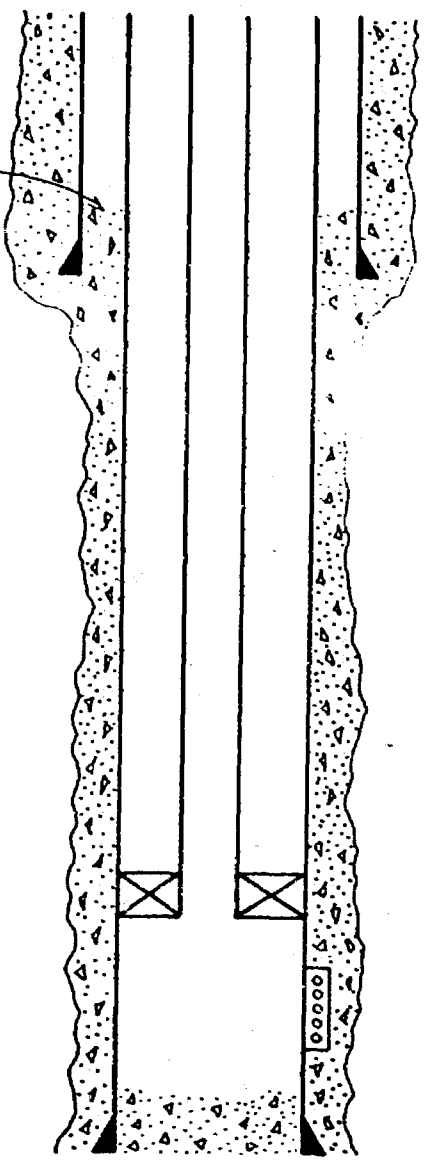
10 SX CMT. PLUG 1700 - 1780'

9 SX CMT. PLUG 2038 - 2110'
QUEEN-GRAYBURG PERFS
1859 - 2258'

NOTE: MUD LADEN FLUID WAS PLACED BETWEEN ALL CMT. PLUGS.

SUN OIL COMPANY
EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

SUN OIL COMPANY
NEW MEXICO SELTZER STATE NO. 1
SEC. 12, T.-19-S., R.-28-E.
UNIT E
ELEV. 3414'



TOP OF CMT @ SURFACE

TOP OF CMT. @ 500'

8 5/8" 24 # J-55 CSG @ 632' W/400 SX CMT.

2 3/8" CMT LINED TUBING ON TENSION PKR. SET @ 1790'

4 1/2" 9.5 # J-55 CSG @ 2289' W/410 SX CMT

P.B.T.D. 2252'
T.D. 2295'

TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN - GRAYBURG PERFS
1828 - 48', 2076 - 82', 2107 - 30'
& 2248 - 51'

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6977
Exhibit # #4

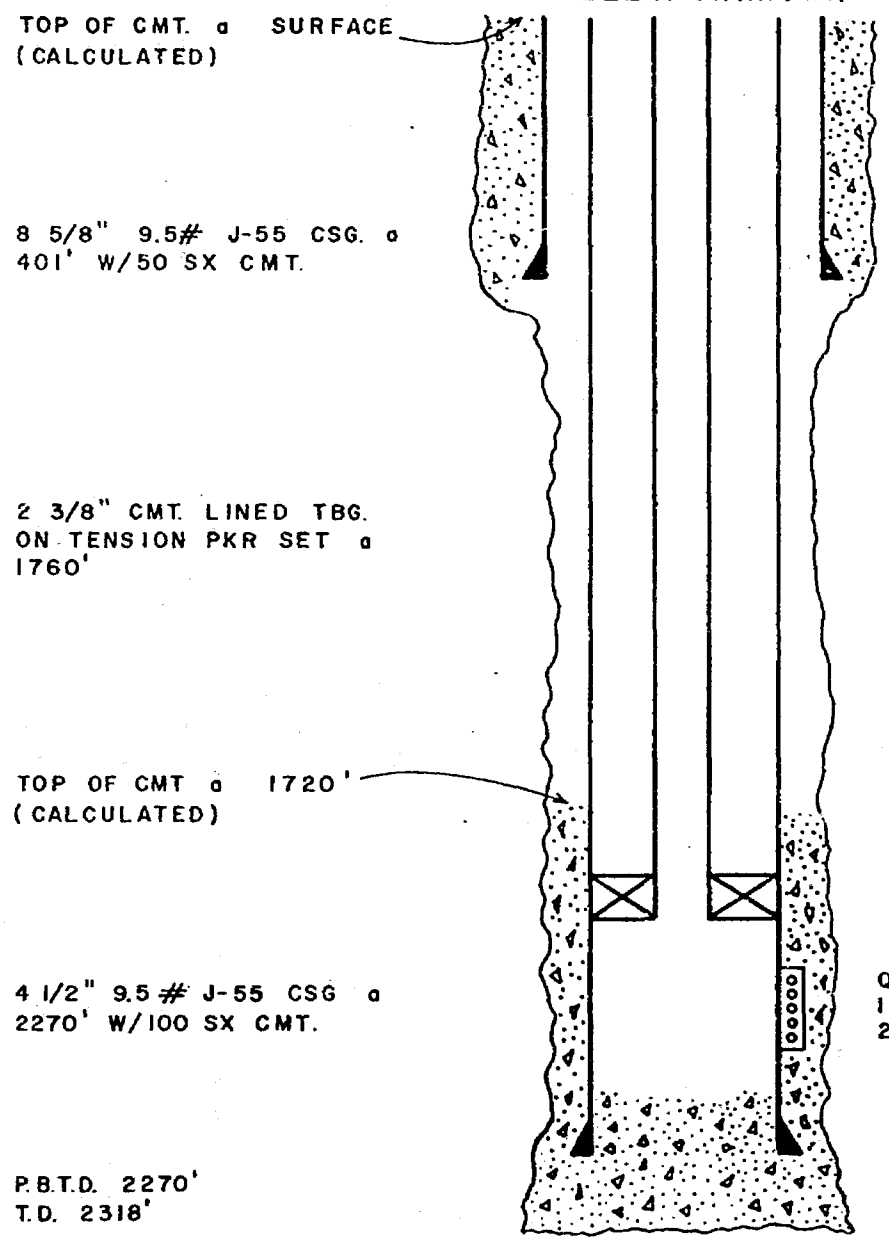
PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

KERSEY OIL COMPANY
BASS NO. 1
SEC. 12, T.-19-S., R.-28-E.
UNIT I
ELEV. UNKNOWN



PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

MARALO OIL CO.
STATE "OG 272" NO. 2
SEC. 12, T.-19-S., R.-28-E.
UNIT M
ELEV. 3410' DF

TOP OF CMT. @ SURFACE

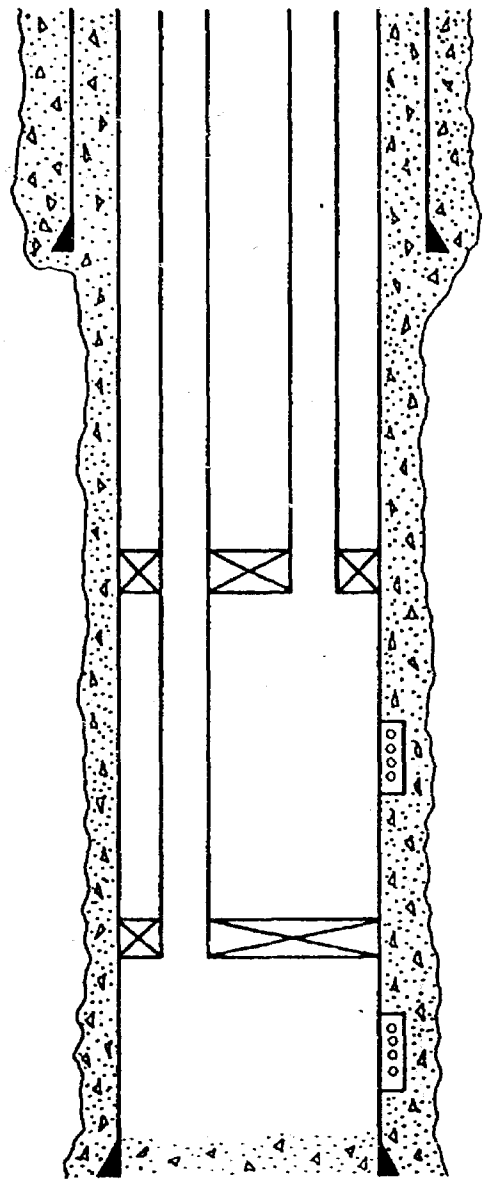
8 5/8" 24# J-55 CSG.
@ 632' W/ 350 SX CMT.

UPPER TUBING: 2 1/16" CMT LINED TBG. ON DUAL PACKER @ 1780'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 2000'. TBG. EXTERNALLY COATED BETWEEN PKRS.

5 1/2" 14 # J-55 CSG.
@ 2232' W/ 350 SX

P.B.T.D. 2226'
T.D. 2232'



TBG. CSG. ANNULUS PROTECTED W/ CORROSION INHIBITED INERT FLUID

QUEEN PERFS 1758' - 66' & 1820' - 26'

GRAYBURG PERFS 2084'-90', 2100'-06', 2138'-44', & 2203'-12'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

MARALO OIL COMPANY
STATE "OG 272" NO. 3
SEC. 12, T.-19-S., R.-28-E.
UNIT K
ELEV. 3402' DF

TOP OF CMT. @ SURFACE (CALCULATED)

TOP OF CMT. @ 260'

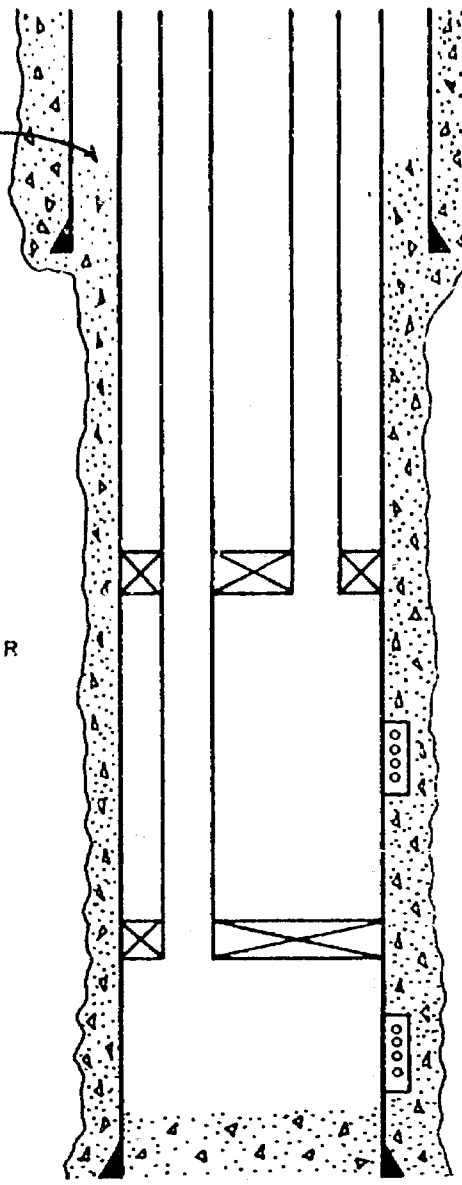
8 5/8" 24# J-55 CSG. @ 635' W/300 SX CMT.

UPPER TUBING : 2 1/16" CMT. LINED TBG. ON DUAL PACKER @ 1740'

LOWER TUBING: 2 1/16" CMT. LINER TBG ON SINGLE PACKER @ 2050' TBG. EXTERNALLY COATS BETWEEN PKRS.

5 1/2" 14# J-55 CSG. @ 2300' W/375 SX CMT.

P. B. T. D. 2294'
T. D. 2302'



TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN PERFS 1778-94' & 1821-25'

GRAYBURG PERFS 2105-08', 2120-30', 2158-64', 2170-74', 2204-08' & 2224-30'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

GULF OIL COMPANY
EDDY STATE "AN" NO. 2
SEC. 13, T.-19-S., R.-28-E.
UNIT E
ELEV. 3392'

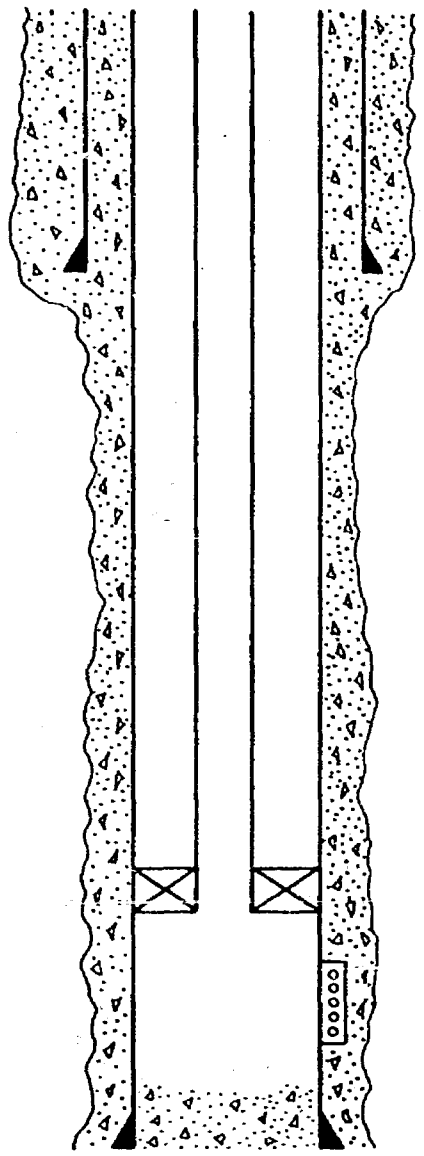
TOP OF CMT @ SURFACE

7 5/8" 26.4# J-55 CSG. @ 598' W/ 325 SX CMT.

2 3/8" CMT LINED TUBING ON TENSION PKR SET @ 1700'

4 1/2" 9.5# J-55 CSG. @ 2197' W/ 330 SX CMT.

P.B.T.D. 2195'
T.D. 2200'



TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

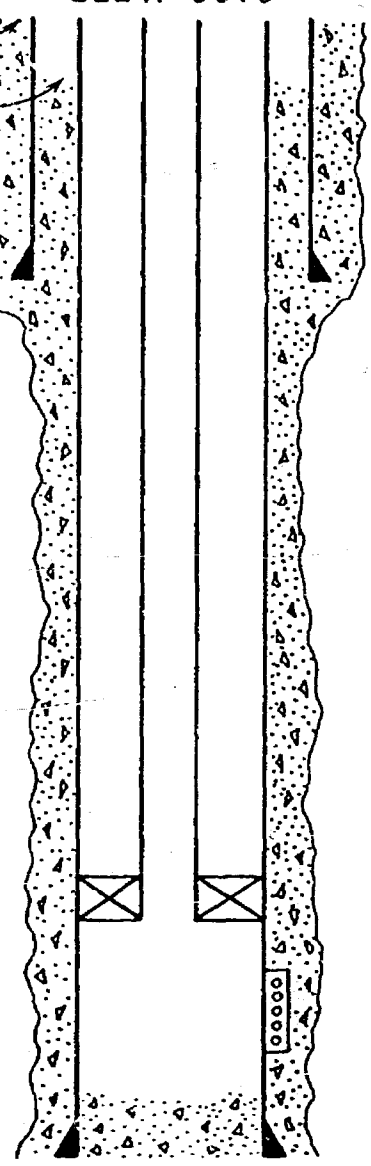
QUEEN-GRAYBURG PERFS
1733'-43', 1789'-1803', 2084'-86',
2095'-97', 2107'-09', 2116'-26'
2149'-51' & 2165'-85'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

GULF OIL COMPANY
EDDY STATE "AN" NO.3
SEC.13,T.-19-S., R.-28-E.
UNIT K
ELEV. 3376'



PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

GULF OIL CO.

EDDY ST. "AN" NO.5

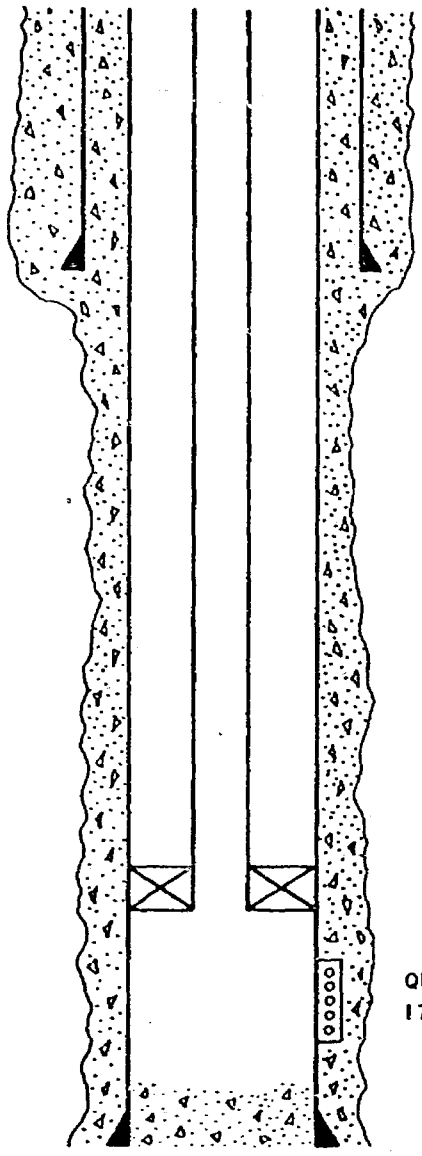
SEC.13, T.-19-S., R.-28-E.

UNIT J

ELEV. 3376' DF

TOP OF CMT. @ SURFACE
(CALCULATED)

8 5/8" 24 # CSG @ 620'
W/150 SX CMT.



TBG.-CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

2 3/8" CMT. LINED TUBING ON
TENSION PKR @ 1730'

QUEEN-GRAYBURG PERFS
1773-85', 2033-43', 2136-42'

5 1/2" 14# CSG. @ 2240'
W/400 SX CMT.

P.B.T.D. 2195'
T.D. 2240'

PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

SUN OIL COMPANY

NEW MEXICO "O" STATE NO. 1

SEC. 13, T.-19-S., R.-28-E.

UNIT C

ELEV. 3377'

TOP OF CMT. @ SURFACE

10 3/4" 32.75# H-40
CSG. @ 359' W/125 SX CMT.

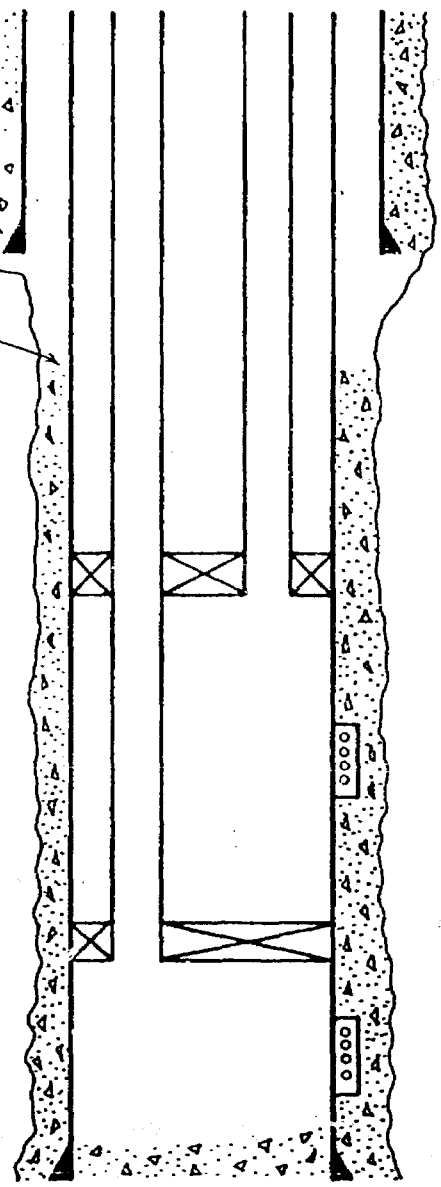
TOP OF CMT. @ 1295'

UPPER TUBING: 2 1/16" CMT.
LINED TBG. ON DUAL PACKER
@ 1720'

LOWER TUBING: 2 1/16" CMT.
LINED TBG. ON SINGLE PACKER
@ 1900' TBG. EXTERNALLY
COATED BETWEEN PKRS.

7" 20# J-55 CSG. @ 2167'
W/250 SX CMT.

P.B.T.D. 2162'
T.D. 2168'



TBG.- CSG. ANNULUS PROTECTED
W/CORROSION INHIBITED INERT
FLUID

QUEEN PERFS
1741-60' & 1802-18'

GRAYBURG PERFS
1956-72', 2026-68', 2078-83',
2098-2124', 2125-30' &
2136-50'

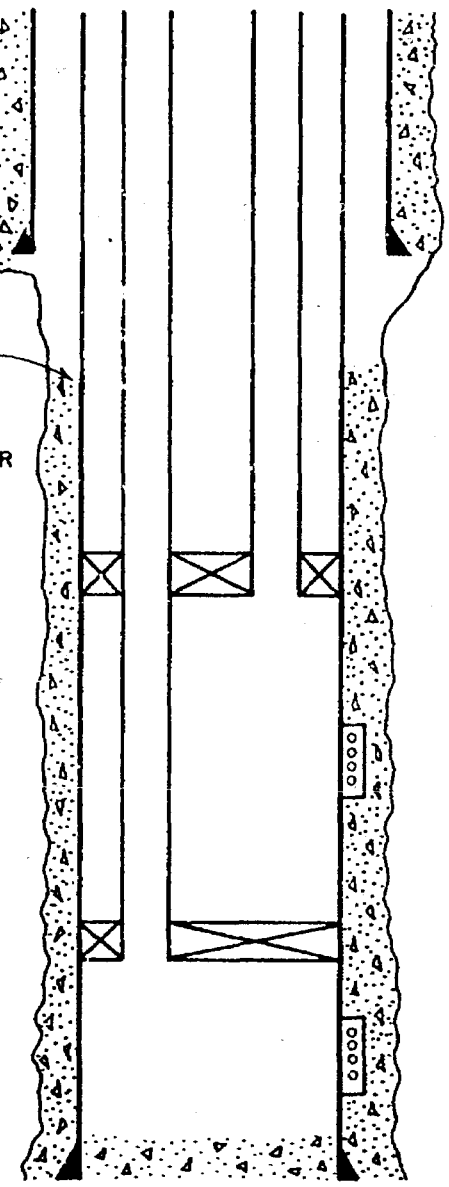
PROPOSED WATER INJECTION WELL

(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL
WELL SCHEMATICS

SUN OIL COMPANY
NEW MEXICO "O" STATE NO. 3
SEC. 12, T.-19-S., R.-28-E.
UNIT O
ELEV. 3381'



TOP OF CMT. @ SURFACE

8 5/8" 24 # H-40 CSG. @ 386' W/500 SX CMT.

TOP OF CMT. @ 884'

UPPER TUBING: 2 1/16" CMT. LINED TBG. ON DUAL PACKER @ 1740'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 2000'. TBG. EXTERNALLY COATED BETWEEN PKRS

5 1/2" 14 & 17# J-55 CSG. @ 2231' W/275 SX CMT.

P.B.T.D. 2198'
T.D. 2232'

TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID

QUEEN PERFS
1763 - 90'

GRAYBURG PERFS
2070', 2085', 2098', 2110 - 30', 2160 - 67' & 2172 - 78'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN - GRAYBURG POOL

WELL SCHEMATICS

SUN OIL COMPANY

NEW MEXICO "O" STATE NO. 4

SEC. 13, T.-19-S, R.-28-E.

UNIT M

ELEV. 3376'

TOP OF CMT. @ SURFACE

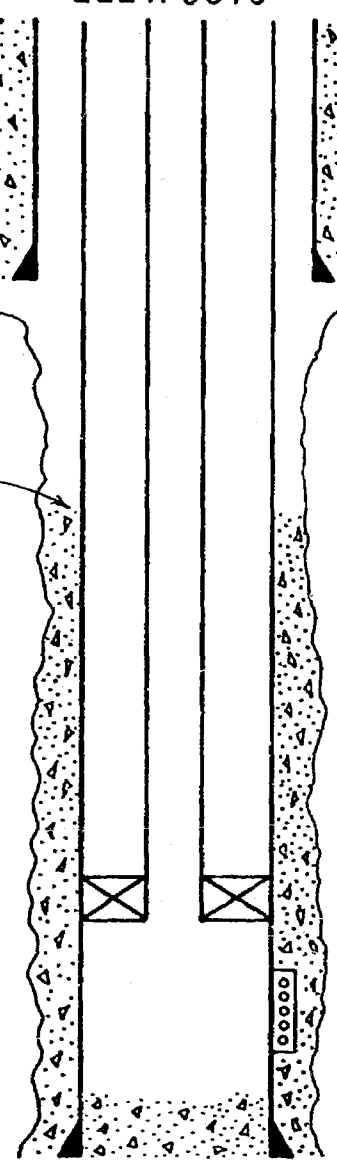
8 5/8" 24# J-55 CSG @ 422' W/250 SX CMT

TOP OF CMT. @ 1115'

2 3/8" CMT. LINED TUBING ON TENSION PKR SET @ 1700'

4 1/2" 9.5# J-55 CSG @ 2280' W/250 SX CMT

P.B.T.D. 2251'
T.D. 2280'



TBG. - CSG. ANNULUS PROTECTED W/CORROSION INHIBITED INERT FLUID.

QUEEN - GRAYBURG PERFS
1743 - 51', 1793 - 1800', 2091', 2102', 2113', 2131', 2140', 2150', 2175 - 77', 2184 - 86', 2198 - 2200' & 2212 - 14'

PROPOSED WATER INJECTION WELL

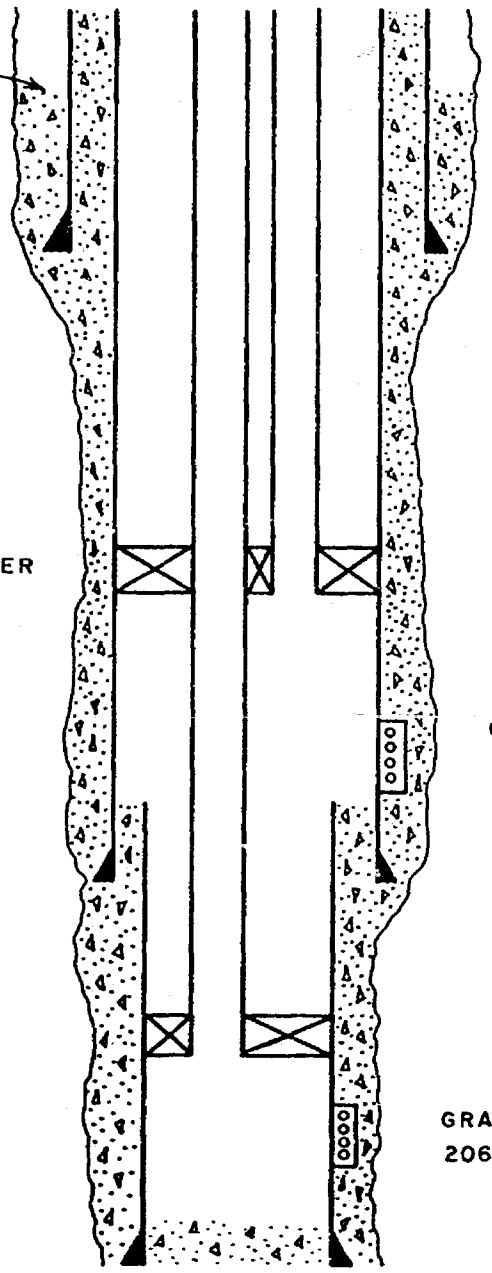
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL

WELL SCHEMATICS

JOHN A. YATES
ELLIOTT & PARCELL NO. 1
SEC. 13, T.-19-S., R.-28-E.
UNIT G
ELEV. 3373' DF



TOP OF CMT. @ SURFACE (CALCULATED)

TOP OF CMT. @ 130' (CALCULATED)

8 5/8" 24# CSG. @ 600' W/ 50 SX CMT.

UPPER TUBING: 2 1/16" CMT. LINED TBG. ON DUAL PACKER @ 1680'

LOWER TUBING: 2 1/16" CMT. LINED TBG. ON SINGLE PACKER @ 2010' TBG. EXTERNALLY COATED BETWEEN PKRS

7" 23# CSG. @ 1790' W/ 200 SX CMT.

5 1/2" 14# LINER SET 1750 - 2145' CEMENTED W/ 18 SX (ALL IT WOULD TAKE)

T.D. 2147'

TBG. - CSG. ANNULUS PROTECTED W/ CORROSION INHIBITED INERT FLUID

QUEEN PERFS 1723 - 40'

GRAYBURG PERFS 2064 - 82', 2127 - 2132'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

SUN OIL COMPANY

EAST MILLMAN QUEEN-GRAYBURG POOL
WELL SCHEMATICS

JOHN A. YATES
ELLIOTT & PARCELL NO. 4
SEC. 13, T.-19-S., R.-28-E.
UNIT A
ELEV. 3368'

TOP OF CMT. @ SURFACE
(CALCULATED)

8 5/8" CSG. @ 277'
W/50 SX CMT.

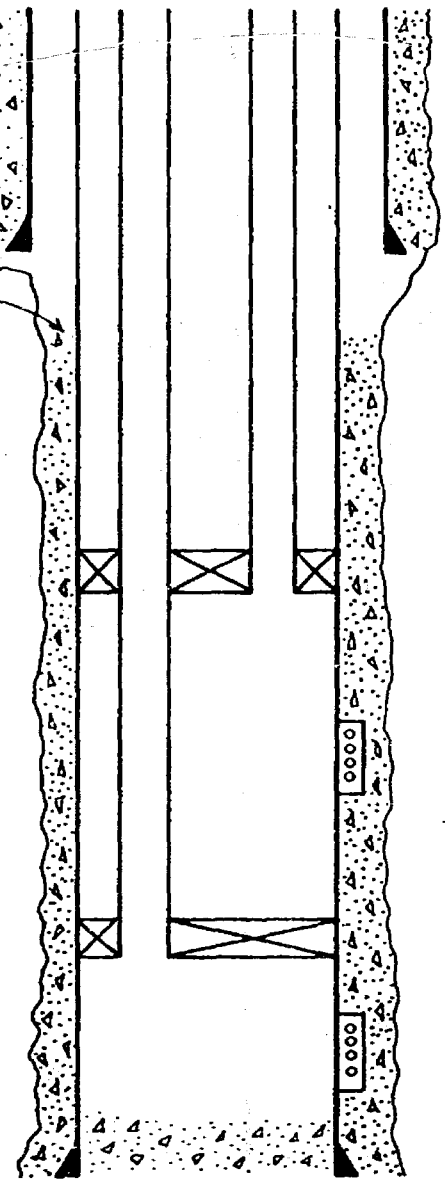
TOP OF CMT. @ 840'
(CALCULATED)

UPPER TUBING: 2 1/16" CMT.
LINED TBG. ON DUAL PACKER
@ 1700'

LOWER TUBING: 2 1/16" CMT
LINED TBG. ON SINGLE PACKER
@ 2040' TBG. EXTERNALLY
COATED BETWEEN PKRS

5 1/2" 15# CSG. @ 2285'
W/190 SX CMT.

T.D. 2285'



TBG.-CSG. ANNULUS PROTECTED
W/CORROSION INHIBITED
INERT FLUID

QUEEN PERFS
1742-48' & 1803-17'

GRAYBURG PERFS
2019-97', 2132-38', 2167-73'
& 2190-2200'

PROPOSED WATER INJECTION WELL
(SHOWN IN INJECTION CONFIGURATION)

MISCELLANEOUS INJECTION
INFORMATION

I. Injection Zones

Name:	Queen	Grayburg
Depth:	1700'	1950'

II. Injection Fluid

Type: Fresh water (90%) and salt water (10%)

Sources: 1. Fresh water - Double Eagle Corp. (City of Carlsbad)

2. Salt Water - Produced water from Queen and Grayburg formations.

III. Injection Data

Anticipated injection pressure: 1300 psig

Anticipated injection volume: 400 BWPD per well

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # #5

EAST MILLMAN-QUEEN-GRAYBURG WATERFLOOD*
DEPCO OPERATOR
INJECTION WELL DATA

WELL	OCTOBER VOLUME (BWPD)	OCTOBER PRESSURE	NOVEMBER VOLUME (BWPD)	NOVEMBER PRESSURE
State "648" #143	103	1225	109	1260
State "648" #145	140	1225	397	1260
State "648" #147	16	1100	99	1200
State "648" #151	231	1125	316	1150
State "648" #153	0	-	0	-
State "648" #160	177	1150	176	1174
State "648" #184	108	1250	136	1300
State "648" #189	186	1130	263	1175
State "E 5003" #1	95	1200	207	1250
State "BN" #2	118	650	198	650
Average	130	1117	211	1158

*East offset to proposed East Millman Pool Waterflood

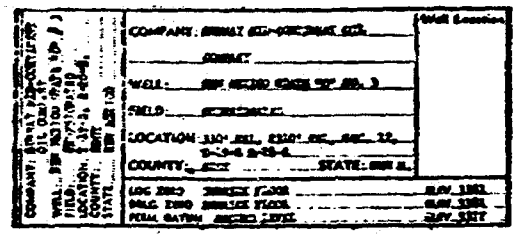
SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # #7

SUN OIL COMPANY

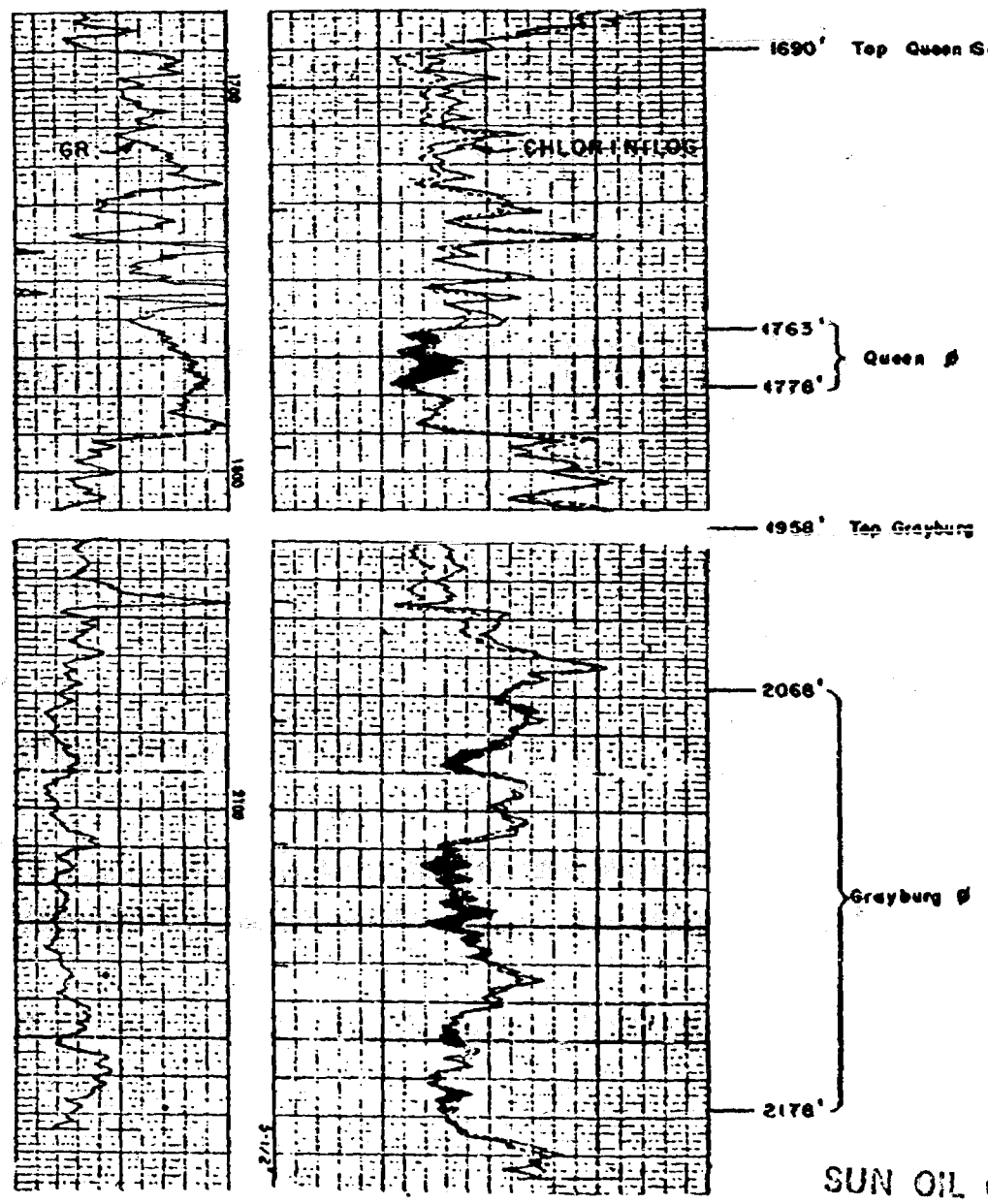
Date of Hearing: _____

Docket No.: _____

Exhibit # _____



PROPOSED FLOOD ZONES



SUN OIL COMPANY

Date of Hearing: 5-11-77

Docket No.: 6477

Exhibit # 1

INTER-OFFICE CORRESPONDENCE

SUBJECT: Water Compatibility: Millman Field, Southwestern District

DATE: February 21, 1979

OFFICE: Richardson

FROM: Production Service Laboratory

TO: Mr. Gary Miller
Southwestern District, Midland

Water samples representing San Andres Formation water and supply water collected from the New Mexico State lease and Double Eagle lease, respectively, were submitted to the lab for compatibility tests to determine if the supply water would be suitable for the planned injection program in the Millman Field.

The enclosed water analyses indicate the two waters are compatible and mixing the waters prior to injection would present no gross incompatibility problems.

Gary, as I suggested during our telephone conversation, for good injection performance, a good quality fresh water must be used for the proposed program. Specifications pertaining to the quality of the water purchased from Double Eagle should be part of the contract. The fresh supply water to be mixed with the produced San Andres Formation water should have an oxygen content of less than 1 ppm, a bacteria count of less than 10 colonies per milliliter and a suspended solids content of less than 2 ppm.

Since a ratio of approximately 90% fresh water and 10% produced water will be injected initially, a mineralogy study should be made on available core material to determine the presence of swelling clays. The presence of these clays in a fresh water environment could cause plugging problems.

If the above suggestions need further clarification, please contact me at the lab.

Johnny M Reinschmidt

Johnny Reinschmidt
Chemical Engineering Section

JR:cs
cc: C. L. Dickson
S. Whitaker
S. Gillett
Bill Hensel
D. Inglish
Danny Rawson
Corrosion Eng.
File 23-360

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # #10

SUN-7900-B

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY

WATER ANALYSIS REPORT

ANALYSIS NO. B-7756

FILE 23-360

Operator Sun Production Company
Lease or Well Double Eagle
Formation OGALLALA
Depth ____ To ____ : T.D. ____
Method of collecting sample From main line

Treatment None
Date and amount of last acid job ____

Prod. ____ BOPD ____ BWPD ____ MCFPD
Description This sample consists of one pint clear water.

Region ____
District S.W. District
Field Millman
County Eddy
State New Mexico
Collected by ____
Date 1-30-79 (Collected) 2-16-79 (Analyzed)
Sample No. 3171
Analyst SII

CONSTITUENTS	ppm
Sodium	60
Calcium	30
Magnesium	10
Barium	0
Strontium	
Potassium	
Iron	0
Chloride	41
Sulfate	39
Carbonate	0
Bicarbonate	178
TOTAL DISSOLVED SOLIDS	358

OTHER PROPERTIES	
pH	8.2
Specific Gravity	1.0001
Resistivity ohm-mtr. @75°F	19.788
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	ABSENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	0
Nitrates	
Phosphate	

REMARKS:

____ NORMAL FORMATION WATER
____ PROBABLY NORMAL FORMATION WATER
____ UNABLE TO CLASSIFY
____ ____% FORMATION ____% INJ. WATER
____ INDICATES A CASING LEAK
__X__ OTHER

Supply water for possible injection.

REPORTED BY: ____

CHEMICAL ENGINEERING SECTION
Copies to:

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO. B-7755

FILE 23-360

Operator: Sun Production Company
Lease or Well: New Mexico St. O # 4
Formation: QUEEN - GRAYBURG
Depth: 1,780 To 2,150 : T.D. 2,280
Method of collecting sample: Wellhead

Treatment: See remarks
Date and amount of last acid job:

Prod. 6 BOPD 28 BWPD MCFPD
Description: This sample consists of one pint cloudy yellow water with an oil film.

Region:
District: Southwestern
Field: Millman
County: Eddy
State: New Mexico
Collected by:
Date: 1-30-79 Collected 2-16-79 Analyzed
Sample No. 3166
Analyst: SII

CONSTITUENTS	ppm
Sodium	41000
Calcium	1960
Magnesium	628
Barium	0
Strontium	
Potassium	
Iron	11
Chloride	66300
Sulfate	2220
Carbonate	0
Bicarbonate	923

OTHER PROPERTIES	
pH	7.7
Specific Gravity	1.0831
Resistivity ohm-mtr. @75°F	.079
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	PRESENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	12
Nitrates	
Phosphate	

TOTAL DISSOLVED SOLIDS 113042

Treatment: 1-1/2 gal. Sun and 1 gal OW - 77 per week

REMARKS:

_____ NORMAL FORMATION WATER
_____ PROBABLY NORMAL FORMATION WATER
_____ UNABLE TO CLASSIFY
_____ _____% FORMATION _____% INJ. WATER
_____ INDICATES A CASING LEAK
__X__ OTHER

This is the first water sample received from this well and field. Unable to classify at this time.

REPORTED BY:
Johnny Reinschmidt
CHEMICAL ENGINEERING SECTION
Copies to:

SUN OIL COMPANY
PRODUCTION SERVICE LABORATORY
WATER ANALYSIS REPORT

ANALYSIS NO B-7757

FILE 23-360

Operator: Sun Production Company
Lease or Well: New Mexico St. O # 5
Formation: QUEEN - GRAYBURG
Depth: 1,759 To 2,156 ; T.D. 2,230
Method of collecting sample: Wellhead

Treatment: See remarks
Date and amount of last acid job:

Prod. 2 BOPD 27 BWPD MCFPD
Description: This sample consists of one pint cloudy yellow water with an oil film.

Region:
District: Southwest
Field: Millman
County: Eddy
State: New Mexico
Collected by:
Date: 1-30-79 Collected; 2-16-79 Analyzed
Sample No.: 10525
Analyst: SII

CONSTITUENTS	ppm
Sodium	34200
Calcium	1390
Magnesium	592
Barium	0
Strontium	
Potassium	
Iron	11
Chloride	55700
Sulfate	984
Carbonate	0
Bicarbonate	1020

OTHER PROPERTIES	
pH	7.1
Specific Gravity	1.0669
Resistivity ohm-mtr. @75°F	.091
Loss on Ignition, ppm	
Total Solids by Evap., ppm	
Organic acids, ppm	
Hardness as $CaCO_3$, ppm	
Sulfide	PRESENT
Mixed Oxides (Qualitative)	
Fluoride	
Silica	
Total Iron, ppm	11
Nitrates	
Phosphate	

TOTAL DISSOLVED SOLIDS 93897

Treatment: 1-1/2 gal Sun 9 and 1 gal OW-77 per week.

REMARKS:

_____ NORMAL FORMATION WATER
_____ PROBABLY NORMAL FORMATION WATER
_____ UNABLE TO CLASSIFY
_____ _____% FORMATION _____% INJ. WATER
_____ INDICATES A CASING LEAK
__X__ OTHER

This is the first water sample received from this well and field Unable to classify at this time.

REPORTED BY:

CHEMICAL ENGINEERING SECTION
Copies to:

EAST MILLMAN-QUEEN-GRAYBURG POOL

SALT WATER DISPOSAL WELL DATA

	SEPTEMBER		OCTOBER	
WELL	VOLUME (BWPD)	PRESSURE	VOLUME (BWPD)	PRESSURE
Eddy "AN" State #5 (Gulf Operator)	78	1275	68	1275
Bass #3 (Kersey Operator)	205	1000	208	1000

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # 11

PROPOSED EAST MILLMAN UNIT

PROJECTED PERFORMANCE

Base Case

Year	Gross Bbls Oil	Gross Gas MCF	Operating Expense $	Operating Cash Flow $
1979	34500	77	194900	114893
1980	31100	73	206600	99384
1981	27900	68	219000	82793
1982	22700	65	232000	48913
1983	20100	61	246100	31215
1984	17900	57	260900	14609
1985	15900	54	276500	-2258
1986	14000	50	293100*	-20310
	184100	505	1929300	369200

Summary

Remaining primary oil, gross bbls 184,100

Remaining primary oil, net bbls 161,100

* Includes P&A costs

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # #12

EAST MILLMAN POOL UNIT

PROPOSED 80 ACRE 5-SPOT PATTERN

Year	Gross Oil Bbls	Gross Gas MCF	Operating Expenses
1979	34500	77	212300
1980	21800	61	225000
1981	19700	51	238500
1982	52100	113	252900
1983	75900	160	268000
1984	81000	164	284100
1985	81300	154	301200
1986	75900	142	319200
1987	67900	128	338400
1988	64100	102	338400
1989	54400	90	338400
1990	51400	71	338400
1991	49200	62	338400
1992	47100	54	338400
1993	45000	47	338400
1994	42900	41	338400
1995	40900	34	338400
1996	38800	29	338400
1997	38800	23	338400
1998	38800	19	338400
1999	38800	18	338400
2000	38800	16	338400
2001	38800	15	338400
2002	38800	14	338400
2003	38800	14	338400
2004	38800	14	338400
2005	38800	13	338400
2006	38800	13	338400
2007	38800	13	338400
2008	*363600	*173	**2788000
	1735400	1925	11995600

* Includes Reserves for Years 31 - 40

** Includes P&A Expenses

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # #13

EAST MILLMAN POOL UNIT

ADDITIONAL RECOVERY

DUE TO WATERFLOOD

Year		Gross Oil Bbls	Gross Gas MCF
1979		0	0
1980		-9300	-12
1981		-8200	-17
1982		29400	48
1983		55800	99
1984		63100	107
1985		65400	100
1986		61900	92
1987		67900	128
1988		64100	102
1989		54400	90
1990		51400	71
1991		49200	62
1992		47100	54
1993		45000	47
1994		42900	41
1995		40900	34
1996		38800	29
1997		38800	23
1998		38800	19
1999		38800	18
2000		38800	16
2001		38800	15
2002		38800	14
2003		38800	14
2004		38800	14
2005		38800	13
2006		38800	13
2007		38800	13
2008		363600	173
	TOTALS	1550200	1420

SUN OIL COMPANY

Date of Hearing: 3-14-79

Docket No.: 6477

Exhibit # #14

EAST MILLMAN POOL UNIT

PROPOSED 80 ACRE 5-SPOT PATTERN

Investment Costs

	Intangible	Tangible
Convert 11 wells to water injection	$ 81000	$ 150000
Injection lines	37000	65000
Production and Text Facilities	30000	60000
Injection Plant - 5000 BWPD @ 1500 psi	10000	60000
Water supply line, est. 5000 ft.	5000	9000
Pumping Units		170000
TOTAL	$163000	$514000

TOTAL INVESTMENT COST $677000

SUN OIL COMPANY
Date of Hearing: 3-14-79
Docket No.: 6477
Exhibit # #15

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

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

December 5, 1979

Re: CASE NO. 6477
ORDER NO. R-6177-A

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

Applicant:

Sun Oil Company

Dear Sir:

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

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

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

November 15, 1979

Re: CASE NO. 6477
ORDER NO. R-6177

Mr. Jason Kellahin
Kellahin & Kellahin
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico 87501

Applicant:

Sun Oil Company

Dear Sir:

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

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

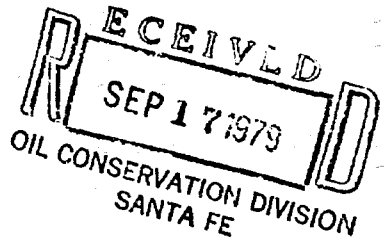
KELLAHIN and KELLAHIN
Attorneys at Law
500 Don Gaspar Avenue
Post Office Box 1769
Santa Fe, New Mexico 87501

Jason Kellahin
W. Thomas Kellahin

Karen Aubrey

Telephone 982-4285
Area Code 505

September 12, 1979



Mr. Dan Nutter
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Sun Oil Company
Case 6477

Dear Dan:

On March 14, 1979, you heard Sun's application for waterflood project Eddy County in Case No. 6477.

As of this date, we have not received an order. I would appreciate you informing me what, if any, problems you are encountering with this order so that I may advise Sun.

Very truly yours,

W. Thomas Kellahin

WTK:eps

cc: Mr. J. T. Harris

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico. CASE 6477

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

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

MR. STAMETS: Call next Case 6477, application of Sun Oil Company for a waterflood project, Eddy County, New Mexico.

MR. KELLAHIN: Tom Kellahin of Santa Fe, appearing on behalf of Sun Oil Company.

We request that that case be continued to the hearing on March 14.

MR. STAMETS: Case 6477 will be so continued.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2468
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

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

Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6422 heard by me on 2-28, 1979.

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
2020 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

BEFORE THE NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

FEB-6 1979

IN THE MATTER OF THE APPLICATION OF SUN OIL COMPANY FOR APPROVAL OF A SECONDARY RECOVERY PROJECT, EAST MILLMAN POOL, EDDY COUNTY, NEW MEXICO.

Case 6477

A P P L I C A T I O N

Comes now Sun Oil Company and applies to the Oil Conservation Division of New Mexico for approval of a secondary recovery project for its East Millman Pool Unit, Eddy County, New Mexico and in support thereof would show the Division:

1. Applicant has formed its East Millman Pool Unit, approval of which is presently pending before the Division.

2. Purpose of the unit is for the institution of a secondary recovery project in the East Millman Pool, pursuant to the unit operating agreement.

3. Applicant proposes to institute the secondary recovery project by means of water injection in the Queen and Grayburg formations in the Millman Pool through eleven existing wells to be converted to injection, as follows:

(1). Gulf Oil Co., Eddy "AN" State No. 2 Unit E, Section 13, Township 19 South, Range 28 East.

(2). Gulf Oil Co., Eddy State "AN" Well No. 3, Unit K, Section 13, Township 19 South, Range 28 East.

(3). Kersey Bass Well No. 1, Unit I, Section 12, Township 19 South, Range 28 East.

(4). Maralo State OG 272 Well No. 2, Unit M, Section 12, Township 19 South, Range 28 East.

(5). Maralo State OG 272 Well No. 3, Unit K, Section 12, Township 19 South, Range 28 East.

(6). Sun Oil Co. Felzer State Well No. 1, Unit E, Section 12, Township 19 South, Range 28 East.

(7). Sun Oil Co. N.M. State O Well No. 1, Unit C, Section 13, Township 19 South, Range 28 East.

(8). Sun Oil State O, Well No. 3, Unit O, Section 12, Township 19 South, Range 28 East.

(9). Sun Oil Co. State O, Well No. 4, Unit M, Section 13, Township 19 South, Range 28 East.

(10). John A. Yates' Elliot Parcell Well No. 1, Unit G, Section 13, Township 19 South, Range 28 East.

(11). John A. Yates' Elliot Parcell Well No. 4, Unit A, Section 13, Township 19 South, Range 28 East.

4. Applicant proposes to initially inject approximately 400 barrels of water per day in each of the above injection wells. Initially fresh Ogalala water will be obtained for this purpose from Double Eagle Water Co., Loco Hills, N.M. As the flood progresses, produced water will probably be reinjected under controlled conditions.

5. At or prior to the hearing applicant will submit the exhibits and technical information required by Oil Conservation Division Rule 701, as amended, together with other data in support of the proposed secondary recovery project.

6. Approval of this secondary recovery project for the East Millman Pool Unit area will result in the production of hydrocarbons that would not otherwise be recovered, will result in the prevention of waste and premature abandonment of the project area, and will protect correlative rights.

WHEREFORE Applicant prays that this application be set for hearing before the Division's duly appointed examiner and that after notice and hearing as required by law, the Division enter its order approving the secondary recovery project as

prayed for, together with provision for administrative approval of the conversion of other wells to injection, and the drilling of further wells for either injection or production, at standard and non-standard locations, and assignment of allowables as provided by Division rules, together with such other and further provision as may be proper.

SUN OIL COMPANY

By Jason Kellahin

Kellahin & Kellahin
P. O. Box 1769
Santa Fe, New Mexico 87501

ATTORNEYS FOR APPLICANT

Dockets Nos. 9-79 and 10-79 are tentatively set for hearing on March 14 and 28, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

Docket No. 7-79

DOCKET: COMMISSION HEARING - FRIDAY - FEBRUARY 23, 1979

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

CASE 6461: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Mayor Eddie Armenta, the Village of Jemez Springs, and all other interested parties to appear and show cause why the Jemez Well No. 1 located in Unit A of Section 26, Township 18 North, Range 2 East, Sandoval County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

****

Docket No. 8-79

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 28, 1979

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

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

CASE 6422: (Continued from January 31, 1979, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Helton Engineering & Geological Services, Inc., Travelers Indemnity Company, and all other interested parties to appear and show cause why the Brent Well No. 1 located in Unit M of Section 29 and the Brent Well No. 3 located in Unit G of Section 19, both in Township 13 North, Range 6 East, Sandoval County, New Mexico, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 6434: (Continued from January 31, 1979, Examiner Hearing)

Application of Amerada Hess Corporation for approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a finding that the drilling of its State "O" Well No. 5 to be located in Unit H of Section 30, Township 19 South, Range 37 East, Eumont Gas Pool, Lea County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well, and further seeks approval of a waiver of existing well-spacing requirements.

CASE 6435: (Continued from February 14, 1979, Examiner Hearing)

Application of Amerada Hess Corporation for approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a finding that the drilling of its W. A. Weir "B" Well No. 3 located in Unit B of Section 26, Township 19 South, Range 36 East, Eumont Gas Pool, Lea County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well, and further seeks approval of a waiver of existing well-spacing requirements.

CASE 6436: (Continued from January 31, 1979, Examiner Hearing)

Application of Amerada Hess Corporation for approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a finding that the drilling of its State "U" Gas Com Well No. 2 to be located in Unit C of Section 32, Township 19 South, Range 37 East, Eumont Gas Pool, Lea County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well, and further seeks approval of a waiver of existing well-spacing requirements.

CASE 6462: Application of McClellan Oil Corporation for an unorthodox well location, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of its Marlisue State Well No. 3 to be located 1155 feet from the North line and 1485 feet from the West line of Section 24, Township 14 South, Range 29 East, Double "L" Queen Associated Pool, Chaves County, New Mexico, the NE/4 NW/4 of said Section 24 to be dedicated to the well.

CASE 6463: Application of Orville Slaughter for pool and lease commingling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle Oswell-Farmington Pool production from his Sangre de Cristo Well No. 1 with undesignated Fruitland production from his Sangre de Cristo Well No. 2, both located in Unit D of Section 34, Township 30 North, Range 11 West, San Juan County, New Mexico.

CASE 6464: Application of Dallas McCasland for clarification of Orders Nos. R-2789 and R-2794, Lea County, New Mexico. Applicant, in the above-styled cause, seeks clarification of Orders Nos. R-2789 and R-2794 to determine what formations have been unitized and what formations are subject to a waterflood project under the South Penrose-Skelly Unit, Sections 6 and 7, Township 22 South, Range 37 East, Lea County, New Mexico, and of the vertical limits of the Eumont and Penrose-Skelly Pools in said sections.

CASE 6465: Application of Getty Oil Company for an unorthodox well location and a non-standard proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard gas proration unit comprising the SE/4 of Section 31, Township 24 South, Range 37 East, Jalmat Gas Pool, Lea County, New Mexico, to be dedicated to its J. W. Sherrell Well No. 9 located 2250 feet from the South line and 1650 feet from the East line of said Section 31.

CASE 6466: Application of Getty Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its State 35 Well No. 1 located in Unit K of Section 35, Township 21 South, Range 34 East, Lea County, New Mexico, to produce oil from an undesignated Wolfcamp pool and gas from the Grama Ridge-Morrow Gas Pool through parallel strings of tubing.

CASE 6467: Application of Getty Oil Company for pool creation and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order creating a new oil pool in the Wolfcamp formation for its State 35 Well No. 1 located in Unit K of Section 35, Township 21 South, Range 34 East, Lea County, New Mexico, and for promulgation of special pool rules, including provision for 160-acre spacing.

CASE 6468: Application of Dome Petroleum Corporation for an exception to Order No. R-1069, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Rule 2 of Order No. R-1069, as amended, for the Bisti-Lower Gallup Oil Pool to approve the following 13 non-standard proration units: the W/2 NW/4, W/2 NE/4, E/2 SW/4, and the E/2 SE/4 of Sections 3, 4, and 9, and the W/2 NW/4 of Section 10, all in Township 26 North, Range 14 West, San Juan County, New Mexico.

CASE 6469: Application of Continental Oil Company for a dual completion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Fed. 34 Well No. 1 located in Unit N of Section 34, Township 20 South, Range 26 East, Eddy County, New Mexico, to produce gas from the Springs-Upper Pennsylvanian Pool and an undesignated Morrow pool through parallel strings of tubing.

CASE 6470: Application of Phillips Petroleum Company for approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well spacing requirements to permit an infill drilling program in its East Vacuum Unit Area, Vacuum Grayburg-San Andres Pool, Lea County, New Mexico, and a finding that such infill wells are necessary to effectively and efficiently drain that portion of their proration units which is not presently being drained by any existing well. Applicant specifically seeks such waivers and findings now for ten wells, all in Township 17 South, Range 35 East, and located as follows: Unit K of Section 27; Units M and O, Section 28; Units B, I, and M of Section 32; Units C, H, and M of Section 33; and Unit C of Section 34.

CASE 6471: Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Freeman Well No. 1-A to be located in Unit C of Section 11, Township 31 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6472: Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Jenny Well No. 1-A to be located in Unit P of Section 13, Township 26 North, Range 4 West, Basin-Dakota Pool, Rio Arriba County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6473: Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its McIntyre Well No. 1-A to be located in Unit K of Section 11, Township 26 North, Range 4 West, Basin-Dakota Pool, Rio Arriba County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6474: Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Williams Well No. 1-A to be located in Unit C of Section 24, Township 31 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6475: Application of Consolidated Oil & Gas, Inc. for approval of infill drilling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Montoya Well No. 1-A to be located in Unit I of Section 35, Township 32 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6476: Application of Pennzoil Company for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be located 660 feet from the South line and 990 feet from the West line of Section 24, Township 17 South, Range 28 East, Aid-Morrow Gas Pool, Eddy County, New Mexico, the S/2 of said Section 24 to be dedicated to the well.

CASE 6477: Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project on its East Millman Pool Unit Area by the injection of water into the Queen and Grayburg formations through eleven wells located in Sections 12 and 13 of Township 19 South, Range 28 East, East Millman Pool, Eddy County, New Mexico.

CASE 6437: (Continued and Readvertised)

Application of Curtis Little for compulsory pooling, approval of infill drilling, and a non-standard proration unit, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of Order No. R-4556 and approval of an order pooling all mineral interests in the Dakota formation underlying all of Section 11 and Lot 4 and the SW/4 SW/4 of Section 12, Township 28 North, Range 13 West, Basin-Dakota Pool, San Juan County, New Mexico, to form a 344.36-acre non-standard gas proration unit to be dedicated to a well to be located 1085 feet from the South line and 285 feet from the West line of said Section 12. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

Applicant further seeks a finding that the drilling of said well is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

CASE 6478: Application of Coronado Exploration Corp. for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the NW/4 SE/4 of Section 26, Township 10 South, Range 28 East, Chaves County, New Mexico, to be dedicated to a well to be located at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6479: Application of Coronado Exploration Corp. for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the SE/4 SE/4 of Section 5, Township 10 South, Range 28 East, Chaves County, New Mexico, to be dedicated to a well to be located at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6480: Application of Harvey E. Yates Company for an NGPA determination, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir or in the alternative a new onshore production well determination for its State 22 Well No. 1 located in Unit P of Section 22, Township 18 South, Range 35 East, Queen formation, Lea County, New Mexico.

CASE 6481: Application of Harvey E. Yates Company for an NGPA determination, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir or in the alternative a new onshore production well determination for its Hanlad State Well No. 1 located in Unit K of Section 2, Township 18 South, Range 35 East, Queen formation, Lea County, New Mexico.

CASE 6482: Application of Harvey E. Yates Company for an NGPA determination, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a new onshore reservoir or in the alternative a new onshore production well determination for its Mobil 27 State Well No. 1 located in Unit A of Section 27, Township 18 South, Range 35 East, Queen formation, Lea County, New Mexico.

CASE 6483: Application of Harvey E. Yates Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp, Pennsylvanian, and Mississippian formations underlying the S/2 of Section 8, Township 14 South, Range 36 East, Lea County, New Mexico, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6484: Application of Harvey E. Yates Company for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp, Pennsylvanian, and Mississippian formations underlying the E/2 of Section 28, Township 16 South, Range 37 East, Lea County, New Mexico, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6485: Application of Harvey E. Yates Company for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp, Pennsylvanian, and Mississippian formations underlying the S/2 of Section 13, Township 18 South, Range 28 East, Eddy County, New Mexico, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6486: Application of Depco Inc. for an unorthodox well location, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be located 660 feet from the North and East lines of Section 21, Township 13 South, Range 30 East, undesignated Morrow pool, Chaves County, New Mexico, the E/2 of said Section 21 to be dedicated to the well.

CASE 6487: Application of El Paso Natural Gas Company for approval of infill drilling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks a waiver of existing well-spacing requirements and a finding that the drilling of its Shell E State Com Well No. 2 located in Unit N of Section 6, Township 21 South, Range 36 East, Eumont Gas Pool, Lea County, New Mexico, is necessary to effectively and efficiently drain that portion of the proration unit which cannot be so drained by the existing well.

Case 6477

BEFORE THE NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION
OF SUN OIL COMPANY FOR APPROVAL
OF A SECONDARY RECOVERY PROJECT,
EAST MILLMAN POOL, EDDY COUNTY,
NEW MEXICO.

FEB-8 1979

A P P L I C A T I O N

Comes now Sun Oil Company and applies to the Oil Conservation Division of New Mexico for approval of a secondary recovery project for its East Millman Pool Unit, Eddy County, New Mexico and in support thereof would show the Division:

1. Applicant has formed its East Millman Pool Unit, approval of which is presently pending before the Division.

2. Purpose of the unit is for the institution of a secondary recovery project in the East Millman Pool, pursuant to the unit operating agreement.

3. Applicant proposes to institute the secondary recovery project by means of water injection in the Queen and Grayburg formations in the Millman Pool through eleven existing wells to be converted to injection, as follows:

(1). Gulf Oil Co., Eddy "AN" State No. 2 Unit E, Section 13, Township 19 South, Range 28 East.

(2). Gulf Oil Co., Eddy State "AN" Well No. 3, Unit K, Section 13, Township 19 South, Range 28 East.

(3). Kersey Bass Well No. 1, Unit I, Section 12, Township 19 South, Range 28 East.

(4). Maralo State OG 272 Well No. 2, Unit M, Section 12, Township 19 South, Range 28 East.

(5). Maralo State OG 272 Well No. 3, Unit K, Section 12, Township 19 South, Range 28 East.

(6). Sun Oil Co. Felzer State Well No. 1, Unit E, Section 12, Township 19 South, Range 28 East.

(7). Sun Oil Co. N.M. State O Well No. 1, Unit C, Section 13, Township 19 South, Range 28 East.

(8). Sun Oil State O, Well No. 3, Unit O, Section 12, Township 19 South, Range 28 East.

(9). Sun Oil Co. State O, Well No. 4, Unit M, Section 13, Township 19 South, Range 28 East.

(10). John A. Yates' Elliot Parcell Well No. 1, Unit G, Section 13, Township 19 South, Range 28 East.

(11). John A. Yates' Elliot Parcell Well No. 4, Unit A, Section 13, Township 19 South, Range 28 East.

4. Applicant proposes to initially inject approximately 400 barrels of water per day in each of the above injection wells. Initially fresh Ogalala water will be obtained for this purpose from Double Eagle Water Co., Loco Hills, N.M. As the flood progresses, produced water will probably be reinjected under controlled conditions.

5. At or prior to the hearing applicant will submit the exhibits and technical information required by Oil Conservation Division Rule 701, as amended, together with other data in support of the proposed secondary recovery project.

6. Approval of this secondary recovery project for the East Millman Pool Unit area will result in the production of hydrocarbons that would not otherwise be recovered, will result in the prevention of waste and premature abandonment of the project area, and will protect correlative rights.

WHEREFORE Applicant prays that this application be set for hearing before the Division's duly appointed examiner and that after notice and hearing as required by law, the Division enter its order approving the secondary recovery project as

prayed for, together with provision for administrative approval of the conversion of other wells to injection, and the drilling of further wells for either injection or production, at standard and non-standard locations, and assignment of allowables as provided by Division rules, together with such other and further provision as may be proper.

SUN OIL COMPANY

By Jason Kellahin

Kellahin & Kellahin
P. O. Box 1769
Santa Fe, New Mexico 87501

ATTORNEYS FOR APPLICANT

DRAFT

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6477

Order No. R- 6177

APPLICATION OF SUN OIL COMPANY

FOR A WATERFLOOD PROJECT, EDDY

COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on ~~February 28~~ March 14, DSN 19 79, at Santa Fe, New Mexico, before Examiner ~~Richard L. Stamets~~.

NOW, on this _____ day of ~~March~~ November, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Sun Oil Company, seeks authority to institute a waterflood project on its East Millman Pool Unit Area~~xxxx~~.

DRAFT

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6477

Order No. R- 6177

APPLICATION OF SUN OIL COMPANY

FOR A WATERFLOOD PROJECT, EDDY

COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on ~~February 28~~ March 14, 19 79, at Santa Fe, New Mexico, before Examiner ~~Richard L. Stamets~~ DSN.

NOW, on this _____ day of ~~March~~ November, 19 79, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Sun Oil Company, seeks authority to institute a waterflood project on its East Millman Pool Unit Area ~~Lease~~, ~~Pool~~ by the injection of water into the Queen and Grayburg formations through eleven injection wells in ~~Sections 12 and 13~~, East Millman Pool, Township 19 South, Range 28 East/, NMPM, Eddy County, New Mexico, described as follows:

WELL NAME	NO.	UNIT LETTER	SEC.	TWP.	RGE.
Sun Felzer State	1	E	12	19S	28E
Sun State "O"	1	C	13	19S	28E
Sun State "O"	3	O	12	19S	28E
Sun State "O"	4	M	13	19S	28E
Maralo State 272	3	K	12	19S	28E
Maralo State 272	2	M	12	19S	28E
Kersey Bass	1	I	12	19S	28E
Yates E. Parcell	1	G	13	19S	28E

Yates E. Parcell	4	A	13	19S	28E
Gulf Eddy State AN	2	E	13	19S	28E
Gulf Eddy State AN	3	K	13	19S	28E

(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(6) That there are certain wells in and near the proposed waterflood project which had casing and cementing or plugging programs which are of doubtful integrity, and which may reasonably be assumed to be capable of providing avenues of escape whereby waters injected into the Queen-Grayburg formations could migrate to other formations and possibly into the fresh water sands in the area.

(7) That the applicant should consult the Supervisor of the Artesia district office of the Division to determine what remedial work, if any, should be performed on the following described wells prior to commencement of water injection operations in the subject waterflood project:

Kersey Bass Well No. 1	Unit I, Section 28
Ohio Merchant Well No. 1	Unit N, Section 1
Nix and Curtis R & B State Well No. 2	Unit G, Section 12
Donnelly Kinney State Well No. 1	Unit L, Section 18
Depco State 648 Well No. 181	Unit J, Section 14
Yates Campbell-Walthney Well No. 1	Unit D, Section 18

all in Township 19 South, Range 28 East, NMPM.

(8) That injection into each of the ~~above authorized water injection~~ wells described in Finding No (2) above should be through cement-lined tubing set in a packer, said packer being installed as near as is practicable to the uppermost perforation; that the casing-tubing annulus in each injection well should be loaded with an inert fluid and equipped with an approved pressure gauge other attention-attracting leak detection device.

(9) That the injection wells or injection pressurization system ~~shall~~ should be so equipped as to limit injection pressure at the wellhead to no more than 900 psi, but the Division Director should have authority to increase said pressure limitation, should circumstances warrant.

(10) That the subject waterflood project should be known as the Sun East Millman Q-GB Waterflood Project.

(11) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sun Oil Company, is hereby authorized to institute a waterflood project on its East Millman Pool Unit Area, by the injection of water into the Queen and Grayburg formations through the following-described wells in Township 19 South, Range 28 East, East Millman Pool, NMPM, Eddy County, New Mexico:

WELL NAME	NO.	UNIT LETTER	SEC.	TWP.	RGE.
Sun Felzer State	1	E	12	19S	28E
Sun State "O"	1	C	13	19S	28E
Sun State "O"	3	O	12	19S	28E
Sun State "O"	4	M	13	19S	28E
Maralo State 272	3	K	12	19S	28E
Maralo State 272	2	M	12	19S	28E
Kersey Bass	1	I	12	19S	28E
Yates E. Parcell	1	G	13	19S	28E
Yates E. Parcell	4	A	13	19S	28E
Gulf Eddy State AN	2	E	13	19S	28E
Gulf Eddy State AN	3	K	13	19S	28E

(2) That injection into each of said wells shall be through internally coated tubing, set in a packer which shall be located as near as practicable to the uppermost perforation; that the casing-tubing annulus of each injection well shall be loaded with an inert fluid and equipped with an approved pressure gauge or attention-attracting leak detection device.

(3) That the operator shall immediately notify the Supervisor of the ~~Division's~~ Artesia district office of the Division of the failure of the tubing or packer in any of said injection wells, the leakage of water or oil from around any producing well, or the leakage of water or oil from or around any plugged and abandoned well within the project area and shall take such timely steps as may be necessary or required to correct such failure or leakage.

(4) That the injection wells herein authorized and/or the injection pressurization system shall be so equipped as to limit injection pressure at the wellhead to no more than 900 psi, provided however, that the Division Director may authorize a higher surface injection pressure upon satisfactory showing that such pressure will not result in fracturing of the confining strata.

(5) That the subject waterflood project is hereby designated the Sun East Millman Q-GB Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

(6) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 704 and 1115 of the Division Rules and Regulations.

IT IS FURTHER ORDERED:

(1) That the operator shall consult with the Supervisor of the Artesia district office of the Division and determine what, if any, remedial action must be taken on the following

described wells prior to initiation of injection into the Sun East Millman Q-GB Waterflood Project:

Kersey Bass Well No. 1	Unit I, Section 28
Ohio Merchant Well No. 1	Unit N, Section 1
Nix and Curtis R & B State Well No. 2	Unit G, Section 12
Donnelly-Kinney State Well No. 1	Unit L, Section 18
Depco State 648 Well No. 181	Unit J, Section 14
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Section 18

all in Township 19 South, Range 28 East, NMPM.

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

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

DRAFT

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

CASE NO. 6177

Order No. R- 6177-A

APPLICATION OF SUN OIL COMPANY FOR A WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE DIVISION:

It appearing to the Division that Order No. R- 6177, dated November 14, 19 79, does not correctly state the intended order of the Division,

IT IS THEREFORE ORDERED:

(1) That Finding No. (7) on Page 2 of Order No. R-6177 be and the same is hereby corrected to read in its entirety as follows:

"(7) That the applicant should consult with the Supervisor of the Artesia district office of the Division to determine what remedial work, if any, should be performed on the following described wells prior to commencement of water injection operations in the subject waterflood project:

Kersey Bass Well No. 1	Unit I, Sec. 12, Twp. 19S, Rge. 28E
Ohio Merchant Well No. 1	Unit N, Sec. 1, Twp. 19S, Rge. 28E
Nix and Curtis R & B State Well No. 2	Unit G, Sec. 12, Twp. 19S, Rge. 28E
Donnelly Kinney State Well No. 1	Unit L, Sec. 18, Twp. 19S, Rge. 29E
Depco State 648 Well No. 181	Unit J, Sec. 14, Twp. 19S, Rge. 28E
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Sec. 13, Twp. 19S, Rge. 29E"

(2) That Order No. (1) of "IT IS FURTHER ORDERED" on Page 4 of Order No. R-6177 be and the same is hereby corrected to read in its entirety as follows:

"(1) That the operator shall consult with the Supervisor of the Artesia district office of the Division and determine what, if any, remedial action must be taken on the following described wells prior to initiation of injection into the Sun East Millman Q-GB Waterflood Project:

Kersey Bass Well No. 1	Unit I, Sec. 12, Twp. 19S, Rge. 28E
Ohio Merchant Well No. 1	Unit N, Sec. 1, Twp. 19S, Rge. 28E
Nix and Curtis R & B State Well No. 2	Unit G, Sec. 12, Twp. 19S, Rge. 28E
Donnelly Kinney State Well No. 1	Unit L, Sec. 18, Twp. 19S, Rge. 29E
Depco State 648 Well No. 181	Unit J, Sec. 14, Twp. 19S, Rge. 28E
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Sec. 18, Twp. 19S, Rge. 29E"

(3) That the corrections set forth in this order be entered nunc pro tunc as of November 14, 1979.

DONE at Santa Fe, New Mexico, on this _____ day of November, 1979.

Nunc pro tunc Order No R-6177 11/14/79

1. Change:
Finding No.(7) to read in its entirety as follows:

"(7) That the applicant should consult with the Supervisor of the Artesia district office of the Division to determine what remedial work, if any, should be performed on the following described wells prior to commencement of water injection operations in the subject waterflood project:

Kersey Bass Well No. 1	Unit I, Sec. 12, Twp. 19S., Rge. 28E.
Ohio Merchant Well No. 1	Unit N, Sec. 1, Twp. 19S., Rge. 28E.
Nix and Curtis R & B State Well No. 2	Unit G, Sec. 12, Twp. 19S., Rge. 28E.
Donnelly Kinney State Well No. 1	Unit L, Sec. 18, Twp. 19S., Rge. 29E.
Depco State 648 Well No. 181	Unit J, Sec. 14, Twp. 19S., Rge. 28E.
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Sec. 18, Twp. 19S., Rge. 29E."

2. Change:
Order No. (1) of "IT IS FURTHER ORDERED" to read in its entirety as follows:

"(1) That the operator shall consult with the Supervisor of the Artesia district office of the Division and determine what, if any, remedial action must be taken on the following described wells prior to initiation of injection into the Sun East Millman Q-GB Waterflood Project:

Kersey Bass Well No. 1	Unit I, Sec. 12, Twp 19S., Rge. 28E.
Ohio Merchant Well No. 1	Unit N, Sec. 1, Twp 19S., Rge. 28E.
Nix and Curtis R & B State Well No. 2	Unit G, Sec 12, Twp 19S., Rge. 28E.
Donnelly Kinney State Well No. 1	Unit L, Sec 18, Twp 19S, Rge 29E.
Depco State 648 Well No. 181	Unit J, Sec 14, Twp 19S, Rge 28E.
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Sec 18, Twp 19S, Rge 29E."

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6477
Order No. R-6177

APPLICATION OF SUN OIL COMPANY FOR A WATERFLOOD PROJECT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 14, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 14th day of November, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Sun Oil Company, seeks authority to institute a waterflood project on its East Millman Pool Unit Area by the injection of water into the Queen and Grayburg formations through eleven injection wells in Township 19 South, Range 28 East, East Millman Pool, NMPM, Eddy County, New Mexico, described as follows:

WELL NAME	NO.	UNIT LETTER	SEC.
Sun Felzer State	1	E	12
Sun State "O"	1	C	13
Sun State "O"	3	O	12
Sun State "O"	4	M	13
Maralo State 272	3	K	12
Maralo State 272	2	M	12
Kersey Bass	1	I	12
Yates E. Parcell	1	G	13
Yates E. Parcell	4	A	13
Gulf Eddy State AN	2	E	13
Gulf Eddy State AN	3	K	13

(3) That the wells in the project area are in an advanced state of depletion and should properly be classified as "stripper" wells.

(4) That the proposed waterflood project should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface from injection, production, or plugged and abandoned wells.

(6) That there are certain wells in and near the proposed waterflood project which had casing and cementing or plugging programs which are of doubtful integrity, and which may reasonably be assumed to be capable of providing avenues of escape whereby waters injected into the Queen-Grayburg formations could migrate to other formations and possibly into the fresh water sands in the area.

(7) That the applicant should consult with the Supervisor of the Artesia district office of the Division to determine what remedial work, if any, should be performed on the following described wells prior to commencement of water injection operations in the subject waterflood project:

Kersey Bass Well No. 1 I-12	Unit I, Section 28	I 12-19-28
Ohio Merchant Well No. 1	Unit N, Section 1 OK	19-28
Nix and Curtis R & B State Well No. 2	Unit G, Section 12 OK	19-28
Donnelly Kinney State Well No. 1	Unit L, Section 18 OK	19-29
Depco State 648 Well No. 181	Unit J, Section 14 OK	19-28
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Section 18 OK	19-29

~~All in Township 19 South, Range 28 East, NMPM.~~

(8) That injection into each of the wells described in Finding No. (2) above should be through cement-lined tubing set in a packer, said packer being installed as near as is practicable to the uppermost perforation; that the casing-tubing annulus in each injection well should be loaded with an inert fluid and equipped with an approved pressure gauge or other attention-attracting leak detection device.

(9) That the injection wells or injection pressurization system should be so equipped as to limit injection pressure at the wellhead to no more than 900 psi, but the Division Director should have authority to increase said pressure limitation, should circumstances warrant.

(10) That the subject waterflood project should be known as the Sun East Millman Q-GB Waterflood Project.

(11) That the subject application should be approved and the project should be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

IT IS THEREFORE ORDERED:

(1) That the applicant, Sun Oil Company, is hereby authorized to institute a waterflood project on its East Millman Pool Unit Area, by the injection of water into the Queen and Grayburg formations through the following-described wells in Township 19 South, Range 28 East, East Millman Pool, NMPM, Eddy County, New Mexico:

WELL NAME	NO.	UNIT LETTER	SEC.
Sun Felzer State	1	E	12
Sun State "O"	1	C	13
Sun State "O"	3	O	12
Sun State "O"	4	M	13
Maralo State 272	3	K	12
Maralo State 272	2	M	12
Kersey Bass	1	I	12
Yates E. Parcell	1	G	13
Yates E. Parcell	4	A	13
Gulf Eddy State AN	2	E	13
Gulf Eddy State AN	3	K	13

(2) That injection into each of said wells shall be through internally coated tubing, set in a packer which shall be located as near as practicable to the uppermost perforation; that the casing-tubing annulus of each injection well shall be loaded with an inert fluid and equipped with an approved pressure gauge or attention-attracting leak detection device.

(3) That the operator shall immediately notify the Supervisor of the Artesia district office of the Division of the failure of the tubing or packer in any of said injection wells, the leakage of water or oil from or around any producing well, or the leakage of water or oil from or around any plugged and

abandoned well within the project area and shall take such timely steps as may be necessary or required to correct such failure or leakage.

(4) That the injection wells herein authorized and/or the injection pressurization system shall be so equipped as to limit injection pressure at the wellhead to no more than 900 psi, provided however, that the Division Director may authorize a higher surface injection pressure upon satisfactory showing that such pressure will not result in fracturing of the confining strata.

(5) That the subject waterflood project is hereby designated the Sun East Millman Q-GB Waterflood Project and shall be governed by the provisions of Rules 701, 702, and 703 of the Division Rules and Regulations.

(6) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Division in accordance with Rules 704 and 1115 of the Division Rules and Regulations.

IT IS FURTHER ORDERED:

(1) That the operator shall consult with the Supervisor of the Artesia district office of the Division and determine what, if any, remedial action must be taken on the following described wells prior to initiation of injection into the Sun East Millman Q-GB Waterflood Project:

Kersey Bass Well No. 1	Unit I, Section	12	19 28
Ohio Merchant Well No. 1	Unit N, Section	1	19 28
Nix and Curtis R & B State Well No. 2	Unit G, Section	12	19 28
Donnelly Kinney State Well No. 1	Unit L, Section	18	19-29
Depco State 648 Well No. 181	Unit J, Section	14	19-28
J. Yates Campbell-Gwaltney Well No. 1	Unit D, Section	18	19-29

~~all in Township 19 South, Range 28 East,~~ NMPM.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/