CASE 6183: GRITY OIL COMPANY FOR EXPANSION OF ITS FROM SEVEN-BLVERS WATERFLOOD PROJECT AND 26 DUAL COMPLETION ROLLY COMPLETION AND COMPLETION ROLLY COMPLETION.

## \_ase Number

## 6103

Application

Transcripts.

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## BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION Santa Fe, New Mexico 14 December, 1977

## EXAMINER HEARING

IN THE MATTER OF: Application of Getty Oil Company ) for expansion of its Fren Seven ) CASE Rivers Waterflood Project and 28 ) 6103

dual completions, Eddy County,

BEFORE: Richard L. Stamets

New Mexico.

## TRANSCRIPT OF HEARING

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For the New Mexico Oil Lynn Teschendorf, Esq. Legal Counsel for the Commission Conservation Commission: State Land Office Building

Santa Fe, New Mexico 87501

William F. Carr, Esq. For the Applicant:

CATRON, CATRON, & SAWTELL Old Santa Fe Trail Santa Fe, New Mexico 87501

and

Chester Blodgett, Esq. Attorney at Law Tulsa, Oklahoma

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MR. STAMETS: Call next Case 6103.

MS. TESCHENDORF: Case 6103. Application of Getty Oil Company for expansion of its Fren Seven Rivers Waterflood Project and 28 dual completions, Eddy County, New Mexico.

MR. CARR: William F. Carr, Catron, Catron, and Sawtell, appearing on behalf of the applicant, Getty Oil Company.

I'm associated today with Mr. Chester Blodgett, attorney for Getty Oil from Tulsa, who will present Getty's case.

MR. BLODGETT: I think we'll only have one.

MR. STAMETS: Will you stand and be sworn,

please?

(Witness sworn.)

## WILLIAM T. THOMAS

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

## DIRECT EXAMINATION

BY MR. BLODGETT:

Q Would you state your name, your occupation,

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and by whom you are employed?

A William T. Thomas, Area Engineer, employed by Getty Oil Company.

Q Have you previously testified before this Commission and your qualifications as an expert witness been accepted?

A. Yes.

MR. BLODGETT: All right, we tender his qualifications.

MR. STAMETS: Mr. Thomas is considered qualified.

Q. (Mr. Blodgett continuing.) Are you familiar with Case Number 6103, that is the application and the facts and circumstances surrounding same?

A. Yes, I am.

Q What is asked for in that application?

A. We wish to -- Getty wishes to expand our Skelly Unit Seven Rivers Waterflood Project, which was established by NMOCC Order Number R-4717 and dated January 28th, 1974.

Q. Do you have an exhibit that shows the approximate area where that waterflood is now located?

A. Yes, I do. Exhibit Number Two.

Q. Number One.

A. Number One.

What does that -- I've asked you to identify

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## A Yes, it is just a plat of the area. Approximately in the center of the plat there's an arrow says Skelly --

- Q Which is the area covered by the application,
  is that --
  - A. Right.

Exhibit Number One.

- Q. All right. Could you give us a short summary of the development of that Seven Rivers Unit?
- A Yes. The Seven Rivers development was initiated with the completion of Well No. 9 during May of 1944.

  Subsequent to that twelve Seven Rivers wells were completed during the period from August, 1944, to October, 1958.

In 1962 and '63 Wells No. 11 and 3 were recompleted in the Seven Rivers upon abandonment of deeper completions.

And the primary area of Seven Rivers development has been in the western portion of the unit area.

Additional Seven Rivers development was not undertaken until

February of 1972 when Well No. 114 was completed in the northern area of the unit.

In May of 1974 additional recovery efforts were initiated in the Seven Rivers interval with the installation of a pilot waterflood. This pilot area consisted

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of two key producers and six injectors, as shown on Exhibit Number Two.

Q All right.

A. Injection into the pilot area was initiated at the rate of 700 barrels of water per day.

At that time production from our original sixteen Seven Rivers completions was approximately 40 barrels of oil and 5 barrels of water per day. Cumulative injection to date in the pilot area has been approximately 1,254,994 barrels of water. Response to injection was noted in approximately ten months and the actual performance of the pilot to date has been better than we anticipated.

Current daily production from the original fourteen Seven Rivers producers is approximately 255 barrels of oil and 74 barrels of water per day.

Exhibit Number Three depicts the performance of the pilot project key pattern producers and the immediate offset wells.

Q As a result of the history have you come to any conclusions concerning this particular project?

A Yes, we have. The reservoir analysis of the primary performance history of the existing Seven Rivers development has indicated that the reservoir is a low pressure solution gas drive. The calculated ultimate primary recovery per well is approximately 68,000 barrels, or 81

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barrels per acre foot.

The low primary recovery and previous low tier crude oil rise were the primary factors which affected the limited field development to date.

The subject reservoir was tested productive at numerous locations within the Skelly Unit area with productivity or tests which ran during development of the deeper Grayburg-Jackson pay.

Utilization of this data and well logs from the Grayburg-San Andres completions and an isopach map was constructed for the Seven Rivers interval.

Exhibit Four, which is a developed isopach defines the areal extent of the pool and available pay quantities.

The requested expansion of waterflood operations in the Fren-Seven Rivers reservoir will encompass approximately 3380 acres within the boundaries of the existing 102 wells, 4040 acre Skelly Unit Grayburg-Jackson waterflood.

The outlined expansion phases are shown areally on Exhibit Number Two. The proposed producing wells will be twin wells to existing Grayburg-Jackson producers and newly drilled producers are to be utilized in lieu of dually completed wells to avoid the mechanical and operational problems inherent with dual completions in waterflood operations.

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The requested injection well conversions will result in dually completed injectors at 28 locations and singularly completed injectors in the remaining four locations.

- Q Do you have any exhibit pertaining to the performance of this unit?
- A Yes, I do. Exhibit Number Five depicts the particular performance of existing and expanded Seven Rivers operation.
- Q. Now what about the reserves? Have you calculated or have any statement concerning the reserves?
- A Yes, sir. The reserves which are stated are based on a gross primary plus secondary of approximately 80,000 barrels per well or 95 barrels per acre foot, which is indicative of the producing performance of the existing Seven Rivers development.

Similar calculations based on performance of our key pattern producers along with immediate offsets have indicated a gross recovery of 105,000 barrels per well, or 125 barrels per acre foot. Therefore we feel the conservative reserve position which was originally assumed for an evaluation of the requested development and expansion indicate that the proposed expansion will yield at least the additional reserves.

Q. Well, now, specifically what does Getty want

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to do to expand this unit?

A. Okay. Getty seeks authority to expand its Seven Rivers Waterflood Project by injection of water into the Seven Rivers formation Fren Pool through 32 injection wells within its Skelly Unit Area located in Section 21, 22, 23, and portions of Section 14, 15, 28, 27, and 26, Township 17 South, 31 East, NMPM, Eddy County, New Mexico.

Q. And these are shown on Exhibit Number Two?

A. Yes. Injection of water in the subject project will take place through four singly completed wells converted to water injectors, those being Skelly Unit Wells No. 4, Unit B, Section 21; No. 6, Unit B, Section 21; Well No. 8, Unit G, 21; Well No. 14, Unit L, 21. And all of these located in Township 17 South, Range 37 East.

And through 28 wells to be recompleted as conventional dual completions to inject water into both the Seven Rivers and the Grayburg-Jackson formations.

Q If you read through all those -- are those 28 wells listed in or shown on Exhibit Two?

A Yes, they are indicated, on Exhibit Two. They are shown and listed here.

Q Listed in the application, all right. For the sake of time we will not have the witness read that, if that's all right with the Examiner.

MR. STAMETS: Let me clarify that while we're

at this point.

Q All right.

MR. STAMETS: Looking at Exhibit Number Two, the single injectors are those with a little arrow -- a single arrow pointing southwest; and the dual injectors are those with an arrow that has a point at both ends.

A That's right.

MR. STAMETS: And all of the proposed injection wells have the -- have a colored circle around; some of them are blue and some of them are green.

A. Yes, sir. Our original pilot is outlined in yellow. Okay, our proposed Plan A expansion is within the blue outline. All right, our proposed Plan A 1978 expansion is within the -- is outlined in red.

MR. STAMETS: Okay. Now, all of the injection wells that you've shown on Exhibit Number Two are current injection wells. These are included in the 32 that you have requested.

A. No, sir, they are not. The only injection wells we have is the original pilot area as of this point.

MR. STAMETS: No, I think you misunderstood me.

A. Okay.

MR. STAMETS: The application also requests that -- the application requests one, I'm not sure we ad-

vertised one -- an expansion procedure, and I believe I understand the situation.

Q (Mr. Blodgett continuing.) I'll call your attention to Exhibit Six through Twelve. Would you identify and discuss each one of those exhibits, please, for the Examiner?

A Yes. Okay. Exhibit Six is a plat showing the location of the proposed injection wells and location of all other wells within a radius of two miles from the proposed injection wells and the formation from which the wells have produced or are producing.

The plat also indicates lessees within a two mile radius.

Exhibit Number Seven is a pipe log of the area from Skelly Unit Well No. 45. Tops are marked and the proposed injection is indicated.

I might state that all other logs of the area are on file with the Commission.

Q. Exhibit Number Eight?

A. Exhibit Eight is a diagrammatic sketch of the proposed injection wells showing all casing strings, including diameters and setting depths, quantities of cement used, tops of cement, perforated or open hole intervals, tubing strings, which includes diameters and setting depths, types and locations of packers.

## Q. Exhibit Nine?

A. Exhibit Nine is a tabulation of all wells within the unit and surrounding the unit within one-half mile. This tabulation shows casing diameters and depths, volumes of cement used, known or calculated cement tops, completion intervals, total depths.

### Q. Exhibit Ten?

A. Exhibit Ten are Downhole Schematics of all wells in the unit and within one-half mile radius of the unit which have been plugged and abandoned.

## 0 Exhibit Eleven?

A Exhibit Eleven is a current analysis of the water which will be injected. This water will be purchased from the City of Carlsbad, New Mexico. The source of the water is Ogallala formation. The water for this flood will be supplied by the present Skelly Unit injection system. We have adequate capacity to our dual injection points. The water is mildly corrosive but this is reduced by the use of oxygen scavenging chemicals, sulfadioxide, and the produced water will be re-injected by the Skelly Unit injecting system.

## Q Exhibit Twelve?

A Exhibit Twelve is a copy of January, 1975, and August, 1977, C-120 reports and as the reports indicate, the response to date has been encouraging and as

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injection pressures show, water can be injected up to 1250 PSIG surface without causing unusual problems.

Q Now, at what pressure does the Getty Oil Company seek permission to inject this water into the above mentioned thirty-two wells? Or the thirty-two wells here-tofore mentioned?

A. We request authority to inject water into the thirty-two wells at a pressure not to exceed 1300 pounds PSIG surface.

- Q Do you have any support for that position?
- A. Yes, I do. That is Exhibit H.
- Q Exhibit Thirteen?

A. Exhibit Thirteen. The plots and tabulations of step rate tests taken on our four initial injection wells on the Seven Rivers Waterflood Project, as you can see is indicated by the curves, water can be injected up to 1355 PSIG surface without causing formation fracture.

As shown on Exhibit Twelve current injection pressures are being held to 1250 pounds surface.

Pressures are regulated and maintained through the use of automatic surface regulators.

Now, assuming that this application is approved, would Getty also request that procedures be set up in the order for administrative approval of any future expansion or the terms and conditions of administrative approval --

2	<pre>0 of any future expansion request?</pre>
3	A. We would request that, uh-huh.
4	Q Were Exhibits One through Thirteen prepared
5	by you or under your direction and supervision?
6	A. Yes, they were.
7	MR. BLODGETT: We offer into evidence Exhibits
8	One through Thirteen.
9	MR. STAMETS: These exhibits will be admitted.
10	MR. BLODGETT: And pass the witness.
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12	CROSS EXAMINATION
13	BY MR. STAMETS:
14	Q Mr. Thomas, Seven Rivers is the is the
15	Seven Rivers the shallowest producing area, or producing
16	formation, in this area?
17	A. Yes, sir, right in that area it is. Now,
18	there is some shallower Yates production, in the area.
19	Q. Where is that shallower Yates production
20	located?
21	A. It's just a couple of hundred feet or so
22	above the top of the Seven Rivers; in this immediate area
23	there is not any Yates, you understand, until the south.
24	Q I see. How far away from the waterflood?
25	A. Three or four miles, I would guess.

Yes.

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- A Yes.
- Q Okay.
- A But during our recent program we have -- we have noted and watched this Yates real close. It has potential, we feel.
- Q Okay. Now, referring to Exhibit Number Eight, looking at this first well diagram, now, are these dual injectors to be dual injection wells with injection going into the zone?
  - A. Yes, sir, that is correct.
- Q Okay. Will the tubing in the injection wells be internally coated?
  - A. Yes, sir, they will.
  - Q Would that be plastic coating of some sort?
- A. Yes, sir, it will be a plastic or fiberglass type of PVC internal coating.
- Q Okay. Now you propose to load the annulus and put a gauge on it or will you be able to?
  - A Yes.
  - Q Test that periodically?
- A. Yes, we do. It will be that or fully equipped with a gauge.
- Q Mr. Thomas, I've heard a lot of complaints by operators and our field people alike concerning the effective-

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ness of annulus gauging procedures that the Commission has had and that operators have used.

If you put a gauge on there somebody's apt to put a thirty-aught-six through it. Put a permanent gauge on anything around salt water, they deteriorate pretty rapidly.

Do you have any solutions to this problem that you could submit today?

- A. No, sir, I don't.
- Q. What about the process of reading a valve with a small opening in the circumstances?
- A That is a real good detection; probably the best, in fact. In some of these corrosive areas oxygen can enter through this open space and cause corrosion, particularly where you have a lot of sour gas.
  - Q Is there any way to guard against that?
- A Yes, keep the annulus -- keep the annulus full of a inert treated fluid.
- Q. Would that be any problem? Say you had it full of treated water and a very small opening, sixteenth of an inch, something like that?
  - A. No, sir, I think we could handle it.
- Q Okay. Getting back to this first page here, it indicates that the top of the cement on that well is below the top of the Seven Rivers, and that you propose to

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determine where that is and then cement back up above the top of the Seven Rivers.

A Yes, sir, as stated in our testimony here at the end, cement bond logs have been and are being run at all wells with cement tops, where the tops are less than 500 feet above the proposed injection or the top perforations. These wells we perforated and cement brought back up, in fact, the wells up within the salt section, and to date we have done 15, approximately 15 wells of this type.

- Now, you indicated that you would determine which ones had cement, to the best of your knowledge, less than 500 feet above the top of the Seven Rivers.
  - A. That's correct.
- Now, is that going to be on the basis of
   calculated cement logs or --
- A. No, sir, this is on the basis of cement bond logs.
- Q. Okay, now is that for injection wells only or all of the wells?
  - A. It's all of the wells everywhere on the site.
- Q Okay, does thatinclude the Grayburg producers in here?
  - A. Yes.
  - So every well within the red, blue, and yellow

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outlines will have cement bond logs done on them?

- A. That is correct.
- Q. At least this states.
- A. Yes, sir.
- Q Okay. Are you furnishing copies of those bond logs for our district office?
  - A. Yes, we are.
  - Q And you will do that on the rest of them?
  - A. Yes.
- Q. I presume that after reviewing all of this data that if we have any question about the cement tops on these, you would work with the Commission --
  - A. Yes, sir.
  - Q -- to make such determinations if required?
  - A. Right.
- Q While I'm looking through this voluminous information, Mr. Thomas, would you mind calculating the fracture gradient on the Seven Rivers based on the step rate tests that you've submitted?
  - A. All right.

All right, sir. These -- it's based on his plots how we determine --

Q Yeah. In other words, you figure 1300, 1350 pounds as frac pressure and it looks like the, you know, whatever your average depth is, what the depth was on that

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well, and just give me the frac gradient.

- A Okay. Point six or seven, approximately.
- Q Point six, point seven, and then is that including the weight of the water?
  - A. Yes, uh-huh.
- Q. Okay, so if you subtract, say it's point four, five, from that, does that come -- say, point seven -- that would give you a figure of about what, point two-five?
  - A Point two-five.
  - Q Yeah, that's not too far off the two-tenths --
  - A. Well, that's right.
  - Q Referring now to --
- A. The point two, though, would only give us about five hundred pounds?
  - Q All right.
- A. Per foot of depth, surface; that point two at surface.
  - Q All right, I'll get to that in a little bit.
  - A. Okay.
- Q. Exhibit Number Ten. The very first page the well was plugged in 1927. Looking down here, cement plug at surface, volume unknown.
  - A. Uh-huh.
- Q Cement cap on top at twelve and a half, volume unknown.

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A	II h	-huh

Q Cement cap at the top of the ten inch. Ten inch was pulled from 1765. Volume unknown.

Eight sacks of cement at about 2883.

Does Getty intend to look into this well and see that it doesn't become a source of potential contamination in this area?

A. Yes. There are -- there are wells here that have problems and will have to be resolved. There's no question about it.

Q I see, that's one of them you're aware of?

A. Yes, uh-huh. Now, these, of course, are all out -- we don't have any plugged and abandoned wells within the unit area. They're outside.

Q I see. These are within that half mile radius?

A. Right, uh-huh.

Q. Likewise, there could potentially be some problems with producing wells within this half mile radius.

A. Yes.

Q And rather than spending the time to examine that now we'll review it after the hearing.

A. Yes. The records are pretty sketchy on that tabulation and, however, based on our calculated tops there could be some problems, yes.

Q Okay. Now, looking at Exhibit Number Thirteen,

which is the step rate test, the first well is Number 16 and you estimate the breakdown pressure at about 1350 pounds.

A. Uh-huh.

Q If we go back to the beginning of this test, we find an alignment of point one, two, and three up to about 950 pounds, and then we have a break in the alignment between points three and four; another break in the alignment between points four and five; and another one between points five and six. Why do you feel that we're not seeing a fracture between points three and four?

A. Well, as indicated on our tabulation of that data on further back, we continue to increase our rates, and as, of course, you can see, as the rate was increased the pressure -- there was no break indicated.

Q. I thought that's the way a step rate test operated, when you started getting more barrels of water in per pound of pressure, you had achieved the fracture in the formation.

A Right, with the pressure remaining more or less constant you had increased the water injection.

Q. Could you run that by me one more time?

We could have at this -- he worked this data up on the step rate.

MR. BLODGETT: We have another witness that worked on this. Maybe we ought to swear him and put him

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to answer your questions.

Q That sounds fine. Are there any other questions of Mr. Thomas at this time? Ralph?

MR. GRAY: Mr. Stamets, may I ask Mr. Thomas a question? I'm not sure that I --

I believe you said that the anticipated injection pressures would be, what was it, 1350, something like that?

A. Yes.

MR. GRAY: And how deep is the formation?

A. Probably not guite that high; 2300.

MR. GRAY: 2300?

A. 2300, 2600, yes.

MR. GRAY: And I believe Mr. Stamets asked you a question if the gradient which you quoted him included the weight of the water.

A. Right.

MR. GRAY: And I think you said yes, and I don't believe it does. I think your gradient is based on surface pressure divided by that, is that right?

MR. STAMETS: I believe you're right about that, Mr. Gray, and I think that will be brought out by their next witness.

Any other questions of the witness? He may be excused.

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I'd like to have this witness stand and be sworn before you start his testimony, please.

(Witness sworn.)

## HAL OWENS

being called as a witness on behalf of the applicant, having been duly sworn upon his oath, testified as follows, to-wit:

## DIRECT EXAMINATION

BY MR. BLODGETT:

- Q Would you state your full name, your occupation, and by whom you are employed?
- A. I'm Hal Owens. I'm one of the Staff Engineers at Getty Oil Company in Hobbs, New Mexico.
- Q And have you previously testified before this Commission and have your qualifications as an engineer been accepted?
- A. My qualifications were accepted but I never testified.
  - Q Would you explain that, please?
- A. I can't recall the case number. The case that the Commission called on the water -- water problem in southeast New Mexico. I submitted a statement and was called to the stand and my qualifications were accepted there and there was no testimony given on it.

MR. STAMETS: Okay, since you were qualified in that case concerning waterflood problems, we feel you're qualified at this time.

Q (Mr. Blodgett continuing.) All right. Does the Examiner have some questions of this witness?

MR. STAMETS: If he would -- I'd like to have him tell us how this particular test was performed on Number 16, and explain why the pressure, the gradient change between points three and four, in his opinion does not represent fracture.

A. Okay. One of the initial assumptions of a step rate test, what -- what you generally assume, like everything else, you have to have some basic general assumption to it, and the rules that are set up are that as the pressure -- as flow rate increases the pressure will go up till you reach a breakdown pressure and then you will see a sudden change due to formation fracturing, which is indicative of increased permeability, and so forth.

What we feel we're seeing here is points one,
two, and three just so happened to fall on a straight line
and then you see four and five -- you can't be sure you're
not seeing some leak-off here or something of that sort.
What you look at once you get up to these rates over this
long of a period of time, these are average pressures. You
may be seeing some leak-off into the formation and we don't

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feel that you see an actual breakdown until this stabilized pressure we see up here at the top, what we're -- I'm calling here 1355 as the estimate there. Like I say, you can move these curves around. Your judgment would be as good as mine on this sort of test that we're running here.

But what -- the initial theory behind this is once you get to a certain -- your pressure will climb at a fast rate till you get to the breakdown pressure and then it will essentially be flat; that's what we think we're seeing.

Also, I might bring up, we have drilled now,
I think, this will be number 17 of these proposed Seven
Rivers producers, and in all of these, on five of the frac
jobs that we've done so far, the instantaneous shut-in
rates have all been -- this is with two percent KCL water,
which has a gradient of about point -- point 46, something
like that -- but instantaneous shut-in pressures are -the minimum we've seen on frac jobs is 1600 pounds and
the max is about 1900, and on all the acid jobs, so far,
which would -- initially we considered the instantaneous
shut-in on those somewhat lower than what they actually
would be since it's with acid. The minimum on those have
been 1400 pounds, which is still more than what we're at
in our area, and that's why we feel that this rate I'm
showing you is the correct breakdown rate for these wells.

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The only difference being these wells were semi-depleted wells and the other wells are brand new wells that hadn't had any primary production.

MR. STAMETS: Do you have those instantaneous shut-in pressures?

A I don't have them with me but I can make them available real -- in a couple of days, just as long as it takes me to get back and get them.

MR. STAMETS: That would probably be most helpful.

A. Okay.

MR. STAMETS: To have that. Any other questions of this witness? He may be excused.

MR. STAMETS: I have another question of Mr. Thomas.

## WILLIAM T. THOMAS

being recalled as a witness on behalf of the applicant, and having been duly sworn upon his oath, testified as follows, to-wit:

## RECROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Thomas, are there any wells in this unit

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area which could be used to monitor the formations to determine if water was getting out of the injection intervals?

٩. Yes, sir.

Where is such a well located and what's its status?

Well, I would think there would be several, in fact, to run different types of surveys, temperature surveys, tracers, and we will definitely monitor those.

I see, but you don't have one that -- that would be open, say, in the Yates section or in the salt section, which could be used then just to determine if there was any water?

Yes, sir, we probably do, yes, sir.

Why don't you look into that and advise us what the status would be? We'd certainly appreciate that.

> A. Okay.

MR. STAMETS: Any other questions of the witness? He may be excused.

> Do you have anything further in this case? MR. BLODGETT: We have nothing further.

MR. STAMETS: If there is nothing further, the case will be taken under advisement.

(Hearing concluded.)

## REPORTER'S CERTIFICATE

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

sid morrish reporting servic General Court Reporting Strates 125 Calls Meija, No. 122, Seria Pe, Nov Mexico the I.

Ducker Oil Conservation Commission

Ter Nexico Oil Conservation Commission

EXHIBIT ""//

CURRENT ANALYSIS

OF

INJECTION WATER

BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
EXHIBIT NO.

CASE NO.

Submitted by
Hearing Date

12-14-7

Hearing Date

P. O. BOX 1468 MONAHANS, TEXAS 79756 PHONE 943-3234 on 563-1040 Water Laboratorias. Inc JULRESQLT WATER ANALYSES

406 W. ILLINOIS MIDLAND, TEXAS 7970I PHONE 683-4521

		12	
	To: Mr. Dale Crockett P. O.Box 730. Hobbs	ဖြင့်	BECELAN
F 51 LT \$	To:MrDale_Crockett	- 12	College City C
*:	P. O.Box 730, Hobbs	. No	Mexicae

LABORATORY NO. 77741 RESULTS REPORTED7-13-77

COMPANY Getty Oil Company Cos 62821292 LEASE Skelly Unit - Plant #1	
FIELD OR POOL Grayburg - Jackson	
SECTION BLOCK SURVEY COUNTY PONTY STATE NEW MEXICO	
SOURCE OF SAMPLE AND DATE TAKEN:	; .
No. 1 Injection water - taken from input #26. 7-6=77	
Treated water - taken from injection pump suction. 7-6-77	

Raw water - taken from raw water line. 7-6-77 NO. 3

, NO. 4

REMARKS: Supply Water System				
CHE	MICAL AND PHYSICAL PR	OPERTIES		
	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0013			
pH When Sampled	6.1			
pH When Received	6.1			
Bicarbonate as HCO3	88			
Supersaturation as CaCO3				
Undersaturation as CaCO3	81			
Total Hardness as CaCO3	185			
Calcium as Ca	63			• .
Magnesium as Mg	7			
Sodium and/or Potassium	37			
Sulfate as SO4	128			
Chloride as CI	42:			
Iron as Fe	0,48		₹.	
Barium as Ba	0		-	
Turbidity, Electric	15			
Color as Pt	16	1		
Total Solids, Calculated	365			
Temperature *F.	87			
Carbon Dioxide, Calculated	114			
Dissolved Oxygen, Winkler	0-0	0.0	0.0	
Hydrogen Sulfide	0.0			
Resistivity, ohms/m at 77° F.	20.0			
Suspended Oil				
Filtrable Solids as mg/	201	i		
Valume Filtered, ml	4,000	-		
			1	

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks The above results show an improvement in the filtrable solids as compared to analysis #477128 (4-20-77). This confirms the conclusions at that time that it: was temporary. The remainder of the results are considered very favorable with clear-cut evidence of effective control over oxygen. therefore advise no changes in current handling procedures.

Form No. 3 cc: F. J. Petro, Midland

Waylan C. Martin, M. A.

## Martin Water Laboratories, Inc.

P. O. BOX 1468 MONAHANS, TEXAS 79756 PH. 943-3234 OR 563-1040

### WATER CONSULTANTS SINCE 1933 BACTERIAL AND CHEMICAL ANALYSES

406 W. ILLINOIS MIDLAND, TEXAS 79701 PHONE 683-4521

To: Mr. Dale Crockett
P. O. Box 730
Hobbs, New Mexico

Laboratory No. B7775
Samples received 7-6-77
Results reported 7-13-77

Company: Getty Oil Company

County: Eddy

Field: Grayburg - Jackson Lease: Skelly Unit - Plant #1

## Source of sample and date taken:

#1. Raw water - taken from raw water line. 7-6-77

#2. Treated water: taken from injection pump suction. 7-6-77

#3. Injection water - taken from input #26. 7-6-77

	<u> #1</u>	#2	#3
*Tron bacteria	.Not detected	Not detected	Not detected
*Sulfur bacteria	18	76	100
*Sulfate-reducing bacteria	Not detected	Not detected	Not detected
*Other aerobes	6,300	2,400	7,200
WOther anaerobes	2,100	1,100	1,900
*Fungi (& aciduric bacteria)	· 74	16	20
*Algae	Not detected	Not detected	Not detected
*Protozoa	Not detected	Not detected	Not detected
Total count	8,492	3,592	9,220
рн	6.1	6.2	6.1
Temperature	75	78	87
Note: All numerical results are	reported as th	e number of ce	lls per milliliter
of the sample as determined by p		cept iron, alg	ae, and protozoa,
which are determined microscopica	•		
* Included in API Procedure	-		•
on sulfur bacteria and fung			
qualitiative identification	ı by microscopi	c examination.	

<u>Remarks:</u> The above results show a mild increase in bacterial numbers but they are erratic and obviously originating from the raw water line prior to the sulfur dioxide treatment. There was no clear-cut evidence of any slime conditions involved at this time. Therefore, in general, we would classify bacterial conditions as being acceptable and warranting no changes in current practices.

cc: Mr, F, J. Petro, Midland

Waylan C. Martin, M. A.

P. O. BOX 1468
MONAHANS, TEXAS 79756
PHONE 943-3234 on 563-1040

### RESULT OF WATER ANALYSES

404 W. ILLINOIS MIDLAND, TEXAS 79701 PHONE 683-4521

	LAZORATORY NO. LLIS
To: _ Hr. Dale Crockett	SAMPLE RECEIVED 7-6-77
P. O. Box 730, Hobbs, New Mexico	RESULTS PEPORTED 7-19-77
	en de la companya de
COMPANY Getty 011 Company	LEASE Skally Toit - Plant 37
FIELD OR POOL	Graphurg - Jackson
SECTION BLOCK SURVEY	COUNTY BAR STATE No. No.
SOURCE OF SAMPLE AND DATE TAKEN:	
No. : Raw water - taken from Plant &	transfer man 7-6-77
NO 2 Injection water - taken from in	put \$69. (cear injection discharce) 7-6-77
NO. 3 Injection water - taken from in	
NO. 4	
MENA DVa.	

	NO. 1	NO. 2	NO. 3	NO. 4
pecific Gravity at 60° F.	1 0586		<u></u>	
H When Sampled		1.0413	<del>-1.0404                               </del>	······································
H When Received		7.3	7.2	<del></del>
licarbonate as HCO3	7.3	7.4	<del>7.2  </del>	
Supersaturation as CaCO3	793	<del>525  </del>	<del>561</del>	
Undersaturation as CaCO3	120	<del></del>	<del></del>	
oral Hardness as CaCO3				
	7,200	<del>- 5,400 -</del>	<del>-3,5∞ </del>	
	2,040	1,480	1,480	
lagnesium as Mg	<del>- </del>	413	437	
odium and/or Potassium	25,338	19,005	13,512	
ulface as SO4	3,415	2.133	2,133	
hloride as CI	41,191	31,249		
on as Fe		1	30,538	
erium as Ba	0.00	2.4	U.52.	
urbidity, Electric	0	0 1	0	
olor as Pt	13	164	24	
otal Solids, Calculated	73,239	F4 222	100	
emperature °F.	13,23	54,819	53,667	
arbon Dioxide, Calculated		51	60	
issolved Oxygen, Winkler	55	33	62	
lydrogen Sulfide	0.0	0.0	9.0	eren en en en en
lesistivity, ohms/m at 77° F.	225	70.0	95.0	
uspended Oil	0,113	0.149	0.151	
iltrable Solids as mg/	270	145	10	- <del> </del>
Volume Filtered, ml	23.5	14.0	3.3	
	1,000	2,000	<del>6,000 ;</del>	

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks in regard to suspended all, the shown results in combination with analysis A177129 (A-20-77) suggest there are wide regrittens in Product of all sarrying over through the system. It appears to be a possibility that this may originate from separation vessels back in production but it was also carrying over to the discharge; therefore, there could be an excessive anount of all or top of the water in the suction task. We feel it would be fessible at this time to go over the system and try to see where any corrections could be raide to reduce all carry-over, as it is significantly influencing injection quality. It is noted that we exceunter

Form No. 3 Was none in the filtrable solids; therefore, no changes are suggested.

cc: Mr. P. J. Petro, Midland

Waylan C. Martin, H. A.

P. O. BOX 1468 MONAHANS, TEXAS 79756 PH. 943-3234 OR 563 1040 WATER CONSULTANTS SINCE 1953 BACTERIAL AND CHEMICAL ANALYSES

408 W, ILLINOIS MIDLAND, TEXAS 79701 PHONE 663-4521

To: Nr. Dale Crockett
P. O. Box 730
Robbs, New Maxico

Laboratory No. B7776
Sample received 7-5-77
Results reported 7-13-77

Companys . Getty 011 Company

County: Eddy

Field: Grayburg - Jackson

Lease: Skelly Unit - Plant 02

Scurce of sample and date taken;

#1. Injection water - taken from input #77. 7-6-77

	•
*Iron bacteria	Not detected
Sulfur bacteria	13
Sulfate-raducing bacteria	Not detected
Other derobes	40
Other angerobes	7,600
Fungi (& aciduric bacteria)	Not detected
Algae	Not detected
Protozoa	Not detected
Potal count	7,653
pH	7.2

Note: All numerical results are reported as the number of cells per milliliter of the sample as determined by plate counts; except iron, algae, and protozoa, which are determined microscopically.

Included in API Procedure reports except these results include plate counts on sulfur bacteria and fungi, whereas the API Procedure calls for only qualitative identification by microscopic examination.

Remarks: The above results show a clange in the type of bacteria since analysis \$547714 (4-21-77). Therefore, we are currently jetting fluctuations in numbers and also fluctuations in types of bacteria but is no instance have we encountered any significant excess of bacteria. Therefore, we would recommend applying no bactericidal treatment.

ce: Er. F. J. Petro, Midland

Maylan C. Martin, M. A.

exhibit 🐨 /3

STEP RATE TEST DATA

REQUEST FROM #1, MEMO NO. 3-77

### STEP-RATE TEST FORM

PROJECT NAME: SFELLY WHIT

FIELD: SELE RIVESS

COUNTY: FROY

STATE: ARRESTS

INJECTION WELL NO. 16

Reading				taneous			
No.	No. Date Time		Rate Pressure (BWPD) (PSIG)		Remarks, If Any		
(1)	7-9-75	10:45 A.M.	115	650			
(2)	7-10-75	10:45 AM	150	800			
(3)	7-11-75	10:45 AM	180	940			
(4)	7-17-75	10:45 AM	250	1210.			
(5)	7-18-75	10:45 AM	360	1335			
(6)	7-19-75	10:45 AM	635	1395			
(7)	7-26-25	10:45 AM	720	1380			
(8)	7-26-75	10:45 AN	740	1380	•		
(9)							
(10)							
(11)							
(12)				-			
(13)							
(14)							
(15)					·		

## Procedue:

- 1) Check portable rate meter and pressure gauge for accuracy, and calibrate if necessary.
- (2) Read instantaneous injection rate and wellhead pressure and record them.
- (3) Increase the injection rate.
- (4) After 24 hours, record the wellhead pressure and instantaneous injection rate.
- (5) Repeat Step (3) and (4) until advised.

Note: If injection plant fails during test, note in Remarks column. Suggestions to improve this form, procedure, and technique are welcome.

PROJECT	NAME: SELLLY CLL
FIELD:_	SEVEL MILETS
COUNTY:	そのわと。
STATE:	KER BOOKER

INJECTION WELL NO.

Reading			Instai	ntaneous	
No. Date	Time	Rate (BWPD)	Pressure (PSIG)	Remarks, If Any	
(1)	7-9.75	11:30 AM	160	1300	
(2)	7-10-75	11: 30 A.	165.	1310	
(3)	7-13-75	11:30 A.M	200 .	1400	<i>'</i> .
(4)	7.1575	11:30 A.S.	235	1430	
(5)	7-16-75	11:30 A.M.	275	. 1440	
(6)	7.17.75	1130 AM	375	1440	
(7)	7 - /8-75	11,30 AM	430	1440	
(8)					
(9)					
(10)					
(11)					
(12)					
(13)				·	
(14)					•
(15)			·		

## Procedue:

(1) Check portable rate meter and pressure gauge for accuracy, and calibrate if necessary. (2) Read instantaneous injection rate and wellhead pressure and record them.

(3) Increase the injection rate.

(4) After 24 hours, record the wellhead pressure and instantaneous injection rate. (5) Repeat Step (3) and (4) until advised.

Note: If injection plant fails during test, note in Remarks column. Suggestions to improve this form, procedure, and technique are welcome.

#### STEP-RATE TEST FORM

PROJECT NAME: SKELLY UNIT FIELD:\_ SEVEN RIVERS COUNTY: EDDY STATE: NEW MEXICO

INJECTION WELL NO. \_

Reading	T				
No.	Date	Time	Rate (BWPD)	Pressure (PSIG)	Remarks, If Any
(1)	7-11-75	10:15 A.M.	240	1340	
(2)	7-12-75	10:15 AM	260	1375	
(3)	7-14-75	10:15 AM	280·	. 1375	
(4)	7-15-75	10:15 AM	315	1390	
(5)	7-15-75	10.75 AM	425	. 1400	
(6)	7-17-75	10:15 AM	4.6 C	1400	
(7)	7-18-75	10:15 AM.	490	1400	
(8)					
(9)					
(10)					
(11)					
(12)					
(13)				·	
(14)					
(15)					

# Procedue:

- Check portable rate meter and pressure gauge for accuracy, and calibrate if necessary.
- (2) Read instantaneous injection rate and wellhead pressure and record them.
- (3) Increase the injection rate.
- (4) After 24 hours, record the wellhead pressure and instantaneous injection rate.
  (5) Repeat Step (3) and (4) until advised.

Note: If injection plant fails during test, note in Remarks column. Suggestions to improve this form, procedure, and technique are welcome.

FIELD: SEVEN FORES

COUNTY: A DOWN

STATE: NEW MICHAEL

COUNTY: A DOWN

STATE: NEW MICHAEL

COUNTY: A DOWN

CO

Reading		Time	Instan	taneous	
No. Da	Date		Rate (BWPD)	Pressure (PSIG)	Remarks, If Any
(1)	7-9-75	11:00 A.M.	<b>3</b> 20 ·	1260	
(2)	7-10-75	H:00 A. 1.	340	1270	
(3)	7-11-75	11:00 A 19	350·	1275	
(4)	7-14-75	11: 00 AM	3 <i>70</i>	12.80	
(5)	7-15-75	11:00 A	420	. 1305	·
(6)	7-16-75	11:00 AM	500	1350	
(7)	7-17-75	11:00 2 1	565	1375	
(8)	7-18-75	11.00 A.M.	635	1395	
(9)	7-19-75	11:00 AM.	720	1350	
(10)	7-20-75	11:00 A.M.	760	1320	
(11)	7-21-75	11:00 A.M.	.800	1320	
(12)					
(13)	,				
(14)					
(15)			·		

### Procedue:

- (1) Check portable rate meter and pressure gauge for accuracy, and calibrate if necessary.
- (2) Read instantaneous injection rate and wellhead pressure and record them.
- (3) Increase the injection rate.
- (4) After 24 hours, record the wellhead pressure and instantaneous injection rate.
- (5) Repeat Step (3) and (4) until advised.

Note: If injection plant fails during test, note in Remarks column. Suggestions to improve this form, procedure, and technique are welcome.

IN AND 1/2 MEMO 1/2, MEMO

EXHIBIT \*9

TABULATION OF ALL WELLS IN AND 1/2

MILE SURROUNDING THE UNIT WITH

INFORMATION REQUESTED FROM #2, MEMO

NO. 3-77.

EXHIBIT .

DIAGRAMMATIC SKETCH

OF

PROPOSED INJECTION WELLS

BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
CASE NO. 6/03

Submitted by\_

Hearing Date 17-14-

OPERATOR	DAYI	
Getty Oil Company		
LEASE Skelly Unit	WELL No LOCATION 30 650 FSL 2087 FWL	15-17-31

777			
		2213 2213 2353 3182	

Long String: 2 1/6 OD 3.25 # IPC Tubing Short String: 2 1/6 OD 3.25 # IPC Tubing

· 8 5/8 OD 24 # CSG set @ 533 w/ 350 sks
Top cement 54, fmc.

-2699 Top of cement ( w: 11 run bond log - perforate

And bring cement Above 7-R)

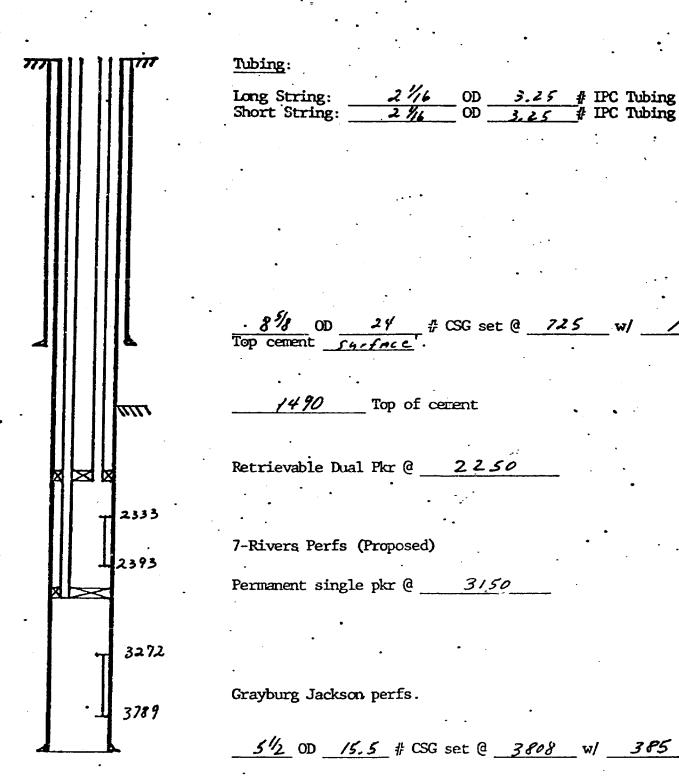
7-Rivers Perfs (Proposed)

Permanent single pkr @ 3080

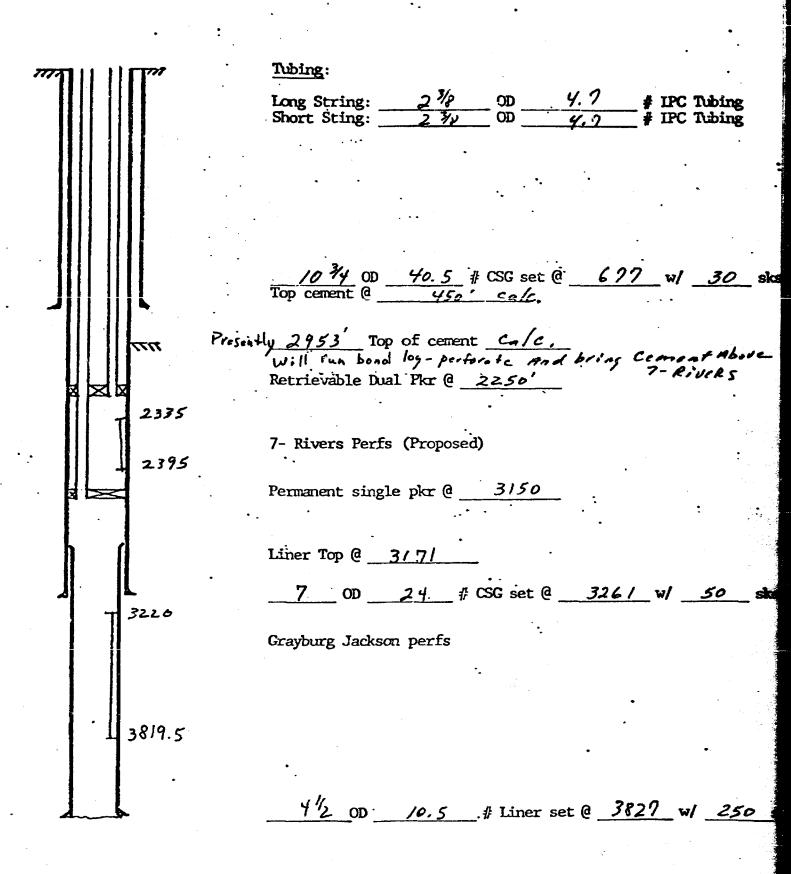
Grayburg Jackson perfs.

5/2 OD 14 # CSG set @ 3900 w/ 250 sks

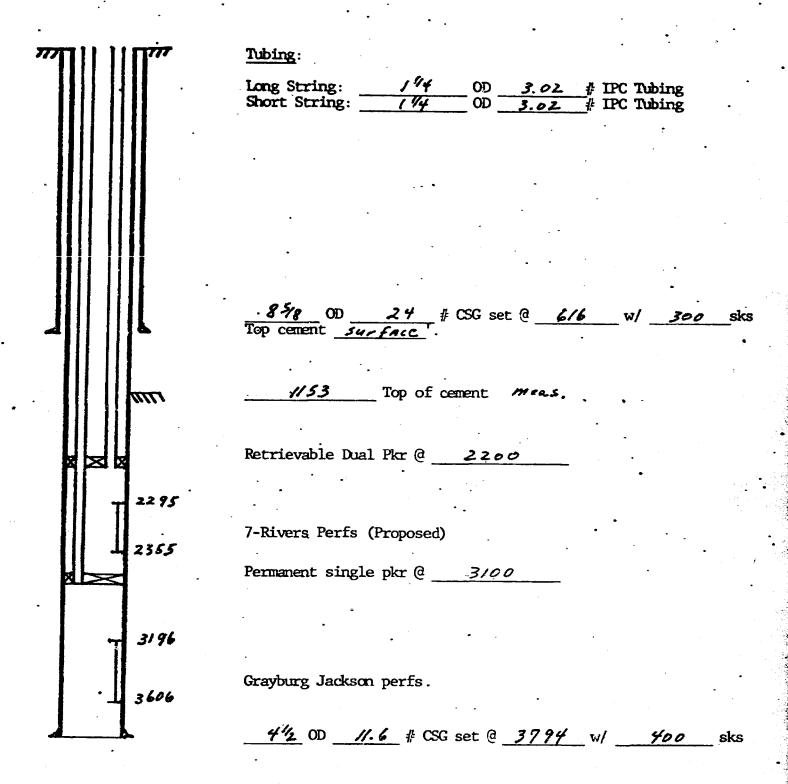
OPERATOR  Getty Oil Company			•	DATE		
LEASE Skelly Unit	WELL NO	LOCATION 660 FSA	i bboff	7.	15-17-31	



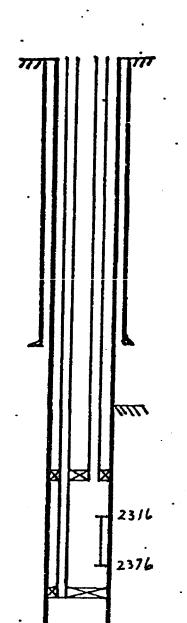
OPERATOR Getty Oil Company		DATE	
LEASE Skelly Unit	WELL NO LOCATION 40 660 FAL & 660 F	WL	23-17-31



OPERATOR  Getty Oil Company	. DAT	_
LEASE Skelly Unit	WELL NO LOCATION 42 660 FAL 1880 FAL	22-17-31



OPERATOR Getty Oil Company		•		DATE		
LEASE Skelly Unit	WELL NO L	OCATION 1980 FAL	i 560 F	EL	22-17-3	3/



3202

3808

Tubing:

Long String: 1/4 OD 3.02 # IPC Tubing Short String: 1/1/4 OD 3.02 # IPC Tubing

1706 Top of cement Meas.

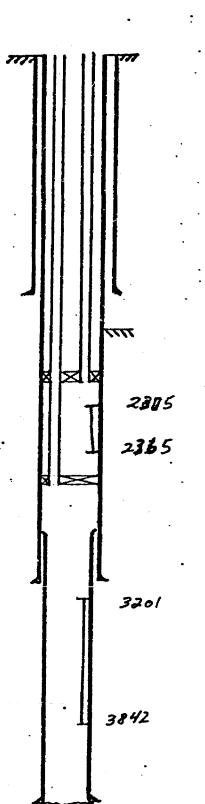
Retrievable Dual Pkr @ 2250

7-Rivers Perfs (Proposed)

Permanent single pkr @ 3/00

Grayburg Jackson perfs.

41/2 OD 11.6 # CSG set @ 3820 w/ 400 sks



Long String: 23/8 OD 4.7 # IPC Tubing Short Sting: 23/8 OD 4.7 # IPC Tubing

85/8 OD 28 # CSG set @ 655 w/ 100 skg

Retrievable Dual Pkr @ 2200

7- Rivers Perfs (Proposed)

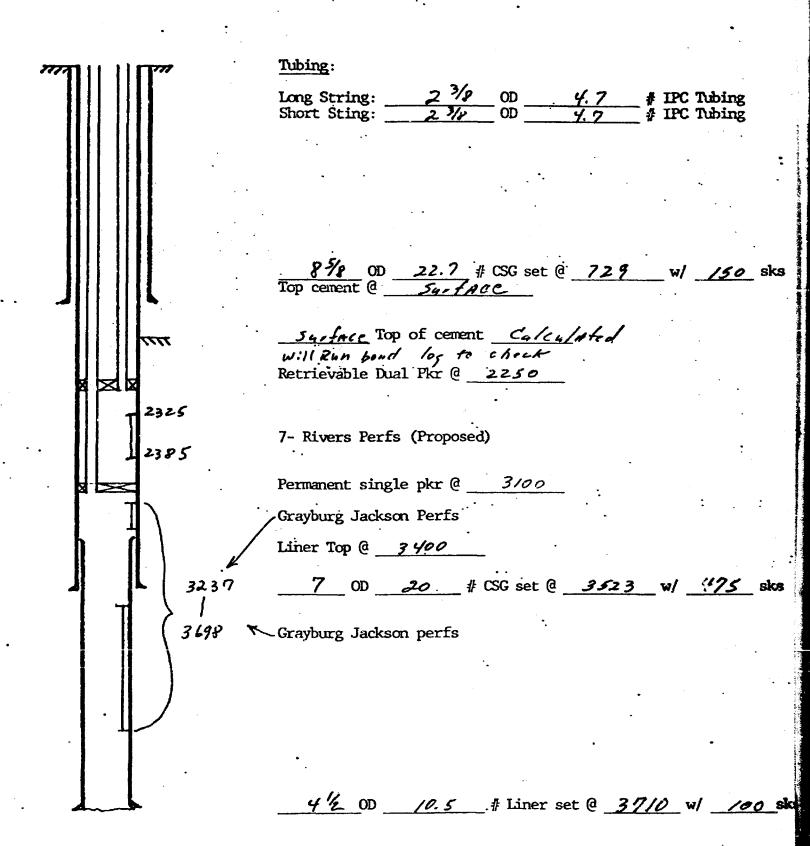
Permanent single pkr @ 2990

Liner Top @ 3006

7 OD 20 # CSG set @ 3/30 w/ 150 si

Grayburg Jackson perfs

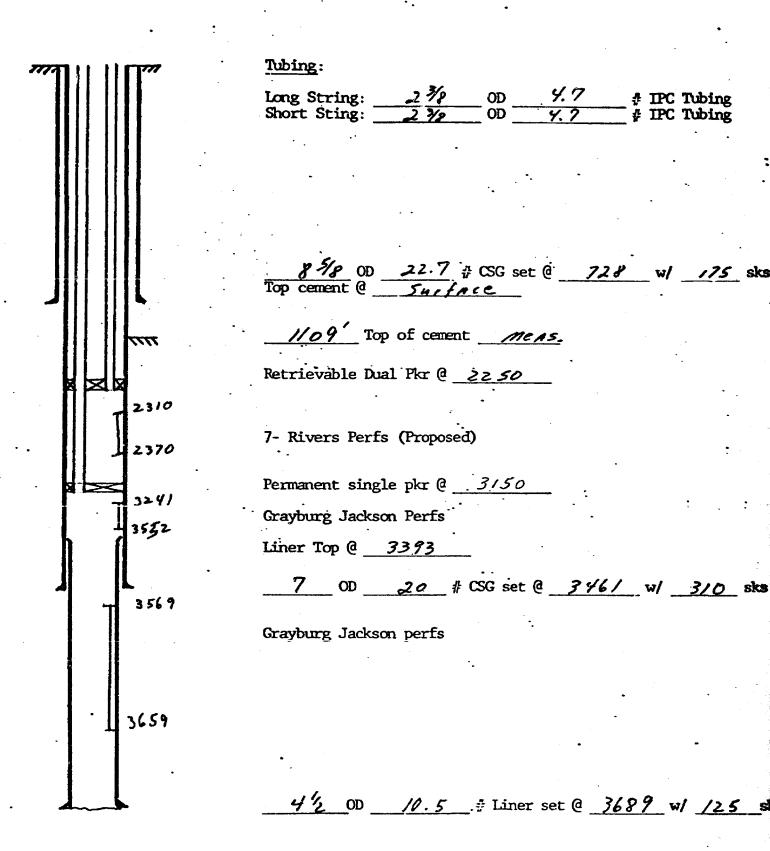
4½ OD 10.5 .# Liner set @ 3870 w/ 200



OPERATOR
Getty Oil Company

WELL No LOCATION
Skelly Unit

87 330 Ful 1 330 Ful 27-17-3/



OPERATOR

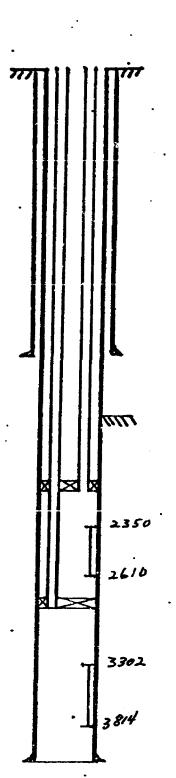
Getty Oil Company

LEASE
Skelly Unit

DATE

WELL No LOCATION

2/30 FSL 660 FWL 23-/7-3/



Tubing:

Long String: //4 OD 3.02 # IPC Tubing Short String: //4 OD 3.02 # IPC Tubing

·/6/2 Top of cement

Retrievable Dual Pkr @ 2300

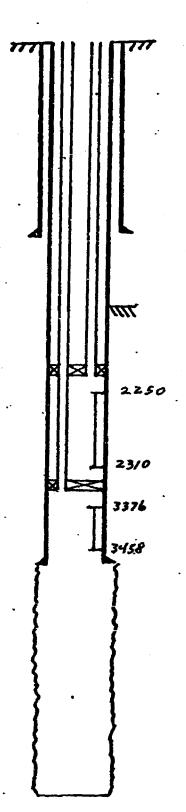
7-Rivers Perfs (Proposed)

Permanent single pkr @ 3200

Grayburg Jackson perfs.

4½ OD //.6 # CSG set @ 3834 w/ 400 sks

OPERATOR	[0	DATE .
Getty Oil Company		
LEASE	WELL No LOCATION 44 1980 File 1980 F	40.
Skelly Unit	44 1980 FN- 1980 F	WL 22-17-31



Long String: 2 1/6 OD 3.25 # IPC tubing Short String: 2 1/6 OD 3.25 # IPC tubing

| 8 | OD | 22.7 | CSG set @ 680 w/ 150 sks

1570 Top of Cement

Retrievable Dual Pkr. @ 2/50

7 - Rivers Perfs ( Proposed )

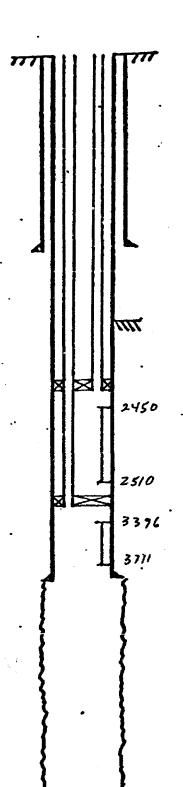
Permanent single pkr @ 3270

Grayburg Jackson perfs

31/2 OD 14 # CSG set @ 3472 w/ 366 sk

Grayburg Jackson Open Hole
3472 — 3808

OPERATOR .	DATE	•
Getty Oil Company	WELL NO LOCATION	- 0 . 0 . 0 . 1
LEASE Skelly Unit	96 1580 FAL & 1980 FUL	27-17-31



Long String:  $2\frac{1}{6}$  OD 3.25 # IPC tubing Short String:  $2\frac{1}{6}$  OD 3.25 # IPC tubing

 85/8
 OD
 24
 # CSG set @ 2075
 W/ 575
 sks

 Top cement
 300'
 ca/c.

2194 Top of Cement

Retrievable Dual Pkr. @ 2350

7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3300

Grayburg Jackson perfs

5/2 OD 15.5 # CSG set @ 3710 w/ 350 skg

Grayburg Jackson Open Hole

OPERATOR

Getty Oil Company

LEASE

Skelly Unit

DATE

WELL No LOCATION , 1980 FEL 27-17-31

777		777	
· 🔏			
×	<b>X</b> X	mr'	
		2414 .	
N		3339 36'86	
	•		

Tubing:

Long String:  $2\frac{1}{6}$  CD 3.25 # IPC tubing Short String:  $2\frac{1}{6}$  CD 3.25 # IPC tubing

85/8 OD 24 # CSG set @ 754 W/ 125 sks
Top cement 54/Facc

15/3 Top of Cement

Retrievable Dual Pkr. @ 2300

7 - Rivers Perfs ( Proposed )

Grayburg Jackson perfs

51/2 OD 15.5 # CSG set @ 3705 w/ 360 sks

Grayburg Jackson Open Hole

OPERATOR

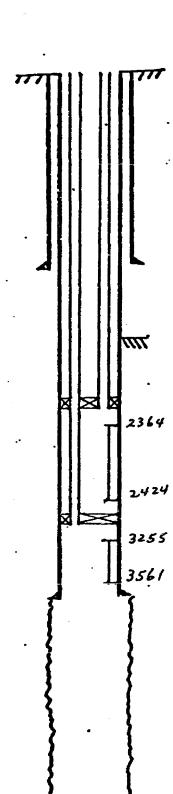
Getty Oil Company

LEASE

Skelly Unit

DATE

WELL No LOCATION , 100 FEL 22-17-31



Tubing:

Long String:  $2\frac{1}{6}$  OD 3.25 # IPC tubing Short String:  $2\frac{1}{6}$  OD 3.25 # IPC tubing

85/9 OD 24 # CSG set @ 760 w/ 95 sks
Top cement 350 Ca/c.

15/6 Top of Cement

Retrievable Dual Pkr. @ 2250

7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3/50

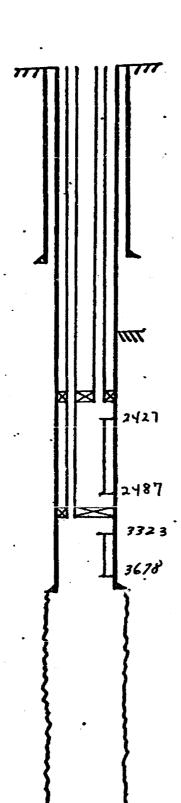
Grayburg Jackson perfs

51/2 OD 15.5 # CSG set @ 3589 w/ 355 sk

Grayburg Jackson Open Hole

3589 — 3850

OPERAT	OR		DATE	•
•	Cathan Oil Company	IL No LOCATION .	L	
LEASE	Skelly Unit	83 GO FAL EGGO	FUL	26-17-31



Long String: 2 1/6 OD 3.25 # IPC tubing Short String: 2 1/6 OD 3.25 # IPC tubing

8 5/8 OD 24 # CSG set @ 783 w/ 100 sks
Top cement 383 Ca/c,

1766 Top of Cement

Retrievable Dual Pkr. @ 2320

7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3220

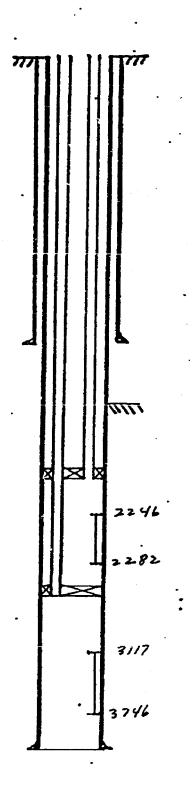
Grayburg Jackson perfs

51/2 OD 15.5 # CSG set @ 3700 w/ 375 sk

Grayburg Jackson Open Hole

3701 - 3900

OPERATOR Oil Communication	. ,	DATE	
Getty Oil Company LEASE Skelly Unit	WELL NO LOCATION 660 FUL & 6	60 FM	22-17-31



Long String: 2% OD 4.7 # IPC Tubing Short String: 2% OD 4.7 # IPC Tubing

·C/RC Top of cement

Retrievable Dual Pkr @ 2/50

7-Rivers Perfs (Proposed)

Grayburg Jackson perfs.

OPERATOR Getty Oil Company	DATE	_
LEASE Skelly Unit	WELL No LOCATION 290 FWL 21-17-31	_

777			777
			•
	×	×	
	•		

Tubing 2 % OD 4.7 # IPC

 8 /8
 OD
 28
 # CSG

 Set
 601
 w!
 /50
 SKS

 5u - face
 Top Of Cement

 Retrievable PKR @ 2000

 7
 OD 17
 # CSG

 Set @ 2029
 W/ 155
 SKS

 Cement top @ 54.fmc (ca/ca/af.d)

7-Rivers - Open Hole

2029 - 21/2

OPERATOR		DATE	
Getty Oil Company		<u></u>	
LEASE Skelly Unit	WELL No LOCATION 4 8/0 FNL	¿ 1980 FEL	21-17-31

SKS

سا اا الب	Tubing 2 3/8	OD	4.7
	# 5/4 OD	י איז איז איז איז איז איז איז איז איז אי	# 000
		26 427	_# CSG
	Set 6// W/	750	SKS
	Surface	Top or cen	enc
	•		
		•	
			•
			•
	Retrievable PKR @_	1900	
X X	· 7 OD		# CSG
	Set @ /970	w/ /	175
	Cement top @ 54	rface	(calc.)
. }	. •		
}	• 32	•	
}			
<b>}</b>	7-Rivers - Open Ho	le	
}	1970 - 2227		
}	•		
<b>{</b> }		3	

OPERATOR Getty Oil Company		DATE	
LEASE Skelly Unit	WELL No LOCATION . 14 1980 FSL & 660	FWL	21-17-31

	•
	1

Tubing 23/2 OD 4.7 # IPC

 10 3/4 OD
 45
 # CSG

 Set
 600
 w/
 /00
 SKS

 Surface
 Top Of Cement

 Retrievable PKR @ 2000

 85/8
 OD 28 # CSG

 Set @ 2090
 W/ /50
 SKS

 Cement top @ Suffree ( Ca/cs/afel)

7-Rivers - Open Hole
2090 - 2139

OPERATOR		DATE	
Getty Oil Company			
LEASE Skelly Unit	WELL No LOCATION .	2310 FWL	21-17-31

777			
	X	×	
	•		

Tubing \_\_\_\_\_\_ OD \_\_\_\_\_# IPC

 8 5/8
 OD
 32
 # CSG

 Set
 6/0
 w/
 /50
 SKS

 Surface
 Top Of Cement

 Retrievable PKR @ /950

 7
 OD
 20
 # CSG

 Set @ /970
 w/ /50
 SKS

 Cement top @ C;2C
 (Cal.)

7-Rivers - Open Hole

/970 - 2175

OPERATOR

Cetty Oil Company

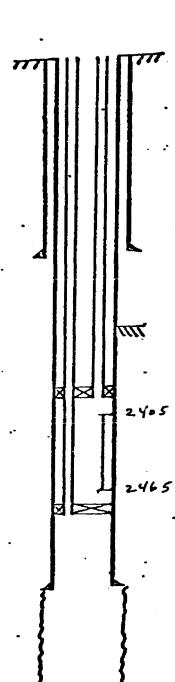
LEASE

Skelly Unit

DATE

WELL No LOCATION

50 /980 FAL 2660 FBL 23-/7-3/



Tubing:

Long String: 2 % OD 4.7 # IPC tubing Short String: 2 % OD 4.7 # IPC tubing

 8 5/P
 OD
 2P
 # CSG set @ 7// w/ 75 sks

 Top cement
 200′ Ca/.

And bring cement above 7-R itweeled)

Retrievable Dual Pkr. @ 2300

7 - River's Perfs ( Proposed )

Permanent single pkr @ 3/50

7 OD 20 # CSG set @ 3265 W/ 150 s

Grayburg Jackson Open Hole

OPERATOR .	DATE .
Getty Oil Company	WELL NO LOCATION . 36 660 F34 2 660 FEZ 14-17-31
Skelly Unit	36 660 F36 2 660 FEE 14-17-31

777			<i>r</i>
	M	71111 241	10
		250	ο.
	•		

Long String: 2 3/8 OD 4.7 # IPC tubing Short String: 2 3/9 OD 4.7 # IPC tubing

| 85/8 | OD | 28 | # CSG set @ 743 | W/ 100 sks | Top cement | 54/face

1978 Top of Cement calc. (Will Rom Boad log-

Retrievable Dual Pkr. @ 2350

7 - River's Perfs ( Proposed )

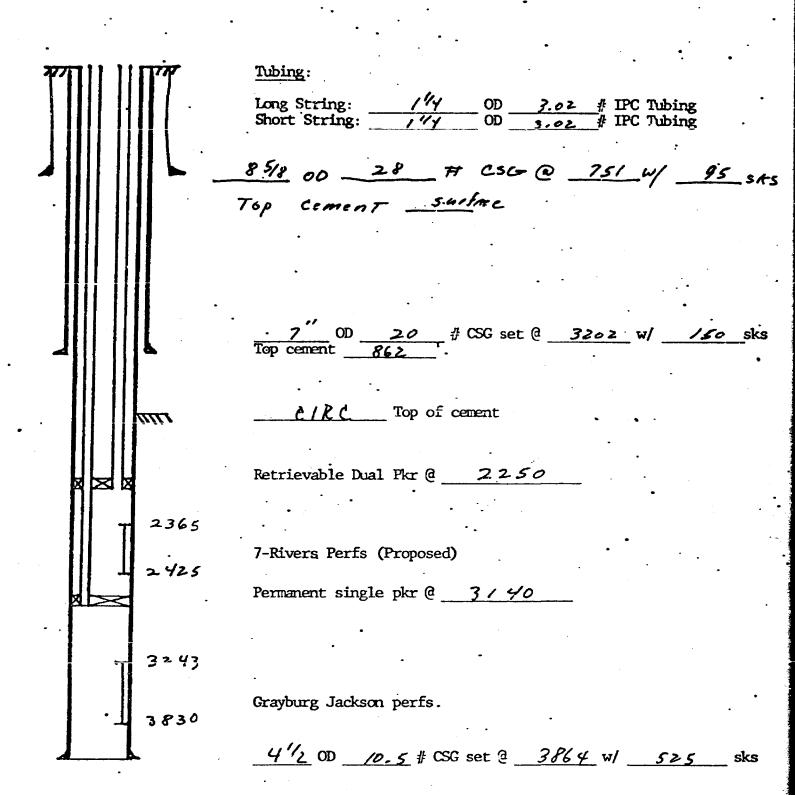
Permanent single pkr @ \_\_\_\_\_\_3200

7 OD 20 # CSG set @ 33/8 w/ /30 sks

Grayburg Jackson Open Hole

33/8 - 36/6

OPERATOR  Getty Oil Company			•	DATE		
LEASE Skelly Unit	WELL No.	LOCATION	54 ÷ 158	o FEL	23-17-31	



OPERATOR

Getty Oil Company

LEASE

Skelly Unit

DATE

WELL No LOCATION

22 /98063L \$ 1980 FEL 14-17-31

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m

2330

2390

Long String: 2% OD 4.7 # IPC tubing Short String: 2% OD 4.7 # IPC tubing

| 1 | 2 | 4 | CSG set @ 738 w/ 75 sks | Top cement | 300' Ca/C.

2102 Top of Cement (cal.) (will run boad log -perforate

And bring comm + Above 77 if needed)

Retrievable Dual Pkr. @ 2230

7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3250

Grayburg Jackson Open Hole

OPERATOR

Getty Oil Company

LEASE

Skelly Unit

DATE

WELL No LOCATION

91 660 FNL 5 660 FNL 28-17-31

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Tubing:

Long String: 2 1/9 OD 4.7 # IPC tubing Short String: 2 1/9 OD 4.2 # IPC tubing

2622 Top of Cement calculated (will Run bond log-Perforate And bring Coment Above 7-2)

Retrievable Dual Pkr. @ 2/00

7 - Rivers Perfs ( Proposed )

7 OD 20 # CSG set @ 3025 w/ 50 skg

Grayburg Jackson Open Hole

3025 — 3528

OPERATOR

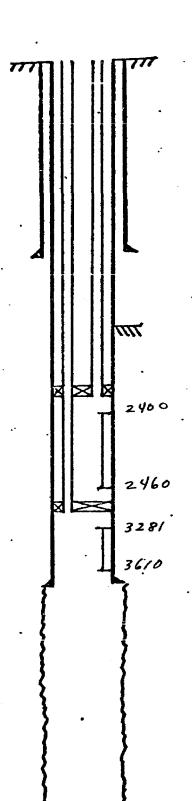
Getty Oil Company

LEASE

Skelly Unit

DATE

WELL No LOCATION
79 660 FSL : 1980 FWL 23-17-31



Tubing:

Long String:  $2 \frac{1}{4}$  OD 3.25 # IPC tubing Short String:  $2 \frac{1}{4}$  OD 3.25 # IPC tubing

1409 Top of Cement

Retrievable Dual Pkr. @ 2300

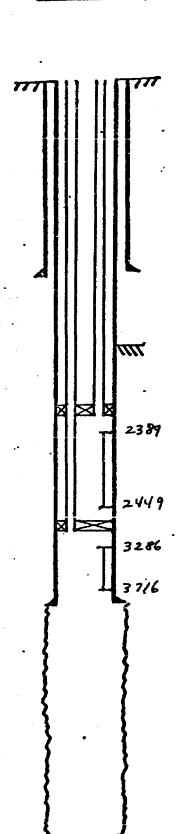
7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3/50

Grayburg Jackson perfs

Grayburg Jackson Open Hole

	DATE	
OPERATOR		
Getty Oil Company		
LEASE	WELL NO LOCATION . 34 660 FSL & 1980 FWL	14-17-31
Skelly Unit	34 660 752 2 7710 742	77 -1 2.



Long String: 21/6 0D 3.25 # IPC tubing Short String: 21/6 0D 3.25 # IPC tubing

8 1/9 01) 24 1 CSG set @ 150 w/ 100 sks
Top cement 850 cm.

1335 Top of Cement

Retrievable Dual Pkr. @ 2290

7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3/50

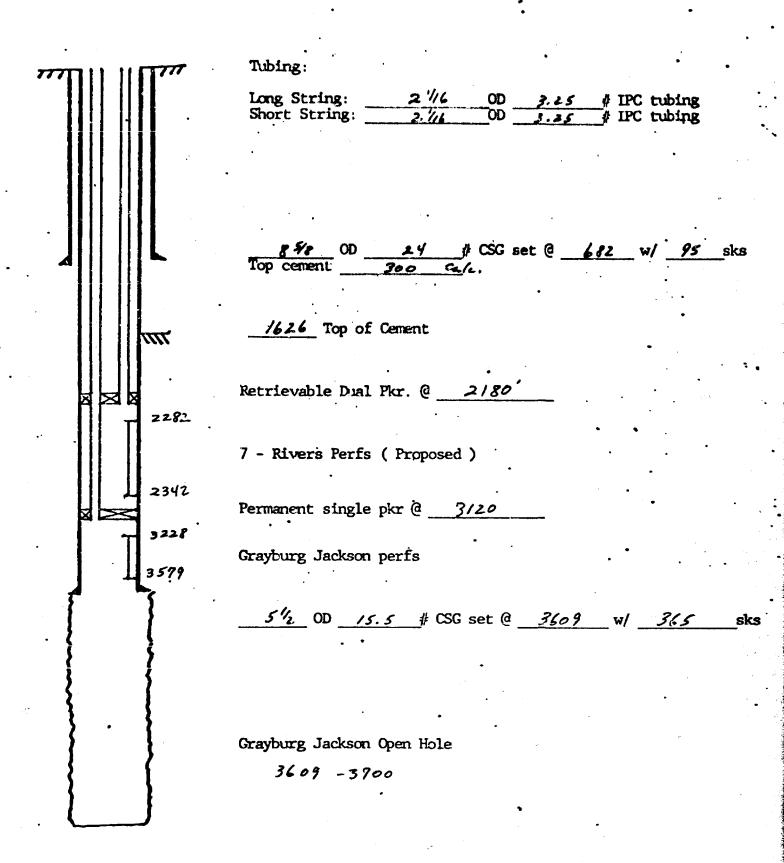
Grayburg Jackson perfs

<u>5½</u> OD <u>/5.5</u> # CSG set @ <u>3737</u> w/ <u>380</u> sk

Grayburg Jackson Open Hole

3737 — 3850

OPERATOR	DATE	
Getty Oil Company	WELL NO LOCATION , 1990 FUL	28-17-31
Skelly Unit		



OPERATOR	DA	TE .
Getty Oil Company LEASE	WELL NO LOCATION	28-17-31
Skelly Unit	100 1980 FSL 3 660 FUL	28-11-31

×	× ×	WY 2360
ρā		2420 3522 359/
	•	

Long String:  $2\frac{1}{5}$  OD  $\frac{3.25}{3.25}$  # IPC tubing Short String:  $\frac{2\frac{1}{5}}{2}$  OD  $\frac{3.25}{3.25}$  # IPC tubing

 P 5/8
 OD
 2 f
 # CSG set @ 707
 w/ 90
 sks

 Top cement
 350
 Ca/.

159/ Top of Cement

Retrievable Dual Pkr. @ 2260

7 - Rivers Perfs ( Proposed )

Permanent single pkr @ 3400

Grayburg Jackson perfs

5/12 OD 15.5 # CSG set @ 3632 w/ 370 sks

Grayburg Jackson Open Hole

OPERATOR

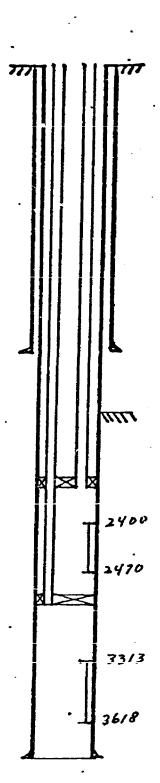
Cetty Oil Company

LEASE
Skelly Unit

DATE

WELL NO LOCATION

38 SLO FAL : 1980 FEL 23-17-31



Tubing:

Long String: 2 1/6 OD 3.25 # IPC Tubing Short String: 2 1/1 OD 3.25 # IPC Tubing

· 85/8 OD 24 # CSG set @ 626 w/ 350 sks

And bring coment Above 7-2)

Retrievable Dual Pkr @ 2350

7-Rivers Perfs (Proposed)

Permanent single pkr @ \_\_\_\_\_3200

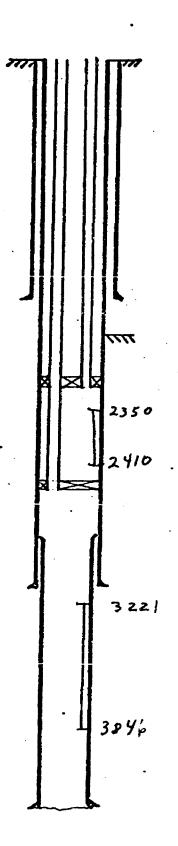
Grayburg Jackson perfs.

5/2 OD 14 # CSG set @ 3935 w/ 250 sks

OPERATOR
Getty Oil Company

LEASE
Skelly Unit

WELL No LOCATION
/980 FNL E /980 FNL 23-17-3/



Tubing:

Long String: 2 % OD 4.7 # IPC Tubing Short Sting: 2 % OD 7.7 # IPC Tubing

8 4/8 OD 28 # CSG set @ 740 w/ 100 sk
Top cement @ 340' Ca /C.

2434 Top of cement <u>Calculated</u> (w:11 vun bond log - Profeste und bring coment ubove 2-2)

Retrievable Dual Plor @ 2300

7- Rivers Perfs (Proposed)

Permanent single pkr @ 3/00

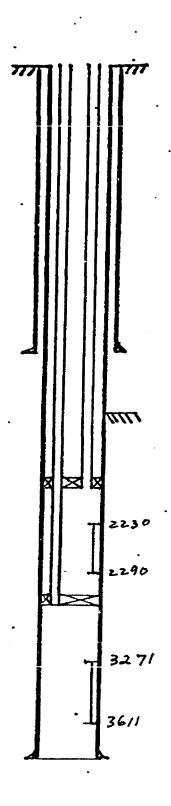
Liner Top @ 3/50

7 OD 20 # CSG set @ 3248 W/ 100 s

Grayburg Jackson perfs

41/2 OD 10.6 . Liner set @ 3856 W/ 200

OPERATOR				DATE		
Cetty Oil Company				<u> </u>		
LEASE Skelly Unit	WELL No. 26	LOCATION	1980	EL	15-17-31	



Tubing:

Long String: 2% OD 3.25 # IPC Tubing Short String: 2% OD 7.25 # IPC Tubing

· 8 5/8 OD 24 # CSG set @ 728 w/ /25 sks
Top cement 200' ca/c.

·/724 Top of cement

Retrievable Dual Pkr @ 2/50

7-Rivers Perfs (Proposed)

Grayburg Jackson perfs.

51/2 OD 15.5 # CSG set @ 3742 w/ 350 sks

OPERATOR

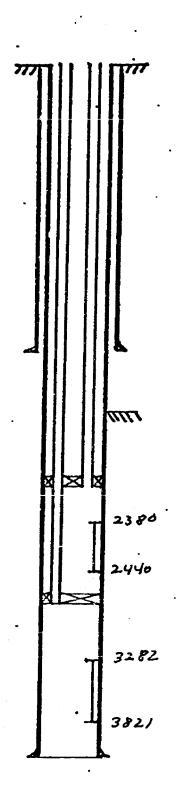
Cetty Oil Company

LEASE
Skelly Unit

DATE

WELL No LOCATION

24 /980 FSL £ 660 FWL /4-17-3/



Tubing:

Long String: 2 1/6 OD 3.25 # IPC Tubing Short String: 2 1/6 OD 3.25 # IPC Tubing

- 8 1/8 OD 24 # CSG set @ 772 w/ 100 sks
Top cement 350' . Ca/c.

·/527 Top of cement

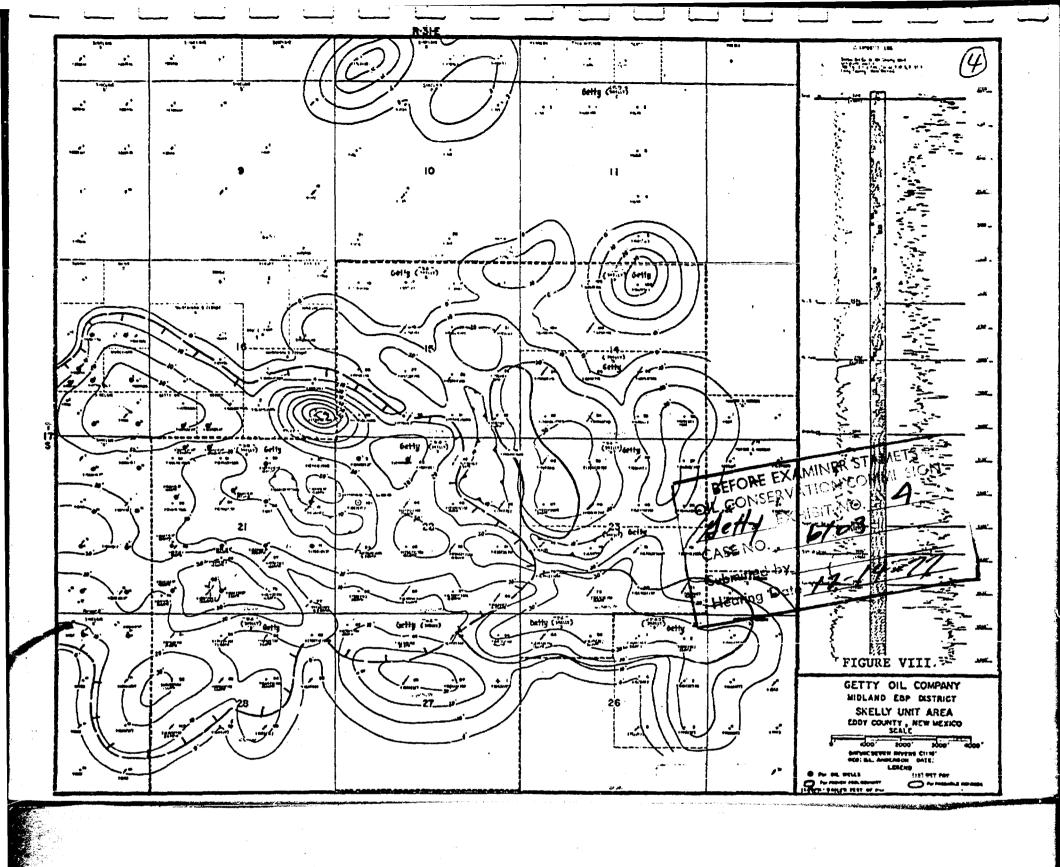
Retrievable Dual Pkr @ 2280

7-Rivers Perfs (Proposed)

Permanent single pkr @ 3/80

Grayburg Jackson perfs.

51/2 OD 15.5 # CSG set @ 3844 w/ 385 sks



5

SETTY OIL COMPANY
SKELLY UNIT EXPANSION
FREN (SEVEN RIVERS) FIELD

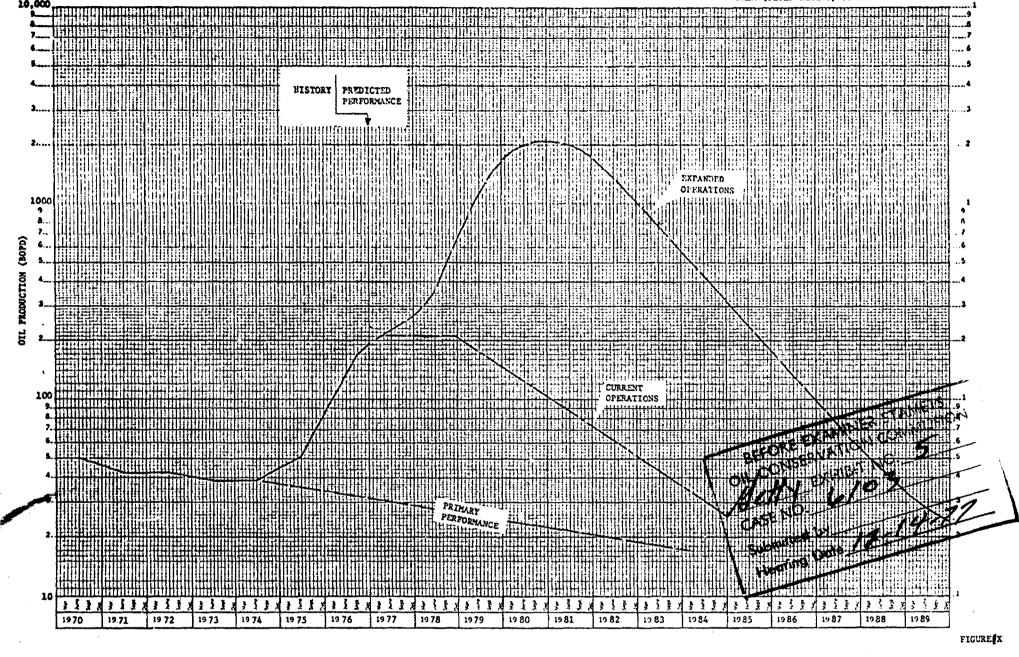


EXHIBIT \*\* 6
TWO MILE RADIUS MAP

BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
EXHIBIT NO.

CASE NO. 6/0

Submitted by

Hearing Date 12

0: single SR inj were (aurunt)

1: proposed SR inj well

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EXHIBIT 🖝 10

DOWNHOLE SCHEMATIC OF P/A
WELLS REQUESTED IN #3 MEMO NO 3-77.

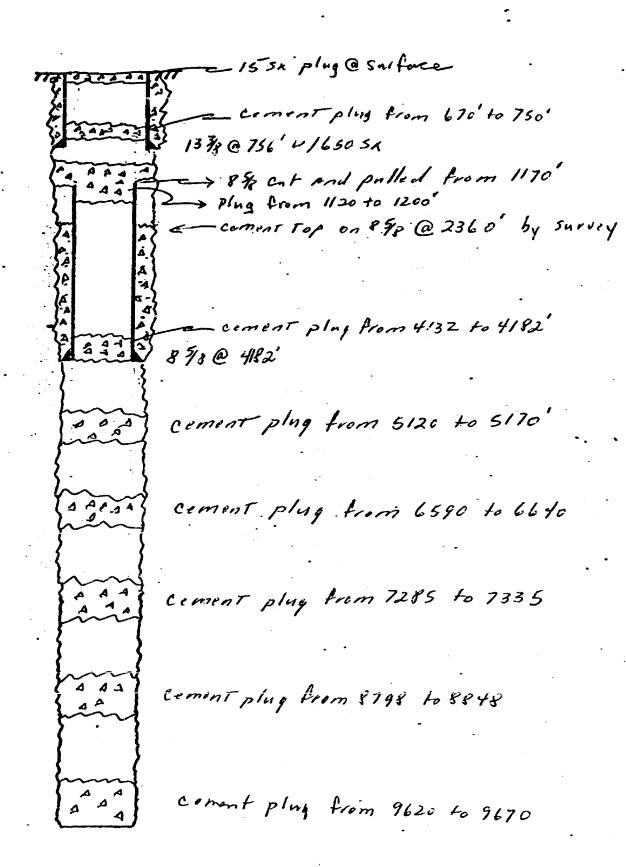
BEFORE EXAMINER STAMETS
OIL CONSERVATION COMMISSION
CASE NO. 603
Submitted by
Hearing Dais 12-14-77

OPERATOR PrairiE Dil And GAS LEASE	Co.	DATE	
LEASE WEST B'	WELL NO LOCATION P SEC	=.10 T-17-5	R-31-E

This well was Deilled and Plugged IN 1927

2000 2000 Cement plug @ surface volume unknown f calculated coment Top @ 20' 151/2'csq set @ 41' W/3 ex coment -- Cement cap on Top of 12% Valume unknown 121/2 Pulled from 582 Wed Iculated Come AT Top @ 610 12/2 csg Set @ 680 w/ 10 Sx. cement Zo cement CAP on Top of 10" Volume unknown 10" palled from 1765' Accelentated coment Top @ 1773' 10" set @ 1823 W/ 10 sx. Coment 8sr. Cement cap on Top of 8 % 8% pulled from 2883 898 csq set @ 2953 Not Cemented cement plug from 2970 +02975 TD @ 3380

MASTAGATION 10 St. plny @ Surface Calculated cement Top @ 302' comentpluy from 320 to 625' \$ 858 @ 558' W/ 50 SX. A Cut 51/2 @ 610 PO.H - Bottom @ 145 sout 51/2 @ 770 pulled 25' and stack Retainer @ 3095' W/ 70 Sx Squeezed below GERY barg Perfs 5 1/2 @ 3945 W/ 200 SX.



OPERATOR EMPEROR Dil Co.

LEASE
PUCKETT

WELL No LOCATION
Sec 24 T-17-5 P-31-E

cement cop w/ 4' PIA MARKER @ Surface

cement volume not given.

Lable filled w/ mud Inden fluid

Cable tool hole to 1770'

OPERATOR Atlantic Richfield DATE

LEASE TURNER B' WELL No LOCATION 29-17-31

7 10 5x plug @ Surface -cal coment Top @ 276' \$ 85/8 csq Set @ 532 w/ 50 SX. -> 100' plug from 500' to 600' 100' plug from 850 to 950 7" cut off@ 909' CIBP @ 2010 W/ 10 5x on Top. 7" csg set@ 2112 w/100 sx's FREN 7-R OPEN Hole

T.D. 2204

EXHIBIT "# /2

C-120 REPORTS FOR PALOT AREA

BEFORE EXAMINER STAMETS

OIL CONSERVATION COMMISSION

OIL CONSERVATION COMMISSION

CASE NO. 6/03

Submitted by 2-/4-72

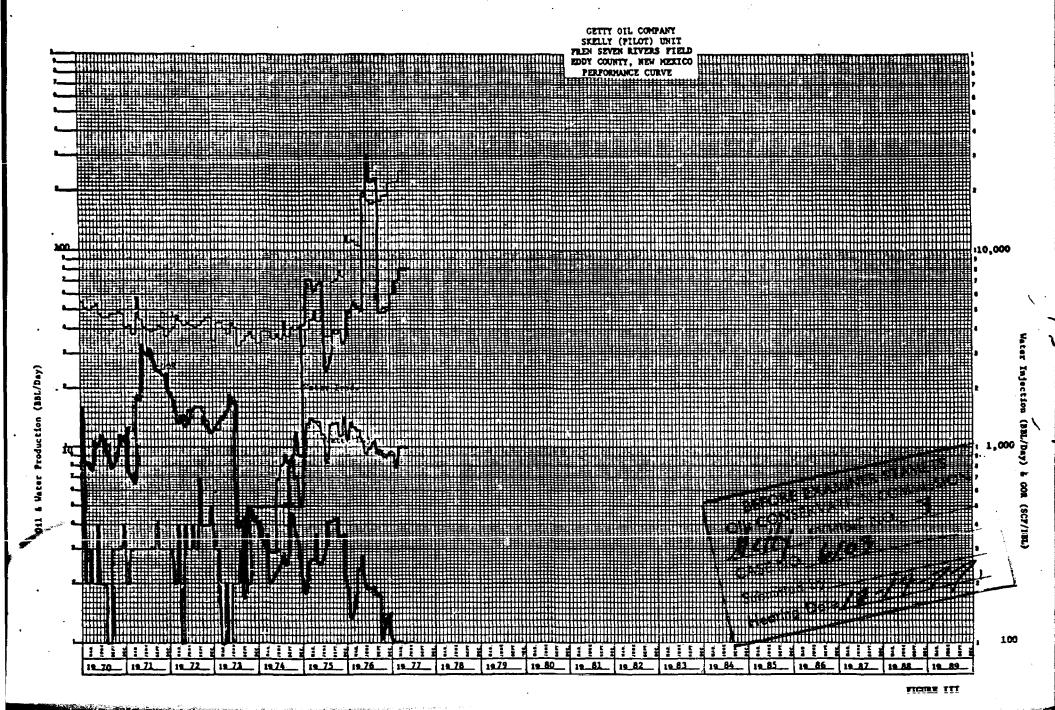
# NEW MEXICO OIL CONSERVATION COMMISSION MONTHLY INJECTION REPORT Submit this report in triplicate to the District Office, Oil Conservation Commission.

Company Ge	tty O	il Co	mpa	ny					Poo	- : !	Fren	1		
CountyEd	dy	• :.	• .						_ Mon.	ıh	A,	ugust_	1977	
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	WELL	L	OCA				CF GA			AULATI	1	BBLS, WATER	CUMULATIVE	AVG. INJ.
LEASE	NO.	UL	5	T	R	1	ECTE			AS INJ.		INJECTED	WATER INJ.	PRESSURES
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Skelly Unit	10	H			<u> </u>		••		<u> </u>			5050	276610	1200
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		34.5				CING W	ELLS	(Àtta	ch addis	ionsi sh	eels i	if necessary)		
LEASE	WELL NO.	UL	S	TION	R	1	LS. O	-		OF GAS		GOR	BBLS. WATER PRODUCED	% WATER PRODUCED
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Remarks:		* .			•		٠.		MALLE	-	1	Chille	. Historial a R	. Crockett
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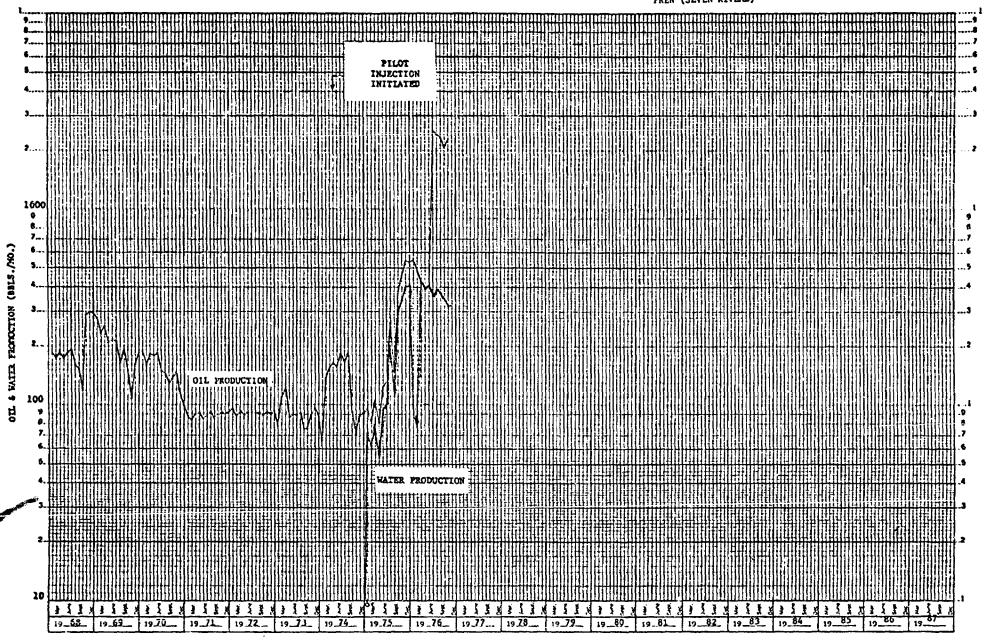
Form C -120 (Revised 5-)-60)

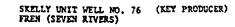
EW MEXICO OIL CONSERVATION COMME ION
MONTHLY INJECTION REPORT
Submit this report in triplicate to the District Office, Oil Conservation Commission.

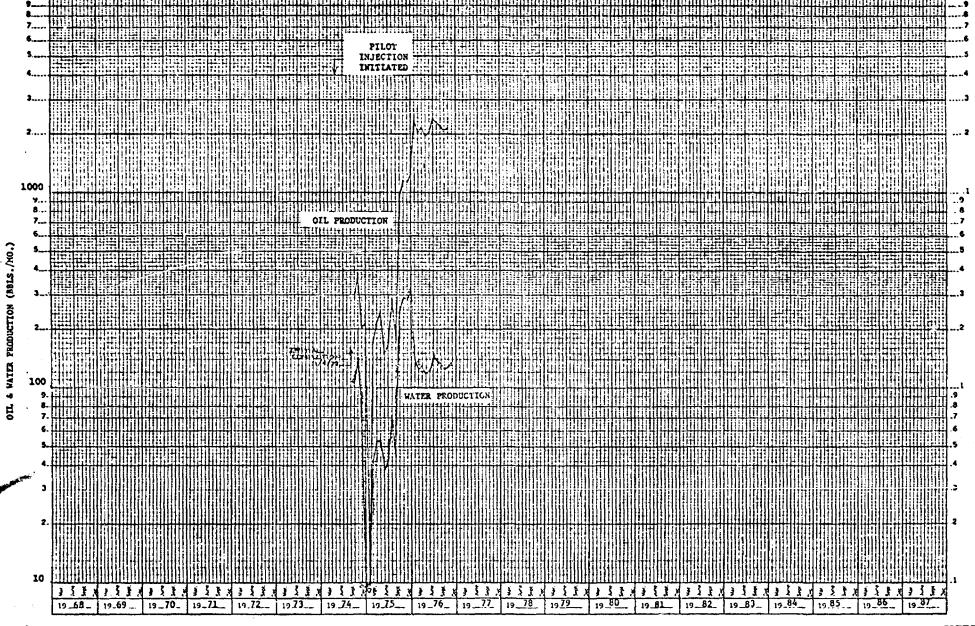
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County Eddy	<del></del>						· 	_	Month_		JANUARY	1975	
				IN	JEC	TION WE	LLS (A	ttoch	addition	ol sheets	if necessory)		
LEASE	WELL NO.	UL	DCA'	TION		MC	F GAS ECTED		CUMU	ATIVE	BBLS. WATER	CUMULATIVE WATER INJ.	AVG. INJ. PRESSURES
Skelly Unit	10	H	21	17	31						72.35	76868	12.50
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				PR	ODU	CING WI	ELLS (A	ttoch	odditio	nal sheets	if necessary)		
LEASE	WELL NO.	UL	S S	T	R	PRO	S. OIL			GAS IUCED	GOR	BBLS. WATER PRODUCED	% WATER PRODUCED
Skelly Unit	3	D	22	1			39	L		23	651	121	39.0
	4	В	21				20			0	. 0	30	32.6
	8	F	21				02			7	113	31	45.1
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I hereby certify that th	ie above i	informat	ion is	true	and t	ompietė (	o the bes	st of m		ದ್ವೇ ತನಡೆ be	Elet. DRBnot	D. R. Cr	ow ·
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SKELLY UNIT WELL NO. 11 (KEY PRODUCER) FREN (SEVEN RIVERS)







## SKELLY UNIT WELL NO. 9 (IMMEDIATE OFFSET FREM (SEVEN RIVERS)

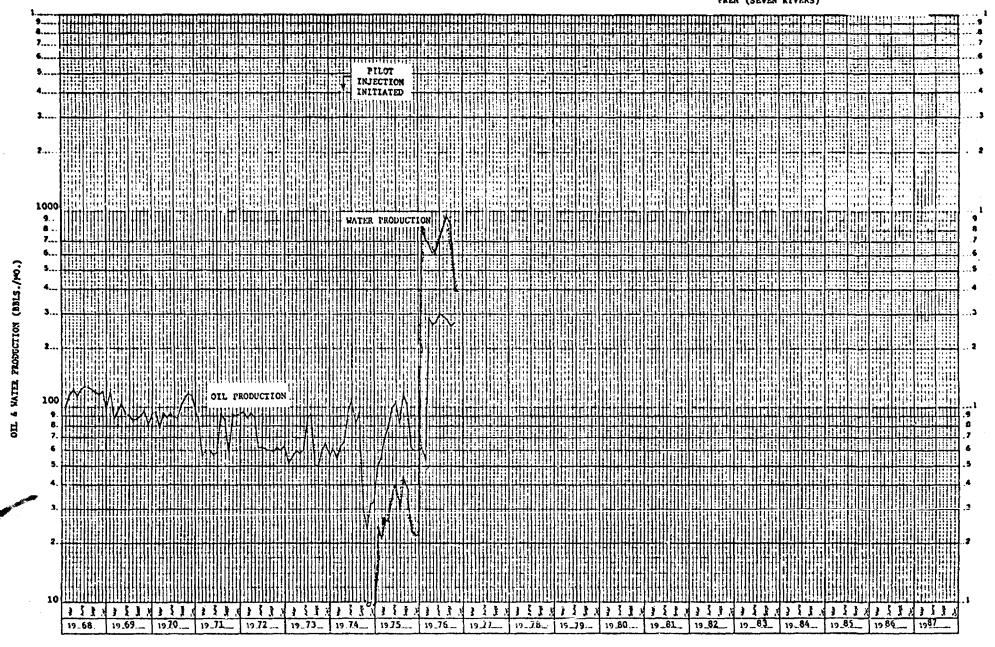
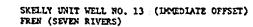
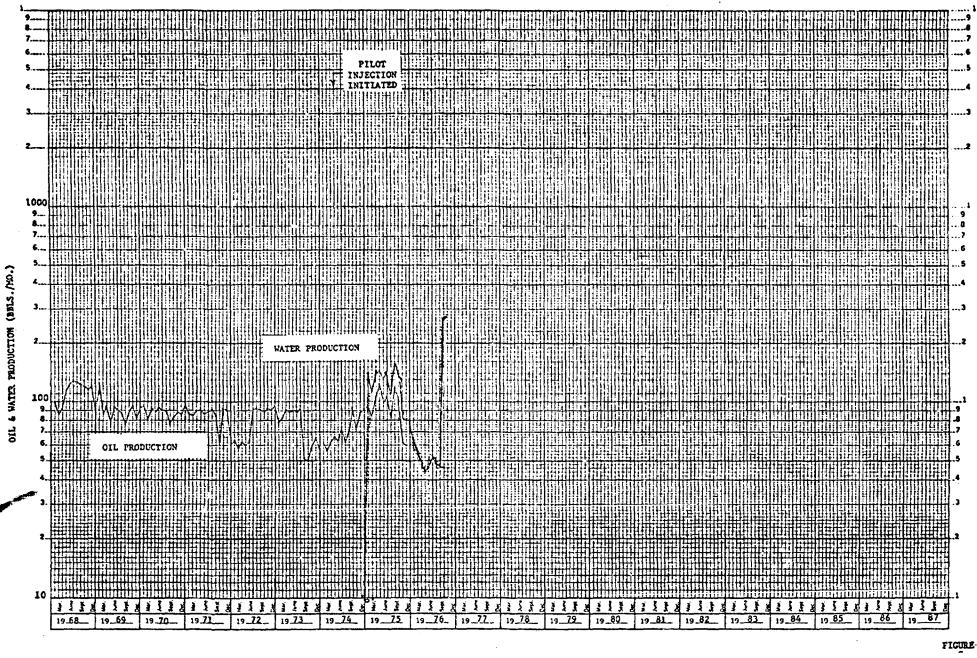
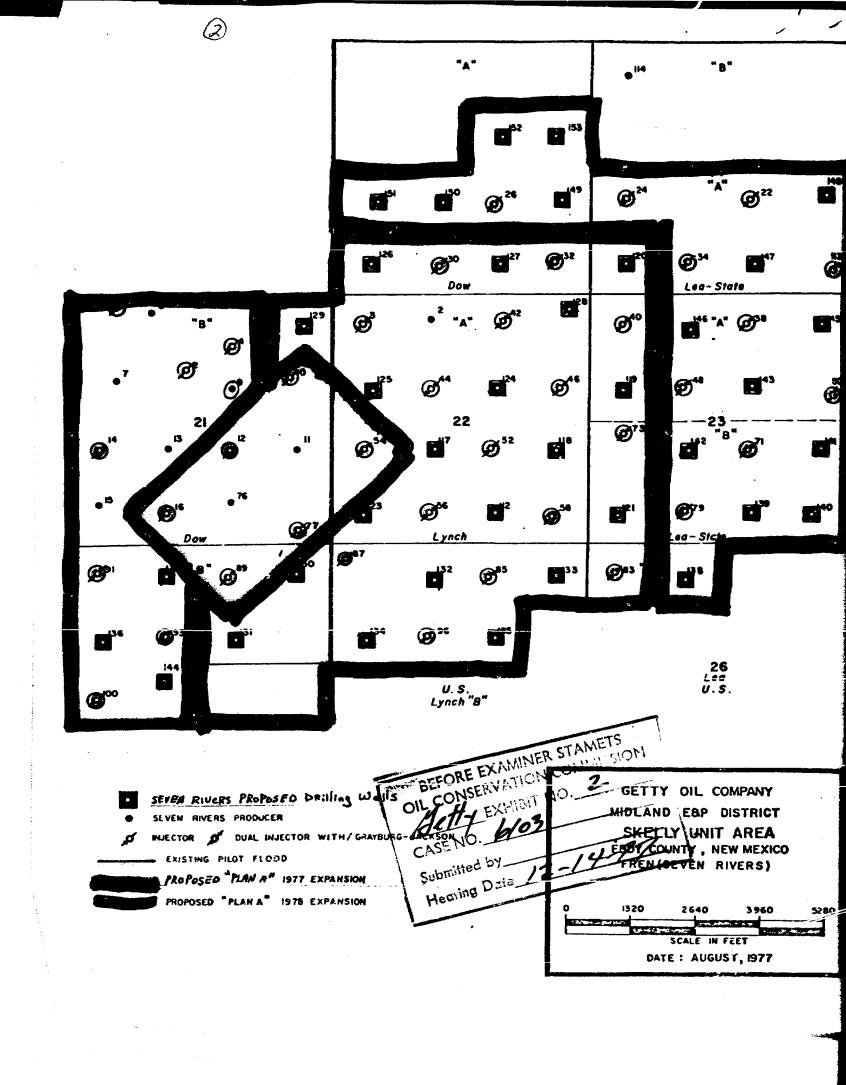


Figure VI









DIRECTOR
JOE D. RAMEY

### OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO P. O. DRAWER DD - ARTESIA

LAND COMMISSIONER
PHIL R. LUCERO

February 28, 1978



STATE GEOLOGIST EMERY C. ARNOLD

Murchison & Closuit D 107 Petroleum Center San Antonio, TX 78209

Re: Case #6103 Order R-4717-A
Getty Oil Co., Skelly Unit
Fren Seven Rivers Waterflood Project
Township 17S Range 31E
Eddy County, NM

#### Gentlemen:

Findings in the subject case show that there are 42 wells, as set out on Exhibit B of the Order, which are located within or immediately adjacent to the boundaries of said Skelly Unit area which may or may not be completed or plugged in such a manner that will assure that they will not serve as channels for injected water to migrate from the Seven Rivers formation to other formations or to the surface.

You are hereby requested to submit any available evidence which will show that your wells (as shown on the attached list) are cemented in such a manner as to effectively seal off the Seven Rivers formation as required by Rule 107 (a), Commission Rules and Regulations.

Further, if the evidence shows that the Seven Rivers formation is not sealed off by cement, you are requested to submit plans and a time schedule to accomplish same.

If you have any questions concerning this matter, please feel free to call upon me.

Sincerely yours,

W.A. Gressett

W.a. Li

Supervisor, District II

WAG:sm

Enclosure

Xc/ Mr. Joe D. Ramey P.O. Box 2088 Santa Fe, NM 87501



DIRECTOR
JOE D. RAMEY

#### **OIL CONSERVATION COMMISSION**

STATE OF NEW MEXICO P. O. DRAWER DD - ARTESIA 88210

LAND COMMISSIONER
PHIL R. LUCERO

STATE GEOLOGIST
EMERY C. ARNOLD

February 28, 1978

Atlantic Richfield Co. P.O. Box 1710 Hobbs, NM 88240

> Re: Case #6103 Order R-4717-A Getty Oil Co., Skelly Unit Fren Seven Rivers Waterflood Project Township 17S Range 31E Eddy County, NM

#### Gentlemen:

Findings in the subject case show that there are 42 wells, as set out on Exhibit B of the Order, which are located within or immediately adjacent to the boundaries of said Skelly Unit area which may or may not be completed or plugged in such a manner that will assure that they will not serve as channels for injected water to migrate from the Seven Rivers formation to other formations or to the surface.

You are hereby requested to submit any available evidence which will show that your wells (as shown on the attached list) are cemented in such a manner as to effectively seal off the Seven Rivers formation as required by Rule 107 (a), Commission Rules and Regulations.

Further, if the evidence shows that the Seven Rivers formation is not sealed off by cement, you are requested to submit plans and a time schedule to accomplish same.

If you have any questions concerning this matter, please feel free to call upon me.

Sincerely yours,

W.A. Gressett

Supervisor, District II

WAG:sm

Enclosure

Xc/ Mr. Joe D. Ramey P.O. Box 2088 Santa Fe. NM 87501 **AtlanticRichfieldCompany** 

North American Producing Division Permian District - West Area Post Office Box 1710 Hobbs, New Mexico 88240 Telephone 505 393 7163

George V. Ricks, Superintendent

.

Production & Drilling

March 14, 1978

Mr. W. A. Gressett
Supervisor, District II
New Mexico Oil Conservation Commission
P. O. Drawer DD
Artesia, New Mexico 88210

Re: Case #6103 Order R-4717-A

Getty Oil Co., Skelly Unit

Fren Seven Rivers Waterflood Project
Township 17S Range 31E
Eddy County, New Mexico

Dear Sir:

In reply to your letter of February 28, 1978, a cursory examination of the records indicates that a number of Atlantic Richfield Company wells are not cemented in such a manner as to effectively seal off the Seven Rivers formation.

Because of the magnitude of the monies involved, we will need to make an engineering and economic study to determine which of these wells we will re-cement or plug and abandon. Therefore, it will probably be three or four weeks before I can submit the plans on the individual wells and the time schedule to accomplish same.

Yours truly,

D.V. Kuli.

G. V. Ricks

GVR:kd

Mr. Joe Ramey



DIRECTOR

JOE D. RAMEY

## OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO P. O. DRAWER DD - ARTESIA 88210

LAND COMMISSIONER PHIL R. LUCERO

STATE GEOLOGIST **EMERY C. ARNOLD** 

February 28, 1978

William A. & Edward R. Hudson P.O. Box 198 88210 Artesia, NM

> Re: Case #6102 Order R-4717-A Getty Oil Co., Skelly Unit Fren Seven Rivers Waterflood Project Township 17S Range 31E Eddy County, NM

#### Gentlemen:

Findings in the subject case show that there are 42 wells, as set out on Exhibit B of the Order, which are located within or immediately adjacent to the boundaries of said Skelly Unit area which may or may not be completed or plugged in such a manner that will assure that they will not serve as channels for injected water to migrate from the Seven Rivers formation to other formations or to the surface.

You are hereby requested to submit any available evidence which will show that your wells (as shown on the attached list) are cemented in such a manner as to effectively seal off the Seven Rivers formation as required by Rule 107 (a), Commission Rules and Regulations.

Further, if the evidence shows that the Seven Rivers formation is not sealed off by cement, you are requested to submit plans and a time schedule to accomplish same.

If you have any questions concerning this matter, please feel free to call upon me.

Sincerely yours,

W.A. Gressett

Supervisor, District II

WAG:sm

**Enclosure** 

Xc/ Mr. Joe D. Ramey P.O. Box 2088 Santa Fe, NM 87501

MAR 2 0 1978

William A. & Edward Pt. Hudson 1000 First National Building Fort Worth, Tewas 16102

J. C. C.

March 13, 1978

Mr. W. A. Gressett Supervisor, District II Oil Conservation Commission P.O. Drawer DD Artesia, New MExico 88210

Re: Case #6102 Order R4717 A
Getty Oil Co., Skelly Unit
Fren Seven Rivers Waterflood Project
T17S, R31E, Eddy County, New MEXICO

Dear Mr. Gressett:

I have your letter of February 28 concerning the captioned case. The Completion Reports on the seven wells on the Hudson's Puckett A and B leases which were schedule in Exhibit B of your letter of February 28 are attached to this letter.

These wells were properly completed at the time they were drilled. We have no plans to seal off the Seven Rivers Formation in the wells in which this zone is not currently sealed off.

With best wishes

Yours? truly

Edward R. Hudson Jr.

ERHJr/vc

cc: Getty Oil Company Attn. B. W. Koch Box 1231 Midland, Tx 79701

> Mr. Clarence Cardwell Atlantic Richfield Company Box 1610 Midland, Tx 79701

Mr. Buck Closuit 1019 Electric Service Bldg Fort Worth, Tx 76102

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

# OIL CONSERVATION COMMISSION P. O. BOX 2088 SANTA FE, NEW MEXICO 87501

April 3, 1978

William A. and Edward R. Hudson 1000 First National Building Fort Worth, Texas 76102

Attention: Edward R. Budson, Jr.

Re: Case 6103, Order No.
R-4717-A, Getty 0il
Company Skelly Unit
Waterflood Project,
Eddy County, New Mexico

Dear Mr. Hudson:

Your letter of March 13, 1978, to Mr. W. A. Gressett, supervisor of our Artesia district office, has been referred to this office for reply. Before dealing with the specific issues raised in your letter I would like to present some appropriate background information. In widely scattered areas of Southeast New Mexico our agency has been observing significant waterflood leakage problems. While to date no public water supply source has been contaminated by such leakage of water from waterflood zones, pressurized water has been found at the base of the salt section and in other lower zones not being flooded. This water has caused collapsed casing and loss of production or the well itself in some cases. In others, operators have been forced to undertake lengthy and expensive remedial operations to stop waterflows occurring between casing strings. This situation is not confined to waterflood project areas but may also affect surrounding properties. As wells located

Letter to William A. and Edward R. Hudson April 3, 1978

in or near waterflood projects and not properly cased or cemented across the zone to be flooded may serve as channels for injected water to enter the sair section or other zones and be a source for such problems, we have required that all new applicants for injection wells provide us with sufficient data on all wells in and within one-half mile of their project to prove that such wells are completed in such a manner as to prevent the migration of fluids to other zones. In the case where wells are not properly completed or where the data is questionable, injection pressure is severely limited until the situation is corrected or more complete data proving the wells' integrity is submitted.

Directly related to the above is Public Law 93-523, the Safe Drinking Water Act, enected by the 93rd Congress December 16, 1974. Under this Act the Administrator of the Savironmental Protection Agency must establish minimum regulations for the control of the underground injection of fluids in the United States. These regulations, which we expect to be adopted this year and enforced by this agency, provide for a review of all existing injection wells and projects within five years. A part of this review will be a study of all wells within or around existing projects or injection wells with the same detail we currently require for new projects as described in the preceding paragraph. If wells in or surrounding existing projects are inadequately cased or cemented, that project or a portion thereof may be required to shut down or be severely restricted until corrective measures are taken. Under these conditions, a great deal of industry cooperation will be required to avoid costly disruptions in waterflood or salt water disposal operations.

Returning to the case at hand, the information supplied by Getty and from our well files indicates that, if 100 percent fill-up was achieved, those Puckett A and B lease wells identified as questionable on Exhibit B of the subject order would be adequately casented across the Seven Rivers sens. However, other information derived from temperature surveys in the area showed fill-up at only 40 to 60 percent of Letter to William A. and Edward R. Hudson April 3, 1978

calculated volumes. Applying a 50 percent fill-up figure to the wells in question would give coment tops below the Seven Rivers pay. Additionally, from at least since 1942, our Rules and Regulations have required that wells be cased and comented in such a manner as to prevent the migration of fluids from one strate into emother.

In light of all of the above, we forwarded our request to Nudeen and Nudeen to furnish this effice with any information you may have that demonstrates that the eriginal commating of the wells in question resulted in the commat top rising above the top of the Seven Rivers some or for corrective action.

Your ecoperation in this notter as we enticipate the entire industry usest cooperate during the five years of the review of existing projects will be greatly appreciated. If there are any questions on this matter, please do not hesitate to call upon me.

Very truly yours,

R. L. STANKIS Tochnical Support Chief

RLS/fd

ce: Bill Gressett, District Supervisor, Artesia V. Sutherland, U.S.G.S., Albuquerque Balph Gray, Artesia

#### BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

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

> CASE NO. 6103 Order No. R-4717-A

APPLICATION OF GETTY OIL COMPANY FOR A WATERFLOOD PROJECT EXPANSION AND DUAL COMPLETIONS, EDDY COUNTY, NEW MEXICO.

#### NUNC PRO TUNC ORDER

#### BY THE COMMISSION:

It appearing to the Commission that Order No. R-4717-A, dated January 31, 1978, does not correctly state the intended order of the Commission:

#### IT IS THEREFORE ORDERED:

- (1) That Finding No. (10) on Page 2 of Order No. R-4717-A is hereby corrected to read in its entirety as follows:
  - "(10) That there are 42 wells, as set out on Exhibit B to this order, which are located within or immediately adjacent to the boundaries of said Skelly Unit Area which may or may not be completed or plugged in such a manner that will assure that they will not serve as channels for injected water to migrate from the Seven Rivers formation to other formations or to the surface."
- (2) That this order shall be effective nunc pro tunc as of January 31, 1978.

DONE at Santa Fe, New Mexico, on this 21st day of February, 1978.

> STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

PHIL\_R. LUCERO, Chairman

Member

RAMEY, Member & Secretary JOE D.

SEAL jr/

## BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

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

> CASE NO. 6103 Order No. R-4717-A

APPLICATION OF GETTY OIL COMPANY FOR A WATERFLOOD PROJECT EXPANSION AND DUAL COMPLETIONS, EDDY COUNTY, NEW MEXICO.

#### ORDER OF THE COMMISSION

#### BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on December 14, 1977, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this <u>31st</u> day of <u>January</u>, 1978, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

#### FINDS:

- (1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That Commission Order No. R-4717 entered on January 25, 1974, authorized a pilot waterflood project in the Skelly Unit Area, Fren-Seven Rivers Pool, Eddy County, New Mexico.
- (3) That said project was designated the Skelly Unit Fren-Seven Rivers Waterflood Project.
- (4) That the applicant, Getty Oil Company, seeks the expansion of said waterflood project by the injection of water into the Seven Rivers formation through 32 additional wells in said project as set out on Exhibit A attached to this order.
- (5) That 28 of said additional injection wells as identified on Exhibit A of this order are to be completed as dual completions with injection into both the Fren-Seven Rivers and Grayburg Jackson Pools, most of said wells having been authorized previously as single completion Grayburg Jackson injection wells.
- (6) That injection into each of the singly completed wells should be through internally coated tubing set in a packer to be located within approximately 100 feet of the casing shoe.

-2-Case No. 6103 Order No. R-4717-A

- (7) That injection into each of the dually completed wells should be through internally coated tubing with the long string of tubing set in a packer to be located as close as practicable to the lowermost injection interval and the short string of tubing set in a packer to be located within approximately 100 feet of the uppermost perforation.
- (8) That the casing-tubing annulus in each injection well should be filled with an inert fluid, and that a pressure gauge or approved leak detection device should be attached to the annulus or the annulus should be left open in order to determine leakage in the casing, tubing, or packer.
- (9) That the injection wells or system should be equipped with a pressure limiting switch or other acceptable device which will limit the surface injection pressure to no more than 1300 pounds unless the Secretary-Director of the Commission should administratively authorise a higher pressure.
- (10) That there are 42 wells, as set out on Exhibit B to this order, which are located within or immediately adjacent to the boundaries of said Skelly Unit Area which may or may not be completed or plugged in such a manner that will assure that they will not serve as channels for injected water to migrate from the San Andres formation to other formations or to the surface.
- (11) That to prevent migration of injected water from the Seven Rivers formation, formation injection pressure at wells within one half mile of any well identified on said Exhibit B should be limited to hydrostatic pressure until such time as the wells on said Exhibit B have been repaired or it shall otherwise be demonstrated to the satisfaction of the Secretary-Director of the Commission that the same will not serve as avenues for escape of such waters.
- (12) That the wells within the project should be equipped to facilitate periodic testing of the annular space between strings of production and surface casing.
- (13) That the operator should take all other 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, producing, or plugged and abandoned wells.
- (14) That approval of the subject application should result in the recovery of additional volumes of oil from the Skelly Unit Area, thereby preventing waste.
- (15) That the applicant should secure Commission approval for injection into the Grayburg Jackson Waterflood Project for any well herein authorized as a dual completion injection well which has not heretofore been approved as a Grayburg Jackson injection well.

-3-Case No. 6103 Order No. R-4717-A

(16) That the application should be approved.

#### IT IS THEREFORE ORDERED:

- (1) That the applicant, Getty Oil Company, is hereby authorised to expand its Skelly Unit Fren-Seven Rivers Waterflood Project by the injection of water into the Seven Rivers formation through 4 singly completed and 28 dually completed injection wells, as set out on Exhibit A to this order, Fren-Seven Rivers Pool, Eddy County, New Mexico.
- (2) That injection into each of said singly completed wells shall be through internally coated tubing installed in a packer set within approximately 100 feet of the casing shoe.
- (3) That injection into each of said dually completed wells shall be through two strings of internally coated tubing with the long string to be installed in a packer set as close as practicable to the lowermost injection interval (Grayburg Jackson) and with the short string installed in a packer set within approximately 100 feet of the uppermost perforation.
- (4) That the casing-tubing annulus in each injection well shall be filled with an inert fluid and a pressure gauge or approved leak detection device shall be attached to the annulus or the annulus allowed to remain open in order to determine leakage in the casing, tubing, or packer.
- (5) That the injection wells or system shall be equipped with a pressure limiting switch or other acceptable device which will limit the surface injection pressure to no more than 1300 pounds.
- (6) That the Secretary-Director of the Commission may administratively authorize a pressure limitation in excess of that set out in Order No. (5) above upon a showing by the operator that such higher pressure will not result in fracturing of the confining strata.
- (7) That the applicant shall not inject water into the Seven Rivers formation through any well located within one half mile of any of the 42 wells identified on Exhibit B attached hereto and by reference made a part hereof, at a pressure greater than hydrostatic until such well has been repaired or it has been shown to the satisfaction of the Secretary-Director of the Commission that such well will not serve as an avenue of escape for waters injection into the Seven Rivers formation and he has authorized a higher than hydrostatic pressure.
- (8) That the wells within the project area shall be equipped with risers or in another acceptable manner such as to facilitate the periodic testing of the bradenhead for pressure or fluid production.

-4-Case No. 6103 Order No. R-4717-A

- (9) That the operator shall immediately notify the supervisor of the Commission district office at Artesia 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, the leakage of water or oil from or around any plugged and abandoned well within the project area, or any other evidence of fluid migration from the injection zone, and shall take such timely steps as may be necessary or required to correct such failure or leakage.
- (10) That monthly progress reports of the waterflood project herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1115 of the Commission Rules and Regulations.
- (11) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

PHIL R. LUCERO, Chairman

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

SEAL

## GETTY OIL COMPANY SKELLY UNIT Additional Authorised Injection Wells

## All in Township 17 South, Range 31 East, NMPM

#### SINGLE COMPLETIONS

Skelly Unit Well No.	Unit	Section		
4	B	21		
6	D	21		
8	G	21		
14	T.	21		

#### DUAL COMPLETIONS

Skelly Unit Well No.	Unit	Section
3	Ð	22
22	J	14
24	L	14
26	J	15
30	N	15
32	P	15
34	N	14
36	P	14
38	В	23
40	D	23
42	В	22
44	r	22
46	H	22
48	F	23
50	H	23
52	J	22
56	N	22
58	P	22
71	J	23
73	Ľ	23
79	N	23
83	D	26
85	В	27
87	D	27
91	D	28
93	P	28
96	F	27
100	L	28

Case No. 6103 Order No. R-4717-A

Exhibit "A"

		Well				
Operator	Lease	No.	Ut.	Sec.	Twp.	Rge.
Atlantic Rich.	Turner "B"	1	P	17	17	31
Company		7	ō	17	17	31
Company		9	Ä	20	17	31
		10	Ĝ	20	17	
						31
		11	H	20	17	31
		30	P	17	17	31
		47	B	29	17	31
		49	G	29	17	31
		51	I	20	17	31
		55	H	29	17	31
		59	λ	29	17	31
		61	J	29	17	31
		62	Ī	29	Ĩ7	31
		63	ō	29	17	31
		68				
			P	29	17	31
		69	В	29	17	31
		78	J	20	17	31
	West "B"	20	0	10	17	31
_						
Murchison &						
Closuit	Foster Federal	1	I	17	17	31
	State "A"	1	K	16	17	31
	State "A"	2	L	16	17	31
	State "B"	ī	J	16	17	31
	State B	2		16	17	
		2	0			31
		3	P	16	17	31
William A. &		_				
Edward R. Hudson	Puckett "A"	9	F	24	17	31
		10	E	24	17	31
		13	D	24	17	31
		14	M	13	17	31
		20	F	24	17	31
		27	K	24	17	31
	Puckett "P"	8	ĉ	25	17	31
	1 donote b	•	•			<b>31</b>
Getty Oil Co.	State "AZ"	1	M	16	17	31
oger, orr co:				14		
	Skelly Unit	23	K		17	31
		29	M	15	17	31
		31	0	15	17	31
		35	0	14	17	31
		45	G	22	17	31
		55	M	22	17	31
	á	72	K	23	17	31
		78	M	23	17	31
		106	C	15	17	31
		116	L	22	17	31
		<del>-</del>				

Case No. 6103 Order No. R-4717-A

Exhibit "B"