CASE 3866: Application of SHELL OIL COMPANY FOR SALT WATER DISPOSAL, CHAVES COUNTY, N. MEX.

Case Number

3866

Application

Transcripts.

Small Exhibits

ETC.

SHELL OIL COMPANY
PETROLEUM BUILDING
P.O. BOX 1509
MIDLAND, TEXAS 79701

'69 FEB PM 1

February 25, 1969

Subject: Salt Water Disposal
Cato Field
Chaves County, New Mexico

File NMOCC 3866

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico 87501

Gentlemen:

Shell Oil Company began disposal of salt water into its Thelma Crosby "F" Well No. 1 on Monday, February 24, 1969. Disposal is through plastic coated tubing. The casing-tubing annulus is filled with inhibited fresh water and is monitored for leaks by a pressure gauge attached to the annulus at the surface. These conditions comply with the stipulations of NMOCC Order No. R-3511, dated October 2, 1968.

Should further information be required, please advise.

Yours very truly,

L. S. Mitchell

for S. M. Paine, Manager
Production Department - West
Midland Division

DSK:MKM

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

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

October 2[illegible], 1968

Mr. Richard S. Morris
Montgomery, Federici, Andrews,
Hannahs & Morris
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Re: Case No. 3866
Order No. R-3511
Applicant:
Shell Oil Company

Dear Sir:

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC
Other

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. 3866
Order No. R-3511

APPLICATION OF SHELL OIL COMPANY
FOR SALT WATER DISPOSAL, CHAVES
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on September 25, 1968, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 2nd day of October, 1968, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Shell Oil Company, is the owner and operator of the Thelma Crosby "F" Well No. 1, located in Unit H of Section 17, Township 9 South. Range 30 East, NMPM, Cato-San Andres Pool area, Chaves County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the San Andres formation, with injection into the perforated interval from approximately 3360 feet to 3512 feet.

(4) That the injection should be accomplished through 2-inch tubing installed in a packer set at approximately 3350 feet; that the casing-tubing annulus should be filled with an inert fluid; and that a pressure gauge should be attached to

the annulus at the surface in order to determine leakage in the casing, tubing, or packer.

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

IT IS THEREFORE ORDERED:

(1) That the applicant, Shell Oil Company, is hereby authorized to utilize its Thelma Crosby "F" Well No. 1, located in Unit H of Section 17, Township 9 South, Range 30 East, NMPM, Cato-San Andres Pool area, Chaves County, New Mexico, to dispose of produced salt water into the San Andres formation, injection to be accomplished through 2-inch tubing installed in a packer set at approximately 3350 feet, with injection into the perforated interval from approximately 3360 feet to 3512 feet;

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

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

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

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

esr/

SHELL OIL COMPANY
WESTERN DIVISION
P. O. BOX 1509
MIDLAND, TEXAS 79701

August 30, 1968

Subject: Salt Water Disposal
Cato Field
Chaves County, New Mexico

Case 3866

SEP 3 AM 8 20

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico 87501

Gentlemen:

Attached is an Application to Dispose of Salt Water by Injection Into a Porous Formation submitted by Shell Oil Company to test the injectivity and if satisfactory to begin salt water disposal into the Thelma Crosby "F" No. 1 Well located in Unit H Section 17, T-9-S, R-30-E in Chaves County, New Mexico. Also attached are waivers from all offset operators and the surface owner, a log of the proposed injection well, a diagrammatic sketch of the proposed injection well, and a plat of offset wells producing in the same proposed injection zone.

Shell Oil Company respectfully requests permission for injection of 1000 BPD of brine water (250,000 TDS) produced in conjunction with oil and gas operations in the Cato Field. It is anticipated that the maximum pressure required for both the test and injection will not exceed 1500 psi.

Although wells in the area are producing from the proposed injection formation, completion tests indicated that the well is located well below the oil-water contact.

Should further information be required, please advise.

Yours very truly,

for S. M. Paine
Division Production Manager
Midland Division West

GAM:MKM

Attachments

DOCKET MAILED
Date 9-13-68

Case 3866

Form C-108
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

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

OPERATOR	ADDRESS
Shell Oil Company (Western Division)	P. O. Box 1509, Midland, Texas 79701

LEASE NAME	WELL NO.	FIELD	COUNTY
Thelma Crosby F	1	Cato Field	Chaves

LOCATION

UNIT LETTER H ; WELL IS LOCATED 1980 FEET FROM THE north LINE AND 660 FEET FROM THE east LINE, SECTION 17 TOWNSHIP 9-S RANGE 30-E NMPM. Chaves County

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY
SURFACE CASING					
24# J-55	8 5/8"	270'	200	Circ. Cement	
INTERMEDIATE					
10.5# J-55	4 1/2"	3550'	400	2600	Temp. Survey
LONG STRING					
TUBING			NAME, MODEL AND DEPTH OF TUBING PACKER		
EUE	2"	3350'	Baker Model A at 3350'		

NAME OF PROPOSED INJECTION FORMATION	TOP OF FORMATION	BOTTOM OF FORMATION
San Andres	2659'	3920'±

IS INJECTION THROUGH TUBING, CASING, OR ANNULUS?	PERFORATIONS OR OPEN HOLE?	PROPOSED INTERVAL(S) OF INJECTION
Tubing	Perforations	3360' - 3512'

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

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

DEPTH OF BOTTOM OF DEEPEST FRESH WATER ZONE IN THIS AREA	DEPTH OF BOTTOM OF NEXT HIGHER OIL OR GAS ZONE IN THIS AREA	DEPTH OF TOP OF NEXT LOWER OIL OR GAS ZONE IN THIS AREA
Above 250'	None	None

ANTICIPATED DAILY INJECTION VOLUME (BBLS.) MINIMUM	MAXIMUM	OPEN OR CLOSED TYPE SYSTEM	IS INJECTION TO BE BY GRAVITY OR PRESSURE?	APPROX. PRESSURE (PSI)
560	1000	Closed	Pressure	1500

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

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

Mrs. Bob Crosby c/o Emmet McCombs, Kenna, New Mexico

LIST NAMES AND ADDRESSES OF ALL OPERATORS WITHIN ONE-HALF (½) MILE OF THIS INJECTION WELL

The Superior Oil Company, P. O. Box 1900, Midland, Texas 79701

Midwest Oil Corporation, 1500 Wilco Building, Midland, Texas 79701

68 SEP 3 AM 9 20

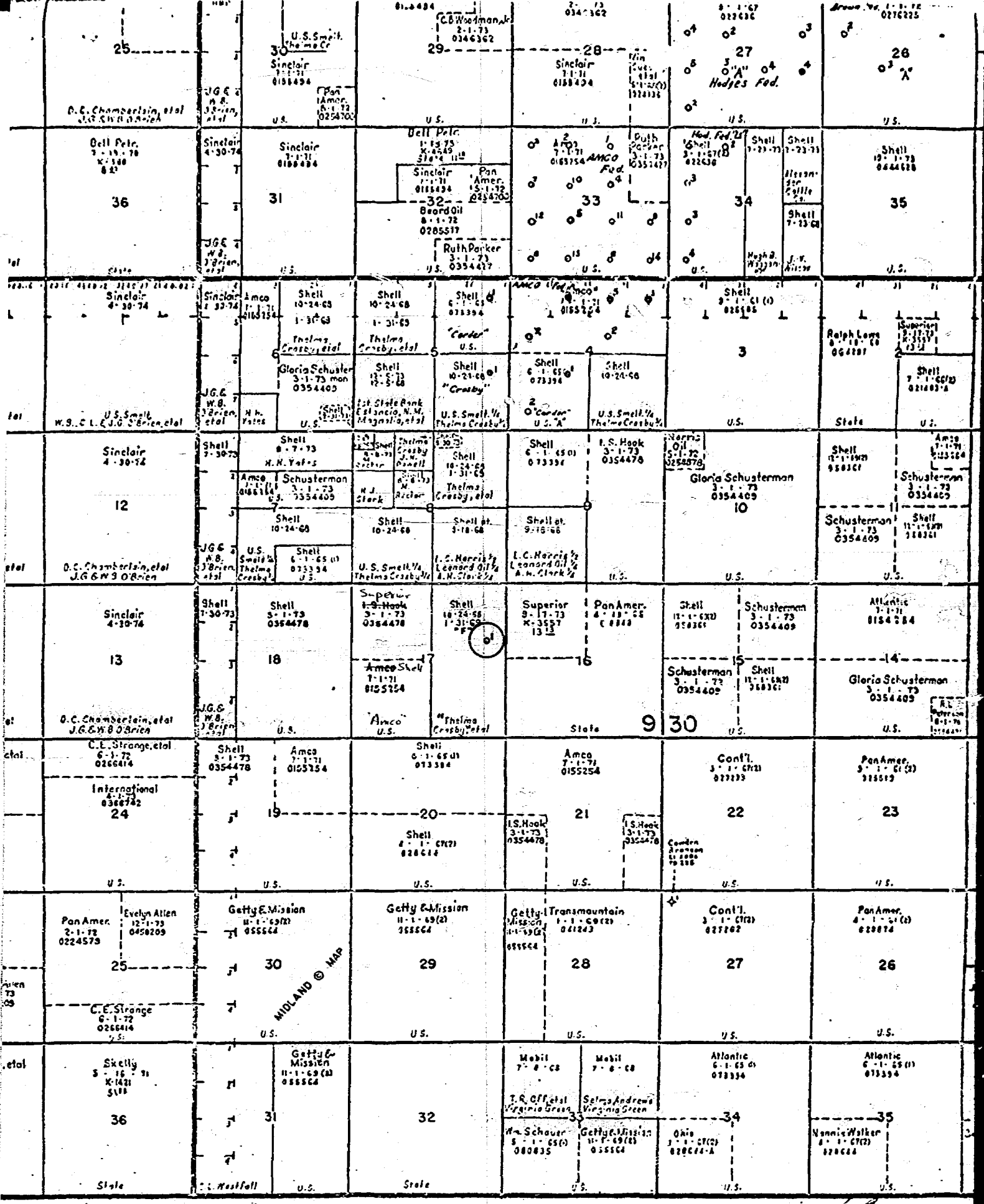
HAVE COPIES OF THIS APPLICATION BEEN SENT TO EACH OF THE FOLLOWING? SURFACE OWNER	EACH OPERATOR WITHIN ONE-HALF MILE OF THIS WELL	THE NEW MEXICO STATE ENGINEER
Yes	Yes	Yes

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

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

J. M. Lawrence (Signature) for Division Production Manager (Title) 8/30/68 (Date)

NOTE: Should waivers from the State Engineer, the surface owner, and all operators within one-half mile of the proposed injection well not accompany this application, the New Mexico Oil Conservation Commission will hold the application for a period of 15 days from the date of receipt by the Commission's Santa Fe office. If at the end of the 15-day waiting period no protest has been received by the Santa Fe office, the application will be processed. If a protest is received, the application will be set for hearing, if the applicant so requests. SEE RULE 701.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D.C. Chamberlain, etal J.G.&W.B. O'Brien
Sinclair 4-30-74
12
Sinclair 4-30-74
13
D.C. Chamberlain, etal J.G.&W.B. O'Brien
C.E. Strange, etal 6-1-72 0266414
International 4-1-73 0366742
24
U.S.
Pan Amer. 2-1-72 0224579
Evelyn Allen 12-1-73 0458209
25
C.E. Strange 6-1-72 0266414
U.S.
Skelly 5-16-71 K-1431 5188
36
State
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Sinclair 3-1-71 0188494
Pan Amer. 5-1-72 0254700
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Amco 7-1-71 0155254
Shell 10-24-68
1-31-69
Thelma Crosby, etal
Gloria Schuster 3-1-73 mon 0354409
H.H. Yates
U.S.
Shell 8-7-73
H.H. Yates
Amco 7-1-71 0155254
Schusterman 3-1-73 0354409
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Shell 10-24-68
U.S. Smelt, Thelma Crosby
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Shell 7-30-73
Shell 5-1-73 0354478
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Shell 7-30-73
J.G.& W.B. O'Brien, etal
U.S.
Amco 7-1-71 0155254
Shell 6-1-73 0354478
19
U.S.
Getty & Mission 11-1-69(2) 055564
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MIDLAND © MAP
U.S.
Getty & Mission 11-1-69(2) 055564
31
U.S.
Getty & Mission 11-1-69(2) 055564
U.S.
C.B. Woodman, Jr. 2-1-73 0346362
29
Bell Pete. 3-19-70 K-568 8.82
Sinclair 3-1-71 0188494
Pan Amer. 5-1-72 0254700
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Beard Oil 8-1-72 0285519
Ruth Parker 3-1-73 0354417
U.S.
Shell 10-24-68
1-31-69
Thelma Crosby, etal
Shell 13-5-73
12-5-68
1st State Bank Estancia, N.M. Magnolia, etal
Shell 6-1-65 073394
"Carter"
U.S.
Shell 10-24-68
"Crosby"
U.S. Smelt, Thelma Crosby
Shell 10-24-68
1-31-68
Thelma Crosby, etal
Shell 10-24-68
U.S. Smelt, Thelma Crosby
Shell at 3-18-68
L.C. Harris, Leonard Oil, A.N. Clark
Superior I.S. Hook 3-1-73 0354478
Amco Shell 7-1-71 0155254
Amco
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1-31-69
Thelma Crosby, etal
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Sinclair 3-1-71 0188494
Amco 7-1-71 0155254
AMCO Fed.
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Shell at 9-15-66
L.C. Harris, Leonard Oil, A.N. Clark
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Superior 9-17-73 K-3557 13
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State
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Ruth Parker 3-1-73 0351427
Shell 7-23-73
Hugh B. Williamson
J.V. Kinsey
34
Shell 6-1-65 (1) 073394
I.S. Hook 3-1-73 0354478
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Mobil 7-8-68
T.R. Off, etal Virginia Green
Mobil 7-8-68
Selma Andrews Virginia Green
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W. Schauer 5-1-65(1) 080835
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J.V. Kinsey
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Shell 6-1-65 (1) 073394
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"Carter"
U.S. "A"
Shell 10-24-68
U.S. Smelt, Thelma Crosby
Shell 10-24-68
U.S.
Norris Oil 3-1-72 0254578
Gloria Schusterman 3-1-73 0354409
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Shell 3-1-73 0354478
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Pan Amer. 4-19-65 C 8843
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State
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Schusterman 3-1-73 0354409
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Schusterman 3-1-72 0354409
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Cont'l. 3-1-67(2) 022702
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Shell 10-1-73 0444628
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Ralph Lowe 8-18-66 064881
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Shell 11-1-63(2) 058361
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Atlantic 3-1-71 0154284
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Gloria Schusterman 3-1-73 0354409
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Pan Amer. 4-1-67(2) 029874
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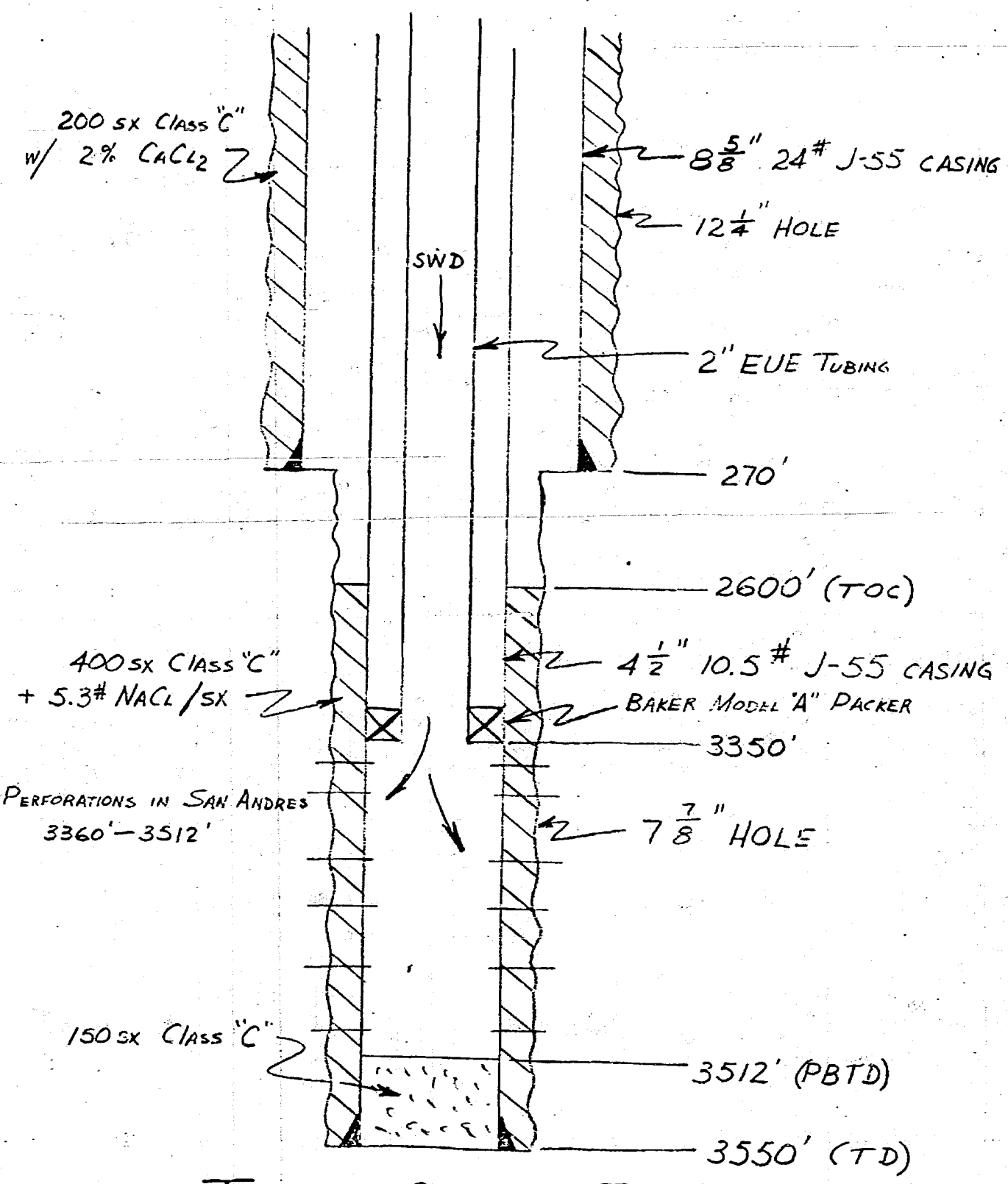
Pan Amer. 4-1-67(2) 029874
23
U.S.
Atlantic 6-1-65 (1) 073394
35
Nannie Walker 4-1-67(2) 029874
U.S.

Cell 3866



THELMA CROSBY F No. 1

SHELL OIL COMPANY

DSK
7-29-68

SHELL OIL COMPANY

WESTERN DIVISION
P. O. BOX 1509
MIDLAND, TEXAS 79701

July 30, 1968

Case 3866

Subject: Disposal of Salt Water into Thelma Crosby F No. 1, Cato Field, Section 17, T-9-S, R-30-E Chaves County, New Mexico

Midwest Oil Corporation
1500 Wilco Building
Midland, Texas 79701

Gentlemen:

Shell Oil Company is presently considering the Thelma Crosby F No. 1 for subsurface disposal of produced water. Shell would like to test the San Andres formation, in the interval between 3360 and 3512 feet, for possible disposal zones. If injectivity tests prove successful, Shell would convert the well to facilitate disposal of 1000 BWPD.

For your information, you will find attached a copy of the NMOCC Form C-108, a plat of the area and a schematic drawing of the subject well.

If the proposed test and installation meet your approval, please sign and return two copies of this waiver to this office. The waiver will accompany the NMOCC Form C-108 at the time formal application is made.

Yours very truly,

ORIGINAL SIGNED
By J. E. R. SHEELER

J. E. R. Sheeler
Division Production Manager

Attachments

The Midwest Oil Corporation has no objections to use of the subject well for salt water disposal as outlined above.

John Reed, Dist. Engr. — 8-5-68

Name and Title — Date

SHELL OIL COMPANY
WESTERN DIVISION
P. O. BOX 1509
MIDLAND, TEXAS 79701

July 30, 1968

Case 3866

Subject: Disposal of Salt Water into Thelma Crosby F No. 1, Cato Field, Section 17, T-9-S, R-30-E Chaves County, New Mexico

Mrs. Bob Crosby
c/o Emmet McCombs
Kenna, New Mexico

Dear Mrs. Crosby:

Shell Oil Company is presently considering the Thelma Crosby F No. 1 for subsurface disposal of produced water. Shell would like to test the San Andres formation, in the interval between 3360 and 3512 feet, for possible disposal zones. If injectivity tests prove successful, Shell would convert the well to facilitate disposal of 1000 BWPD.

For your information, you will find attached a copy of the NMOCC Form C-108, a plat of the area and a schematic drawing of the subject well.

If the proposed test and installation meet your approval, please sign and return two copies of this waiver to this office. The waiver will accompany the NMOCC Form C-108 at the time formal application is made.

Yours very truly,

ORIGINAL SIGNED
By J. E. R. SHEELER

J. E. R. Sheeler
Division Production Manager

Attachments

I, Mrs. Bob Crosby, have no objections to use of the subject well for salt water disposal as outlined above.

Thelma Crosby Owner — 8/26/68
Name and Title — Date

SHELL OIL COMPANY

WESTERN DIVISION
P. O. BOX 1509
MIDLAND, TEXAS 79701

July 30, 1968 *Case 3866*

Subject: Disposal of Salt Water into Thelma Crosby F No. 1, Cato Field, Section 17, T-9-S, R-30-E Chaves County, New Mexico

Midwest Oil Corporation
1500 Wilco Building
Midland, Texas 79701

Gentlemen:

Shell Oil Company is presently considering the Thelma Crosby F No. 1 for subsurface disposal of produced water. Shell would like to test the San Andres formation, in the interval between 3360 and 3512 feet, for possible disposal zones. If injectivity tests prove successful, Shell would convert the well to facilitate disposal of 1000 BWPD.

For your information, you will find attached a copy of the NMOCC Form C-108, a plat of the area and a schematic drawing of the subject well.

If the proposed test and installation meet your approval, please sign and return two copies of this waiver to this office. The waiver will accompany the NMOCC Form C-108 at the time formal application is made.

Yours very truly,

ORIGINAL SIGNED
By J. E. R. SHEELER

J. E. R. Sheeler
Division Production Manager

Attachments

The Midwest Oil Corporation has no objections to use of the subject well for salt water disposal as outlined above.

John Pitts, Div. Engr. — Name and Title

8-5-68 — Date

CASE 3865: Application of Southern Union Production Company for an unorthodox location and a dual completion, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Jicarilla "A" Well No. 9 to produce gas from the Blanco-Mesaverde and Basin Dakota Pools at an unorthodox location for the Blanco-Mesaverde Pool 790 feet from the North line and 1670 feet from the West line of Section 14, Township 26 North, Range 4 West, Rio Arriba County, New Mexico.

CASE 3866: Application of Shell Oil Company for salt water disposal, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from approximately 3360 feet to 3512 feet in its Thelma Crosby "F" Well No. 1 located in Unit H of Section 17, Township 9 South, Range 30 East, Cato-San Andres Pool area, Chaves County, New Mexico.

CASE 3867: Application of Tenneco Oil Company for a unit agreement, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks approval of the South Hospah Unit Area comprising 476 acres, more or less, of federal lands in Section 12, Township 17 North, Range 9 West, South Hospah Upper Sand Oil Pool, McKinley County, New Mexico.

CASE 3868: Application of Texaco, Inc., for a waterflood expansion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks expansion of the Texaco BV Waterflood Project, Lazy J-Pennsylvanian Pool, by the conversion to water injection of its "BV" State (NCT-1) Well No. 5 located in Unit M of Section 26, Township 13 South, Range 33 East, Lea County, New Mexico.

CASE 3869: Application of Texaco, Inc., for a down-hole commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle the marginal production from the Blinebry and Paddock Oil Pools in the wellbore of its C. H. Lockhart Federal NCT-1 Well No. 3 located in Unit O of Section 18, Township 22 South, Range 38 East, Lea County, New Mexico.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
September 25, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Shell Oil Company for salt water disposal, Chaves County, New Mexico.

Case No. 3866

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will take up Case Number 3866.

MR. HATCH: Case 3866, application of Shell Oil Company for salt water disposal, Chaves County, New Mexico.

MR. MORRIS: Mr. Examiner, I'm Dick Morris, of Montgomery, Federici, Andrews, Hannahs and Morris, Santa Fe, appearing for the applicant Shell Oil Company. I have one witness, Mr. Bob Norris, and ask that he stand and be sworn at this time.

(Witness sworn.)

(Whereupon, Applicant's Exhibits Numbers 1, 2, and 3 were marked for identification.)

ROBERT P. NORRIS

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Norris, will you please state your name, where you reside, and by whom you are employed and in what capacity?

A Robert P. Norris. I reside in Midland, Texas, and I'm employed by Shell Oil Company as a Production Geologist in the Exploitation Section.

Q Will you please state briefly your education and your experience in the petroleum industry?

A I have a Bachelor of Science Degree from Yale University in 1948, Master of Science Degree in Geology from Kansas University in 1951. I have been employed since 1951 by Shell Oil Company in various aspects of exploration, and have recently transferred to the Exploitation Section.

Q Now, are you familiar with Shell's application in this case?

A Yes. We are seeking authority to dispose of produced salt water into the San Andres Formation and perforate intervals from approximately 3360 feet to 3512 feet in the Thelma Crosby "F" Well No. 1 located in Unit H of Section 17, Township 9 South, Range 30 East in the Cato-San Andres Pool, Chaves County, New Mexico.

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

MR. NUTTER: Yes, they are.

Q Mr. Norris, will you please step up to what has been marked as Exhibit 1 in this case, and point out the location of the subject well and the other matters that are shown on that exhibit?

A Exhibit 1 is a structural contour map on the Cato Field, the black dots being the producing interval. A portion of this was cut off. The well in question is the Crosby "F" 1

down here with the red arrow and the structural connotation of this is that on this San Andres marker, the "F" 1 is invariably near the oil-water contact as you can predict it. However, I would like to say that it is very unpredictable in this vicinity to exactly distinguish a true oil-water contact. We believe that it is generally, structurally on the southeast flank of the field. It's separated right now by a mile and a half from a marginal producer, and in between is an abandoned San Andres test. The line of the cross-section as shown on Exhibit 2 goes from the Amco 10 to the Crosby "F" 1 to these wells.

Q How far is the subject well from the nearest producer?

A Right now, it is a mile and a half, separated in between by, apparently, a water-wet San Andres test.

Q Will you resume your seat, please.

MR. NUTTER: Two miles, isn't it, to the nearest producer?

THE WITNESS: No. I'm sorry, sir, this is a square section right here, but -- wouldn't this be a mile?

MR. NUTTER: A mile and a half to the dry hole; two miles to the producer.

THE WITNESS: I see your point. I'm sorry. I thought

that this would be a mile. I was taking it across the quarter-sections. Approximately two miles to the nearest producer.

Q Would you refer to the cross-section marked as Exhibit Number 2.

A The cross-section is utilizing some porosity logs with the subject well, with Thelma Crosby; the one on the left or the south, to which the perforations that have been made and attempted producing this from what is commonly known in our terminology as the San Andres A-1 and A-2 sub-zones. As you can see, the rates that were recovered from the perforated interval in the Crosby "F" 1 recovered water with a trace of oil at approximately the rate of ten barrels per hour. The lower San Andres in the Crosby "F" 1, the A-3 zone and the BC were all considered to be porous and very water-wet by electric log analyses and were not tested.

Up to the Crosby "C" 1, the "C" 1 had a production test from 3336 to 3357, treated with 2,000 gallons of acid and swabbed three barrels of oil, plus seventeen barrels of water in one hour. Those perforations were squeezed and a notch perforation was attempted, treated with 500 gallons of acid and it was swabbed at the rate of 35 and a half barrels of water in ten hours and it was temporarily abandoned in April of this year.

Proceeding to the north on the Crosby, the Shell Thelma Crosby 1 as the nearest producer, it's producing through perforations of 3337, 3359, and was known as the A-2 sub-zone. It was treated with 2,000 gallons of acid and pumped 78 barrels of oil, plus 13 barrels of water per day. The lower intervals in this well were also condemned by electric log analyses as containing high saturation salt water. The Shell Amco Federal A-1 was perforated over the A-1, the A-2, the A-3 and the BC interval from 3387 to 3466, treated with 4,000 gallons of acid, and on initial potential, it flowed 282 barrels of oil per day and no water. Likewise, to the main portion of the field in the Amco Federal 10, the perforations are over the entire San Andres interval A-1 through the BC, 3427 to 3481. The perforations were treated with 5,000 gallons of acid and on OPT, that flowed 336 barrels of oil per day. The structural difference as between 50 and 70 feet; higher on the Amco Federal 10 than the Thelma Crosby "F" 1. So we are considered to be down dip.

Q Mr. Norris, the perforations shown in the subject well on this exhibit are the presently existing perforations in this well, is that correct?

A That is true.

Q Your application seeks permission to inject water into

the entire San Andres zone in this well which would be a much larger area than the present perforations, is that correct?

A That is correct.

Q Has any injectivity tests been run on the well?

A Yes. There has been a trial injection of water through the present perforations to which only 1.2 barrels per hour with a 2100 psi pressure, and so it is our intentions, with approval, to perforate the lower zones in which the porosity is of a greater magnitude; ten and fourteen per cent porosity in the lower zones.

Q So it will be necessary to come into the well and re-perforate?

A Yes, it will.

Q What is the source of water that you expect to dispose of through this well?

A It's from current producing wells in the north of this well in the Cato Field. The edge wells in the field are making considerable water.

Q How much water per day do you expect to inject into this well, assuming it will take it?

A We have anticipated a daily injection volume between 560 and 1,000 barrels per day.

Q What pressure will the water be injected at?

A Approximately 1500 psi, not to exceed that.

Q Please refer to the diagrammatic sketch marked as Exhibit 3 and point out the significant features of that exhibit.

A The surface casing, eight and five-eighths is set at 270 feet, using 200 sacks of cement. The approximate lowest water, fresh water zone, it's about 250 feet. They have seven and seven-eighths inch casing set to 3550 feet with 400 sacks of cement. The top of the cement is calculated from temperature surveys to be approximately 2600 feet. They will inject the water through the tubing with a Baker Model A Packer set at 3350 to perforations from 3360 to 3512.

Q Will the annular space between the tubing and the casing be filled with any kind of an inhibited fluid?

A Yes, it will.

Q In the interval between 270 feet and 2600 feet, are there any fresh water or productive zones?

A None. Not to my knowledge.

Q Has a long on this well previously been furnished to the Commission with the application in this case?

A Yes, I believe it has a log and a diagrammatic sketch and the waivers from all offset operators.

Q In your opinion, Mr. Norris, will injection of water

into this well in the manner that you have outlined create a hazard to any oil or gas production or to any fresh water zones in this area?

A Not to my knowledge. We feel that it is considerably down dip from the development and the edge of the current field.

MR. MORRIS: At this time, Mr. Examiner, we offer into evidence Applicant's Exhibits 1, 2, and 3.

MR. NUTTER: Applicant's Exhibits 1 through 3 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1, 2, and 3 were admitted into evidence.)

MR. MORRIS: That's all I have of Mr. Norris at this time.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Norris, now, there are two overlapping sets of perforations in the well at the present time, is that correct, as indicated from your cross-section?

A Yes. The first one was squeezed.

Q Oh, it has been squeezed?

A Yes.

Q So you've only got perforated interval number 2 being from 3375 to 3400 open?

A If I may, I would like to say that that is in error and that the typist typed it backwards and that "1" should be "2" and vice versa; that is, the 3375, 3400 was squeezed, and it's open now as 3373 to 3386.

Q That's number 2, then?

A Yes. I failed to note that, to bring that to your attention.

Q So that the zone, then, that's open at the present time is 3373 to 3386?

A That is correct.

Q And you ran an injection test on that zone, and how much water did it take?

A Only 1.2 barrels per hour.

Q And that was at 2100 pounds pressure?

A Yes.

Q So then it is your proposal to open the well from 3360 clear down to 3512 which would be the entire San Andres A-1, A-2, A-3 and the B and C zones?

A It looks like most of the injection would be in the A-3 and the BC, the greater porous interval there.

Q And this is where the whole salt water is anyway, isn't it?

A That's right. From electric log calculations, it's

90 to 100 per cent salt water saturations.

Q And the nearest productive well is two miles to the north being Shell's Crosby "C" 1?

A From the A-2 interval.

Q Now, this well, when it was completed, made how much?

A Water? The Crosby 1 pumped 78 barrels of oil, plus 13 barrels of water per day.

Q And what is its present potential?

A The last I saw of it was about 25 barrels of oil and about maybe 30 barrels of water. It's dropped off.

Q And the water cut on it has increased?

A Yes.

Q Now, you stated that the annulus would be filled with an inhibited fluid?

A Yes.

Q This annulus can be left open or equipped with a pressure gauge to detect tubing or packer leakage, correct?

A Right.

Q Which would be done?

A We would probably have both, if that's permissible. I mean, we have, on the well head, some detector of --

Q Well, it wouldn't do any good to put a pressure gauge

if you left it open?

A Well, we would have the tubing under the pressure. We would have the pressure gauge on the tubing.

Q And how would you detect a leak in it?

A Well, now, you --

Q I'm talking about the annulus now. If the annulus is loaded with fluid and you had a leak, why, your pressure would go up on the annulus if you had a gauge on the annulus?

A Right.

Q And so, will you equip the annulus with a gauge also?

A Right.

MR. NUTTER: Are there any further questions of Mr. Norris? How about you, Mr. Morris?

MR. MORRIS: I have nothing further.

MR. NUTTER: The witness may be excused. Does anyone have anything they wish to offer in Case Number 3866? We'll take the case under advisement.

I N D E X

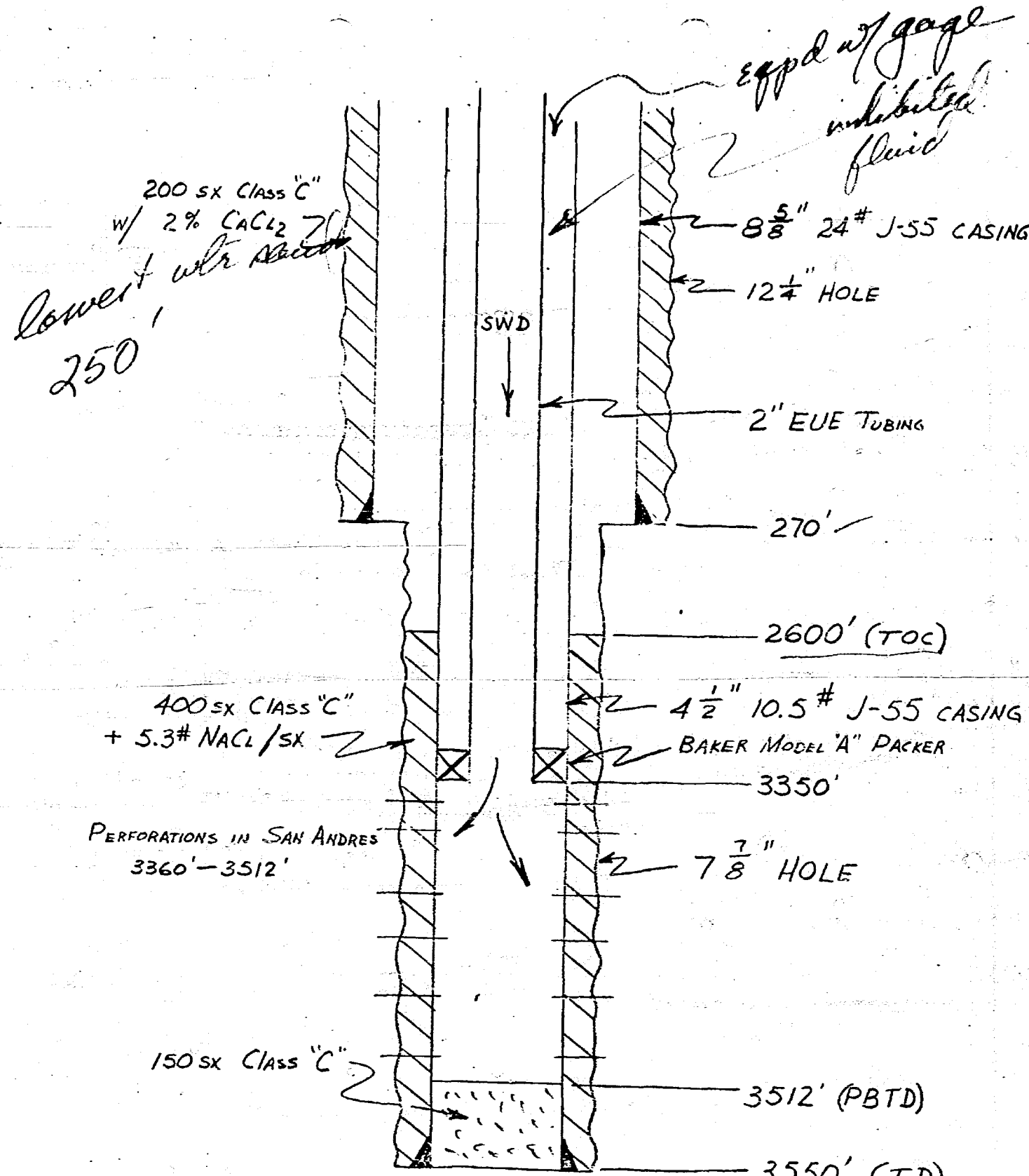
STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

Charlotte Macias
Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case 3866, heard by me on 9/25, 1968.

....., Examiner
New Mexico Oil Conservation Commission



THELMA CROSBY F No. 1

DSK
7-29-68

SHELL OIL COMPANY

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
Appli. EXHIBIT NO. 3
CASE NO. 3666