

CASE 2798: Application of PAN AM.

CASE No.
2798

Application,
TRANSCRIPTS,
SMALL Exhibits
ETC.

DRAFT

JMD/esr
April 26, 1963

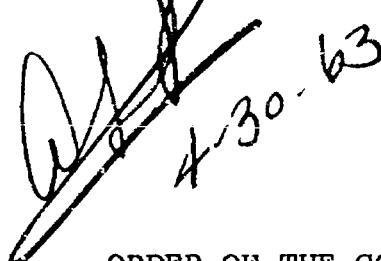
BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 2798

Order No. R- 2475

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


ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 24, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 24th day of April, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Pan American Petroleum Corporation, seeks authority to dually complete its Navajo "C" Well No. 1, located in Unit D of Section 1, Township 29 North, Range 17 West, NMPM, San Juan County, New Mexico, to produce hydrocarbons from the Pennsylvanian-Paradox formation and to dispose of produced salt water into the Entrada, Chinle, and Cutler formations.

(3) That the applicant proposes to inject the produced salt water down the annulus between the 10 3/4-inch intermediate casing and the 7 5/8-inch production casing into the open hole interval between the 10 3/4-inch casing shoe at approximately 2300 feet and the top of the cement, at approximately 5000 feet.

(4) That the produced salt water is unfit for domestic, stock, irrigation, or other general use and that the proposed disposal interval is non-productive of oil, gas, or fresh water in this area.

(5) That there is no vertical communication between the proposed injection zone and the proposed producing zone in the subject well.

(6) That the mechanics of the proposed dual completion are feasible and in accordance with good conservation practices.

(7) That approval of the subject application will neither cause waste nor impair correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Pan American Petroleum Corporation, is hereby authorized to dually complete its Navajo "C" Well No. 1, located in Unit D of Section 1, Township 29 North, Range 17 West, NMPM, San Juan County, New Mexico, to produce hydrocarbons from the Pennsylvanian-Paradox formation and to dispose of produced salt water into the Entrada, Chinle, and Cutler formations.

PROVIDED HOWEVER, That the produced salt water shall be injected down the annulus between the 10 3/4-inch intermediate casing and the 7 5/8-inch production casing into the open hole interval between the 10 3/4-inch casing shoe at approximately 2300 feet and the top of the cement at approximately 5000 feet.

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

(2) 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.

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March 20, 1963



FARMINGTON DISTRICT	
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Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

Reference is made to the application of Pan American Petroleum Corporation dated March 22, 1963 which seeks to dispose of salt water in the Pan American Petroleum Corporation Navajo "C" No. 1 undesignated Paradox Pool, San Juan County, New Mexico.

After reviewing the application and the exhibits submitted therewith, I have concluded that the injection of this water into the Entrada-Chinle formations will not constitute a threat of contamination to the fresh waters existing in the area. Therefore, this office offers no objection to the granting of this application.

Yours truly,

S. E. Reynolds
State Engineer

FEL/ma
cc-Mr. T. M. Curtis

By:
Frank E. Irby
Chief
Water Rights Division

BEFORE EXAMINER UTZ	
OIL CONSERVATION COMMISSION	
EXHIBIT NO.	6
CASE NO.	2798

MAIL OFFICE 600



1963 APR 1 AM STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

March 29, 1963

ADDRESS CORRESPONDENCE TO:
STATE CAPITOL
SANTA FE, N. M.

Mr. A. L. Porter, Jr.
Secretary-Director
Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Porter:

Reference is made to the application of Pan American Petroleum Corporation dated March 22, 1963 which seeks to dispose of salt water in the Pan American Petroleum Corporation Navajo "C" No. 1 undesignated Paradox Pool, San Juan County, New Mexico.

After reviewing the application and the exhibits submitted therewith, I have concluded that the injection of this water into the Entrada-Chinle formations will not constitute a threat of contamination to the fresh waters existing in the area. Therefore, this office offers no objection to the granting of this application.

Yours truly,

S. E. Reynolds
State Engineer

FEI/ma
cc-Mr. T. M. Curtis

By: *Frank E. Irby*
Frank E. Irby
Chief
Water Rights Division

DOCKET: EXAMINER HEARING - WEDNESDAY - APRIL 24, 1963

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

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

- CASE 2792: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Everett D. Burgett and all other interested parties to appear and show cause why the Meyers Union Well No. 1, located in Unit I of Section 11, Township 23 South, Range 27 East, and the Richardson-Bass State Well No. 1, located in Unit H of Section 5, Township 25 South, Range 28 East, both in Eddy County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.
- CASE 2793: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Everett D. Burgett and all other interested parties to appear and show cause why the Pure State Wells Nos. 1, 2, 3, and 7, located in Units J and O of Section 15, and the Magnolia State Well No. 1, located in Unit E of Section 14, all in Township 21 South, Range 27 East, Eddy County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.
- CASE 2794: Application of Ambassador Oil Corporation for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Grayburg-Jackson Unit Area comprising 1600 acres of Federal and State lands in Township 17 South, Range 30 East, Eddy County, New Mexico.
- CASE 2795: Application of Marathon Oil Company for a multiple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order authorizing the triple completion (conventional) of its State McCallister Well No. 5, located in Unit M of Section 25, Township 17 South, Range 34 East, Lea County, New Mexico, to produce oil from the North Vacuum Abo, the Vacuum-Wolfcamp, and the Vacuum-Devonian Pools through parallel strings of tubing.
- CASE 2796: Application of Texaco Inc. for an unorthodox well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill its L. R. Manning Federal "B" Well No. 4 at an unorthodox location 330 feet from the South line and 1491 feet from the East line of Section 28, Township 18 South, Range 30 East, North Benson Queen-Grayburg Pool, Eddy County, New Mexico.

- CASE 2797: Application of Texaco Inc. for a non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 360-acre non-standard gas proration unit comprising the SW/4, N/2 SE/4, and SE/4 SE/4 of Section 31, and the S/2 SW/4 of Section 32, Township 23 South, Range 37 East, Jalmat Gas Pool, Lea County, New Mexico, to be dedicated to its E. E. Blinebry "A" Well No. 2, located in Unit I of said Section 31.
- CASE 2798: Application of Pan American Petroleum Corporation for a salt water disposal dual completion, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete its Navajo "C" Well No. 1, located in Unit D of Section 1, Township 29 North, Range 17 West, San Juan County, New Mexico, to produce hydrocarbons from the Pennsylvanian-Paradox formation and to dispose of produced salt water through the intermediate casing annulus into the open hole interval from 2300 feet to approximately 5000 feet.
- CASE 2784: (Continued from April 10, 1963 Examiner Hearing)
Application of Continental Oil Company for authority to conduct interference tests, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to shut-in all wells in the Oil Center-Blinebry Pool, Lea County, New Mexico, for approximately 7 days to achieve stabilization, to leave one well shut-in for a period not to exceed 90 days to observe pressure behavior, and to transfer the allowables and make-up underproduction from the shut-in wells.
- CASE 2799: Application of Phillips Petroleum Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formations, Maljamar Pool, Lea County, New Mexico, through one well in Unit J, Section 2, Township 17 South, Range 32 East.
- CASE 2800: Application of Olen F. Featherstone for a special allowable, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order authorizing the assignment of a special allowable to his Valentine Well No. 1, located in Unit M of Section 27, Township 16 South, Range 31 East, Eddy County, New Mexico. Said well offsets and has received a response from Newmont's East Square Lake Waterflood Project.

-3-

Docket No. 13-63

CASE 2801:

Application of Socony Mobil Oil Company, Inc. for a multiple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the triple completion (conventional) of its State Bridges Well No. 96, located in Unit H of Section 26, Township 17 South, Range 34 East, Lea County, New Mexico, to produce oil from the Vacuum-Pennsylvanian, Vacuum-Wolfcamp, and North Vacuum-Abo Pools through parallel strings of tubing.

iqg/

PAN AMERICAN PETROLEUM CORPORATION

P. O. Box 480, Farmington, New Mexico
 March 22, 1963
 File: N-230-986.510.1

Subject: Application to Dispose
 of Salt Water in Pan
 American Petroleum Corporation's
 Navajo "C" No. 1
 Undesignated Paradox Pool
 San Juan County, New Mexico

Mr. A. L. Porter, Jr.
 Secretary-Director
 New Mexico Oil Conservation Commission
 P. O. Box 871
 Santa Fe, New Mexico

Dear Sir:

Pan American Petroleum Corporation hereby makes Application under the Administrative Provisions of Rule 701 for permission to dispose of salt water produced from the Navajo "C" No. 1, Undesignated Paradox Pool, into the 7-5/8 - 10-3/4-inch casing annulus in the Navajo "C" No. 1, located in Unit "D", Section 1, T-29-N, R-17-W, San Juan County, New Mexico. In connection with this Application, attached are the following exhibits:

1. Three copies of New Mexico Oil Conservation Commission form entitled "Application to Dispose of Salt Water By Injection into a Porous Formation Not Productive of Oil or Gas."
2. A map of the area showing the location of Navajo "C" No. 1 in the NW/4 of Section 1, T-29-N, R-17-W, and the location of the two wells in the Hogback Pennsylvanian Pool in Section 19, T-29-N, R-16-W.
3. A copy of the electric log on Navajo "C" No. 1 showing the 10-3/4-inch casing set at 2300 feet, approximately 332 feet below the top of the Entrada formation, and the top of the cement behind the 7-5/8-inch casing at 5000 feet or approximately 276 feet above the top of the Pennsylvanian-Hermosa formation.
4. A schematic diagram showing the casing program which was employed on Navajo "C" No. 1 together with the approximate location of the various formation tops in this well. The diagram also shows the present completion zone in the Pennsylvanian-Paradox formation and the

DOCKET MAILED

Date 4-11-63

[Handwritten signature]

March 22, 1963
N-230-986.510.1

amount of cement used in each casing string. It is the interval 2300 feet, the 10-3/4-inch casing seat, to 5000 feet, the top of the cement behind the 7-5/8-inch casing, that is proposed for use as a salt water disposal interval.

5. A copy of a water analysis obtained from the Pennsylvanian-Paradox formation on Navajo "C" No. 1 showing that the water produced from this well is unfit for domestic, stock, irrigation, and/or other general use.

With regard to the use of the Entrada-Chinle-Cutler interval in Navajo "C" No. 1 as a disposal interval, the following points are submitted:

1. By letter dated December 21, 1962, the United States Geological Survey stated that that agency had no objection to the use of this approximate interval as a disposal zone in the nearby Hogback Pennsylvanian Pool.
2. By letter dated January 28, 1963, the State Engineer's Office stated that that office had no objection to the use of the equivalent interval for salt water disposal in the Hogback Pennsylvanian Pool.
3. By Order R-2438, dated February 27, 1963, the NMOCC granted its approval for the use of the Entrada-Chinle interval in USG Section 19 Well No. 17 as a salt water disposal zone in the Hogback Pennsylvanian Pool.
4. In connection with the Application and at the hearing, after which Order R-2438 was issued, a water sample from the Entrada formation in the Pan American Navajo Tribal No. 1, located in the NW/4 NW/4 of Section 12, T-29-N, R-17-W, was submitted showing that the water contained in the Entrada formation is unfit for domestic, stock, irrigation, and/or other general use.
5. The proposed disposal interval in Navajo "C" No. 1 is not known to be productive of oil, gas or fresh water anywhere in the vicinity of this well.
6. The casing program used on this well adequately protects the known fresh or brackish water zones of the Dakota-Morrison formation from contamination by the injected water, and it also protects the Pennsylvanian producing interval in the well from the injected water.

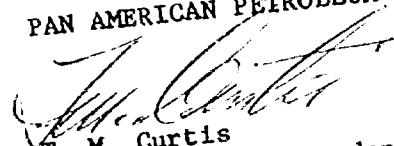
March 22, 1963
N-230-986.510.1

Page 3
Mr. A. L. Porter, Jr.

Copies of this Application are being furnished to the U.S.G.S.
and to the State Engineer's office.

Yours very truly,

PAN AMERICAN PETROLEUM CORPORATION


T. M. Curtis
District Superintendent

GWE:en
Attachments

File
2798

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

APPLICATION
TO DISPOSE OF SALT WATER BY INJECTION INTO A POROUS FORMATION
NOT PRODUCTIVE OF OIL OR GAS

Operator Pan American Petroleum Corporation Address Box 480, Farmington, New Mexico

Lease Navajo "C" Well No. 1 County San Juan

Unit D Section 1 Township 29-N Range 17-W

This is an application to dispose of salt water produced from the following pool(s):

Undesignated Paradox

Name of Injection Formation(s): Entrada, Chinle, Cutler

Top of injection zone: 2300' Bottom of injection zone: 5000'

Give operator, lease, well no., and location of any other well in this area using this same

zone for disposal purposes: Pan American Petroleum Corporation, USG Section 19 Well No. 17,

790' FEL and 1850' FSL, Section 19, T-29-N, R-16-W

CASING PROGRAM

	Diameter	Setting Depth	Sacks Cement	Top of Cement
Surface	16"	361'	500	Circulated
Intermediate	10-3/4"	2300'	1300	Circulated
Long String	7-5/8"	5570'	150	5000'
Liner	5"	5377-7026'	260	5377'

Will injection be through tubing, casing, or annulus? _____

Size tubing 2-3/8" Setting depth: 6364' Packer set at. None

Name and Model No. of packer: _____

Will injection be through perforations or open hole? Open hole between 7-5/8" and 10-3/4"
casing string.

Proposed interval(s) of injection. 2300-5000'

Well was originally drilled for what purpose? Gas well

Has well ever been perforated in any zone other than the proposed injection zone? Yes

List all such perforated intervals and sacks of cement used to seal off or squeeze each:
Mississippian 7008-7014' and 6981-95'. Bridge plug set at 6910' with one sack cement on top
of bridge plug. Well now producing from Pennsylvanian through perforations 6366-90'

Give depth of bottom of next higher zone which produces oil or gas: None

Give depth of top of next lower zone which produces oil or gas. 5947' (Pennsylvanian-Paradox)

Give depth of bottom of deepest fresh water zone in area: No fresh water in area. Brackish
water in Morrison from 897' to 1950'.

Expected volume of salt water to be injected daily (barrels). 90

Will injection be by gravity or pump pressure? Pump Estimated pressure: 800

Is system open or close type? Close Is filtration or chemical treatment necessary? No

Is the water to be disposed of mineralized to such a degree as to be unfit for domestic, stock, irrigation, and/or other general use? Yes

Is any water occurring naturally within the proposed disposal formation mineralized to such a degree as to be unfit for domestic, stock, irrigation, and/or other general use? Yes

List all offset operators to the lease on which this well is located and their mailing address

None

Name and address of surface owner Navajo Tribe of Indians, c/o United States Geological Survey, P. O. Box 959, Farmington, New Mexico.

Have copies of this application been sent by registered mail or given to all offset operators, surface owners, and to the New Mexico State Engineer? Yes

Is a complete electrical log of this well attached? Yes

Operator: Pan American Petroleum Corporation

By: T. M. Curtis

Title: District Superintendent

STATE OF New Mexico)

) ss.

County of San Juan)

BEFORE ME, The undersigned authority, on this day personally appeared T. M. Curtis known to me to be the person whose name is subscribed to the above instrument, who being by me duly sworn on oath states that he is duly authorized to make the above report and that he has knowledge of the facts stated therein and that said report is true and correct.

SUBSCRIBED AND SWORN TO before me this the 22nd day of March, 19 63.

C. K. Dietz
Notary Public in and for the County of San Juan

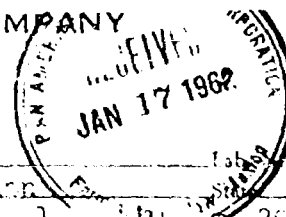
February 27, 1965
My Commission Expires

NOTE:

Should waivers from all offset operators, the surface owner, and the State Engineer not accompany an application, the New Mexico Oil Conservation Commission will hold the application for a period of fifteen (15) days from date of receipt by the Commission's Santa Fe office. If at the end of said fifteen-day period, no protest nor request for hearing is received by the Santa Fe office, the application will then be processed.

ir/

STANOLIND OIL AND GAS COMPANY
RESEARCH DEPARTMENT
WATER ANALYSIS



Lease No. 2-24,000 Well No. 1 Loc. 2-24,000
Field San Juan County San Juan State New Mexico
Quarter or Survey 17-1 Section 1 T. 24-N R. 17-W
Exact Location _____ Sample Series No. W-1
Producing Stratum Paradox PBTB _____ Total Depth 6000-PTD
Stratum Yielding Sample Perforations From 6366 To 6390
Condition of Well _____
Sample Collected From Separator Method Used Direct form Discharge
Collected by T. M. Whitmire Date Collected 1-3-62 Date Received 1-9-62
Transmittal Letter by L. C. Speer, Jr. Date 1-4-62 File N-1006-535.11

Radicle	Per Cent by Analysis	(a) P. P. M.	(b)	(a) X (b)	Per Cent Reacting Value	Calculated Compound	P. P. M.
Na	25.30	21,300	.0435	935.60	35.53	Na ₂ SO ₄	
Ca	7.80	5,880	.0499	293.11	11.14	NaCl	53,721
Mg	1.55	1,170	.0822	57.95	3.33	Na ₂ CO ₃	
Fe						NaHCO ₃	733
						CaSO ₄	560
						CaCl ₂	15,825
SO ₄	.52	395	.0208	8.22	.31	CaCO ₃	
Cl	61.12	46,100	.0282	1300.02	49.36	Ca(HCO ₃) ₂	
CO ₂		0	.0333			MgSO ₄	
HCO ₃	.71	532	.0164	6.72	.33	MgCl ₂	4,582 ✓
H ₂ S						MgCO ₃	
						Mg(HCO ₃) ₂	
Total solids as a summation of radicles							75,421 P.P.M.
Total solids by evaporation and ignition of residue at low red heat							70,040 P.P.M.
Sample as received: Resistivity: ohms/MM .0969 at 77°F. pH Value 6.2 Specific Gravity 60°/60°F 1.057							

PROPERTIES OF REACTION IN PER CENT

PRIMARY SALINITY: SO₄ + Cl = _____ with equal value Na (K) = 71.06 %
SECONDARY SALINITY: If SO₄ + Cl is greater than Na (K) = _____ %
Then SO₄ + Cl = _____ with equal value of Ca + Mg = 26.18 %
PRIMARY ALKALINITY: Excess Na (K) over SO₄ + Cl = _____ with equal value of CO₂ + S = _____ %
SECONDARY ALKALINITY: Excess Ca + Mg over SO₄ + Cl = _____ with equal value of CO₂ + S = .66 %
CHLORIDE SALINITY: Cl + (SO₄ + Cl) = _____ X 100% = 99.38
SULPHATE SALINITY: SO₄ + (SO₄ + Cl) = _____ X 100% = .62

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

REMARKS: Resistivity: ohms/MM .0459 at 172°F

J. L. Hoyt, Jr.
W. T. Smith
T. M. Curtis
L. C. Speer, Jr.
T. T. Martin (2)

FARMINGTON DISTRICT	
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Analyst J. L. Hoyt, Jr. Date 1-9-62

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. 2798
Order No. R-2475

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

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 24, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 3rd day of May, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Pan American Petroleum Corporation, seeks authority to dually complete its Navajo "C" Well No. 1, located in Unit D of Section 1, Township 29 North, Range 17 West, NMPM, San Juan County, New Mexico, to produce hydrocarbons from the Pennsylvanian-Paradox formation and to dispose of produced salt water into the Entrada, Chinle, and Cutler formations.

(3) That the applicant proposes to inject the produced salt water down the annulus between the 10 3/4-inch intermediate casing and the 7 5/8-inch production casing into the open hole interval between the 10 3/4-inch casing shoe at approximately 2300 feet and the top of the cement behind the 7 5/8-inch casing at approximately 5000 feet.

(4) That the produced salt water is unfit for domestic, stock, irrigation, or other general use, and that the proposed

-2-

CASE No. 2793

Order No. R-2475

disposal interval is non-productive of oil, gas, or fresh water in this area.

(5) That there is no vertical communication between the proposed injection zone and the proposed producing zone in the subject well.

(6) That the mechanics of the proposed dual completion are feasible and in accord with good conservation practices.

(7) That approval of the subject application will neither cause waste nor impair correlative rights.

IT IS THEREFORE ORDERED:

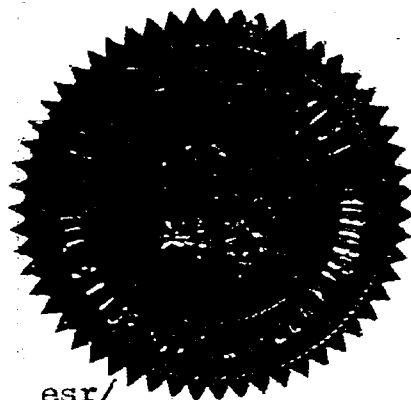
(1) That the applicant, Pan American Petroleum Corporation, is hereby authorized to dually complete its Navajo "C" Well No. 1, located in Unit D of Section 1, Township 29 North, Range 17 West, NMPM, San Juan County, New Mexico, to produce hydrocarbons from the Pennsylvanian-Paradox formation and to dispose of produced salt water into the Entrada, Chinle, and Cutler formations.

PROVIDED HOWEVER, That the produced salt water shall be injected down the annulus between the 10 3/4-inch intermediate casing and the 7 5/8-inch production casing into the open hole interval between the 10 3/4-inch casing shoe at approximately 2300 feet and the top of the cement behind the 7 5/8-inch casing at approximately 5000 feet.

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

(2) 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.



esr/

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

E. S. Walker
E. S. WALKER, Member

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

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
E. B. JOHNNY WALKER
MEMBER

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

P. O. BOX 471
SANTA FE

May 3, 1963

Mr. Charles Malone
Atwood & Malone
Attorneys at Law
Box 700
Bloomfield, New Mexico

Re: Case No. 2798
Order No. R-2775
Applicant:
Pan American Petroleum Corporation

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

ir/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC

Aztec OCC x

OTHER Mr. Guy Buell

Case - 2798

Heard. 4-24-63

Rec. 4-25-63

1. Grant Pan Am's request for a
SND well for the Karago - C #1.
720/N, 220/W lines sec. 1-29 N-17 W.
2. The injection zone shall be ~~between~~
below the 10 3/4" casing ~~set~~ at 2300'
and above the cement behind the 7 1/8"
casing. Top of cement is at 5000'. This
zone includes part of the Entrada all of
the Chinle & part of the Cutler formations
none of which ~~has~~ shown any
oil, gas, or potable water production in
the area.
3. Use R-2438 as a guide for this
order.

Thos. A. [Signature]

STANGLIND OIL AND GAS COMPANY

205.37

RESEARCH DEPARTMENT

WATER ANALYSIS

Lease Navajo Tribal Well No. 1 Lab. No. T-11,537
 Field Hildcat County San Juan State New Mexico
 Quarter or Survey 29N 17W Blk. 12 Section 12 T. 29N R. 17W
 Exact Location 720' From N & 1090' From W Lines Sample Series No. HG-70
 Producing Stratum Entrada P.B.T.D. 2190 Total Depth 2190
 Stratum Yielding Sample Entrada From Drill Pipe Breakout To Drill Pipe Breakout
 Condition of Well Drill Pipe Method Used From Drill Pipe Breakout
 Sample Collected From Drill Pipe Date Collected 4-30-54 Date Received 5-12-54
 Collected by A. W. Rothe Transmittal Letter by L. O. Speer, Jr. Date 4-30-54 File CCF-2033-251.3

Radicle	Per Cent by Analysis	(a) P. P. M.	(b)	(a) X (b)	Per Cent Reacting Value	Calculated Compound	P. P. M.
Na	33.37	3,010	.0435	130.73	47.26	Na ₂ SO ₄	6,503
Ca	.81	73	.0499	3.64	1.34	NaCl	2,221
Mg	.14	13	.0822	1.07	.40	Na ₂ CO ₃	69
Fe						NaHCO ₃	
						CaSO ₄	
						CaCl ₂	
SO ₄	48.75	4,397	.0208	91.46	33.76	CaCO ₃	182
Cl	14.93	1,347	.0282	37.97	14.03	Ca(HCO ₃) ₂	
CO ₂	2.00	180	.0333	5.99	2.21	MgSO ₄	
HCO ₃		0	.0164			MgCl ₂	
H ₂ S						MgCO ₃	45
						Mg(HCO ₃) ₂	
Total solids as a summation of radicles						9,020	P.P.M.
Total solids by evaporation and ignition of residue at low red heat						10,050	P.P.M.
Sample as received: Resistivity: ohms/MM .810 at 77°F. pH Value 1.50 Specific Gravity 60°/60°F. 1.0095							

PROPERTIES OF REACTION IN PER CENT

PRIMARY SALINITY: SO₄ + Cl = with equal value Na (K) 94.52 %
 SECONDARY SALINITY: If SO₄ + Cl is greater than Na (K)
 Then SO₄ + Cl = with equal value of Ca + Mg 1.06 %
 PRIMARY ALKALINITY: Excess Na (K) over SO₄ + Cl = with equal value of CO₂ + S
 SECONDARY ALKALINITY: Excess Ca + Mg over SO₄ + Cl = with equal value of CO₂ + S 4.42 %
 CHLORIDE SALINITY: Cl ÷ (SO₄ + Cl) = X 100% 23.36 %
 SULPHATE SALINITY: SO₄ ÷ (SO₄ + Cl) = X 100% 76.64 %

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

REMARKS:

This analysis indicates contamination, probably from drilling fluid and is not considered representative of formation water.

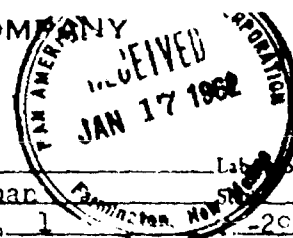
cc: C. F. Bedford
C. L. Kelley
L. O. Speer, Jr.

RECEIVED	
Roswell Dist. Office	
JUN 18 1954	
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BEFORE EXAMINER UTZ	
OIL CONSERVATION COMMISSION	
EXHIBIT NO.	5
CASE NO.	2798

Analyst W. D. Dutton Date 5-11-54

STANDARD OIL AND GAS COMPANY
RESEARCH DEPARTMENT
WATER ANALYSIS



Lease Navajo "C" Well No. 1 Lab. No. T-14,600
Field Undesignated Pennsylvanian County San Juan State New Mexico
Quarter or Survey NW/4 Bk. 1 Section 1 T. 20-N R. 17-W
Exact Location _____ Sample Series No. HG-1
Producing Stratum Paradox PBT.D. _____ Total Depth 6899-PBD
Stratum Yielding Sample Perforations From 6366 To 6390
Condition of Well _____
Sample Collected From Separator Method Used Direct form Discharge
Collected by T. H. Whitmire Date Collected 1-3-62 Date Received 1-8-62
Transmittal Letter by L. C. Speer, Jr. Date 1-4-62 File N-1006-535.11

Radicle	Per Cent by Analysis	(a) P. P. M.	(b)	(a) X (b)	Per Cent Reacting Value	Calculated Compound	P. P. M.
Na	28.30	21,311	.0435	935.60	35.53	Na ₂ SO ₄	
Ca	7.80	5,880	.0499	293.41	11.14	NaCl	53,721
Mg	1.55	1,170	.0822	87.95	3.33	Na ₂ CO ₃	
Fe						NaHCO ₃	733
						CaSO ₄	560
						CaCl ₂	15,825
SO ₄	.52	395	.0208	8.22	.31	CaCO ₃	
Cl	61.12	46,100	.0282	1300.02	49.36	Ca(HCO ₃) ₂	
CO ₂		0	.0333			MgSO ₄	
HCO ₃	.71	532	.0164	8.72	.33	MgCl ₂	4,582
H ₂ S						MgCO ₃	
						Mg(HCO ₃) ₂	
Total solids as a summation of radicles							75,421 P.P.M.
Total solids by evaporation and ignition of residue at low red heat							79,040 P.P.M.
Sample as received: Resistivity: ohms/M.M. .0969 at 77°F. H Value 6.2 Specific Gravity 60°/60°F. 1.057							

PROPERTIES OF REACTION IN PER CENT

PRIMARY SALINITY: SO₄ + Cl = _____ with equal value Na (K) _____ = 71.06 %
SECONDARY SALINITY: If SO₄ + Cl is greater than Na (K) _____ = _____ %
Then SO₄ + Cl = _____ with equal value of Ca + Mg _____ = 28.18 %
PRIMARY ALKALINITY: Excess Na (K) over SO₄ + Cl = _____ with equal value of CO₂ + S. _____ = _____ %
SECONDARY ALKALINITY: Excess Ca + Mg over SO₄ + Cl = _____ with equal value of CO₂ + S. _____ = 66 %
CHLORIDE SALINITY: Cl + (SO₄ + Cl) = _____ X 100% = 99.38 %
SULPHATE SALINITY: SO₄ + (SO₄ + Cl) = _____ X 100% = 62 %

NOTE: Multiply Parts per Million by .0583 to obtain Grains per Gallon.
REMARKS: Resistivity: ohms/M.M. .0459 at 172°F

J. L. Hoyt, Jr.
W. T. Smith
T. M. Curtis
L. C. Speer, Jr.
T. T. Martin (2)

BEFORE EXAMINER UTZ
OH CONSERVATION COMMISSION
EXHIBIT NO. 4
CASE NO. 2798

FARMINGTON DISTRICT		
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DSS		
IS		
AF		
AC		
OE		
RE		
FARM-714		

Analyst James E. Smith Date 1-8-62

GEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.
PHONE 325-1182

SANTA FE, N. M.
PHONE 983-3971

ALBUQUERQUE, N. M.
PHONE 243-6691

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 24, 1963

EXAMINER HEARING

IN THE MATTER OF:

Application of Pan American Petroleum Corpora-
tion for a salt water disposal dual completion,
San Juan County, New Mexico. Applicant, in the
above-styled cause, seeks authority to dually
complete its Navajo "C" Well No. 1, located in
Unit D of Section 1, Township 29 North, Range
17 West, San Juan County, New Mexico, to pro-
duce hydrocarbons from the Pennsylvanian-
Paradox formation and to dispose of produced
salt water through the intermediate casing
annulus into the open hole interval from 2300
feet to approximately 5000 feet.

CASE 2798

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 2798.

MR. DURRETT: Application of Pan American Petroleum
Corporation for a salt water disposal dual completion, San Juan
County, New Mexico.

MR. MALONE: May it please the Commission, Charles
Malone of Roswell for the Applicant. We have one witness and
six exhibits. Would our witness be sworn, please?

(Witness sworn.)

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



(Whereupon, Applicant's Exhibits Nos. 1 through 6 marked for identification.)

FRANK H. HOLLINGSWORTH

called as a witness, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

BY MR. MALONE:

Q Would you state your name and address, please?

A Frank H. Hollingsworth, Petroleum Engineer with Pan American Petroleum Corporation, Farmington, New Mexico.

Q What is your position in that office, please?

A Petroleum Engineer.

Q How long have you been in the Farmington office of Pan American?

A Six years.

Q Does the Farmington office have jurisdiction over the area and the well described in this application?

A Yes, sir.

Q Are you personally familiar with this application and its details?

A Yes, sir.

Q Have you previously testified before the Commission?

A No, sir.

Q Would you briefly describe your educational and experience background?

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A I have a Bachelor of Science in Petroleum Engineering from the University of Texas, and have been working for Pan American for the past eleven years, except for three-year military leave of absence. In this eleven years, the past six years have been in Farmington.

MR. MALONE: Are the qualifications of this witness satisfactory to the Commission?

MR. UTZ: Yes, sir, they are.

Q (By Mr. Malone) Briefly, what is the purpose of this application?

A Pan American desires to dispose of salt water that's produced from the Paradox interval of the Pennsylvanian formation from our Navajo "C" No. 1, which is in Unit D, Section 1, Township 29 North, Range 17 West, San Juan County, New Mexico, to dispose of this salt water into the 10-3/4, 7-5/8 casing annulus, which will put it into the Entrada, Chinle, and Cutler formations. This will enable us to continue the production of this well in an economic manner.

Q Do I understand that the water to be disposed of is the water produced from the disposal well?

A Yes, sir.

Q Would you state briefly what Exhibit No. 1 shows, please?

A I would like to refer first to our application of March 22, 1963, in which we submitted an unnumbered form to the State



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of New Mexico Oil Conservation Commission entitled "Application to Dispose of Salt Water by Injection into a Porous Formation not Productive of Oil or Gas."

Q In your application, did you set forth the information which is required under the Rule 701?

A Yes, sir.

Q Go ahead.

A Exhibit 1 is a map of San Juan County, New Mexico. It shows the location of the subject Navajo "C" No. 1 in the Northwest Quarter of Section 1, 29, 17, and it is colored red. It also shows the two wells completed in the Hogback-Pennsylvanian Field in Section 19, Township 29 North, 16 West, which are colored green.

Now a similar salt water disposal method is being used here in our Well No. 17 in the Southeast Quarter of Section 19, and this was approved by Order R-2428 of February 27, 1963.

Q That was Case No. 2762, is that correct?

A Yes, sir. It also shows the location of a dry hole in the Pan American Navajo Tribal No. 1 in the Northwest Quarter of Section 12, 29, 17, which will be referred to later.

Q That well is immediately south of the subject well, is it not?

A Yes, sir.

Q Go ahead.

A There is also a dry hole to the Pennsylvanian interval



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drilled by Humble, their Navajo "K" No. 2 in the Northwest Quarter of Section 31, 30 North, 16 West; and a number of shallow dry holes in this immediate vicinity. The nearest production is the Hogback-Pennsylvanian and Hogback-Dakota Field wells approximately three miles to the south, and an undesignated Gallup Field located in Section 3, 29, 16, approximately four miles to the east.

It should also be noted that the Navajo "C" No. 1, the subject well, is located very near the San Juan River, and this is an area of intense farming by Navajo Indians. Therefore, the produced water from this well which commenced approximately in December of 1961 has been collected in a tank and hauled away by truck. This procedure has been costly and the production of the well is nearing the point where it will be uneconomic to continue this type of disposal. Therefore, that is the reason for this application, to seek a more economical means of disposing of salt water.

The producing horizons in the Hogback-Pennsylvanian and Hogback-Dakota Fields are cemented in the subject Navajo and are cemented off and are adequately protected. The Gallup formation in this undesignated Gallup Field four miles to the east is right below the surface on the subject Navajo "C" No. 1, and is cemented off by surface casing.

Q Is there anything else with respect to Exhibit No. 1?

A No, sir.



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Q Briefly describe Exhibit No. 2, please.

A Exhibit No. 2 is a copy of the electric log run on the subject Navajo "C" No. 1. It has the various formation tops, casing seats, disposal interval bracketed in two red lines, producing interval, plugback depth, and total depth. On it you can see that the disposal interval is in the lower Entrada, Chinle, and Upper Cutler.

Q Do any of those formations -- or have they ever indicated any type of production of hydrocarbons?

A No, sir.

Q Please go to Exhibit No. 3 and describe it.

A Exhibit No. 3 is a diagrammatic sketch of the well conditions on the Navajo "C" No. 1, showing the various casing seats, cement volumes, cement fills and formation tops. The disposal interval and the producing interval, total depth, plugback depth. It can be seen here that the 10-3/4 inch surface casing is set at 2300, cement circulated back to surface, and that the top of the cement behind the 7-5/8 casing string is at 5,000 feet.

We propose to dispose of the Paradox salt water between the 10-3/4, 7-5/8 casing string and will go into the open hole between 2300 and 5,000 feet.

Q How have you determined the top of the cement behind the 7-5/8ths casing?

A By temperature survey.



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Q Is there anything else with respect to this exhibit?

A Yes, it should be pointed out that the top of the cement behind the 7-5/8ths is approximately 1300 feet above the producing interval.

Q What is Exhibit No. 4, please?

A Exhibit No. 4 is a copy of a water analysis on the produced Paradox water from the Navajo "C" No. 1. Referring to it, you can see that the total solids into this water is in excess of 70,000 parts per million, and totally unfit for human, animal, domestic, or irrigation purposes.

Q Would you go now to Exhibit No. 5, please?

A Exhibit No. 5 is a copy of a water analysis from the dry hole, Navajo Tribal No. 1, which was referred to on Exhibit 1 being located approximately one mile south of the Navajo "C" No. 1. This water was obtained on drillstem test and as can be seen, the total solids content is in excess of 9,000 parts per million. It should also be noted in the "Remarks" column that this water was probably contaminated with the drilling fluid. As the mud was fresh water base, this would mean that the sample was contaminated with fresh water and the total solids content is probably in excess of the amount analyzed.

MR. UTZ: What was this water from, the Entrada?

A Entrada, yes, sir. The solids content of the 9,000 parts per million is unfit for human, domestic, animal, or irrigation use.



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Q What is Exhibit No. 6, please?

A Exhibit No. 6 is a copy of a letter from the State Engineer, S. E. Reynolds, dated March 29, 1963, in which he concludes that the injection with produced Paradox water into the Entrada-Chinle formations would not constitute a threat of contamination to the fresh waters in the area, and therefore he offers no objection to this application.

Q Was a copy of this application furnished to the U.S.G.S.?

A Yes, sir.

Q On what date?

A On the date of the application, which was March 22, 1963.

Q Has it furnished any objection whatsoever to Pan American with respect to this application?

A No, sir. Referring back to Order R-2438, Case 2762, we do have a letter from the U.S.G.S. in which they did not object to this disposal of salt water into similar formation on our U.S.G.S. Section 19 No. 17. This was Exhibit No. 5 on this case.

Q As a matter of fact, the testimony in the former Case 2762 reflected the fact that it was the U.S.G.S. which suggested to Pan American that salt water disposal rights be obtained in the former application, is that not correct?

A Yes, sir. And in this case, the U.S.G.S. had no opinion



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on the disposal of salt water, since it was being tanked and trucked away and not a threat to any surface.

Q Do you have any comment to make with respect to the subject application as to prevention of waste?

A Yes, sir. If we're not able to dispose of this salt water in the method requested, we will be forced to abandon the well prematurely, which will result in the waste of hydrocarbons and helium gas. This well has been producing gas to the N.ajo Helium Plant in Shiprock, New Mexico, for approximately four years. It contains helium content of 5.4 percent.

Q What about economic waste and the difference in expense between trucking the salt water and disposal of it in the manner described in the application?

A Well, trucking the salt water is costing us approximately 30 cents per barrel, and disposal of the water into the casing annulus, it will be somewhat less than this. I don't know the amount.

Q Do you have anything further to offer with respect to the application?

A No, sir.

Q Were Exhibits No. 2 and 3 prepared by you or under your direction, and Exhibit No. 1 prepared by the Land Department of your company?

A That's right.

MR. MALONE: We offer Exhibits 1 through 6.



MR. UTZ: Exhibits 1 through 6 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits Nos. 1 through 6 entered in evidence.)

MR. MALONE: That concludes our presentation of evidence.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Hollingsworth, how much water and how much oil is this well producing at the present time?

A It's producing between 70 and 90 barrels of salt water per day, approximately 15 barrels of condensate and 750 mcf of gas.

Q Is this hydrocarbon gas, all except the five percent helium?

A Yes, sir. But it is a very low BTU gas and it has approximately 40 percent nitrogen in it.

Q And you feel that this formation is capable of taking in excess of seven barrels of water per day?

A Yes, sir.

Q The only water samples that you had in the Entrada was from the well to the south?

A Yes, sir.

Q You never took any out of this well?

A Well, we did not run a drillstem test on the Navajo "C" No. 1, since this Navajo Tribal No. 1 was downdip from the

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well and it was concluded to be water-bearing, also. Also the logs conducted on the Navajo "C" No. 1 showed it to be water-bearing.

Q Do you intend to treat this water--

A No, sir.

Q -- before injection? Do you think it's corrosive enough to do any damage to your 7-5/8ths casing?

A No, sir.

Q In producing this water, you have never experienced any corrosive problems?

A No, sir.

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

MR. DURRETT: Yes, sir, I have a question.

MR. UTZ: Mr. Durrett.

BY MR. DURRETT:

Q Mr. Hollingsworth, I understood your testimony on direct examination that approval of this application would prevent economic waste, as you stated it would be cheaper to inject the water rather than haul it off?

A Yes, sir.

Q However, I did not understand your testimony as to how approval of the application would prevent premature abandonment of the well. Would you go into that a little bit?

A Well, if we have to continue to haul this water away from the well to dispose of it, we cannot continue to operate



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this well economically so it will result in this abandonment of this well.

Q You mean you would have to abandon it right away, at this date?

A Yes, sir.

Q What is the estimated difference in cost, do you have that?

A No, sir. Like I stated, it's costing us approximately 30 cents a barrel to haul this water away, and we don't know how much it will cost us to dispose of it by pumping it into the annulus, but I would venture a guess at five cents or less per barrel.

Q You feel it would be substantially cheaper, at any rate?

A Yes, sir.

MR. DURRETT: Thank you.

MR. MALONE: Mr. Examiner, I neglected to ask the witness the age of the casing in the well. Could I ask that at this time?

MR. UTZ: Yes, sir.

A It's four years old.

MR. MALONE: That's all we have.

MR. UTZ: Are there other questions? The witness may be excused.

(Witness excused.)



MR. UTZ: The case will be taken under advisement and we'll recess until 1:15.

(Whereupon, a recess was taken.)

* * *

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss

I, ADA DEARNLEY, Notary Public 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.

WITNESS my Hand and Seal this 3rd day of May, 1963.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:
June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 278 E. heard by me on *May 24*, 19 *63*.
Thos. G. O'Connell, Examiner
New Mexico Oil Conservation Commission

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SANTA FE, N. M. PHONE 983-3971
FARMINGTON, N. M. PHONE 325-1182



Memo

7-22-63

From

A. R. Kendrick
Engineer

To Elvis:

The attached data is submitted to prove separation between casing strings in Pan American's #17 USG 19 well as required by Order R-2475.

Summary:

7" Casing	psi inside	psi outside
Surface	1104	0
2157'	1661	994
3100'	2003	1429

Therefore, the salt water cannot enter the long string within the injection interval.

Case 2475
R-2475

OK
Case 2798

OK?

PAN AMERICAN PETROLEUM CORPORATION

P. O. Box 480, Farmington, New Mexico
July 17, 1963

File: H-1099-400.1

Subject: USG Section 19 Well No. 17
Communication Test

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

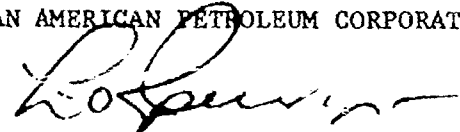
Dear Sir:

We are submitting data for your information on the communication test for our USG Section 19 Well No. 17.

On July 12, 1963, a sonolog test was run, witnessed by your representative, Mr. Kendrick. The enclosed attachment shows the results and are submitted for your approval, according to Examples 6 and 7 of the NMOCC Manual for Back Pressure Tests.

Yours very truly,

PAN AMERICAN PETROLEUM CORPORATION


L. O. Speer, Jr.
Area Superintendent

DSB:ep

Attachments



USG 19 WELL NO. 17
COMMUNICATION TEST

INJECTION INTERVAL:

Top: 2157' - 9-5/8" casing seat
Base: 3100' - Top of cement behind 7" casing

OBSERVED DATA:

Specific gravity of gas = .700 (est.)
Measured wellhead pressure = 1104 psia
Wellhead temperature = 60° (520° Rankine)
Reservoir temperature = 150° (610° Rankine)
Gravity of Crude = 48°

SONOLOG RESULTS:

Joints to fluid: 17½
Depth of fluid: 537.43'
Average joint: 30.71'

SUMMATION OF CALCULATIONS:

Pcr = 668	Tcr = 392
Pn = 1104	Pr = 1.553
T = 520° R	Z = .662
Fpv = 1.073	TZ = .31181
TZ = 344.24	Pn
GH = 376	Lbs./psi Gas Column = 22.647
IF = 1.33	

Total psi/ft. of Gas Column = 1104 + 23 = 1127.6

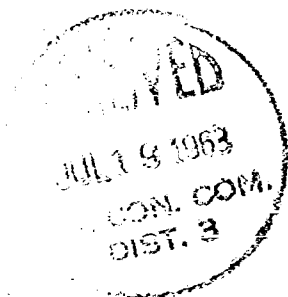
OBSERVED DATA LIQUID COLUMN:

H = 2157' Injection Depth
G₁ = .700
G₂ = .7883
h = 1620
BHP @ 2157' = 533 + 1128 = 1661 psia in 7" casing

H = 3100' Top of Cement
G₁ = .700
G₂ = .7883
h = 2563
BHP @ 3100' = 875 + 1128 = 2003 psia in 7" casing

INJECTION INTERVAL:

Specific Gravity = (Salt Water) = 1.0635
2157' X .4333 X 1.0635 = 993.9770
Injection Pressure = 994 psia into formation
3100' X .4333 X 1.0635 = 1428.5251
Pressure @ 3100' Top of Cement = 1429 @ formation



USG 19 Well # 17

SKETCH OF CASING &
Producing Intervals

GROUND LEVEL

