NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF HANSON, WATERS & WILLIAMSON

FOR A

PILOT WATER FLOOD PROJECT

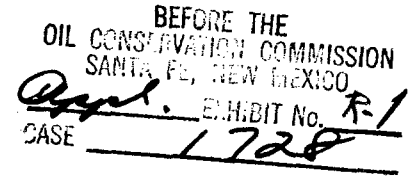
AND CERTAIN PROPOSED LOCATIONS FOR WELLS

IN THE

COYOTE QUEEN POOL

CHAVES COUNTY, NEW MEXICO

PRODUCTION SUMMARY



ERNEST A. HANSON
Petroleum Building
Roswell, New Mexico

HANSON, WATERS AND WILLIAMSON
PROPOSED PILOT FLOOD
COYOTE QUEEN FIELD
CHAVES COUNTY, NEW MEXICO

PRODUCTION SUMMARY

Total Number of Wells:	11
Total Field Production Aug. 1, to Oct. 31:	5,251.34 barrels
Daily Field Average for 92 Producing Days:	57.08 barrels
Daily Well Average for 92 Producing Days:	5.19 BOPD
Total Field Production Oct. 1, to Oct. 31:	2,106.52 barrels
Daily Field Average for 31 Producing Days:	67.95 barrels
Daily Well Average for 31 Producing Days:	6.18 BOPD

Wells to be Effected by the Proposed Pilot Flood:

Hanson, Waters & Williamson - #1 Hanson State "A"	10.95 BOPD
Hanson, Waters & Williamson - #2 Hanson State "A"	1.16 BOPD
Hanson, Waters & Williamson - #1 Levick State "C"	5.32 BOPD
Hanson, Waters & Williamson - #2 Levick State "C"	3.01 BOPD
Total daily oil produced by effected wells:	20.44 BOPD
Daily average of effected wells:	5.09 BOPD

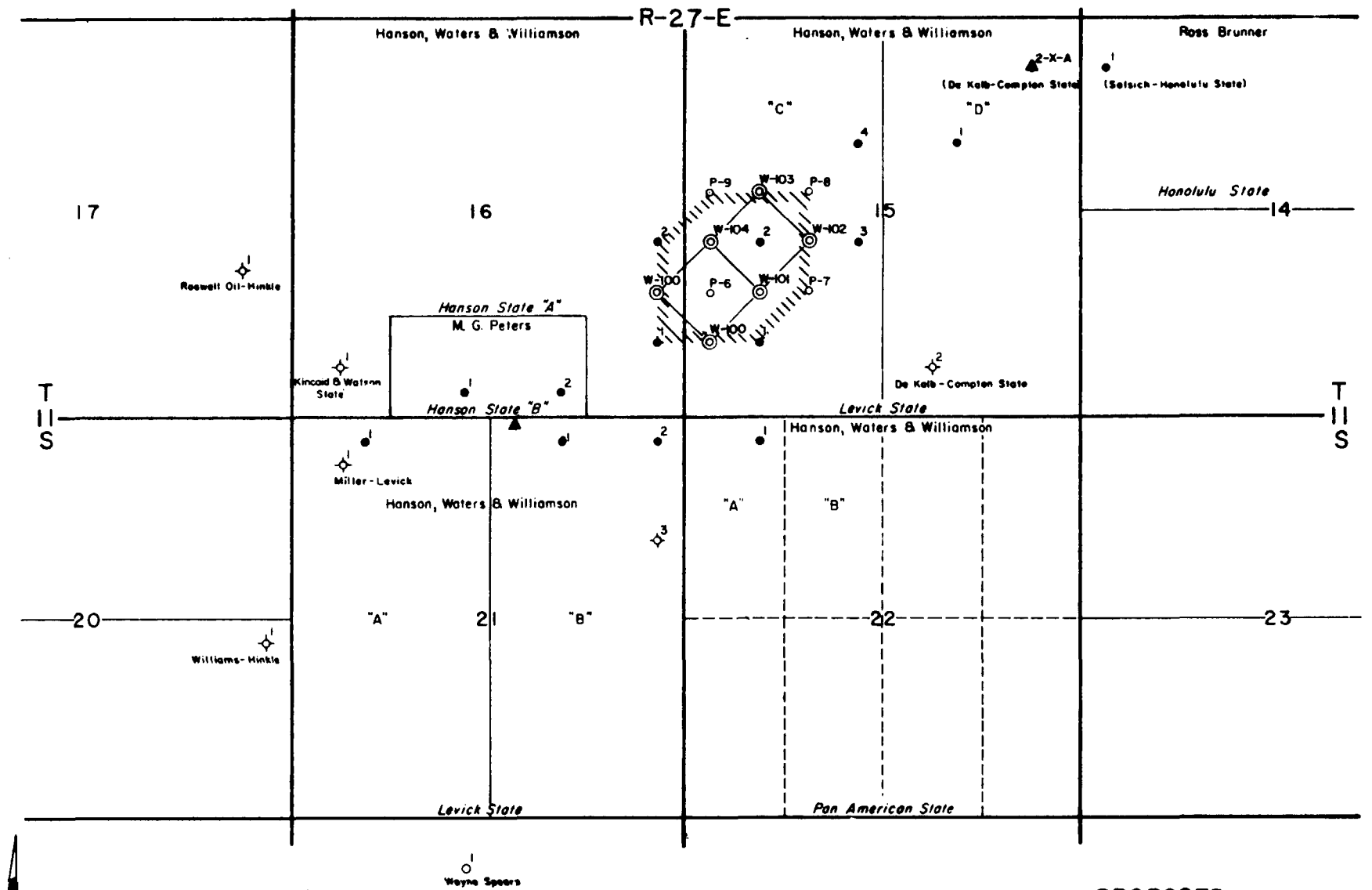


Fig 1

Revised: July 1959

RUSSELL ENGINEERING
PETROLEUM CONSULTANTS

Levick State "A"

HANSON, WATERS AND WILLIAMSON
Levick State "A"
W½, Sec. 21, T. 11 S., R. 27 E., N.M.P.M.
Coyote-Queen Field
Chaves County, New Mexico

Producing wells on lease:
Hanson, Waters & Williamson - #1 Levick State "A"

Lease Production Summary:

Total amt. oil produced from Aug. 1, to Oct. 31:	284.33 barrels
Daily average for 92 producing days:	3.09 barrels
Daily average for period Oct. 1, to Oct. 31:	2.57 barrels

Individual well Production Record:

Hanson, Waters & Williamson - #1 Levick State "A"

Same as Lease Production Summary

31 day potential test; Oct. 1, to Oct. 31:	2.57 BOPD

LEASE PRODUCTION RECORD

LEVICK STATE "A"
W½, Section 21, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field, Chaves County, New Mexico

Date	August	September	October
1	14.00	4.62	3.48
2	9.86	4.62	1.16
3	0.00	2.31	1.15
4	9.28	3.47	1.74
5	0.00	0.00	1.16
6	6.96	2.31	0.00
7	0.00	6.93	2.32
8	3.48	6.93	2.32
9	0.00	2.31	5.80
10	1.74	0.00	2.89
11	0.00	3.47	3.48
12	4.64	2.31	4.04
13	7.00	1.73	0.00
14	0.00	2.31	1.16
15	5.22	2.89	1.15
16	0.00	4.04	1.74
17	4.06	4.05	2.31
18	0.00	2.31	3.46
19	4.06	2.88	2.88
20	4.64	4.05	2.89
21	0.00	6.93	2.31
22	0.00	3.46	1.16
23	4.64	4.05	4.62
24	4.64	1.15	5.20
25	9.86	2.31	3.46
26	4.64	1.16	3.47
27	3.48	8.66	4.62
28	7.58	5.78	2.89
29	0.00	2.89	1.73
30	4.64	2.32	5.78
31	0.00		0.00
Total	114.42	89.54	80.37

HANSON, WATERS AND WILLIAMSON
Levick State "B"
E½, Sec. 21, T. 11 S., R. 27 E., N.M.P.M.
Coyote-Queen Field
Chaves County, New Mexico

Producing wells on lease:
Hanson, Waters & Williamson - #1 Levick State "B"
Hanson, Waters & Williamson - #2 Levick State "B"

Lease Production Summary:

Total amt. Oil produced from Aug. 1, to Oct. 31:	2155.58 barrels
Daily average for 92 producing days:	23.43 barrels
Daily average for period Oct. 1, to Oct. 31:	22.97 barrels

Individual Well Production Record:

Hanson, Waters & Williamson - #1 Levick State "B"

Date	November
1	23.73
2	19.19
3	18.51
4	19.68
5	20.83
6	15.04
7	20.96
8	17.36
9	18.51
10	17.36
Total	191.17

10 day potential test; Nov. 1, to Nov. 10: 19.12 BOPD

Individual Well Production Record: (Continued)

Hanson, Waters & Williamson - #2 Levick State "B"

Date	November
1	3.47
2	2.32
3	5.78
4	0.00
5	19.68
6	9.25
7	12.73
8	6.95
9	15.04
10	10.41
Total	85.63

10 day potential test; Nov. 1, to Nov. 10: **8.56 BOPD**

LEASE PRODUCTION RECORD

LEVICK STATE "B"
E½, Section 21, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field, Chaves County, New Mexico

Date	August	September	October
1	39.60	0.00	21.52
2	61.80	0.00	13.89
3	33.80	0.00	15.04
4	15.32	15.05	20.83
5	30.64	34.71	7.52
6	23.28	14.89	3.47
7	20.09	31.32	17.35
8	18.60	0.00	23.73
9	11.02	48.75	40.50
10	14.00	38.76	24.88
11	34.38	26.04	20.83
12	25.02	6.99	59.17
13	26.18	32.50	20.83
14	11.60	26.62	32.40
15	14.58	34.71	23.14
16	28.00	55.55	23.15
17	28.00	21.98	11.57
18	53.60	22.68	15.04
19	21.58	20.83	28.93
20	27.42	12.73	14.56
21	19.80	39.35	13.95
22	32.64	0.00	28.93
23	26.18	6.79	24.30
24	24.45	29.55	24.30
25	0.00	27.42	34.72
26	15.74	13.30	26.61
27	17.48	42.23	30.09
28	22.70	9.84	24.30
29	35.58	32.98	22.00
30	31.40	2.98	22.02
31	0.00		21.98
Total	764.48	649.55	711.55

Levick State "C"

HANSON, WATERS AND WILLIAMSON
Levick State "C"
W½, Section 15, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field
Chaves County, New Mexico

Producing wells on lease:

Hanson, Waters & Williamson - #1 Levick State "C"
Hanson, Waters & Williamson - #2 Levick State "C"
Hanson, Waters & Williamson - #3 Levick State "C"
Hanson, Waters & Williamson - #4 Levick State "C"

Lease Production Summary:

Total amt. oil produced from Aug. 1, to Oct. 31:	1292.72 barrels
Daily average for 92 producing days:	14.05 barrels
Daily average for period Oct. 1, to Oct. 31:	16.57 barrels

Individual Well Production Record:

Hanson, Waters & Williamson - #1 Levick State "C"

Date	November
1	4.62
2	4.63
3	5.78
4	10.41
5	1.16
Total	26.60

5 day potential test; Nov. 1, to Nov. 5: 5.32 BOPD

Hanson, Waters & Williamson - #2 Levick State "C"

Date	November
1	2.31
2	2.31
3	3.47
4	3.47
5	3.47
Total	15.03

5 day potential test; Nov. 1, to Nov. 5: 3.01 BOPD

Individual Well Production Record: (Continued)

Hanson, Waters & Williamson - #3 Levick State "C"

Date	November
8	4.63
9	4.62
10	4.63
Total	13.88

3 day potential test; Nov. 1, to Nov. 3: 4.63 BOPD

Hanson, Waters & Williamson - #4 Levick State "C"

Date	November
1	6.93
2	13.88
3	10.41
Total	31.22

3 day potential test; Nov. 1, to Nov. 3: 10.41 BOPD

LEASE PRODUCTION RECORD

LEVICK STATE "C"
W½, Section 15, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field, Chaves County, New Mexico

Date	August	September	October
1	12.76	16.19	29.49
2	21.00	15.09	15.61
3	21.00	0.00	13.88
4	19.80	0.00	13.88
5	18.64	18.03	24.86
6	0.00	6.97	15.03
7	28.00	6.94	17.35
8	33.32	13.72	21.97
9	0.00	4.63	19.66
10	28.00	.58	9.83
11	26.76	4.65	6.94
12	38.44	12.80	11.56
13	22.70	11.60	10.99
14	12.18	8.08	13.95
15	12.18	9.25	13.88
16	0.00	13.88	8.57
17	6.38	13.88	5.30
18	11.60	6.94	27.76
19	12.76	10.47	16.77
20	4.06	5.81	12.14
21	0.00	10.99	13.88
22	0.00	16.19	15.03
23	0.00	0.00	17.35
24	0.00	3.47	17.34
25	30.32	1.16	13.88
26	36.16	5.20	8.10
27	30.32	20.24	13.91
28	50.12	1.15	13.88
29	31.48	0.00	37.62
30	33.22	5.78	29.48
31	0.00		23.72
Total	541.20	237.91	513.61

Levick State "D"

HANSON, WATERS AND WILLIAMSON
Levick State "D"
E½, Section 15, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field
Chaves County, New Mexico

Producing wells on lease:
Hanson, Waters & Williamson - #1 Levick State "D"

Lease Production Summary:

Total amt. oil produced from Aug. 1, to Oct. 31:	418.91 barrels
Daily average for 92 producing days:	4.55 barrels
Daily average for period Oct.1, to Oct. 31:	9.90 barrels

Individual Well Production Record:

Hanson, Waters & Williamson - #1 Levick State "D"

Same as Lease Production Summary

31 day potential test; Oct. 1, to Oct.31:	9.90BOPD

LEASE PRODUCTION RECORD

LEVICK STATE "D"
E½, Section 15, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field, Chaves County, New Mexico

Date	August	September	October
1	0.00	4.12	5.51
2	0.00	0.00	13.71
3	0.00	0.00	19.31
4	0.00	0.00	12.40
5	0.00	0.00	0.00
6	0.00	0.00	24.82
7	0.00	0.00	15.16
8	0.00	0.00	19.31
9	0.00	0.00	20.68
10	0.00	0.00	9.67
11	0.00	0.00	11.04
12	0.00	0.00	16.48
13	0.00	0.00	4.11
14	0.00	0.00	8.22
15	0.00	0.00	5.58
16	0.00	0.00	8.22
17	0.00	0.00	8.22
18	0.00	0.00	9.59
19	0.00	0.00	0.00
20	0.00	0.00	2.74
21	15.16	0.00	4.11
22	0.00	0.00	2.74
23	0.00	0.00	4.11
24	0.00	0.00	6.85
25	27.58	0.00	7.56
26	17.42	0.00	8.73
27	6.80	0.00	11.05
28	8.22	0.00	8.15
29	8.22	0.00	9.87
30	13.70	0.00	14.45
31	10.84		14.46
Total	107.94	4.12	306.85

Hanson State "A"

HANSON, WATERS AND WILLIAMSON
Hanson State "A"
E½, Section 16, Township 11 South, Range 27 East, N. M.P.M.
Coyote-Queen Field
Chaves County, New Mexico

Producing wells on lease:
Hanson, Waters & Williamson - #1 Hanson State "A"
Hanson, Waters & Williamson - #2 Hanson State "A"

Lease Production Summary:

Total amt. oil produced from Aug. 1, to Oct. 31:	856.63 barrels
Daily average for 92 producing days:	9.31 barrels
Daily average for period Oct. 1, to Oct. 31:	13.42 barrels

Individual Well Production Record:

Hanson, Waters & Williamson - #1 Hanson State "A"

Date	November
1	14.55
2	2.32
3	7.57
4	16.25
5	10.41
6	13.87
7	13.88
8	5.78
9	13.88
Total	98.51

9 day potential test; Nov. 1, to Nov. 9: 10.95 BOPD

Individual Well Production Record: (Continued)

Hanson, Waters & Williamson - #2 Hanson State "A"

Date	November
1	1.16
2	1.17
3	1.16
4	1.16
5	.59
6	1.74
7	1.16
8	1.17
9	1.16
Total	10.47

9 day potential test; Nov. 1, to Nov. 9: 1.16 BOPD

LEASE PRODUCTION RECORD

HANSON STATE "A"
E½, Section 16, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field, Chaves County, New Mexico

Date	August	September	October
1	0.00	16.55	34.47
2	0.00	19.31	50.66
3	0.00	16.55	38.71
44	0.00	16.55	41.37
5	0.00	13.79	0.00
6	0.00	16.55	27.58
7	0.00	16.55	17.92
8	0.00	0.00	34.47
9	0.00	0.00	22.07
10	0.00	13.79	24.82
11	0.00	2.81	24.44
12	0.00	0.00	4.11
13	0.00	2.81	6.85
14	0.00	16.55	4.11
15	0.00	0.00	0.00
16	0.00	24.82	8.22
17	0.00	0.00	5.48
18	0.00	7.55	2.74
19	0.00	15.16	8.22
20	33.10	15.16	6.85
21	35.84	20.68	12.33
22	0.00	17.92	4.11
23	19.18	2.74	4.11
24	0.00	0.00	6.98
25	0.00	0.00	5.82
26	0.00	0.00	1.75
27	0.00	0.00	0.00
28	5.48	0.00	2.32
29	0.00	0.00	3.49
30	0.00	91.02	3.49
31	0.00		8.73
Total	93.60	346.86	416.17

Pan Am. State "A"

HANSON, WATERS AND WILLIAMSON
Pan American State "A"
W½, Section 22, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field
Chaves County, New Mexico

Producing wells on lease:
Hanson, Waters & Williamson - #1 Pan American State "A"

Lease Production Summary:

Total amt. oil produced from August 1, to October 31:	243.17 barrels
Daily average for 92 producing days:	2.64 barrels
Daily average for period Oct. 1, to Oct. 31:	2.52 barrels

Individual Well Production Record:

Hanson, Waters & Williamson - #1 Pan American State "A"

Same as Lease Production Summary

31 day potential test; Oct. 1, to Oct. 31: 2.52 BOPD

LEASE PRODUCTION RECORD

PAN AMERICAN STATE "A"
W½, Section 22, Township 11 South, Range 27 East, N.M.P.M.
Coyote-Queen Field, Chaves County, New Mexico

Date	August	September	October
1	11.04	1.38	2.76
2	6.27	1.38	0.00
3	6.27	1.38	4.15
4	2.76	0.00	2.76
5	9.54	0.00	2.76
6	5.48	0.00	2.77
7	6.80	5.52	2.75
8	5.45	4.15	2.76
9	5.48	4.14	2.75
10	0.00	4.14	4.14
11	0.00	4.15	2.76
12	2.74	5.52	2.75
13	0.00	5.53	4.14
14	4.11	5.52	2.75
15	0.00	2.76	6.89
16	2.74	2.77	2.07
17	0.00	2.76	2.76
18	5.48	4.14	2.77
19	0.00	4.15	2.76
20	2.74	4.14	2.76
21	0.00	1.38	1.38
22	1.37	2.76	2.76
23	0.00	2.77	1.39
24	0.00	4.14	2.76
25	0.00	0.00	2.76
26	0.00	0.00	1.38
27	4.11	0.00	0.00
28	0.00	0.00	1.38
29	2.74	0.00	1.38
30	0.00	2.76	2.77
31	2.74		0.00
Total	87.86	77.34	77.97

AVAILABLE WATER SOURCES
FOR
PILOT INJECTION FLOOD
COYOTE QUEEN POOL
CHAVES COUNTY, NEW MEXICO

Available sources and previous tests conducted for a water supply in the area of the Coyote Queen Pool, Chaves County, New Mexico.

DEVONIAN:

Richfield - #1 Comanche Unit
Sec. 13, T. 11 S., R. 26 E., N.M.P.M.
Total Depth 6129'
Lease presently owned by Ernest A. Hanson

Richfield - #2 Comanche Unit
Sec. 24, T. 11 S., R. 26 E., N.M.P.M.
Perf. 6118-42' and 6157-84'; F. 15 BXWPH
Lease presently owned by Ernest A. Hanson

Kewannee - #1 De Kalb Federal
Sec. 25, T. 11 S., R. 26 E., N.M.P.M.
DST 6184-6202'; op. 2 hrs., rec. 2160' XW

Honolulu - #1 State
Sec. 13, T. 11 S., R. 27 E., N.M.P.M.
DST 6692-6743'; op. 2 hrs., rec. 5880' X&SW

Texas Co. - #1 State "AM"
Sec. 13, T. 11 S., R. 27 E., N.M.P.M.
Perf. 6583-93'; F. 10 BXWPH

De Kalb - #1 Coll
Sec. 18, T. 11 S., R. 27 E., N.M.P.M.
Perf. 6315-25'; F. 35 BXWPH

Union & De Kalb - #1 State
Sec. 27, T. 11 S., R. 27 E., N.M.P.M.
DST 7400-95'; op. 2 hrs., rec. 1000' SG&MCXW
and 4000' GCXW

GLORIETTA:

Hanson, Waters & Williamson - #2-X Levick State "D"
Sec. 15, T. 11 S., R. 27 E., N.M.P.M.
Potentialed for 625 BXWPD

QUEEN:

Eide - #2 Gorman Federal
Sec. 19, T. 11 S., R. 27 E., N.M.P.M.
Perf. Penrose section; unable to swab down XW
Est. 600 - 1200 BXWPD

Peters - #1-B Federal Kelly
Sec. 19, T. 11 S., R. 27 E., N.M.P.M.
Perf. Penrose section; unable to swab down XW
Est. 600 - 1200 BXWPD

YATES:

Whaley Co. water well
Sec. 10, T. 11 S., R. 27 E., N.M.P.M.
Est. 300 BWPD

Hanson, Waters & Williamson - #1-X Levick State "B"
Sec. 26, T. 11 S., R. 27 E., N.M.P.M.
Potentialed 650 BWPD

PHONE OR 4-4386

RUSSELL ENGINEERING
PETROLEUM CONSULTANTS
CORE ANALYSTS
101 PETROLEUM BUILDING
ABILENE, TEXAS

JAMES E RUSSELL
P M BRIDGES
C.O. DENNIS
D.A. FLANAGAN
A L JENKE

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
App. EXHIBIT No. R-3
CASE 1728

September 5, 1959

Hanson, Waters, and Williamson
P. O. Box 852
Roswell, New Mexico

Re: Complete Water Analysis
and Compatibility Tests
Water Supply Well No. 2-X
Coyote (Queen) Pool
Chaves County, New Mexico

Gentlemen:

Two samples of water taken from the Glorietta Sandstone at an approximate depth of 3200 feet in the above well were submitted to our laboratory for complete analysis. The samples were sealed in one-gallon polystyrene containers before shipment. The results of the analyses are shown in both tabular and graphical form. The water contained a pH of 6.5 and carbon dioxide content of 125 parts per million, indicating that it is potentially corrosive to metal surfaces with which it may come in contact. The extremely high iron content (500 parts per million total iron) is, in all probability, the result of reaction between the pipe in this well and the corrosive water. It is doubtful that the iron content is representative of formation water.

Special compatibility tests were conducted using the current water sample and a sample of water from a fresh water supply well analyzed in our laboratory, July 13, 1959 and presented as our Laboratory No. W-414. Waters from Water Supply Well No. 2-X and from the fresh water supply well were mixed in the ratios of 1 to 3, 1 to 1, and 3 to 1 and checked for formation of precipitates, pH content, alkalinity, and supersaturation. Results of these tests indicated that these waters are compatible in all ratios tested under laboratory conditions.

We trust that the above data may be of assistance.

Very truly yours,

RUSSELL ENGINEERING

A. L. Jenke

ALJ:cw
6 copies - Addressee
1 copy - Frank B. Waters Oil Company

Hanson, Waters & Williamson

Lease	Description	Size hole	Size Pipe	Length	length factor	weight	cement Circulated?	No. of Sacks	Calculated No. of Sx	150% Calculated No	% Sx used to Circ.
Levick State "A"											
	1-D 21-11-27	7 7/8"	5 1/2"	930'		14 lb.	Yes	250	119.8	179	208
Levick State "B"											
	2-A 21-11-27	6 1/4"	4 1/2"	931'	.0933	9 1/2 lb.	Yes	175	86.86	130	201
	1-B 21-11-27	6 1/4"	4 1/2"	920'	.0933	9 1/2 lb	Yes	150	85.84	129	175
Levick State "C"								225?			
	1-M 15-11-27	6 1/4"	4 1/2"	940'	.0933	9 1/2 lb	No	100	87.70	132	
	2-L 15-11-27	6 1/4"	4 1/2"	918'	.0933	9 1/2 lb.	No.	100	85.65	129	
	3-K 15-11-27	6 1/4"	4 1/2"	966'	.0933	9 1/2 lb	No	100	90.13	135	
	4-F 15-11-27	6 1/4"	4 1/2"	932'	.0933	9 1/2 lb	No	100	86.96	130	
Levick State "D"											
	1-G 15-11-27	6 1/4"	4 1/2"	964'	.0933	9 1/2 lb.	No	100	89.94	135	
Hanson State "A"											
	1-P 16-11-27	6 1/4"	4 1/2"	927'	.0933	9 1/2 lb	No	100	86.49	130	
	2-I 16-11-27	6 1/4"	4 1/2"	927'	.0933	9 1/2 lb	No	100	86.49	130	
Pan American State A											
	1-D 22-11-27	6 1/2"	4 1/2"	959'	.0933	9 1/2 lb	No	100	89.47	134	

.1289

NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF HANSON, WATERS & WILLIAMSON DRILLING COMPANY

FOR A

PILOT WATER FLOOD PROJECT

AND CERTAIN PROPOSED LOCATIONS FOR WELLS

IN THE

COYOTE QUEEN POOL

CHAVES COUNTY, NEW MEXICO

H. W. & W.

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 1
CASE NO. 1728

RUSSELL ENGINEERING
PETROLEUM CONSULTANTS
101 Petroleum Building
Abilene, Texas

PHONE OR 4-4386

RUSSELL ENGINEERING
PETROLEUM CONSULTANTS
CORE ANALYSTS
101 PETROLEUM BUILDING
ABILENE, TEXAS

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New Mexico Oil Conservation Commission
Capitol Building
Santa Fe, New Mexico

Gentlemen:

The following data are submitted in reference to the case covering application of Hanson, Waters & Williamson for an order authorizing a pilot water flooding project in the Coyote Queen Pool, Chaves County, New Mexico and approval for the drilling of several unorthodox locations for wells in this water flood project.

Exhibit 1 is submitted showing a map of the area and includes all the wells drilled in the pool to date. Also shown on this exhibit is the Pilot Area and the locations of the proposed new wells.

The Coyote Queen Pool is producing from the Queen Sand at an approximate depth of 835 feet subsurface. Exhibit 2 is a structure map on top of the Queen Sand.

None of the injection wells have been drilled as yet; however gamma ray-acoustilogs of Hanson, Waters & Williamson Levick State "C" Wells Nos 1 and 2 and Hanson State "A" Wells Nos. 1 and 2 are presented as Exhibit 3. Core graphs of the same wells are presented as Exhibit 4. Future wells in the pilot area are not expected to vary much from those already completed.

Pilot Area: The proposed pilot area will consist of six injection wells to be drilled. Two producers will be completely enclosed by injection wells and eight producers will be outside wells for control purposes. The distance between injection wells will be 933 feet resulting in 20-acre 5-spots. The layout of the pilot area is shown on Exhibit 1.

Proposed completion procedure for the injection wells is to set approximately 900 feet of 4-1/2" - 9.5# continuous weld casing through the pay zone

and circulate cement to the surface. The casing will be tested in the conventional manner prior to perforating. The wells will be perforated with four shots per foot of pay in the porous zones and hydraulically fractured with 250 pounds of sand per foot of pay.

It is anticipated that source water for this project can be obtained from a dry hole originally drilled by DeKalb as Compton State No. 2-X-A at a location designated on Exhibit No. 1, 660 feet from the North line and 660 feet from the East line of Section 15, Township 11-S, Range 27-E. The source horizon is the Glorietta formation of Permian age at approximately 2800 feet. The producing capacity of this well is not known at this time.

Reservoir Fluid Characteristics: Average core data from 12 wells cored in this field indicate porosity of 11.9 percent and average horizontal permeability of 16 millidarcys. Connate water saturation determined by dynamic oil flooding tests is 32.3 percent. Average residual oil saturation after complete sweep of this reservoir rock is 24.0 percent.

A stock tank sample of the produced oil tested 39.7° API gravity and 4.34 centipoises viscosity at 80° F.

Production History: The productive limits of this field are not as yet defined by the drilling to date. There is no evidence of an active water drive in this reservoir, and it is believed the primary producing mechanism is solution gas drive.

The first production from this Pool was from a well drilled and completed in Section 21, T-11-S, R-27-E by George Williams in January, 1958. Exhibit 5 is a production curve of this well. The M. G. Peters (formerly Steinberger Drilling Company) has a similar production history. The average rate of production of these wells has been submarginal since completion.

Development has been quite recent on the Hanson, Waters & Williamson

leases with first production in March, 1959. Production date for the Levick State "B" lease is tabulated below:

Month	Barrels
March	728
April	1,024
May	282
June	1,528
Total	3,562

Although the reservoir characteristics are more favorable for productivity on the Hanson, Waters & Williamson wells than on the George Williams well, it is anticipated they will be submarginal producers within six to nine months after completion.

Water Requirements: Based on injectivity calculations for the average permeability of this reservoir of 16 millidarcys and the reservoir fluid characteristics, it has been determined that 4.5 barrels per day per foot of sand will be the maximum injection rate at 650 psi surface pressure. Average thickness of the pay in the pilot area is 42 net feet. Average injection rate per well should be 190 barrels per day or 1140 barrels for the six proposed injection wells.

Results Expected: Maximum recoverable oil reserves for this flood project are 215 barrels per acre foot or 9000 barrels per acre for the area represented in the pilot flood. Total oil recovery from the two enclosed producing wells should be approximately 361,000 barrels. This represents an increase over continued primary operations of 283,600 barrels.

Optimum Spacing: Detailed calculations were performed to determine the optimum spacing for this flood assuming maximum injection rates per well. Considered in these computations were development costs, operating costs, reserves, and producing life. A sufficient number

of cases were computed between one and 40-acre spacing units to develop a mathematical relationship between spacing and all other factors. Results of this study indicated the maximum net cash realization occurs on a spacing pattern of 20-acre 5-spots. When taxes and value of money are considered, the optimum spacing is even less.

It is estimated that 12-14 years will be required to flood-out the average 20-acre unit. With wider spacing such as 40-acre units, the life is extended considerably and cash realization reduced because of higher operating and equipment costs. Our experience has shown that the useful life of equipment in continuous use in water flooding operations is seldom more than 15 years and that replacement costs often cause premature abandonment and consequently loss of potentially recoverable reserves.

Conclusions: Based on the evidence submitted and in the interest of conservation, it is requested that the Oil Conservation Commission grant a permit for this pilot water flood project and that approval be given for the drilling of the following wells at the locations indicated:

Well No.	Lease	Township	Range	Section	Location	
Proposed Injection Wells:						
W-100	Hanson State "A"	T-11-S	R-27-E	16	1650' FSL	330' FWL
W-100	Levick State "C"	T-11-S	R-27-E	15	990' FSL	330' FWL
W-101	Levick State "C"	T-11-S	R-27-E	15	1650' FSL	990' FWL
W-102	Levick State "C"	T-11-S	R-27-E	15	2310' FSL	1650' FWL
W-103	Levick State "C"	T-11-S	R-27-E	15	2310' FNL	990' FWL
W-104	Levick State "C"	T-11-S	R-27-E	15	2310' FSL	330' FWL
Proposed Producing Wells:						
P-6	Levick State "C"	T-11-S	R-27-E	15	1650' FSL	330' FWL
P-7	Levick State "C"	T-11-S	R-27-E	15	1650' FSL	1650' FWL

Well No.	Lease	Township	Range	Section	Location
Proposed Producing Wells (Continued):					
P-8	Levick State "C"	T-11-S	R-27-E	15	2310' FNL 1650' FWL
P-9	Levick State "C"	T-11-S	R-27-E	15	2310' FNL 330' FWL

For Hanson, Waters & Williamson:

Yours very truly,

RUSSELL ENGINEERING

James E. Russell

JER:gc

LARGE FORMAT EXHIBIT HAS BEEN REMOVED AND IS LOCATED IN THE NEXT FILE