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REPORTS

DATE:

1987

1987 STATUS REPORT
VACUUM FIELD WATERFLOW TECHNICAL COMMITTEE
DECEMBER 15, 1987

This is the third annual report presented to the New Mexico Oil Conservation Division by the Vacuum Field operators. Efforts of the Vacuum Waterflow Technical Committee during the past 12 months concentrated towards implementation of measures adopted in 1986 to identify and solve the causes of the waterflow problem. The most viable techniques identified are as follows:

1) Pressure falloff tests evaluating storage volumes.
   Pressure falloffs are a standard industry method of evaluating injection wells. One variable which is calculated from early time data is wellbore storage. Any injection wells communicating with the salt section whether through a direct channel or other wellbores, should exhibit significantly larger storage. This anomalous behavior will provide a means of screening wells for communication.

2) Radioactive tracer surveys using scintillation detectors.
   Radioactive material released into the injection well fluids is traced by a detector and if channeling is present will be sensed.

3) Nuclear decay time logs.
   This method traces fluid movement behind casing by activating the oxygen in water as it passes by the tool thus creating the tracer material. Measures velocity of fluid channeling.

4) Texaco neutron activation tool.
   Works similar to the nuclear decay time logs. Design of this tool allows measurement of volumes channeling. Major disadvantage of this tool is the size prohibits running through tubing.

5) Radial differential temperature surveys.
   Sensitive temperature measuring device with extending probes which contact casing wall and read differences in temperature thus detecting channeling (+0.01 degrees Farenheit).

EV - 9/3

Field wide, 263 wells were identified as target wells. This classification consisted of wells injecting above 900 psi. These are broken down by operator as follows:

ARCO	12
MOBIL	88
PHILLIPS	85
TEXACO	78

Examination of 146 target wells by one or more of the various techniques adopted by the committee failed to establish communication between the injection interval and salt section. This includes 192 surveys of one type or another as shown in the following table:

WELL SURVEYS AS OF 12/01/87

OPERATOR	WELLS EXAMINED	FALLOFFS	PROFILES TEMPERATURE	DECAY TEMPERATURE	TDT	TOTAL SURVEYS
Arco	6	2	5	0	0	7
Mobil	35	1	34	0	0	35
Phillips	55	31	51	5	0	87
Texaco	50	32	30	0	1	63

Falloff tests conducted on 66 wells identified ten wells as possibly in some way contributing to the waterflow problem. This could be either through direct channeling or communication through other wellbores. A wellbore storage volume greater than 5000 bbls is being used as a cutoff to identify questionable areas where additional investigation is necessary.

The ten wells identified are:

Central Vacuum Unit Well Nos.: 58, 60 72, 73, 81 and 141.

Vacuum Grayburg San Andres Unit Well No. 49**.

East Vacuum Grayburg San Andres Unit Well Nos.: 0524-005, 2801-007*, 2801-005*.

Further investigation of these areas is underway.

*Radioactive tracer surveys run on these wells did not identify communication with salt section.

**Radioactive tracer survey and thermal decay time log did not identify communication with salt section.

Radioactive tracer and temperature surveys run on 125 of the targeted wells did not identify any wells communicating with the salt section.

Field drilling activity for the year included 39 wells penetrating the salt section. Waterflows from the salt section occurred in 6 wells. One additional waterflow occurred from the Queen formation. This along with wells identified by the OCD as experiencing bradenhead pressures through their annual surveys have been mapped. Eight wells experienced bradenhead pressure. Only one of these, Phillips EVGSAU No. 3229-001, required remedial action.

A list of wells drilled and those experiencing troubles in 1987 is attached. Bradenhead/casing leaks tabulated for the history of the Vacuum Field follows:

SUMMARY OF BRADENHEAD/CASING LEAK FOR THE VACUUM FIELD

YEAR	LEAKS
1987	1
1986	1
1985	2
1984	9
1983	8
1982	24
1981	23
1980	59
Prior to 1980	91

Seven wells currently monitor pressure across the salt section with Mobil's Bridges State No. 6 being completed in 1987. No significant pressure changes occurred during the past year on any of the monitor wells.

Wells experiencing waterflows from the salt section with maximum flow rate and final flow rate:

Texaco -
Central Vacuum Unit No. 302 - 2000 BPH - 100 BPH
N.M. "O" ST. NCT-1 No. 26 - 1200 BPH - 120 BPH
N.M. "O" ST. NCT-1 No. 27 - 3000 BPH - 150 BPH
N.M. "R" ST. NCT-3 No. 24 - 110 BPH - 30 BPH

Phillips-
East Vacuum Grayburg San Andres Unit #3229-010 - 43 BPH-minimal
Lea Well No. 34 - 34 BPH - 0

Well with waterflow from the Queen:

Phillips-
Philmex No. 20 - 39 BPH-minimal

Wells experiencing bradenhead/casing leaks:

Arco - Hale State No. 1
Mobil - Bridges State No. 49
Bridges State No. 61
Bridges State No. 89
Phillips- East Vacuum Grayburg San Andres Unit No. 2054-001
East Vacuum Grayburg San Andres Unit No. 3229-001
Samedan - State GS16 No. 1
Yates - Angle State No. 1

1987 Drilling Activity/Water Flows/Bradenhead Pressure or Casing Leak
Vacuum Field
Lea County, New Mexico

12/15/87

Well Name	Well Location	Wells Drilled During 1987 Which Encountered: No Wtr Flow	Salado Wtr Flow	Queen Wtr Flow	Flow Rate	Existing Wells With Bradenhead Press or Casing Leak in Salt
Phillips Philmex #28	1980' FNL & 660' FEL Sec 26-17S-33E	X				
Phillips Philmex #19	1980' FNL & 560' FEL Sec 35-17S-33E	X				
Phillips Philmex #21	1980' FNL & 1980' FEL Sec 35-17S-33E	X				
Phillips Philmex #24	660' FNL & 1980' FEL Sec 35-17S-33E	X				
Phillips Philmex #25	1980' FNL & 1980' FWL Sec 35-17S-33E	X				
Phillips Philmex #20	660' FNL & 660' FWL Sec 36-17S-33E			X	39 BPH	
JFG Mobil State #1	1980' FNL & 1980' FWL Sec 07-17S-34E	X				
SW Royalties Mobil State #1	600' FSL & 1971' FWL Sec 07-17S-34E	X				
D. R. Ormand Amoco State #1	660' FNL & 1980' FWL Sec 18-17S-34E	X				
Mobil State N #3	800' FNL & 2010' FWL Sec 10-17S-34E	X				
Mobil State N #4	1918' FNL & 850' FWL Sec 10-17S-34E	X				
Mobil Bridges State #512	470' FSL & 1850' FEL Sec 11-17S-34E	X				
Mobil Bridges State #507	1150' FSL & 1200' FEL Sec 26-17S-34E	X				
Mobil Bridges State #49	1980' FNL & 660' FEL Sec 27-17S-34E					X
Mobil Bridges State #89	660' FNL & 660' FEL Sec 10-17S-34E					X
Mobil Bridges State #63	1980' FSL & 1980' FWL Sec 13-17S-34E					X
Arco Hale State #1	660' FNL & 660' FEL Sec 31-17S-34E					X
Yates Angle State #1	660' FNL & 1980' FWL Sec 09-17S-34E					X
Samedan State GS16 #1	660' FSL & 660' FEL Sec 16-17S-34E					X
Texaco N.M. O State #26	990' FSL & 990' FWL Sec 36-17S-34E		X		1200 BPH	
Texaco N.M. O State #27	990' FSL & 990' FEL Sec 36-17S-34E		X		3000 BPH	
Texaco CVU #266	1971' FNL & 1310' FEL Sec 36-17S-34E	X				
Phillips Lea #34	935' FSL & 1980' FWL Sec 30-17S-34E		X		34 BPH	
Mobil State JJ #3	544' FSL & 760' FWL Sec 07-17S-35E	X				
Marathon State Com #1	1980' FNL & 1980' FWL Sec 17-17S-35E	X				
Lynx Pet State 20 #1	1980' FSL & 660' FEL Sec 20-17S-35E	X				
Sun Shoe Bar State Com #1	660' FSL & 2030' FWL Sec 15-17S-35E	X				
Arco Shoe Bar 23 State Com #1	1980' FNL & 660' FWL Sec 23-17S-35E	X				
BTA Oil Buckeye B #3	330' FNL & 1650' FWL Sec 36-17S-35E	X				
BTA Oil Buckeye C #1	1750' FNL & 1650' FWL Sec 36-17S-35E	X				
Phillips EVGSAU #3374-003	2630' FSL & 400' FWL Sec 33-17S-35E	X				
Phillips EVGSAU #3202-017	2000' FNL & 120' FEL Sec 32-17S-35E	X				
Phillips EVGSAU #3236-009	2510' FNL & 1850' FWL Sec 32-17S-35E	X				
Phillips EVGSAU #3229-010	1980' FSL & 10' FWL Sec 32-17S-35E		X		43 BPH	
Phillips EVGSAU #3202-019	2065' FNL & 2540' FEL Sec 32-17S-35E	X				
Phillips EVGSAU #3229-001	1980' FSL & 660' FWL Sec 32-17S-35E					X
Phillips EVGSAU #2054-001	330' FSL & 660' FWL Sec 20-17S-35E					X
Sun N.M. Federal C #1	2080' FNL & 600' FEL Sec 24-18S-34E	X				
Phillips Airstrip State A #1	1931' FSL & 1980' FWL Sec 15-18S-34E	X				
Southland Tonto 15 State #2	1880' FNL & 550' FEL Sec 15-18S-34E	X				
Southland Tonto 14 State #3	1980' FNL & 660' FWL Sec 14-18S-34E	X				
Texaco N.M. Z State NCT 5 #1	1850' FSL & 2110' FEL Sec 14-18S-34E	X				
Texaco N.M. R State #24	860' FSL & 660' FEL Sec 01-18S-34E		X		110 BPH	
Texaco N.M. Z State TN Com #1	660' FNL & 2200' FWL Sec 02-18S-34E	X				
Texaco CVU #302	2030' FNL & 1310' FEL Sec 06-18S-35E		X		2000 BPH	
Sun State AF #2	330' FSL & 2130' FEL Sec 08-18S-35E	X				
Yates Shining Star AEA #1	1650' FSL & 2310' FEL Sec 11-18S-35E	X				

1987 Drilling Activity/Water Flows
Vacuum Field
Lea County, New Mexico 12/15/87

Key To Map

Well drilled during 1987:

- which did not encounter any water flow
- which encountered water flow in the Salado
- which encountered water flow in the Queen

Existing well which had bradenhead pressure or casing leak in the salt section during 1987

R-33-E

R-34-E

R-35-E

T-17-S

T-18-S

NORTH VACUUM UNIT

NORTH VACUUM ABO EAST UNIT

BRIDGES STATE

NORTH VACUUM ABO UNIT

NORTH VACUUM ABO WEST UNIT

EAST VACUUM GB/SA UNIT

CENTRAL VACUUM UNIT

STATE VACUUM UNIT

WEST VACUUM UNIT

VACUUM GB/SA UNIT

VACUUM ABO UNIT

NORTH EK QUEEN UNIT

YATES
MAPLE STATE #1

MOBIL
STATE N #3

MOBIL
BRIDGES STATE #89

MOBIL
STATE N #4

MOBIL
BRIDGES STATE #512

MOBIL
STATE JJ #3

MARATHON
STATE COM #1

MOBIL
BRIDGES STATE #6

SUN EXPL
EAGLE BAR STATE COM #1

ARCO
EAGLE BAR 23 STATE COM #1

MOBIL
BRIDGES STATE #49

MOBIL
BRIDGES STATE #507

PHILLIPS
PHILMEX #28

PHILLIPS
LEA #34

PHILLIPS
PHILMEX #20

PHILLIPS
PHILMEX #19

ARCO
MAPLE STATE #1

TEXACO
CVU #266

TEXACO
NM O STATE #26

TEXACO
NM O STATE #27

TEXACO
CVU #302

TEXACO
STATE #24

YATES
MINING STAR AEA #1

SUN EXPL
STATE AF #2

TEXACO
STATE #3

PHILLIPS
ASTRIP STATE A #1

TEXACO
STATE #4

SUN EXPL
NEW MEXICO FED C #1

STA OIL
MCKEYE B #3

STA OIL
MCKEYE C #1

VACUUM FIELD
WATERFLOW COMMITTEE
LEA COUNTY, NEW MEXICO

1987 DRILLING ACTIVITY/WATER FLOWS

SCALE 1 INCH = 4000'