

HALE 12
INJECTION APPLICATION

III. WELL DATA

A. Name, Location, Downhole Data

(1) Lease Name: M. E. Hale, Well No. 12

Location: 1260' FSL and 2630' FEL, Section 35, T-17-S,
R-34-E, Lea County, New Mexico

(2) Casing: Surface: 10-3/4", 40.5#/foot, H-40, ST&C set
at 1570' in 14-3/4" hole. Cemented
with 1100 sx Class "C" with 2% CaCl₂.
Cement circulated.

Production: 7", 26#/foot, K-55, ST&C set at
4800' in 9-1/2" hole, 7" Lynes
external casing packer at 1638' and
Howco DV tool at 1630'. Cement,
stage 1: 1400 sx lite, with 10%
Diocel D, 12# salt, 3# gilsonite,
1/4# floccel followed by 400 sx
Class C with 6# salt and 3#
gilsonite. Cement circulated
through DV tool, stage 2: 200 sacks
lite with 10% Diocel D, 12# salt,
3# gilsonite and 1/4# floccel
followed by 100 sx Class C neat.
Cement circulated on both stages.

(3) Injection Tubing: 2-3/8" 4.7#/foot J-55 IPC with TK-70
set @ 4300'

(4) Injection Packer: 7" X 2-3/8" Elder "Lok-Set" style
packer with on-off tool set @ 4300'

B. Reservoir Data

(1) Injection Formation: Grayburg/San Andres
Pool Name: Vacuum

(2) Injection Interval: Perforations 4356'-4700'

(3) Original Well Intent: San Andres Producer

(4) Other Perforated Intervals: None

(5) Productive Zones:
Next Higher: Queen 3700'
Next Lower: Glorieta 6000'

VII. PROPOSED INJECTION DATA

- (1) Injection Rate: Average = 2500 BWPD
Maximum = to be determined by step rate test
- (2) Injection System: Closed
- (3) Injection Pressure: Average = 1900 psig
Maximum = 100 psig below fracture pressure as determined by step rate test
- (4) Injection Fluid: Produced water from Phillips' Hale and Mable leases, and fresh water make up from Ogalaga supply wells. Attached is a chemical analysis of the produced water taken at the Hale tank battery, and an analysis of a 50/50 produced/fresh water mixture.

IX. PROPOSED STIMULATION

Based on results of injectivity test and survey, the well may be acidized with 15-20% HCl as deemed necessary.

**WELL SERVICE APPROVAL - NON AFE
PHILLIPS PETROLEUM COMPANY--PERMIAN BASIN REGION**

RKB @ 4027
GL @ 4015
RKB-GL 12

Category Code 0
Area North Subarea Buckeye
Lease & Well No. M. E. Hale No. 12
Legal Description 1260' FSL & 2630' FEL, Sec. 35, T-17-S, R-34-E
Lea County State: New Mexico
Field Vacuum Grayburg-San Andres
Status: 75 BOPD 650 BOPD MCFD
Tbg. 2 3/8" 4.7#/ft J-55 IPC set at 4300'
Other Elder "Lok-set style" packer set at 4300'
Downhole Equip:
Date Drilled: 4/83
Hole/Casing Condition Squzd Csg leak at 1648' - 8/83 (Tight @ 1648'-4/90)
Last Stimulation: 8/83-A-18675 gals 15% HCl, 7/90-A-10000 gals 20% HCl
Workover Proposal:
Well Condition: Convert to water injector
Wellhead Description: (Include connection that BOP will bolt to)

14-3/4" Hole
TOC @ Surf

10-3/4" OD
@ 1570'

9-1/2" Hole
TOC @ Surface

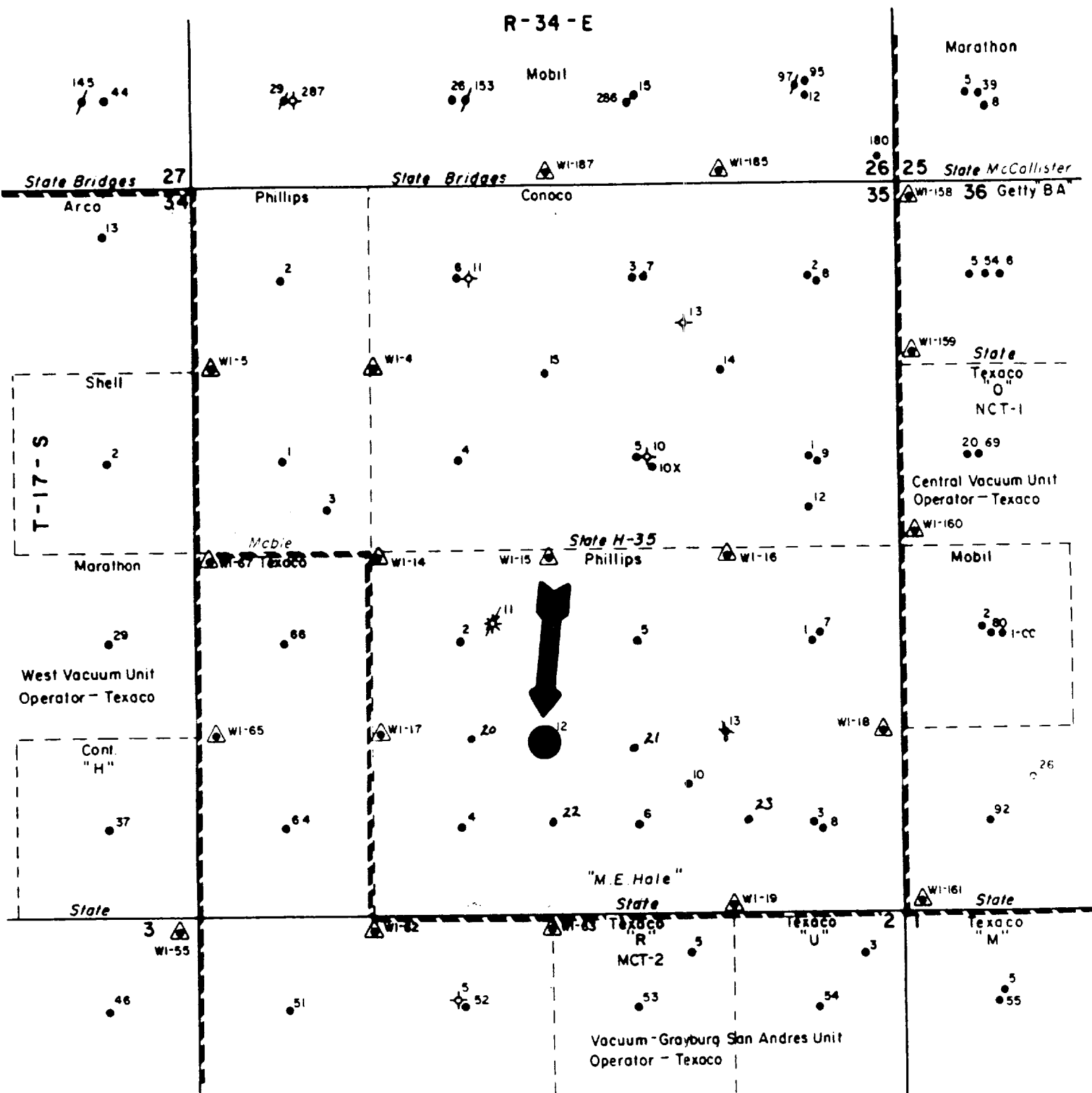
DV pkr assembly @ 1630'
Sqzd DV tool w/50 sx to 2500# OK

2-3/8" 4.7#/ft J-55 IPC tubing set @ 4300"
7" Elder "Lok-set style" Packer @ 4300'

San Andres Perfs
1 spf 4356'-4438' 82'
4457'-4462' 5'
4488'-4495' 7'
4514'-4524' 10'
4561'-4593' 32'
4596'-4602' 48'
4602'-4644'
4680'-4700' 20'
204 holes

7" @ 4800'
26# K-55
TOC @ 4800'

TD @ 4800'
PBTD @ 4736'



PHILLIPS PETROLEUM COMPANY
 HALE-MABLE VACUUM G-SA
 PRESSURE MAINTENANCE PROJECT
 SECTION 35, T-17-S, R-34-E
 VACUUM GRAYBURG- SAN ANDRES FIELD
 LEA COUNTY, NEW MEXICO

SCALE 1" = 1000'

HALE 13
INJECTION APPLICATION

III. WELL DATA

A. Name, Location, Downhole Data

(1) Lease Name: M. E. Hale, Well No. 13

Location: 1360' FSL and 1210' FEL, Section 35, T-17-S,
R-34-E, Lea County, New Mexico

(2) Casing: Surface: 10-3/4", 40.5#/foot, H-40, ST&C set @
1570' in 14-3/4" hole. Cemented with
1100 sacks of Class C with 2% CaCl₂.
Cement circulated.

Production: 7", 26#/foot, K-55, ST&C set at
4829' in 9-1/2" hole, 7" Lynes
external casing packer at 1590', and
Howco DV tool at 1583'. Cement,
stage 1: 1125 sx TLW, with 10%
Dioclele D, 10# salt, 1/4# flocele,
3# gilsonite followed by 400 sx
Class C with 6# salt and 3#
gilsonite. Stage 2: 165 sacks TLW
with 10% Dioclele D, 10# salt, 1/4#
flocele, 3# gilsonite and 100 sx
Class C neat. Cement circulated on
both stages.

(3) Injection Tubing: 2-3/8" 4.7#/foot J-55 IPC with TK-70
set @ 4300'

(4) Injection Packer: 7" X 2-3/8" Elder "Lok-Set" style
packer with on-off tool set @ 4300'

B. Reservoir Data

(1) Injection Formation: Grayburg/San Andres
Pool Name: Vacuum

(2) Injection Interval: Perforations 4367'-4690'

(3) Original Well Intent: San Andres Producer

(4) Other Perforated Intervals: None

(5) Productive Zones:
Next Higher: Queen 3700'
Next Lower: Glorieta 6000'

VII. PROPOSED INJECTION DATA

- (1) Injection Rate: Average - 2500 BWPD
Maximum - to be determined by step rate test
- (2) Injection System: Closed
- (3) Injection Pressure: Average - 1900 psig
Maximum - 100 psig below fracture pressure as determined by step rate test
- (4) Injection Fluid: Produced water from Phillips' Hale and Mable leases, and fresh water make up from Ogalaga supply wells. Attached is a chemical analysis of the produced water taken at the Hale tank battery, and an analysis of a 50/50 produced/fresh water mixture.

IX. PROPOSED STIMULATION

Based on results of injectivity test and survey, the well may be acidized with 15-20% HCl as deemed necessary.

WELL SERVICE APPROVAL - NOM AFE
PHILLIPS PETROLEUM COMPANY--PERMIAN BASIN REGION

RKB @ 4022
 GL @ 4011
 RKB-GL 11

Category Code 0
 Area North Subarea Buckeye
 Lease & Well No. M. E. Hale No. 13
 Legal Description 1360' FSL & 1210' FEL, Sec. 35, T-17-S, R-34-E
 Lea County State: New Mexico
 Field Vacuum Grayburg-San Andres
 Status: 30 BOPD 475 BOPD MCFD
 Tbg. 2-3/8" 4.7#/ft J-55 IPC set @ 4300'
 Other Elder "Lok-set style" Packer @ 4300'

Date Drilled: 7/83
 Hole/Casing Condition
 Last Stimulation: 7/83-A-18800 15% HCl
 Workover Proposal:
 Well Condition: Rod Pump 30 BOPD, 475 BOPD

Wellhead Description: (Include connection that BOP will bolt to)
 10-3/4" CB-2000 psi, Huber, Type CJ w/ 7" x 2-7/8" -2000 psi, Type A7S
 Huber, Tubing Head

14-3/4" Hole
 TOC @ Surf

10-3/4" OD
 @ 1572'

9-1/2" Hole (7/83) A/11,100 15%
 TOC @ Surf (2/85) Sub inst

DV Tool Assembly
 @ 1583'

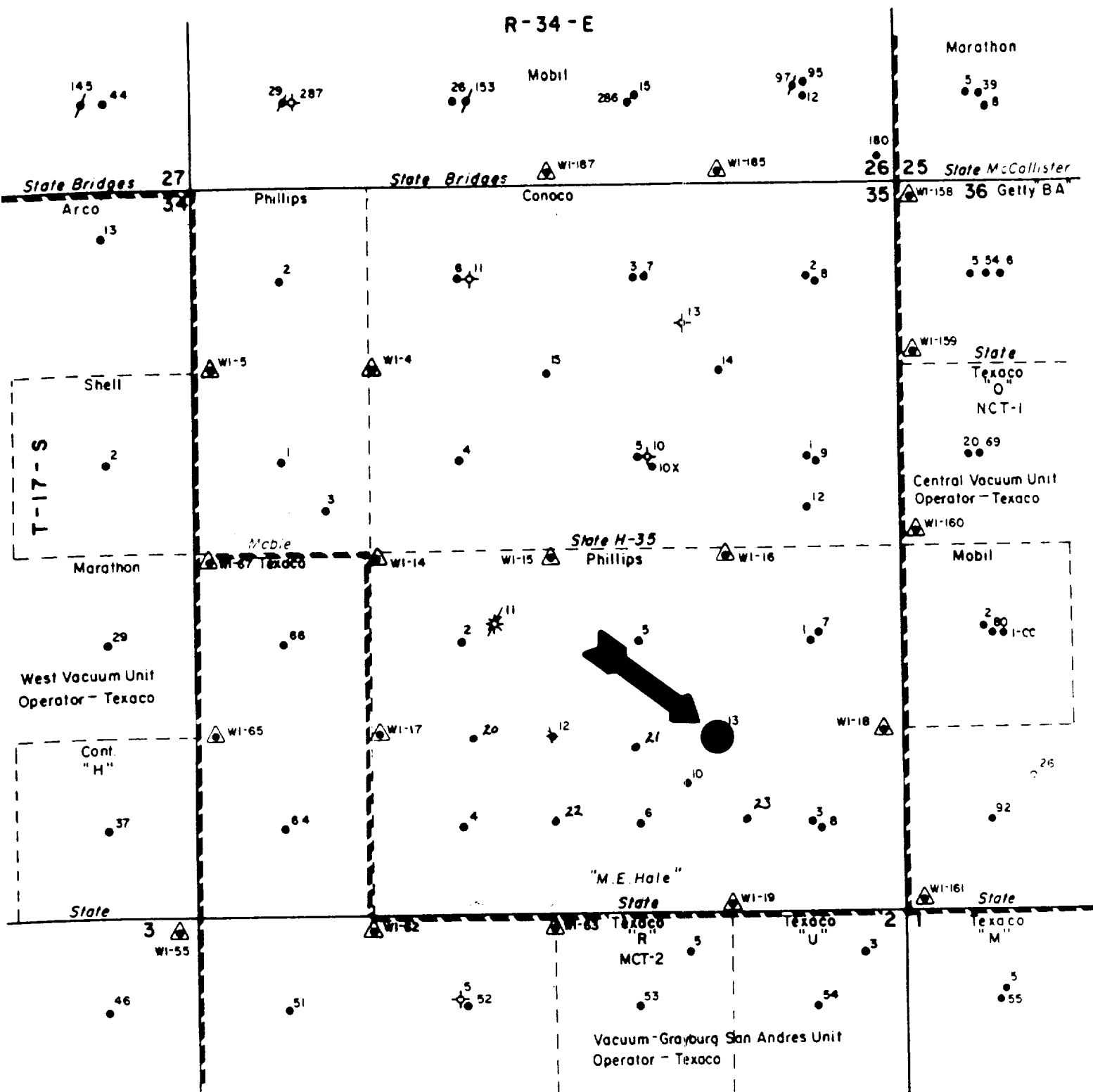
2-3/8" 4.7#/ft J-55 IPC tbg. set @ 4300'
 Elder Lok-Set pkr @ 4300'

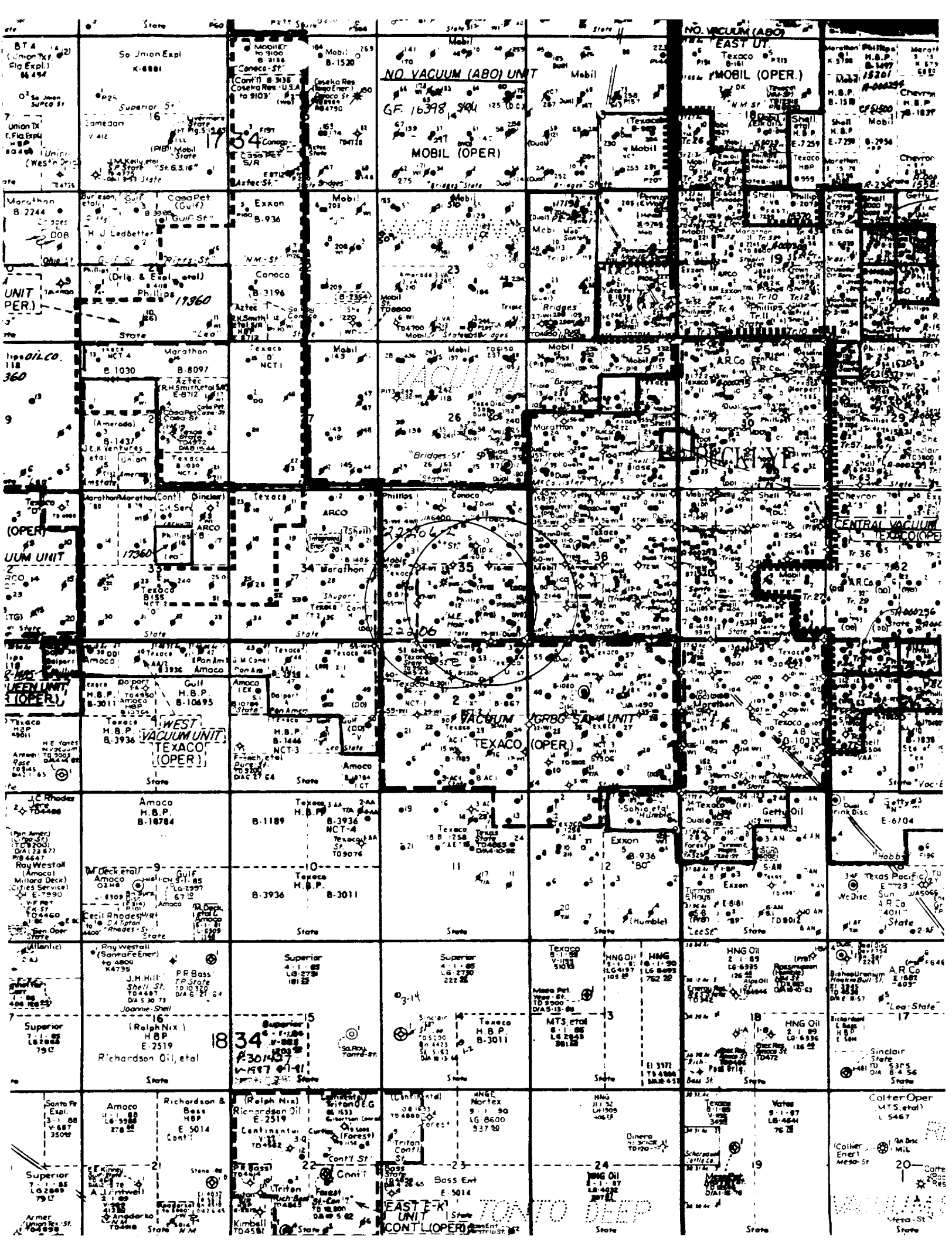
San Andres Perfs:

1 spf	4402'-4367'	35'
	4470'-4480'	10'
	4538'-4562'	24'
	4564'-4567'	3'
	4576'-4582'	6'
	4622'-4690'	68'
		146 holes

7" OD @ 4829'
 26# K-55

TD @ 4830'
 PBTD @ 4795'







Home Office 707 N. Leech, P.O. Box 1400 / Hobbs, MN 58240 / Ph. 505/383-7751, Fax 505/383-8754

June 10, 1992

Mr. Danny Williamson
Phillips Petroleum Co.
West Star Route - Lea Plant
Lovington, NM 88260

Dear Mr. Williamson:

Enclosed please find our water analyses and compatibility reports on the samples submitted June 8, 1992, from the Hale lease.

If you have any questions or require further information, please contact us.

Sincerely,

Sharon Wright
Laboratory Technician

SW/ar

cc: Jay Brown
Pat Culpepper
Scott Malone
Spencer Oden
Joe Hay

UNICHEM INTERNATIONAL INC.

Unichem International

707 North Leach

P.O.Box 1499

Hobbs, New Mexico 88240

Company : PHILLIPS PETROLEUM COMPANY
 Date : 06-10-1992
 Location: HALE - IPD (on 06-08-1992)

Sample 1

Specific Gravity: 1.079
 Total Dissolved Solids: 110813
 pH: 7.10
 IONIC STRENGTH: 1.991

CATIONS:

		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺²)	120	2400
Magnesium	(Mg ⁺²)	16.0	194
Sodium	(Na ⁺¹)	1750	40200
Iron (total)	(Fe ⁺²)	0.021	0.600
Barium	(Ba ⁺²)	0.006	0.390
Manganese	(Mn ⁺²)	0.006	0.170

ANIONS:

Bicarbonate	(HCO ₃ ⁻¹)	12.8	781
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	67.1	3230
Chloride	(Cl ⁻¹)	1810	64000

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium</u> <u>Carbonate</u>	<u>Calcium</u> <u>Sulfate</u>
86°F	30°C	0.70	-15
100°F	38°C	1.3	-15
120°F	49°C	1.6	-15
140°F	60°C	2.0	-15
160°F	71°C	2.4	-11
180°F	82°C	2.8	-11

Unichem International

707 North Leach

P.O.Box 1499

Hobbs, New Mexico 88240

Company : PHILLIPS PETROLEUM COMPANY

Date : 06-10-1992

Location: HALE - WSW #1 (on 06-08-1992)

Sample 1

Specific Gravity:

1.001

Total Dissolved Solids:

1678

pH:

7.20

IONIC STRENGTH:

0.038

CATIONS:

		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺²)	3.80	76.0
Magnesium	(Mg ⁺²)	12.2	148
Sodium	(Na ⁺¹)	13.6	312
Iron (total)	(Fe ⁺²)	0.018	0.500
Barium	(Ba ⁺²)	0.003	0.240
Manganese	(Mn ⁺²)	0.002	0.050

ANIONS:

Bicarbonate	(HCO ₃ ⁻¹)	3.20	195
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	0.972	46.7
Chloride	(Cl ⁻¹)	25.4	900

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium</u> <u>Carbonate</u>	<u>Calcium</u> <u>Sulfate</u>
86°F	30°C	-0.23	-18
100°F	38°C	0.34	-18
120°F	49°C	0.65	-18
140°F	60°C	1.0	-18
160°F	71°C	1.4	-18
180°F	82°C	1.8	-18

Unichem International

707 North Leach

P.O.Box 1499

Hobbs, New Mexico 88240

Company : PHILLIPS PETROLEUM COMPANY

Date : 06-10-1992

Location: HALE - WSW #1 & IPD COMPATIBILITY (on 06-08-1992)

	<u>Sample 1</u>
Specific Gravity:	1.060
Total Dissolved Solids:	83529
pH:	7.13
IONIC STRENGTH:	1.503

<u>CATIONS:</u>		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ²⁺)	90.9	1820
Magnesium	(Mg ²⁺)	15.0	183
Sodium	(Na ⁺)	1320	30200
Iron (total)	(Fe ²⁺)	0.021	0.575
Barium	(Ba ²⁺)	0.005	0.352
Manganese	(Mn ²⁺)	0.005	0.140

<u>ANIONS:</u>			
Bicarbonate	(HCO ₃ ⁻¹)	10.4	634
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	50.6	2430
Chloride	(Cl ⁻¹)	1360	48200

<u>DISSOLVED GASES</u>		
Carbon Dioxide	(CO ₂)	0
Hydrogen Sulfide	(H ₂ S)	0
Oxygen	(O ₂)	0

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium Carbonate</u>	<u>Calcium Sulfate</u>
86°F	30°C	0.48	-29
100°F	38°C	1.1	-29
120°F	49°C	1.4	-29
140°F	60°C	1.7	-29
160°F	71°C	2.1	-25
180°F	82°C	2.6	-25

Comments:

COMPATIBILITY = 75% HALE IPD & 25% WSW #1

Unichem International

707 North Leach

P.O.Box 1499

Hobbs, New Mexico 88240

Company : PHILLIPS PETROLEUM COMPANY

Date : 06-10-1992

Location: HALE - WSW #1 & IPD COMPATIBILITY (on 06-08-1992)

Specific Gravity:

Total Dissolved Solids:

pH:

IONIC STRENGTH:

Sample 1

1.021

28962

7.18

0.526

CATIONS:

		<u>mg/liter</u>	<u>mg/liter</u>
Calcium	(Ca ²⁺)	32.8	657
Magnesium	(Mg ²⁺)	13.1	160
Sodium	(Na ⁺)	447	10300
Iron (total)	(Fe ²⁺)	0.019	0.525
Barium	(Ba ²⁺)	0.004	0.278
Manganese	(Mn ²⁺)	0.003	0.080

ANIONS:

Bicarbonate	(HCO ₃ ⁻¹)	5.60	342
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	17.5	841
Chloride	(Cl ⁻¹)	470	16700

DISSOLVED GASES

Carbon Dioxide	(CO ₂)	0
Hydrogen Sulfide	(H ₂ S)	0
Oxygen	(O ₂)	0

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium</u>	<u>Calcium</u>
		<u>Carbonate</u>	<u>Sulfate</u>
86°F	30°C	-0.03	-41
100°F	38°C	0.86	-41
120°F	49°C	0.87	-41
140°F	60°C	1.2	-41
160°F	71°C	1.6	-37
180°F	82°C	2.1	-37

Comments:

COMPATIBILITY = 25% HALE IPD & 75% WSW #1

Unichem International

707 North Leech

P.O.Box 1499

Hobbs, New Mexico 88240

Company : PHILLIPS PETROLEUM COMPANY

Date : 06-10-1992

Location: HALE - WSW #1 & IPD COMPATIBILITY (on 06-08-1992)

	<u>Sample 1</u>
Specific Gravity:	1.071
Total Dissolved Solids:	99900
pH:	7.11
IONIC STRENGTH:	1.795

<u>CATIONS:</u>		<u>mg/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺⁺)	108	2170
Magnesium	(Mg ⁺⁺)	15.6	190
Sodium	(Na ⁺)	1580	36200
Iron (total)	(Fe ⁺⁺)	0.021	0.590
Barium	(Ba ⁺⁺)	0.005	0.375
Manganese	(Mn ⁺⁺)	0.006	0.158

<u>ANIONS:</u>		<u>mg/liter</u>	<u>mg/liter</u>
Bicarbonate	(HCO ₃ ⁻¹)	11.8	722
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	60.5	2910
Chloride	(Cl ⁻¹)	1630	57700

DISSOLVED GASES

Carbon Dioxide	(CO ₂)	0
Hydrogen Sulfide	(H ₂ S)	0
Oxygen	(O ₂)	0

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium Carbonate</u>	<u>Calcium Sulfate</u>
86°F	30°C	0.60	-21
100°F	38°C	1.2	-21
120°F	49°C	1.5	-21
140°F	60°C	1.9	-21
160°F	71°C	2.3	-17
180°F	82°C	2.7	-17

Comments:

COMPATIBILITY = 90% HALE IPD & 10% WSW #1

Unichem International

707 North Leech

P.O.Box 1499

Hobbs, New Mexico 88240

Company : PHILLIPS PETROLEUM COMPANY

Date : 06-10-1992

Location: HALE - WSW #1 & IPD COMPATIBILITY (on 06-08-1992)

Sample 1

Specific Gravity:

1.040

Total Dissolved Solids:

56246

pH:

7.15

IONIC STRENGTH:

1.014

CATIONS:

		<u>me/liter</u>	<u>mg/liter</u>
Calcium	(Ca ⁺⁺)	61.9	1240
Magnesium	(Mg ⁺⁺)	14.1	171
Sodium	(Na ⁺)	881	20300
Iron (total)	(Fe ⁺⁺)	0.020	0.550
Barium	(Ba ⁺⁺)	0.005	0.315
Manganese	(Mn ⁺⁺)	0.004	0.110

ANIONS:

Bicarbonate	(HCO ₃ ⁻¹)	8.00	488
Carbonate	(CO ₃ ⁻²)	0	0
Hydroxide	(OH ⁻¹)	0	0
Sulfate	(SO ₄ ⁻²)	34.1	1640
Chloride	(Cl ⁻¹)	915	32500

DISSOLVED GASES

Carbon Dioxide	(CO ₂)	0
Hydrogen Sulfide	(H ₂ S)	0
Oxygen	(O ₂)	0

SCALING INDEX (positive value indicates scale)

<u>Temperature</u>		<u>Calcium Carbonate</u>	<u>Calcium Sulfate</u>
86°F	30°C	0.16	-39
100°F	38°C	0.75	-39
120°F	49°C	1.1	-39
140°F	60°C	1.4	-39
160°F	71°C	1.8	-35
180°F	82°C	2.2	-35

Comments:

COMPATIBILITY = 50% HALE IPD & 50% WSW #1

ATTACHMENT NO. 5
Notification

I hereby certify that a complete copy of this application was sent by certified mail to the below listed persons on July 27, 1992.

Signed: 
Name: L. M. Sanders
Title: Supervisor, Regulatory Affairs
Date: July 27, 1992

Offset Operator:

Conoco Inc.
10 Desta Dr., Ste. 100W
Midland, Texas 79705

Texaco Expl. & Prod., Inc.
Box 730
205 E. Bender
Hobbs, NM 88240

Surface Owner:

Commissioner of Public Lands
New Mexico State Land Office
P. O. Box 1148
Santa Fe, NM 87504-1148