

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose:  Secondary Recovery  Pressure Maintenance  Disposal  Storage  
Application qualifies for administrative approval?  yes  no

II. Operator: Marshall Pipe & Supply Co.,  
Address: 13423 Forestway Dr., Dallas, Texas 75240

Contact party: J. W. Marshall Phone: 214-239-7284

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project?  yes  no  
If yes, give the Division order number authorizing the project \_\_\_\_\_

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

- 100 bbls + Closed
  - 200 - 1000psia reinjected produced wtr.
  - No.
1. Proposed average and maximum daily rate and volume of fluids to be injected;
  2. Whether the system is open or closed;
  3. Proposed average and maximum injection pressure;
  4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
  5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: J. W. Marshall Title: Operator

Signature: *J. W. Marshall* Date: 11-30-88

\* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. VI:Wendell Best, 6-13-86, VIII:Form C-105 8-24-88, Lab rept,X: Logs submitted 8-24-88, XI: Lab. report attached...

OPERATION

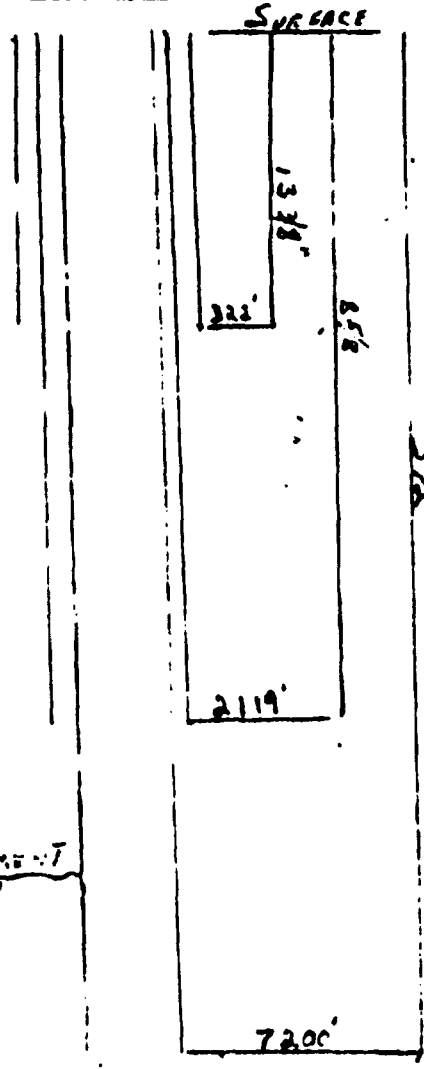
1 Unit B, 330' from North & 1980' From East, Sec. 34, T2S, R29E

WELL NO. FOOTAGE LOCATION SECTION TOWNSHIP RANGE

Roosevelt County, New Mexico

Schematic

Tubular Data



**Surface Casing**  
 Size 13-3/8" Cemented with 300 ex.  
 TOC Surface feet determined by Circulated  
 Hole size 17-1/2"

**Intermediate Casing**  
 Size 8-5/8" Cemented with 200 Sacks Prem 550 HOWC Lt.  
 TOC Surface feet determined by Circulated  
 Hole size 11"

**Long string**  
 Size 5-1/2" Cemented with 225 ex.  
 TOC 6030' feet determined by Cement bond log  
 Hole size 7-7/8"  
 Total depth 7205

**Injection interval**  
7104 feet to 7116 feet  
 (perforated or open-hole, indicate which) Perforated.

Total Cement 6030'

Tubing size 2-3/8" lined with \_\_\_\_\_ set in a \_\_\_\_\_  
 (material)  
5-1/2" Otis WB packer at 7070 feet  
 (brand and model)

(or describe any other casing-tubing used).

Other Data

- Name of the injection formation Montoya
- Name of field or Pool (if applicable) Tule
- Is this a new well drilled for injection?  Yes  No  
 If no, for what purpose was the well originally drilled? commercial production of hydrocarbons
- Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) Pennsylvanian section 7050 to 7064, 6853 to 6857 and 6861 to 6863, shut in gas well because of lack of pressure to "buck" gas line. Will put Penn. zone on line when compressor is installed. (Packer set at 7070'.) penn formation will be produced through 5-1/2" 17#
- Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in N=80 this area. Penn. section as outlined in question "4" above. (overlying) casing None underlying.

**MARSHALL Pipe & Supply Company**

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

FORM C-108.

Details:

- V. Map attached with one-half mile radius, plus larger area plat.
- VI. Copy of Form C-105 covering Wendell Best #1. (also on file with you)
- VII. Data on proposed location.
1. 100 bbls per day, plus
  2. Closed System
  3. 200 to 1000 PSIG
  4. Reinjected produced water
- b. No.
- VIII: Copy of Form C-105 on Cook #1, filed 8-24-88, and on file with you.
- IX: None
- X: Well Logs filed with you 8-24-88
- XI. Chemical Laboratory Report prepared by Halliburton Services
- XII: Affidavit attached.
- XIII: Proof of Notice requested 11-30-88 from Portales News Tribune Portales, New Mexico, 11-30-88. Tear sheet and affidavit of Publishing will be forwarded to you upon receipt from Portales News Tribune.
- III: Well Data
- A. INJECTION WELL DATA SHEET ENCLOSED, plus Otis Completion Guide
- B. " " " "
- XIV: Copy of letter to Surface Owner with copy of Application By Certified Mail to:
- Mrs. O. A. Woody  
Woody Acres  
3414 44th St.  
Lubbock, Texas 79401
- Offset Operator: MARSHALL PIPE & SUPPLY COMPANY  
13423 Forestway Dr.  
Dallas, Texas 75240

Handwritten notes: 7104, 2, 1420.8, (PSI)

*Exhibit 4-A*

**WASP  
WIRELINE INC.**

**GAMMA RAY  
CEMENT BOND**

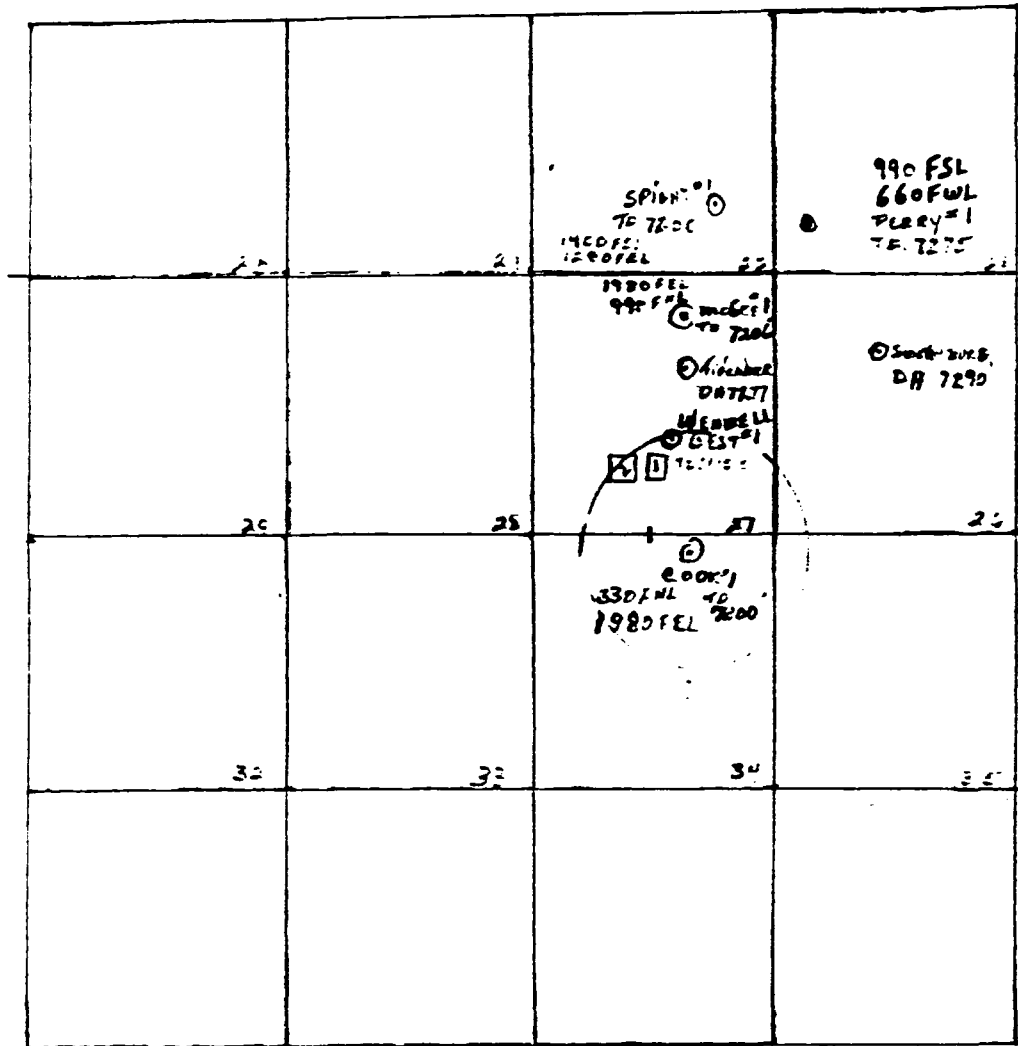
<b>FILING NO.</b>	<b>COMPANY</b> <u>MARSHALL PIPE &amp; SUPPLY COMPANY</u>		
	<b>WELL</b> <u>COOK # 1</u>		
	<b>FIELD</b> <u>TULE MOUNTAIN</u>		
	<b>COUNTY</b> <u>ROOSEVELT</u>	<b>STATE</b> <u>NEW ME</u>	
	<b>LOCATION</b> <u>330' FNL &amp; 1230' FBL</u>	<b>Other Serv</b>	
	<b>SEC</b> <u>34</u>	<b>TWP</b> <u>2-S</u>	<b>RGE</b> <u>20-E</u>

<b>Permanent Datum</b> <u>C.L.</u>	<b>Elev.</b> <u>1259</u>	<b>Elev.: K.B.</b> <u>42</u>
<b>Log Measured from</b> <u>K.B.</u> , <u>10</u> Ft. Above Permanent Datum		<b>D.F.</b> _____
<b>Drilling Measured from</b> <u>K.B.</u>		<b>G.L.</b> <u>133</u>

<b>Date</b>	<u>6-18-88</u>	<b>Type Fluid in Hole</b>		<u>WATER</u>		
<b>Run No.</b>	<u>ONE</u>	<b>Dens</b>	<b>Visc.</b>			
<b>Depth-Driller</b>	<u>7196</u>	<b>Max. Rec. Temp.</b>		<u>N/A</u>		
<b>Depth-Logger</b>	<u>7175</u>	<b>Est. Cement Top</b>		<u>6030</u>		
<b>Btm. Log Interval</b>	<u>7170</u>	<b>Equip.</b>	<b>Location</b>	<u>001</u> <u>B-7</u>		
<b>Top Log Interval</b>	<u>5900</u>	<b>Recorded By</b>		<u>P. WATTS</u>		
<b>Open Hole Size</b>	<u>7 7/8"</u>	<b>Witnessed By</b>		<u>MR. MARSHALL</u>		
<b>CASING REC.</b>	<b>Size</b>	<b>Wt. Ft.</b>	<b>Grade</b>	<b>Type Joint</b>	<b>Top</b>	<b>B</b>
<b>Surface String</b>	<u>3 7/8</u>	<u>24</u>				
<b>Prot. String</b>	<u>5 1/2</u>					
<b>Prod. String</b>						
<b>Liner</b>						

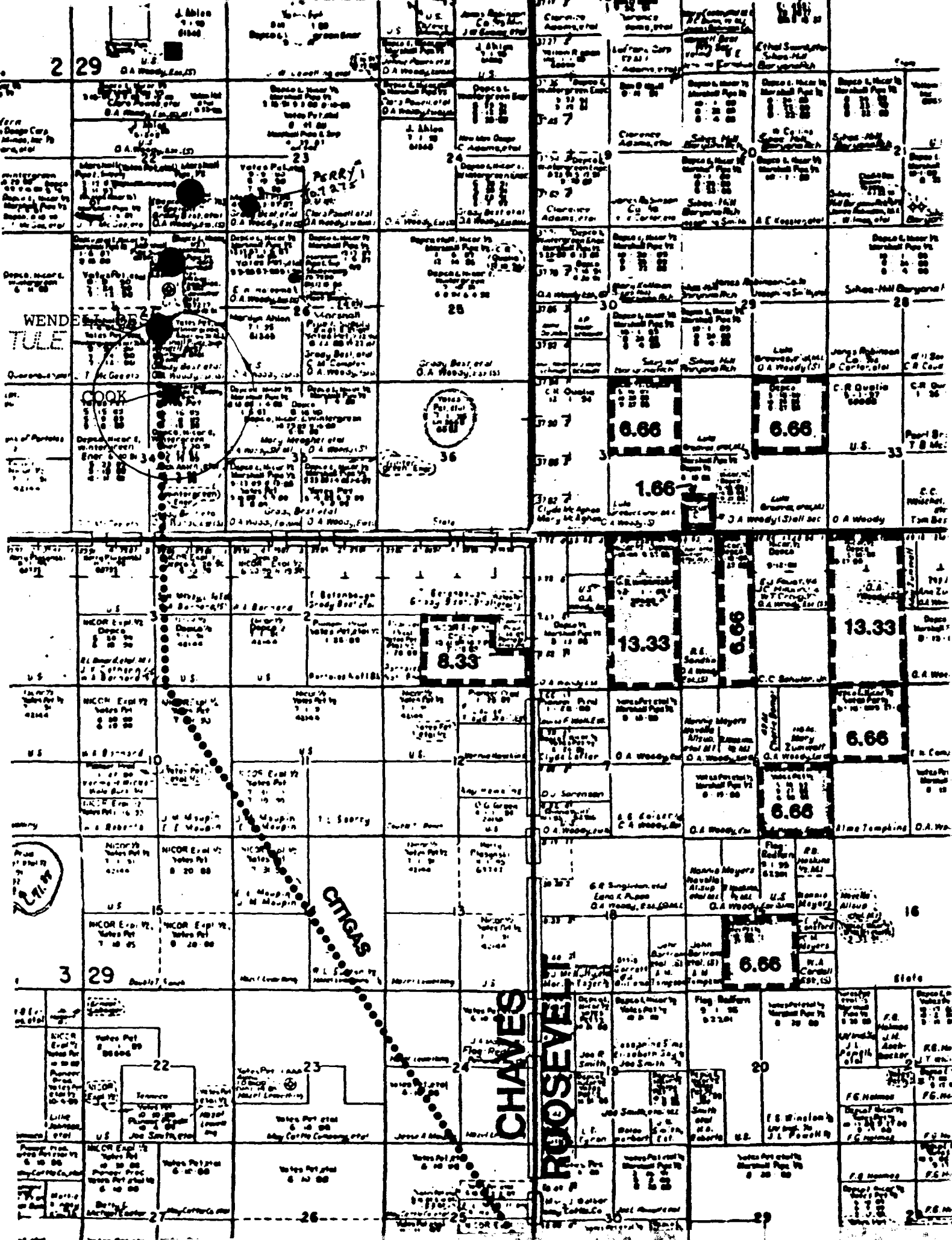
EQUIPMENT & LOGGING DATA			
	Gamma Ray		Bond
<b>Tool No.</b>	<u>050</u>	<u>101</u>	
<b>Diameter</b>	<u>3 1/8"</u>	<u>3 1/8"</u>	
<b>Sensitivity</b>	<u>0.45</u>	<u>1.70</u>	
<b>Time Constant</b>	<u>3</u>		
<b>Logging Speed - Feet Min.</b>	<u>30</u>		
<b>Zero Div. L or R</b>	<u>L-L</u>		
<b>Api Per Log Div.</b>	<u>15</u>		
<b>Start Log</b>	<u>8:00</u>		
<b>Finish Log</b>	<u>11:00</u>		

# DISPOSAL WELL LOCATION



1. FRESH WATER WELL.
2. FRESH WATER WELL.

1" = 4000' Sec 27 T2S, R29E Roosevelt Co. NEW MEXICO:



2 29

23

24

WENDE TULE

COOK

36

6.66

6.66

1.66

8.33

13.33

13.33

6.66

6.66

6.66

3 29

22

23

24

20

CHAVES  
ROOSEVE

CITIGAS

NO. OF COPIES RECEIVED	
DISTRIBUTION	
SANTA FE	
FILE	
U.S.G.S.	
LAND OFFICE	
OPERATOR	

Form C-105  
Revised 1-1-85

NEW MEXICO OIL CONSERVATION COMMISSION  
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5a. Indicate Type of Lease  
State  Fee

5. State Oil & Gas Lease No.

1a. TYPE OF WELL  
OIL WELL  GAS WELL  DRY  OTHER \_\_\_\_\_

b. TYPE OF COMPLETION  
NEW WELL  WORK OVER  DEEPEN  PLUS BACK  DIFF. RESVR.  OTHER \_\_\_\_\_

7. Unit Agreement Name

8. Farm or Lease Name  
Wendell Best

9. Well No.  
1

2. Name of Operator  
Marshall Pipe and Supply Company

10. Field and Pool, or Wildcat  
Wildcat

3. Address of Operator  
Suite 533 - Roswell Petroleum Bldg. - Roswell, N.Mex. 8820

4. Location of Well  
UNIT LETTER J LOCATED 1980 FEET FROM THE South LINE AND 2310 FEET FROM

12. County  
Roosevelt

THE East LINE OF SEC. 27 TWP. 2S REG. 29E NMPM

15. Date Spudded  
1 April 1986

16. Date T.D. Reached  
21 April 86

17. Date Compl. (Ready to Prod.)  
24 May 1986

18. Elevations (DF, RKB, RT, GR, etc.)  
4374 KB

19. Elev. Cashtrough  
4364

20. Total Depth  
7155

21. Plug Back T.D.  
7090

22. If Multiple Compl., How Many  
2

23. Intervals Drilled By: Rotary Tools  
all

Cable Tools  
none

24. Producing Interval(s), of this completion - Top, Bottom, Name  
7006 to 7042 Montoya - 6938-6952 Pennsylvanian

25. Was Directional Survey Made  
no

26. Type Electric and Other Logs Run  
Gamma Ray Compensated Neutron Litho Density, Dual Laterlog

27. Was Well Cored  
no

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8	48#	300	17 1/2	250 sx Cl C, 2% CaCl	circ, none
8 5/8	24#	2185	11	675 sx Cl C, 2% CaCl	circ, none
5 1/2	17#	7153	7 7/8	200 sx Cl H Top cement	6170' none

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2"	6998	6998

31. Perforation Record (Interval, size and number)  
7006-7042', .34 jet, 73, Montoya  
6938-6952', .34 jet, 43, Penn.

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
7006-7042	2000 gal. 10% MCA
6938-6952	1500 gal. 10% MCA

33. PRODUCTION

Date First Production  
Shut-in

Production Method (Flowing, gas lift, pumping - Size and type pump)  
flow Montoya, Temp Abd. Penn.

Well Status (Prod. or Shut-in)  
Shut-in

Date of Test 5/20/86	Hours Tested 5	Choke Size various	Prod'n. For Test Period Oil - Bbl. 1.6	Gas - MCF 518-1699	Water - Bbl. 1.6	Gas - Oil Ratio ---
Flow Tubing Press. 1893-1400	Casing Pressure none	Calculated 24-Hour Rate Oil - Bbl. 2.7	Gas - MCF 2805 CAOF	Water - Bbl. 2.7	Oil Gravity - API (Corr.) 47.7	

34. Disposition of Gas (Sold, used for fuel, vented, etc.)  
Vent

Test Witnessed By  
J.L. Ahlen - J.W. Mars

35. List of Attachments  
C122, Deviation Certificate - Logs, CNLD - DLLMSFL

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED J.L. Ahlen TITLE Agent DATE 13 June 1986

This form is to be filed with the appropriate District Office of the Commission not later than 30 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quadruplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico

Northwestern New Mexico

T. Anhy _____	T. Canyon _____	T. Ojo Alamo _____	T. Penn. "B" _____
T. Salt _____	T. Strawn _____	T. Kirtland-Fruitland _____	T. Penn. "C" _____
B. Salt _____	T. Atoka _____	T. Pictured Cliffs _____	T. Penn. "D" _____
T. Yates <u>1057</u>	T. Miss _____	T. Cliff House _____	T. Leadville _____
T. 7 Rivers _____	T. Devonian _____	T. Menefee _____	T. Madison _____
T. Queen _____	T. Silurian _____	T. Point Lookout _____	T. Elbert _____
T. Grayburg _____	T. Montoya <u>6989</u>	T. Mancos _____	T. McCracken _____
T. San Andres <u>2005</u>	T. Simpson _____	T. Gallup _____	T. Ignacio Qrte _____
T. Glorieta <u>3244</u>	T. McKee _____	Base Greenhorn _____	T. Granite _____
T. Paddock _____	T. Ellenburger _____	T. Dakota _____	T. _____
T. Hinebry _____	T. Gr. Wash _____	T. Morrison _____	T. _____
T. Tubb <u>4645</u>	T. Granite <u>7069</u>	T. Todillo _____	T. _____
T. Drinkard _____	T. Delaware Sand _____	T. Entrada _____	T. _____
T. Abo <u>5204</u>	T. Bone Springs _____	T. Wingate _____	T. _____
T. Wolfcamp <u>5942</u>	T. _____	T. Chinle _____	T. _____
T. Penn. <u>6440</u>	T. _____	T. Permian _____	T. _____
T. Cisco (Bough C) _____	T. _____	T. Penn. "A" _____	T. _____

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	1057	1057	Red Shale & Sand				DST #1
1057	2005	948	Anhy, Sand, Shale and Salt				6422-6576 recovered 180
2005	3244	1239	Anhy, Dolomite and Salt				sl gas cut drilling mud
3244	5204	1960	Anhy, Salt, Sand, Shale, and Dolomite				splr 70#, 300 cc mud +
5204	5942	738	Red Shale and Sand				.558 cu. ft. gas. 15"
5942	6989	1047	Limestone, Shale and Sandstone				IFP 88-88,60" ISIP 815,
6989	7069	80	Dolomite & chert				60" FP 88-110, 120" FSIP
7069	7155	86	Granite				551 HP 3485 BHT 129° F
							DST #2 7000-7155' GTS 5'
							1.24 MMCF/D incr to 2.7
							MMCF/D and stab. at end
							test. rec 309' cond an
							gas cut mud + 330' cond
							est @ 60° gr, spl ch 10
							7.48 cu ft gas, no liqu
							30" IFP 956-1241 60"
							ISIP 2499, 60" FP 876-
							1337, 120" FSIP 2499 HP
							3668, BHT 141° F

RECEIVED  
 JUN 16 1986  
 O.C.B.  
 HOBBS OFFICE



NO. OF COPIES RECEIVED	
DISTRIBUTION	
SANTA FE	
FILE	
U.S.O.S.	
LAND OFFICE	
OPERATOR	

**OIL CONSERVATION DIVISION**  
P. O. BOX 2088  
**SANTA FE, NEW MEXICO 87501**

14. Indicate Type of Lease  
State  Fee   
15. State Oil & Gas Lease No.

**WELL COMPLETION OR RECOMPLETION REPORT AND LOG**

10. TYPE OF WELL  
OIL WELL  GAS WELL  BOV  OTHER \_\_\_\_\_

11. TYPE OF COMPLETION  
NEW WELL  WORK OVER  DEEPEN  PLUG BACK  DIFF. RECV.  OTHER \_\_\_\_\_

1. Name of Operator  
**MARSHALL PIPE & SUPPLY COMPANY**

2. Address of Operator  
**13423 Forestway Dr., Dallas, Texas 75240**

3. Location of Well  
UNIT LETTER **B** LOCATED **330** FEET FROM THE **North** LINE AND **1980** FEET FROM \_\_\_\_\_

4. Location of Well  
TWP. **East** LINE OF SEC. **34** TWP. **T2S**, RGE. **R29E**

7. Unit Agreement Name  
8. Farm or Lease Name  
**Cook**

9. Well No.  
**1**

10. Field and Pool, or Wildcat  
**Tule-Penn**

12. County  
**Roosevelt**

13. Date Spudded **4-22-88** 16. Unit F.D. Reached **5-12-88** 17. Date Compl. (Ready to Prod.) **8-24-88** 18. Elevations (DF, RAB, RT, GR, etc.) **4359 GL** 19. Elev. Casinghead **4369 KB**

20. Total Depth **7205** 21. Plug Back T.D. **Packer: 7070** 22. If Multiple Compl., How Many **One only** 23. Intervals Drilled By: Rotary Tools **X** Cable Tools \_\_\_\_\_

24. Producing Interval(s), of this completion - Top, Bottom, Name  
**Tule-Penn: 7050 to 7064, and 6853 to 6857 and 6861 to 6863**

25. Was Directional S Mode  
**Yes at 5310**

26. Type Electric and Other Logs Run **Compensated Neutron/Litho-Density Log, Schlumberger Dual Laterolog, Litho Cyberlook, BHC Sonic/Caliper** No. \_\_\_\_\_

27. Was Well Cored

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	MOLE SIZE	CEMENTING RECORD	AMOUNT PULL
13-3/8"	48#	322	17-1/2	300 sacks Prem. 2%CaCl	Cir/None
8-5/8"	24#	2119	11"	200 sacks Prem/2%CaCl	Cir/None
				550 sacks HOWCLT.	Cir/None
5-1/2"	17#	7200	7-7/8"	225 sacks "B"	None

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN	SIZE	DEPTH SET	PACKER SET
					2-3/8"	7070'	7070'

30. TOP OF CEMENT **6030'**

31. Perforation Record (Interval, size and number)

**Tule - Penn: 7050 to 7064, and 6853 to 6857 and 6861 to 63**

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
7050-7064	2000 Gal 15% MCA
6853-63'	2000 Gal 15% MCA

33. PRODUCTION

1. Date First Production **Shut In** Production Method (if flowing, gas lift, pumping - Size and type pump) **Flow, but not enough pressure to buck** Well Status (Prod. or Shut-in) **Shut-In**

2. Date of Test **7-26-88** Hours Tested **4 hr.** Pressure on Gas Pipeline **Pressure on Gas Pipeline**

Flow Tubing Press. <b>1076-1015</b>	Casing Pressure <b>1076-468</b>	Calculated 24-Hour Rate <b>0-</b>	Oil - Bbl. <b>0-</b>	Gas - MCF <b>157</b>	Water - Bbl. <b>0-</b>	Gas - Oil Ratio <b>-</b>
-------------------------------------	---------------------------------	-----------------------------------	----------------------	----------------------	------------------------	--------------------------

34. Disposition of Gas (Sold, used for fuel, vented, etc.) **vent** Absolute Open Flow **713** Test Witnessed By **W. Sutton**

35. List of Attachments  
**C-122**

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED *J. Marshall* TITLE **Partner/Operator** DATE **8-24-88**  
**J. W. MARSHALL**

*Tested  
Flow  
Casing*



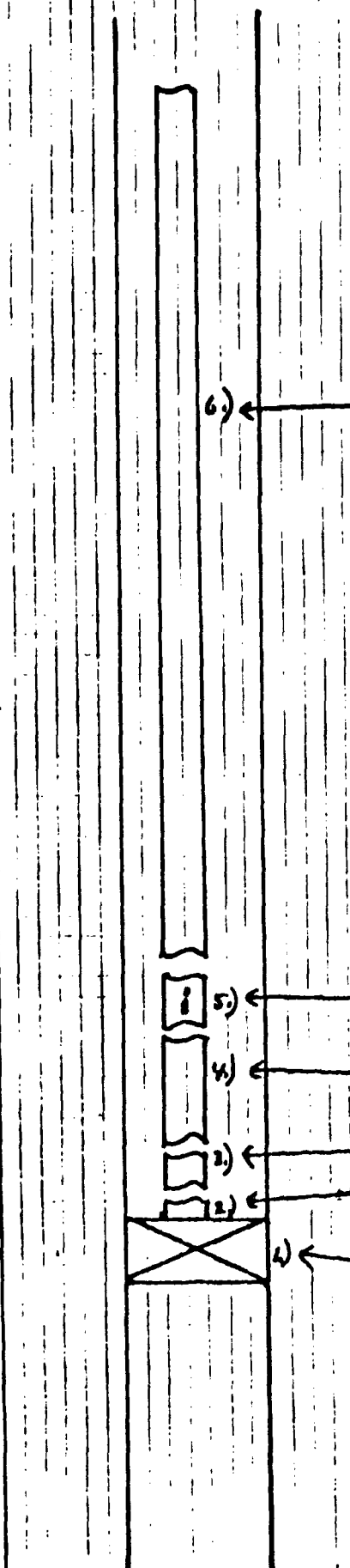
# OTIS COMPLETION GUIDE

DEC-217-E

A HALLIBURTON Company

PREPARED FOR		COMPANY		TELEPHONE		DATE	
WOODY Marshall		Marshall Bldg					
FIELD NAME		WELL NAME		COUNTY		STATE	
N. of Elida		Cook #1		Rockwall		Texas	
CASING	SIZE	WEIGHT	GRADE	THREAD	DEPTH		
	5 1/2	13-17 #					
LINER	SIZE	WEIGHT	GRADE	THREAD	DEPTH		
TUBING SIZE	UT	2 3/8	MT	LT	THREAD	8rd.	

DESCRIPTION	I.D.	O.D.	LENGTH	ESTIMATE OR DEPTH
6.) 227 Joints 2 3/8 C&G TAG.				6942.59
<p><b>NOTICE: BEFORE SALTWATER IS INJECTED IN THE COOK #1 MONTOYA FORMATION THE XO SLIDING DOOR SLEEVE AT 6942' WILL BE CLOSED AND THE PLUG WILL BE PULLED OUT OF THE "N" NIPPLE AT 7069' USING OTIS WIRELINE SERVICE. WE WILL THEN PRODUCE GAS THROUGH THE CASING AND INJECT SALTWATER THROUGH THE TUBING.</b></p> <p>5-1/2" 17# N80 Casing was coldwater tested to 5000#, and cement plug was tested to 2500# when 5-1/2" was set. The 2" EUE Tubing was coldwater tested to 7000# before run in hole.</p>				
5.) XO Sliding Side Door sleeve	1.975		3.00	6942.59
4.) Four Joints 2 3/8 tbg.			1237	6945.59
3.) N-Nipple	1.791	.60		7069.40
2.) J-latch seal assembly 2 seals space tube - males	1.94	2.75		
1.) 5 1/2 WB PRR 2 3/4 Box	2.75	4.64	2.33	7070.00
TOTAL ESTIMATE				)



PREPARED BY	OFFICE	TELEPHONE
Tommy Hinderliter	Gainesville, Tx	817-665-4400

HALLIBURTON DIVISION LABORATORY

HALLIBURTON SERVICES

ARTESIA DISTRICT

LABORATORY REPORT

No. \_\_\_\_\_

TO Woody Marshall  
Marshall Pipe & Supply

Date 10-5-88

This report is the property of Halliburton Services and neither it nor any part thereof nor a copy thereof is to be published or disclosed without first securing the express written approval of laboratory management. It may however be used in the course of regular business operations by any person or concern and employees thereof receiving such report from Halliburton Services

Submitted by \_\_\_\_\_ Date Rec. 10-5-88

Well No. \_\_\_\_\_ Depth \_\_\_\_\_ Formation Montoya; Perm

Field Sec. 27-T 25-R 29E County Roosevelt Source \_\_\_\_\_

	<u>disposal well</u>	<u>windmill</u>	<u>Fresh</u>
Resistivity .....	<u>0.058 @ 70°F</u>	<u>2.88 @ 70°F</u>	<u>4.15 @ 70°F</u>
Specific Gravity ..	<u>1.13</u>	<u>1.002</u>	<u>1.00</u>
pH .....	<u>7</u>	<u>8</u>	<u>7.8</u>
Calcium .....	<u>15400</u>	<u>220</u>	<u><del>600</del> 200</u>
Magnesium .....	<u>4336</u>	<u>133</u>	<u>100</u>
Chlorides .....	<u>115,000</u>	<u>1000</u>	<u>600</u>
Sulfates .....	<u>heavy</u>	<u>small</u>	<u>small</u>
Bicarbonates .....	<u>92</u>	<u>275</u>	<u>260</u>
Soluble Iron .....	<u>heavy.</u>	<u>nil</u>	<u>nil</u>
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----

Remarks:

Rocky Chambers  
Respectfully submitted

Analyst: \_\_\_\_\_

HALLIBURTON SERVICES

NOTICE:

This report is for information only and the content is limited to the sample described. Halliburton makes no warranties, express or implied, as to the accuracy of the contents or results. Any user of this report agrees Halliburton shall not be liable for any loss or damage, regardless of cause, including any act or omission of Halliburton, resulting from the use hereof

**MARSHALL Pipe & Supply Company**

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

AFFIDAVIT

STATE OF TEXAS I

COUNTY OF DALLAS I

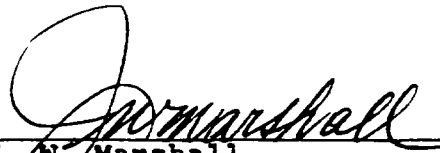
BEFORE ME, the undersigned authority in and for aforesaid County and State, on this day personally appeared:

J. W. MARSHALL

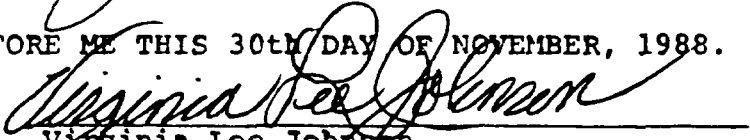
known to me to be the person whose name is signed to the instrument below, and who, after being by me duly sworn, on his oath deposes and says:

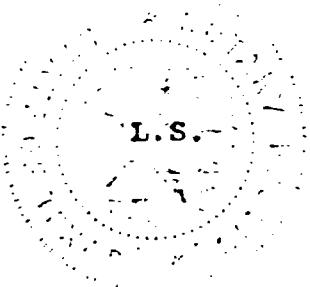
I have examined available geologic and engineering data on the Cook No. 1, Unit B, 330' from North and 1980' from East, Section 34, T2S, R29E, Roosevelt County, New Mexico, and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

Affiant further saith not.

  
\_\_\_\_\_  
J. W. Marshall

SWORN TO AND SUBSCRIBED BEFORE ME THIS 30th DAY OF NOVEMBER, 1988.

  
\_\_\_\_\_  
Virginia Lee Johnson  
Notary Public, State of Texas  
My commission expires 11-30-92



**MARSHALL Pipe & Supply Company**

Drilling

acing

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 233-7284

November 30th, 1988

Portales News Tribune  
101 East First Street  
Portales, New Mexico 88130

Re: Notice

Gentlemen:

We are enclosing NOTICE OF APPLICATION FOR OIL AND GAS WASTE DISPOSAL WELL PERMIT.

Please run this in your newspaper.

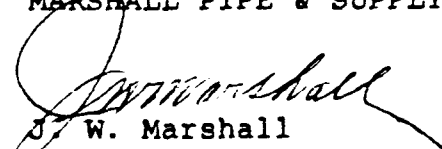
Please rush your invoice for your services, together with clipping of this published notice, plus sworn affidavit from you giving the date on which the notice was published and the pertinent county in which the newspaper is of general circulation. We are enclosing affidavit form for your convenience.

Thanking you, and if this notice is not satisfactory with notices of this type please telephone us collect for more details.

Awaiting your reply, we are,

Very truly yours,

MARSHALL PIPE & SUPPLY COMPANY

  
J. W. Marshall

JWM:vlj

encl:

FEDERAL EXPRESS

cc: State of New Mexico  
Energy and Minerals Department  
Oil Conservation Division  
P.O. Box 2088  
Santa Fe, New Mexico 87501

**MARSHALL Pipe & Supply Company**

Drilling

Finishing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

November 30th, 1988

**NOTICE OF APPLICATION FOR OIL AND GAS WASTE DISPOSAL WELL PERMIT**

Marshall Pipe & Supply Company, 13423 Forestway Dr., Dallas, Texas 75240  
Telephone: 214-239-7284, has applied to the State of New Mexico,  
Energy and Minerals Department, Oil Conservation Division  
for a permit to dispose of produced salt water or other oil  
and gas waste by well injection into a porous formation not  
productive of oil or gas.

The applicant proposes to dispose of oil and gas waste into the  
Montoya formation of the Cook Lease, Well No. 1, NE/4 Section  
34, T2S, R29E, for Tule Field in Roosevelt County, New Mexico.

The waste water will be injected into strata in the subsurface  
depth interval from 7104 to 7116, average PSIG 200 to 1000  
Maximum PSIG., through 2" Tubing with permanent packer set in  
5-1/2" Casing, 100 bbls per day or as needed.

Interested parties must file objections or requests for hearing  
with the Oil Conservation Division, P.O. Box 2088, Santa Fe,  
New Mexico 87501 within 15 days.

STATE OF New Mexico

COUNTY OF \_\_\_\_\_

Before me, the undersigned authority, on this day personally  
appeared \_\_\_\_\_, the \_\_\_\_\_ of the  
(Name) (Title)  
\_\_\_\_\_, a newspaper having general  
(Name of Newspaper)  
circulation in \_\_\_\_\_ County, N.M., who being by me duly  
sworn, deposes and says that the foregoing attached notice was published in  
said newspaper on the following date(s), to wit: \_\_\_\_\_.

Subscribed and sworn to before me this the \_\_\_\_ day of  
\_\_\_\_\_, 19\_\_, to certify which witness my hand and seal of office.

\_\_\_\_\_  
Notary Public in and for

\_\_\_\_\_  
County, New Mexico



# MARSHALL Pipe & Supply Company

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 238-7284

November 30th, 1988

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

Mrs. O. A. Woody  
Woody Acres  
3414 44th Street  
Lubbock, Texas 79401

Re: Cook #1  
Section 34, T2S, R29E  
Roosevelt County, New Mexico

Dear Mrs. Woody:

We are enclosing copies of Application for Authorization to inject into the Montoya formation of the Cook #1 well as a disposal well in this one formation.

The Cook #1 is a shut-in gas well in the Pennsylvanian formation, and will be placed on line when a compressor is installed to enable the gas to "buck" the pipeline pressure.

Very truly yours,

MARSHALL PIPE & SUPPLY COMPANY

J. W. Marshall  
JWM:vlj

encl:

CERTIFIED MAIL - DEMAND RETURN RECEIPT

cc: State of New Mexico  
Oil Conservation Division

13423  
Dallas, 088

1988  
11/30

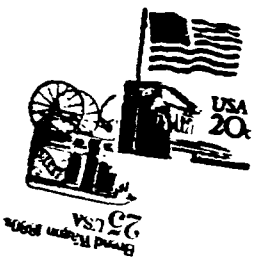
SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.  
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1.  Show to whom delivered, date, and addressee's address.  Restricted Delivery  
↑(Extra charge)↑

3. Article Addressed to: Mrs. O. A. Woody Woody Acres 3414 44th Street Lubbock, Texas 79401	4. Article Number P-582-985-589
Type of Service: <input type="checkbox"/> Registered <input type="checkbox"/> Insured <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Express Mail	
Always obtain signature of addressee or agent and DATE DELIVERED.	
5. Signature - Addressee X Lillian C. Woody	8. Addressee's Address (ONLY if requested and fee paid)
6. Signature - Agent X	
7. Date of Delivery 12-6	

**PSHALL** Pipe & Supply Co.  
13423 FORESTWAY DRIVE  
DALLAS, TEXAS 75240

**CERTIFIED**  
P-582 985 589  
**MAIL**



*Demand Return Receipt*



Mrs. O. A. Woody  
Woody Acres  
3414 44th Street  
Lubbock, Texas 79401

Re •



# NICOR EXPLORATION COMPANY

One of the NICOR  
basic energy companies

1050 Seventeenth Street, Suite 1100  
Denver, Colorado 80265-1101 303-893-1666

November 18, 1988

State of New Mexico  
Oil Conservation Division  
P. O. Box 2088  
Santa Fe, New Mexico 87504-2088

Re: Conversion of Marshall Pipe and  
Supply #1 Cook NE/4 Sec. 34-T2S-  
R29E, to a Saltwater Disposal Well  
for Tule Field in Roosevelt  
County, New Mexico

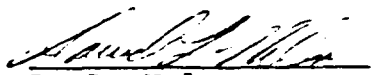
Dear Sirs:

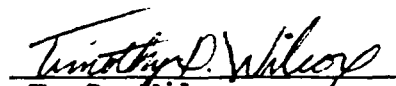
Marshall Pipe and Supply Company is the operator of Tule Field and desires to convert the #1 Cook, NE Section 34-T2S, R29E, to a salt water disposal well in the Montoya Fm. NICOR Exploration Company is a working interest owner in the Tule Field and is in favor of the proposed conversion.

Drill stem testing of the Cook #1 yielded 2200 of gas in pipe, 375 ft. of gas cut mud, and 625 ft. of gassy saltwater. Production tests confirmed that the Montoya section in the #1 Cook was primarily saltwater bearing and incapable of producing economically paying quantities of gas. Due to its low structural position and "wet" nature, the Montoya formation in the #1 Cook is an ideal well in which to dispose of produced saltwater.

It is expected that water production from Montoya producing wells in Tule Field will gradually increase with time. Due to the high costs associated with hauling produced water from this remotely located field, it is desirable to solve our salt water disposal problems before they become volumetrically significant.

Therefore, NICOR Exploration respectfully requests that the State of New Mexico Oil Conservation Division grant Marshall Pipe and Supply Company's request to convert the subject well for saltwater disposal into the Montoya formation.

  
D. L. Nelson  
Rocky Mtn.  
Regional Geologist

  
T. D. Wilcox  
Senior Petroleum  
Engineer

# MARSHALL Pipe & Supply Company

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

*Marshall Pipe &  
Supply  
EX 4-B  
Call 95-74*

COOK #1: PROGRESS REPORT - Completion  
SECTION 34, T2S, R29E  
ROOSEVELT COUNTY, NEW MEXICO

- June, 17th, 1988: Move in Well Service, and Rig Up.
- June 18th, 1988: Ran Gammaray and Cement Bond Log, Bottom of hole 7175'.  
Unload 2-3/8" Tubing, stand in derrick.  
Picked up 12' gun, 2 holes per foot, 25 holes.
- June 19th, 1988: Father's Day - no work.
- June 20th, 1988: Perforate 7093 to 7105', 2 holes per foot, 25 holes. (7104 - 7116' on Schlumberger Log).  
Ran Halliburton RTTS tool, with seating nipple set at 7046.83' (228 Joints.)  
Spot 1 bbl acid over perforations, break formation down at 2100#. Treat with 3000 gal 15% MCA, 1.6 bbl per minute at 2100#. 2 bbl per minute at 2600#. Dropped 50 rubber balls. Shut down 1 minute, pressure dropped to 1700#. 4 bbls per minute at 3500#, split in tubing at 3300' down. Bradenhead balance of acid away at 1700#, 1-1/2 bbl per minute. Reversed out with 66 bbl water down backside. Start out of hole with 2" tubing, find split at 3359'. Lay joint down - go back in hole, set packer at 7046.83', 228 joints. Pressure up on backside to 1000#, held okay. swabbed well down to 2000', recovered load water and acid water. Close well in at 8:00 P.M. (New Mexico time). Used 3000 gal acid and 27 bbl KCL water, total = 100 bbl fluid.
- June 21st, 1988: Tubing pressure 15#, fluid 1700' down. Small show of natural gas;  
11:30 A.M. swabbing 2400 to 3900', gas increasing.  
1:00 P.M. swab well to 2600' down, pulling swab from 4100', small increase in gas and saltwater.  
Pulling RTTS Tool out of hole and string of tubing. No movement on backside while swabbing tubing.  
Set Otis Packer 7070' with expendable plug. Pick up 12' gun, 2 holes per foot, 25 holes. Unload another string of 2-3/8" Tubing. Close well in for night.

# MARSHALL Pipe & Supply Company

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

COOK #1: PROGRESS REPORT - Completion:  
SECTION 24, T2S, R29E  
ROOSEVELT COUNTY, NEW MEXICO

- June 22nd, 1988: Perforate from 7039 to 7043', 2 holes per foot, 29 holes (7050 to 7064' Schlumberger Log) Run ~~FRS~~ <sup>FRS</sup> Tool, 230 Jts., 2-3/8" EUE Tubing, 7052.73'. Spot 1 bbl acid over perforations. Lay down 2 jts., and set packer, 228 jts., 2-3/8" Tubing, at 6993.67'. Break formation down @ 3500#, @ 1 bbl per min @ 3000#, 1.7 bbls per min. @ 3800#, 2 bbls per minute @ 3950#. Shut down for 5 minutes, pressure to 3700# and to 3000# and 2600#. Pump 2 bbls per minute @ 3650 to 3950#, instant shut in pressure: 2950#. Close well in for 12 minutes, pressure at 2950#. Release to pit, run swab 5 times, and swab well down to 3500'. Close in for night.
- June 23rd, 1988: 60# on 2-3/8" Tubing, show of gas, fluid 2500' down. Run swab 4 times, swab to 4500', 5th run fluid at 3300', 1200' entry, increase in gas - - at 10:30 A.M. swab well to bottom, pull 1000' fluid off bottom, run swab back find "0" fluid. Gas increasing to surface. Let set 1 hour. Run Swab, 700' fluid in hole, acid water and gas. Pull 2" tubing. Run HOWC retrievable bridge plug, with cylinder to catch balls, set 2' off bottom, close well in for night.
- June 24th, 1988: Spot 1000 gal Parasperse to dissolve paraffin that was in 5-1/2" Casing. Let set 1 hour on bottom. Displace with 154 bbls KCL Water, Lay down 2 Jts of tubing and 13' of subs, Reset Packer @ 6993.67'. Pump 1000 Gal Parasperse ahead of acid, break formation @ 3100# 1.2 bbls per minute @ 3500#, 2.2 bbls per minute @ 4000#, 3 bbls per minute at 4600#. Increased to 4900# and 5000#. Pumped 2000 gal, 15% MCA. Shut down, instant shut in 3600#, 5 minutes 3300#, 10 minutes 3100#, 15 minutes 3050#, turned to pit. Dropped 50 balls during treatment. Ran swab 8 times, swab well to bottom, let set one hour ran swab, 300' fluid in hole, shut in for night.
- June 25th, 1988: 200# on 2-3/8", gas was at the surface.

# MARSHALL Pipe & Supply Company

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

COOK #1: PROGRESS REPORT - Completion  
SECTION 34, T2S, R29E  
ROOSEVELT COUNTY, NEW MEXICO

---

June 25th, 1988:

Continued:

Ran Swab 3 times, swab to bottom, acid water, no increase in gas over first acid job. Pull RTTS Tool out of hole, perforate from 6842 to 6846 and from 6850 to 6852, 4 holes per foot, 25 holes (6853 to 6857 and 6861 to 6863 Schlumberger Log). Set retrievable bridge plug @ 6998.67'. Set packer at 6993.67' and pressure up on plug to 3000#, held okay. Reset packer @ 6869' and spot 1 bbl acid over perforations. Reset packer at 6807' (222 Jt., 2-3/8" tubing). Break formation down @ 4320#, treat with 2000 gal 15% MCA. Pump 3 bbls per minute @ 3850#, 3.2 bbls @ 4030#, 3.8 bbls @ 4440#. Instant Shut in pressure 3000#. Set 5 minutes, 2540#, 10 minutes 2290#, 15 minutes 2120#, open to pit. Ran swab 7 times, swab to 3900' pulling from 5400', recovering acid gas and acid water and KCL water. Close in for night.

June 26th, 1988:

20# on 2-3/8" Tubing. Fluid at 3000' down, Ran swab 4 times and swab to bottom, show of gas to surface. Load 2" Tubing with HOWC and KCL water. Pick up retrievable bridge plug and pull out of hole, lay down RTTS tool and plug. Pick up seal assembly for Otis W.B. Packer, ran N Nipple with plug in same on top of seal assembly. Ran 4 Jts., of 2-3/8" Tubing, ran sliding sleeve left open at 6942' (total 2-3/8" Tubing in hole = 231 jts.). Push out expendable plug in W. B. Otis Packer at 7070' kelly bushing, "J" up seal assembly in packer and leave in tension. Close well in for night.

# MARSHALL Pipe & Supply Company

Drilling

Producing

13423 FORESTWAY DRIVE

DALLAS, TEXAS 75240

(214) 239-7284

J. W. Marshall  
Dallas, Texas  
RESIDENCE  
(214) 233-7881

COOK #1: PROGRESS REPORT - COMPLETION:  
SECTION 34, T2S, R29E  
ROOSEVELT COUNTY, NEW MEXICO

June 27th, 1988: Find fluid 300' down, Ran swab 12 times and swab well to 3000', left location at 12:30 P.M. due to heavy rain.

June 28th, 1988: Little gas to surface, 2200' down to fluid, gas every run @ 3:00 P.M. 20th run gas to surface and casing building pressure. 6000' to fluid, made 28 runs.

June 29th, 1988: Fluid level at 5500', 200# on casing. Sinker bars unscrewed on swab.

June 30th, 1988: Make trip and remove swab out of sliding sleeve, Ran Swab 6 times, swab well to 4700'. Close well in for night.

July 1st, 1988: Pressure on 2" = "0", Casing pressure 20#. Fluid level at 3000' at 8:00 A.M., at 5:00 P.M. fluid level at 6300', Ran swab 23 times, gas to surface, close well in.

July 2nd, 1988: Well closed in, pressure on tubing = "0", Casing pressure 200#.

July 3rd, 1988: Well Closed In, pressure on tubing = "0", Casing Pressure 310#.

July 4th, 1988: Well closed in, pressure on tubing = "0", Casing pressure 380#

July 5th, 1988: Tubing, slight blow, Casing Pressure: 420#, Fluid 3000' down. Swab well down, tear down well service and move out.

REMARKS: Will let well set and pressure up. At a later date it may be decided to treat the Lime Section with acid from 6842 to 6846, and from 6850 to 6852' (6853 to 6857 and 6861 to 6863 Schlumberger Log).

GAS PROD  
THRU CSG-TB6  
ANNULUS

CEMENT CIRC  
300 sacks

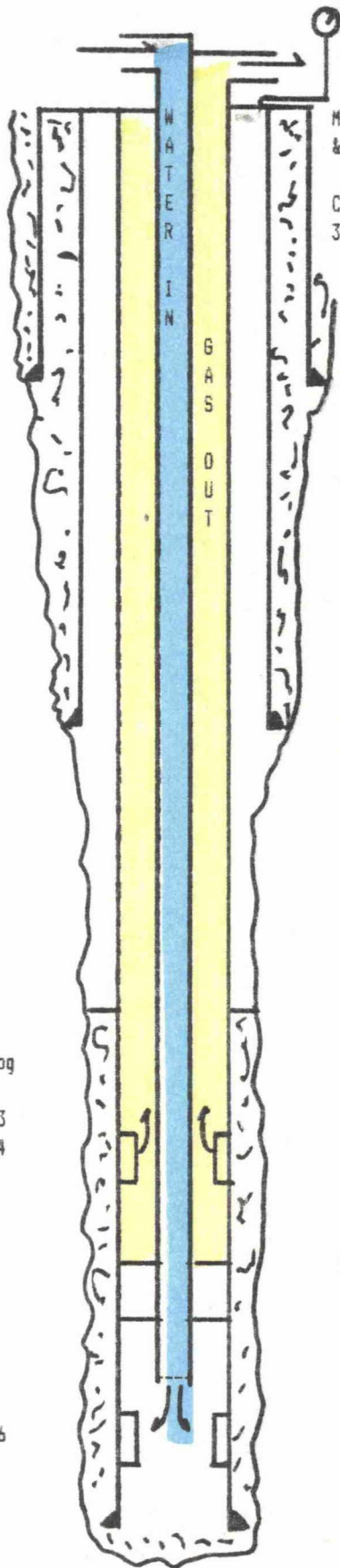
CEMENT CIRC  
750 sacks

CEMENT TOP  
6030 by bond log

PERFS 6853-6863  
7050-7064

PERFS 7104-7116

CEMENT  
225 sacks



MARSHALL PIPE  
& SUPPLY

COOK # 1  
34-T25-R29E

SURFACE CSG.  
13 3/8 at 322

INTERMEDIATE  
8 5/8 at 2119

PACKER 7070

PRODUCTION CSG  
5 1/2 at 7200

MARSHALL PIPE & SUPPLY CO.  
Case No. 9574  
2/15/89 Examiner Hearing  
Exhibit No. 5



and Control, Office of Program Operations, Pension Benefit Guaranty Corporation, Room 53007, 2020 K Street, NW., Washington, D.C. 20009.

(d) *Content.* Each notice shall contain the following information:

- (1) The name of the plan.
- (2) The name, address and telephone number of the plan sponsor, and of the duly authorized representative, if any, of the plan sponsor.
- (3) The date the amendment was adopted.
- (4) A copy of the executed amendment.
- (5) For each of the last three plan years ending prior to September 26, 1980, a copy of the plan's Form 5500 (Annual Report Form) (without attachments).
- (6) A list showing the name of each employer who contributed to the plan, the amount of the contribution of each, and the percentage of the contribution of each to the total annual contributions made to the plan. Except as provided in the next sentence, this information shall be provided for each plan year ending on or after September 2, 1974 but before September 26, 1980. If in the third plan year ending before September 26, 1980 or in one of the prior plan years ending on or after September 2, 1974, one employer contributed 75 percent or more of the plan's total contributions, the information on contributions need not be provided for plan years prior to that year. In that situation, the information on contributions will be provided for the year in which the 75 percent contribution occurred and for each subsequent year.

(e) *Additional information.* In addition to the information described in paragraph (d) of this section, the PBGC may require the plan sponsor to submit any other information the PBGC determines it needs to review a notice of election.

(f) *Date of filing.* The notice of election is considered filed on the date of the United States postmark stamped on the cover in which the notice is mailed. *Provided, That—*

- (1) The postmark was made by the United States Postal Service; and
- (2) The notice was mailed postage prepaid, properly packaged and addressed to the PBGC. If the conditions stated in both paragraphs (1) and (2) are not met, the notice is considered filed on the date it is received by the PBGC. Notices received after regular business hours are considered filed on the next regular business day.

#### § 2671.4 PBGC action on election.

(a) *General.* The PBGC shall approve an election if the PBGC determines that

the plan is eligible to make the election under § 2671.2(b) and that the plan has complied with the procedures set forth in § 2671.2(c).

(b) *PBGC decision.* PBGC's decision approving or disapproving an election shall be in writing. If the PBGC disapproves the election, the decision shall state the reasons for the determination.

#### § 2671.5 Adjustment of premium payments due to election.

(a) *Underpayment.* If a plan has paid its premium for its first plan year beginning on or after September 26, 1980 at the rate payable for a multiemployer plan and thereafter effectively elects to be a single-employer plan, the plan will have underpaid its premium. In this case, the PBGC shall bill the plan for the amount due at the higher rate payable for a single-employer plan. The amount shall be due 30 days after the date of the PBGC bill. Failure to pay within that time shall result in the assessment of penalties and interest accruing from the due date at the rates prescribed in section 4007 of the Act and Part 2602 of this chapter.

(b) *Overpayment.* If a plan has paid its premium for its first plan year beginning on or after September 26, 1980 at the rate payable for a single-employer plan and thereafter makes an election which is not approved by PBGC, the plan will have overpaid its premium. In this case, the PBGC shall refund to the plan an amount equal to the difference between the amount owed by the plan for that plan year at the single-employer rate and the amount owed at the lower multiemployer rate.

Issued at Washington, D.C. on this 21st day of April 1981.

Robert E. Nagle,  
Executive Director, Pension Benefit Guaranty Corporation.

[FR Doc. 81-1007 Filed 5-19-81; 8:45 am]  
BILLING CODE 7708-01-6

## ENVIRONMENTAL PROTECTION AGENCY

40 CFR Ch. I

[WH-FRL-1828-6]

State Underground Injection Control Programs

AGENCY: Environmental Protection Agency.

ACTION: Interim Final Guidance and Request for Public Comment.

SUMMARY: The Safe Drinking Water Act of 1974 (SDWA) was amended on December 3, 1980. Among other changes,

the amendments added a new Section 1425 to the Act. Section 1425 establishes an alternative method for States to obtain primary enforcement responsibility for those portions of its Underground Injection Control (UIC) program related to the recovery and production of oil and gas. More specifically, " . . . In lieu of the showing required under subparagraph (A) of section 1422(b)(1) the State may demonstrate that such portion of the State program meets the requirements of subparagraphs (A) through (D) of section 1421(b)(1) and represents an effective program . . . to prevent underground injection which endangers drinking water sources."

Section 1422(b)(1) of the SDWA specifies that a State, in order to obtain approval for its UIC program, must make a satisfactory showing that it has adopted and will implement a program, that meets the requirements of regulations issued by the Administrator. Such regulations have been promulgated at 40 CFR Parts 122, 123, 124 and 146.

This notice is intended to provide guidance for the implementation of the alternative demonstration provided for in the new Section 1425. It contains information on: (1) how States may apply for approval under Section 1425; and (2) the criteria the Environmental Protection Agency (EPA) will use in approving or disapproving applications under Section 1425.

**DATES:** Effective date: This guidance is issued as interim final. It becomes effective upon May 19, 1981.

**COMMENT DATE:** EPA will accept public comments on this document until July 20, 1981.

**ADDRESS:** Comments should be sent to Mr. Thomas E. Beik, Chief, Ground Water Protection Branch, Office of Drinking Water (WH-350), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Such comments, together with other relevant materials, will be maintained at the same address.

**FOR FURTHER INFORMATION CONTACT:** Mr. Thomas E. Beik (202) 426-3934.

**OMB Approval:** This guidance has been cleared for publication by the Office of Management and Budget.

Dated: May 11, 1981.

Walter C. Barber, Jr.,  
Acting Administrator.

#### Table of Contents

Section	Page
10	Purpose and Scope
20	Applicability
21	Comments

A. An injection well has mechanical integrity if:

- i. there is no significant leak in the casing, tubing or packer; and
- ii. there is no significant fluid movement into an underground source of drinking water through vertical channels adjacent to the well bore.

B. The following tests are considered to be acceptable tests to demonstrate the absence of significant leaks:

- i. a pressure test with liquid or gas;
- ii. the monitoring of annulus pressure in those wells injecting at a positive pressure, following an initial pressure test; or
- iii. all other tests or combinations of tests considered effective by the Director.

C. The following are considered to be acceptable tests to demonstrate the absence of significant fluid movement in vertical channels adjacent to the well bore:

- i. cementing records (they need not be reviewed every five years);
- ii. tracer surveys;
- iii. noise logs;
- iv. temperature surveys; or
- v. any other test or combination of tests considered effective by the Director.

D. If the State program allows or specifies alternative tests under B(iii) or (C)(v) above, the program description should supply sufficient information so that the usefulness and reliability of such tests in the proposed circumstance may be assessed.

#### c. Surveillance.

The demonstration of an effective surveillance program has already been discussed in Section 5.4 above.

#### d. Enforcement.

A State's enforcement of its program is a crucial consideration in making the judgment of whether the State program is effective. States have used a number of enforcement tools to shift the economic incentive of operation more toward compliance with the law. Often State programs have employed civil penalties and, for repeat or willful violators, criminal fines or jail sentences. Other commonly used practices are administrative orders and court injunctions. In the area of oil and gas regulation, many States have found pipeline severance a powerful tool. In assessing a State's enforcement program, EPA will consider not whether a State has all or any particular enforcement tools but whether the State's program, taken as a whole, represents an effective enforcement effort. Certainly, there are many enforcement matrices which create effective programs. In addition, EPA will look at whether the State has exercised

its enforcement authorities adequately in the past.

#### e. Public Participation.

One factor to be used by EPA in assessing the "effectiveness" of a State program is the degree to which it assures the public an opportunity to participate in major regulatory decisions. It is assumed that most States already have legislation that governs public participation in State decision-making and defines such processes as appeals, etc. Therefore, the following represents only a minimal list of elements that EPA will consider:

##### 1. Public Notice of permit application:

- A. The State may give such notice or it may require the applicant to give notice.
- B. The method of giving notice should be adequate to bring the matter to the attention of interested parties and, in particular, the public in the area of the proposed injection. This may involve one or more of the following:
  - i. Posting;
  - ii. Publication in an official State register;
  - iii. Publication in a local newspaper;
  - iv. Mailing to a list of interested persons; or
  - v. Any other effective method that achieves the objective.
- C. An adequate notice should:
  - i. Provide an adequate description of the proposed action;
  - ii. Identify where an interested party may obtain additional information. This location should be reasonably accessible and convenient for interested persons;
  - iii. State how a public hearing may be requested; and
  - iv. Allow for a comment period of at least 15 days.

2. The State program should provide opportunity for a public hearing if the Director finds, based upon requests, a significant degree of public interest.

A. The Director may hold a hearing of his own motion and give notice of such hearing with the notice of the application.

B. If a public hearing is decided upon during the comment period, notice of public hearing shall be given in a newspaper of general circulation. The hearing should be scheduled no sooner than 15 days after the notice.

3. The final State action on the permit application should contain a "response to comments" which summarizes the substantive comments received and the disposition of the comments.

#### 6.0 Oversight

##### 6.1 General

Once a Class II program is approved under Section 1425, the State has

primary enforcement responsibility for such portion of its UIC program. The Class II program is a grant-eligible activity and is subject to the same EPA oversight as other portions of the UIC program (e.g., State/EPA Agreements, Mid-course Reviews, grant conditions, etc.).

##### 6.2 Mid-Course Evaluation

EPA will conduct a mid-course evaluation of Class II programs as envisioned in 40 CFR 122.18(C)(4)(ii) and 146.25. However, *in lieu* of a special reporting requirement, additional requirements have been added to the State's annual report to EPA. Should this mechanism prove unable to provide the necessary data, a special reporting requirement may be negotiated with the primacy States at a later date.

##### 6.3 Annual Reporting

As part of the Memorandum of Agreement, each State shall agree to submit an annual report on the operation of its Class II program to EPA. At a minimum the annual report shall contain:

- a. An updated inventory;
- b. A summary of surveillance programs, including the results of monitoring and mechanical integrity testing, the number of inspections, and corrective actions ordered and witnessed;
- c. An account of all complaints reviewed by the State and the actions taken;
- d. An account of the results of the review of existing wells made during the year; and
- e. A summary of enforcement actions taken.

[FR Doc. 81-16728 Filed 5-19-81; 8:48 am]  
BILLING CODE 6560-29-6

#### 40 CFR Part 52

[AS FRL 1807-2]

#### Approval and Promulgation of Indiana State Implementation Plan for Ozone and Carbon Monoxide

AGENCY: Environmental Protection Agency.

ACTION: Final rulemaking.

SUMMARY: On December 9, 1980 (45 FR 81000) the U.S. Environmental Protection Agency (EPA) proposed approval of an invited public comment on revisions to the Indiana State Implementation Plan (SIP). The revisions provide for the attainment of the ozone and carbon monoxide (CO) standards by December 31, 1982 in Marion County, Indiana. On

UNDERGROUND INJECTION CONTROL PROGRAM FOR CLASS II WELLS  
Memorandum of Agreement  
Between  
The State of New Mexico  
and  
The United States Environmental Protection Agency,  
Region 6

I. General

This Memorandum of Agreement (Agreement) establishes policies, responsibilities, and procedures for the State of New Mexico Underground Injection Control Program for Class II injection wells (State Program) as authorized by Part C of Section 1425 of the Safe Drinking Water Act (Pub. L. 93-523, as amended) (SDWA or the Act).

This Agreement is entered into by the New Mexico Oil Conservation Division of the New Mexico Energy and Minerals Department and signed by Joe Ramey, Director of the Oil Conservation Division (the State) with the United States Environmental Protection Agency (EPA), Region 6 and signed by \_\_\_\_\_, EPA Regional Administrator (EPA or Regional Administrator). After it is signed by the State and the Regional Administrator, this Agreement shall become effective the date the notice of State Program approval is published in the Federal Register.

This Agreement may be modified upon the initiative of the State or EPA. Modifications must be in writing and must be signed by the Director and the Regional Administrator. Modifications may be made by revision prior to the effective date of this Agreement or after the effective date by consecutively numbered and dated addenda attached to this Agreement.

This Agreement shall remain in effect as long as the State has primary enforcement authority for the State Program.

When the State has a fully approved program, EPA will not take enforcement actions without providing prior notice to the State and otherwise complying with Section 1423 of the SDWA. Nothing in this Agreement shall restrict EPA's authority to take Federal enforcement action under Section 1423 of the SDWA.

The State shall administer the State Program in accordance with the program submissions, the SDWA, and the applicable regulations.

EPA shall promptly inform the State of the issuance, content, and meaning of Federal statutes, regulations, guidelines, standards, judicial decisions, policy decisions, directives, and any other factors which might affect the State Program.

The State shall promptly inform EPA of any proposed or pending modifications to laws, regulations, or guidelines, and any judicial decisions or administrative actions which might affect the State Program and the State's authority to administer the program. The State shall promptly inform EPA of any resource allocation changes (for example, personnel, budget, equipment, etc.) which might affect the State's ability to administer the program.

Prior to the use of an alternative test (a test not listed in Section d.3. of the Program Description) for mechanical integrity, the State shall submit a written request to the Regional Administrator and shall obtain his/her written approval. No approval shall be required for the State to conduct experimental test programs at any time.

NEW MEXICO  
ENERGY AND MINERALS DEPARTMENT  
OIL CONSERVATION DIVISION

UNDERGROUND INJECTION CONTROL  
PROGRAM

CLASS II DEMONSTRATION

Submitted to:

U. S. ENVIRONMENTAL PROTECTION AGENCY

September 15, 1981

In lieu of remedial work, operators may conduct tests or present other evidence to the District Supervisor prior to beginning injection to prove that remedial work on specific wells is not required to confine injected fluids in the approved zone.

### 3. Mechanical Integrity

To assure the initial mechanical integrity of any injection well as defined in Rule 703, an initial test is required under Rule 704, as follows:

"Prior to commencement of injection, wells shall be tested to assure the initial integrity of the casing and the tubing and packer, if used, including pressure testing of the casing-tubing annulus."

Field inspectors witness most such tests and operators report the results on Form C-103. SUNDRY NOTICES AND REPORTS ON WELLS.

Whenever additional tests are deemed necessary to assure that the injected fluids will be confined to the approved zones, the Division requires operators to conduct tracer surveys, noise logs, temperature surveys or other tests on injection wells and other wells in the area of review.

As specified in Rule 703, whenever injection wells exhibit failure to confine injected fluids to the authorized injection zones they may be ordered shut-in until the reason for the failure has been identified and corrected.

Periodic pressure tests of all injection wells are required as discussed in Section e. Monitoring, Inspection, Reporting.

The extensive well test program conducted by the Division since 1975 assures the mechanical integrity of existing wells. This program is discussed extensively in our annual reports to EPA and demonstrates that essentially every injection well in the State will have been tested at least once and witnessed by a Division inspector by the end of this year. Such process includes a review of casing and cementing records.

### 4. Injection Pressure

Maximum injection pressures are specified in Division Orders authorizing

e. Monitoring, Inspection, Reporting.

## 1. Well inspection and testing.

All newly drilled or converted injection wells must be pressure tested for mechanical integrity prior to commencing injection and at least once every five years thereafter. Rule 704 states these requirements, as follows:

**RULE 704. TESTING AND MONITORING****A. Testing**

Prior to commencement of injection, wells shall be tested to assure the initial integrity of the casing and the tubing and packer, if used, including pressure testing of the casing-tubing annulus.

At least once every five years thereafter, injection wells shall be tested to assure their continued mechanical integrity. Tests demonstrating continued mechanical integrity shall include the following:

- (a) measurement of annular pressures in wells injecting at positive pressures under a packer or a balanced-fluid seal;
- (b) pressure testing of the casing-tubing annulus for wells injecting under vacuum conditions; and,
- (c) such other tests which are demonstrably effective and which may be approved for use by the Division.

Notwithstanding the test procedures outlined above, the Division may require more comprehensive testing of the injection wells when deemed advisable, including the use of tracer surveys, noise logs, temperature logs, or other test procedures or devices.

In addition, the Division may order special tests to be conducted prior to the expiration of five years if conditions are believed to so warrant. Any such special test which demonstrates continued mechanical integrity of a well shall be considered the equivalent of an initial test for test scheduling purposes, and the regular 5-year testing schedule shall be applicable thereafter.

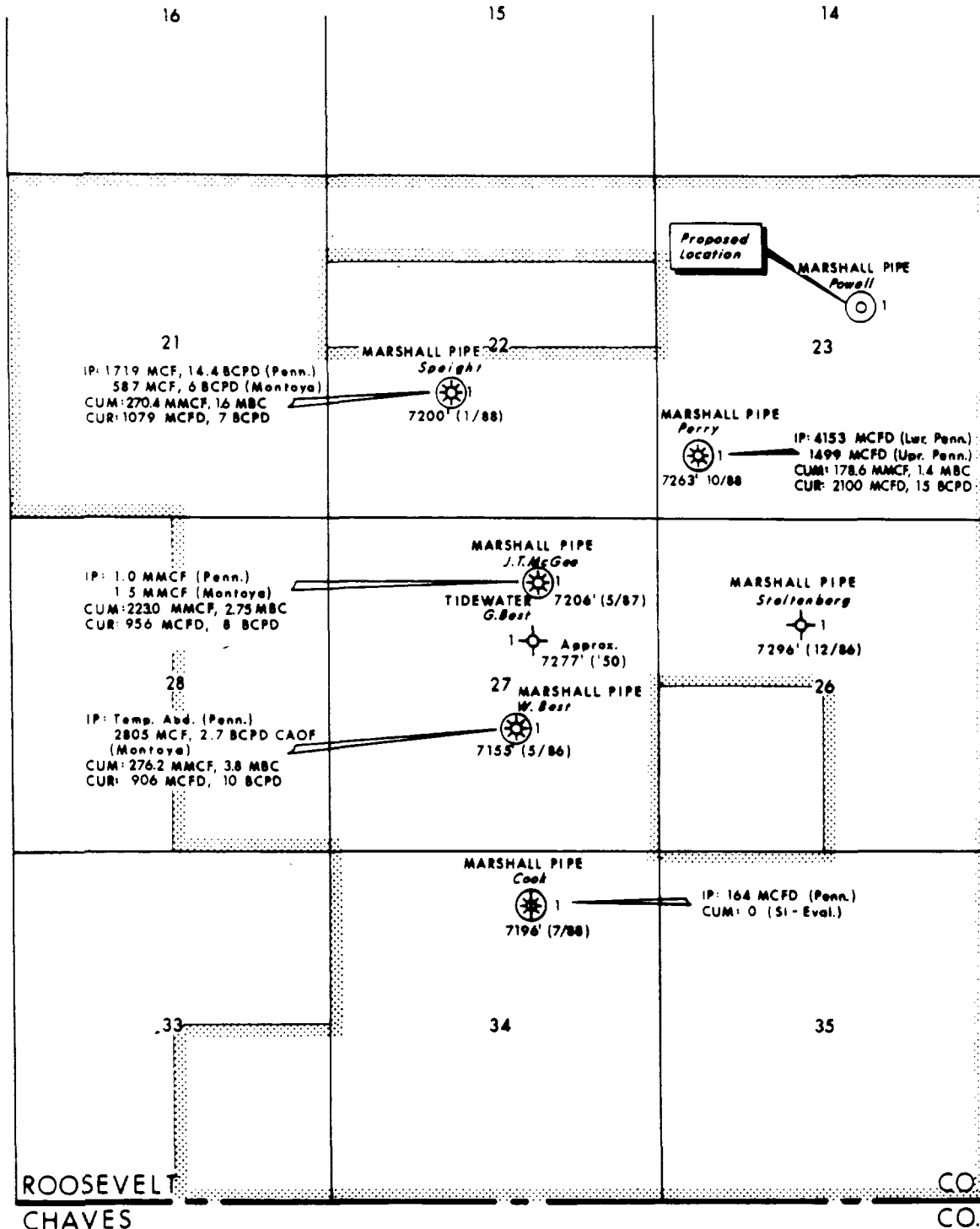
The injection well operator shall advise the Division of the date and time any initial, 5-year, or special tests are to be commenced in order that such tests may be witnessed.

**B. Monitoring**

Injection wells shall be so equipped that the injection pressure and annular pressure may be determined at the wellhead and the injected volume may be determined at least monthly.

Injection wells used for storage shall be so equipped that both injected and produced volumes may be determined at any time.

# R 29 E



T  
2  
S



NICOR Leasehold



NICOR Interest Well

## TULE FIELD - TWIN BUTTES PROSPECT ROOSEVELT COUNTY, NEW MEXICO



NOTE: Rates And Cums. As Of 12/88, Fir

MARSHALL PIPE & SUPPLY CO.  
Case No. 9574  
2/15/89 Examiner Hearing  
Exhibit No. 7

101 COOK #1  
102 ROOSEVELT CO, NM  
103 SEC 34-T25-R29E  
104 TULE FIELD - PENN ZONE  
105 \$1.24/MCF GAS PRICE  
107 OPER - MARSHALL PIPE & SUPPLY  
117 CASE #COMJAN  
\* 120 1 89 12 1 1 89 15 1  
\* 131 COMPL -DB200 7 .1429 0 0 0  
\* 132 DRYHOLE -DB200 7 .1429 0 0 0  
\* 133 LAND -DB200 7 .1429 0 0 0  
\* 134 FACILITY -DB200 7 .1429 0 0 0  
\* 159 SET ESCDATE = 1 1 90  
\* 170 5\*34

W I.	OP. COST (\$/M/MO)	OP. COST (\$/MO.)	ADV. TAX (PCT)	MAJOR PH. NAME	PROD. DATE (MO/DY/YR)	NO. OF WELLS	RATIO TO MAJOR PH	(M OR Y)	CALC VALUE
210	1.00000000	2890.00	3.150	GAS	1/ 1/89				
222		0.00	1.240	SEV. TAX (PCT)		1.0			
410		0.00	150.000	GT RATE		7.819	X	D	
CALC		5.000	150.000	EL			X	D	352.663 MMCF
620		5.000		100.440			YRS		

600 SERIES LINES:  
\* 620 DATA GASP : ESC 0 % 1991.0 AD  
\* 627 ESC 6 % X X 6.00  
630 CASE #G0PR  
630 DATA WELLC : ESC 4 % 627 LINE

FOOTNOTES:  
906 PRIVILEGE TAX SET UP AS AD VALOREM  
907 OPERATING COSTS INCLUDE \$1500/MO FOR COMPRESSOR

MARSHALL PIPE & SUPPLY CO.  
Case No. 9574  
2/15/89 Examiner Hearing  
Exhibit No. 8



COOK #1  
ROOSEVELT CO, NM  
SEC 34-T2S-R29E  
TULE FIELD - PENN ZONE

DATE: 02/07/89  
TIME: 12:42:53  
FILE: TULE  
GET#: 9

R E S E R V E S A N D E C O N O M I C S

OPER - MARSHALL PIPE & SUPPLY

\$1.24/MCF GAS PRICE

AS OF JANUARY 1, 1989

-END- MO-YR	---GROSS PRODUCTION---		---NET PRODUCTION---		---PRICES---		---OPERATIONS, M\$---		NET OPER EXPENSES	CAPITAL COSTS, M\$	CASH FLOW BTAX, M\$	15.00 PCT CUM. DISC BTAX, M\$																																																
	OIL, MBL	GAS, MMCF	OIL, MBL	GAS, MMCF	OIL \$/B	GAS \$/M	NET OPER REVENUES	SEV+ADV+ WF TAXES																																																				
12-89	0.000	53.370	0.000	43.763	0.00	1.24	54.266	3.780	34.680	0.000	15.806	14.751																																																
12-90	0.000	50.701	0.000	41.575	0.00	1.24	51.553	3.591	36.067	0.000	11.895	24.404																																																
12-91	0.000	48.166	0.000	39.496	0.00	1.31	51.914	3.616	37.510	0.000	10.788	32.017																																																
12-92	0.000	45.757	0.000	37.521	0.00	1.39	52.277	3.642	39.010	0.000	9.625	37.923																																																
12-93	0.000	43.470	0.000	35.645	0.00	1.48	52.643	3.667	40.571	0.000	8.405	42.408																																																
12-94	0.000	41.297	0.000	33.864	0.00	1.57	53.013	3.693	42.194	0.000	7.126	45.714																																																
12-95	0.000	39.231	0.000	32.169	0.00	1.66	53.381	3.718	43.881	0.000	5.782	48.047																																																
12-96	0.000	30.671	0.000	25.150	0.00	1.76	44.238	3.082	37.384	0.000	3.772	49.387																																																
12-97																																																												
12-98																																																												
12-99																																																												
12-0																																																												
12-1																																																												
12-2																																																												
12-3																																																												
S TOT	0.000	352.663	0.000	289.183	0.00	1.43	413.285	28.789	311.297	0.000	73.199	49.387																																																
REM.	0.000	0.000	0.000	0.000	0.00	0.00	0.000	0.000	0.000	0.000	0.000	49.387																																																
TOTAL	0.000	352.663	0.000	289.183	0.00	1.43	413.285	28.789	311.297	0.000	73.199	49.387																																																
CUM.	0.000	0.000																																																										
ULT.	0.000	352.663																																																										
<table border="0"> <tr> <td>BTAX RATE OF RETURN (PCT)</td> <td>100.00</td> <td>NET OIL REVENUES (M\$)</td> <td>0.000</td> </tr> <tr> <td>BTAX PAYOUT YEARS</td> <td>0.00</td> <td>NET GAS REVENUES (M\$)</td> <td>413.285</td> </tr> <tr> <td>BTAX PAYOUT YEARS (DISC)</td> <td>0.00</td> <td>TOTAL REVENUES (M\$)</td> <td>413.285</td> </tr> <tr> <td>BTAX BENEFIT COST RATIO</td> <td>0.00</td> <td>BTAX NET PRESENT VALUE</td> <td>49.387</td> </tr> <tr> <td>BTAX BENEFIT COST RATIO (DISC)</td> <td>0.00</td> <td>PROJECT LIFE (YEARS)</td> <td>7.819</td> </tr> <tr> <td></td> <td></td> <td>DISCOUNT RATE (PCT)</td> <td>15.000</td> </tr> <tr> <td></td> <td></td> <td>GROSS OIL WELLS</td> <td>0.000</td> </tr> <tr> <td></td> <td></td> <td>GROSS GAS WELLS</td> <td>1.000</td> </tr> <tr> <td></td> <td></td> <td>GROSS WELLS</td> <td>1.000</td> </tr> </table>													BTAX RATE OF RETURN (PCT)	100.00	NET OIL REVENUES (M\$)	0.000	BTAX PAYOUT YEARS	0.00	NET GAS REVENUES (M\$)	413.285	BTAX PAYOUT YEARS (DISC)	0.00	TOTAL REVENUES (M\$)	413.285	BTAX BENEFIT COST RATIO	0.00	BTAX NET PRESENT VALUE	49.387	BTAX BENEFIT COST RATIO (DISC)	0.00	PROJECT LIFE (YEARS)	7.819			DISCOUNT RATE (PCT)	15.000			GROSS OIL WELLS	0.000			GROSS GAS WELLS	1.000			GROSS WELLS	1.000												
BTAX RATE OF RETURN (PCT)	100.00	NET OIL REVENUES (M\$)	0.000																																																									
BTAX PAYOUT YEARS	0.00	NET GAS REVENUES (M\$)	413.285																																																									
BTAX PAYOUT YEARS (DISC)	0.00	TOTAL REVENUES (M\$)	413.285																																																									
BTAX BENEFIT COST RATIO	0.00	BTAX NET PRESENT VALUE	49.387																																																									
BTAX BENEFIT COST RATIO (DISC)	0.00	PROJECT LIFE (YEARS)	7.819																																																									
		DISCOUNT RATE (PCT)	15.000																																																									
		GROSS OIL WELLS	0.000																																																									
		GROSS GAS WELLS	1.000																																																									
		GROSS WELLS	1.000																																																									
<table border="0"> <tr> <td>INITIAL W. I. FRACTION</td> <td>1.000000</td> <td>INITIAL NET OIL FRACTION</td> <td>0.000000</td> </tr> <tr> <td>FINAL W. I. FRACTION</td> <td>1.000000</td> <td>FINAL NET OIL FRACTION</td> <td>0.000000</td> </tr> <tr> <td>PRODUCTION START DATE</td> <td>1-1-89</td> <td>INITIAL NET GAS FRACTION</td> <td>0.820000</td> </tr> <tr> <td>MONTHS IN FIRST LINE</td> <td>12.00</td> <td>FINAL NET GAS FRACTION</td> <td>0.820000</td> </tr> </table>													INITIAL W. I. FRACTION	1.000000	INITIAL NET OIL FRACTION	0.000000	FINAL W. I. FRACTION	1.000000	FINAL NET OIL FRACTION	0.000000	PRODUCTION START DATE	1-1-89	INITIAL NET GAS FRACTION	0.820000	MONTHS IN FIRST LINE	12.00	FINAL NET GAS FRACTION	0.820000																																
INITIAL W. I. FRACTION	1.000000	INITIAL NET OIL FRACTION	0.000000																																																									
FINAL W. I. FRACTION	1.000000	FINAL NET OIL FRACTION	0.000000																																																									
PRODUCTION START DATE	1-1-89	INITIAL NET GAS FRACTION	0.820000																																																									
MONTHS IN FIRST LINE	12.00	FINAL NET GAS FRACTION	0.820000																																																									
<table border="0"> <tr> <td colspan="4">---PRESENT WORTH PROFILE---</td> </tr> <tr> <td>DISC RATE</td> <td>PW OF NET BTAX, M\$</td> <td>DISC RATE</td> <td>PW OF NET BTAX, M\$</td> </tr> <tr> <td>0.0</td> <td>73.199</td> <td>30.0</td> <td>37.290</td> </tr> <tr> <td>2.0</td> <td>68.867</td> <td>35.0</td> <td>34.554</td> </tr> <tr> <td>5.0</td> <td>63.186</td> <td>40.0</td> <td>32.238</td> </tr> <tr> <td>8.0</td> <td>58.324</td> <td>45.0</td> <td>30.255</td> </tr> <tr> <td>10.0</td> <td>55.462</td> <td>50.0</td> <td>28.541</td> </tr> <tr> <td>12.0</td> <td>52.863</td> <td>60.0</td> <td>25.737</td> </tr> <tr> <td>15.0</td> <td>49.387</td> <td>70.0</td> <td>23.543</td> </tr> <tr> <td>18.0</td> <td>46.344</td> <td>80.0</td> <td>21.782</td> </tr> <tr> <td>20.0</td> <td>44.521</td> <td>90.0</td> <td>20.338</td> </tr> <tr> <td>25.0</td> <td>40.562</td> <td>100.0</td> <td>19.132</td> </tr> </table>													---PRESENT WORTH PROFILE---				DISC RATE	PW OF NET BTAX, M\$	DISC RATE	PW OF NET BTAX, M\$	0.0	73.199	30.0	37.290	2.0	68.867	35.0	34.554	5.0	63.186	40.0	32.238	8.0	58.324	45.0	30.255	10.0	55.462	50.0	28.541	12.0	52.863	60.0	25.737	15.0	49.387	70.0	23.543	18.0	46.344	80.0	21.782	20.0	44.521	90.0	20.338	25.0	40.562	100.0	19.132
---PRESENT WORTH PROFILE---																																																												
DISC RATE	PW OF NET BTAX, M\$	DISC RATE	PW OF NET BTAX, M\$																																																									
0.0	73.199	30.0	37.290																																																									
2.0	68.867	35.0	34.554																																																									
5.0	63.186	40.0	32.238																																																									
8.0	58.324	45.0	30.255																																																									
10.0	55.462	50.0	28.541																																																									
12.0	52.863	60.0	25.737																																																									
15.0	49.387	70.0	23.543																																																									
18.0	46.344	80.0	21.782																																																									
20.0	44.521	90.0	20.338																																																									
25.0	40.562	100.0	19.132																																																									

Cook #1

NE/4 Section 34-T2S-R29E  
Roosevelt County, New Mexico

Salt Water Disposal Economics

I. Current Salt Water Disposal (SWD) Costs

Tule Field Water Production = 170 BWPD or 5,100 BWPM

Cost @ \$1/BBL = 5,100 X \$1.00 = \$5,100/mo to haul water

II. Cost for Converting Cook #1 to SWD

Installation of pipeline and pump = \$20,000

Monthly operating cost = \$500

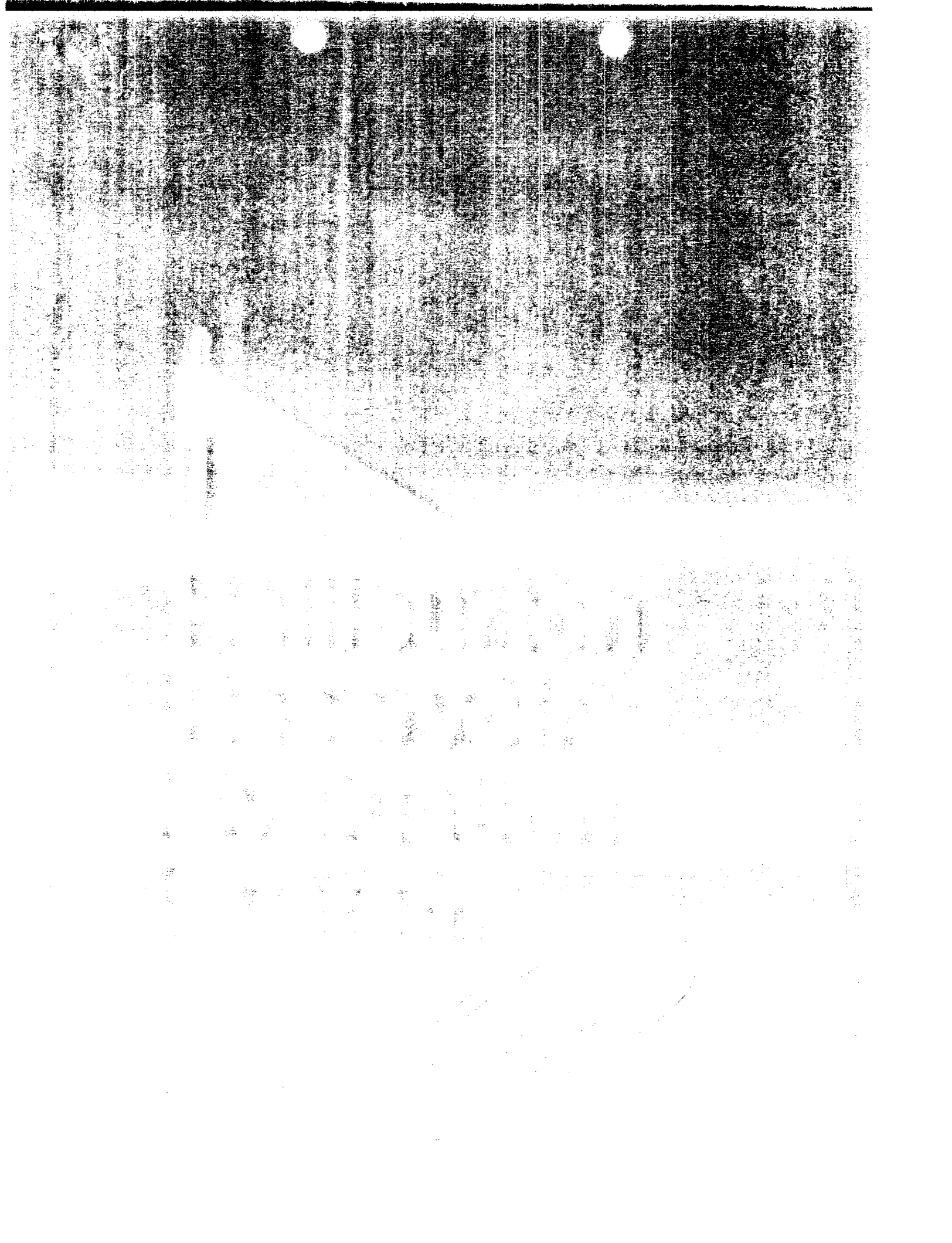
III. Payout for Cook #1 SWD

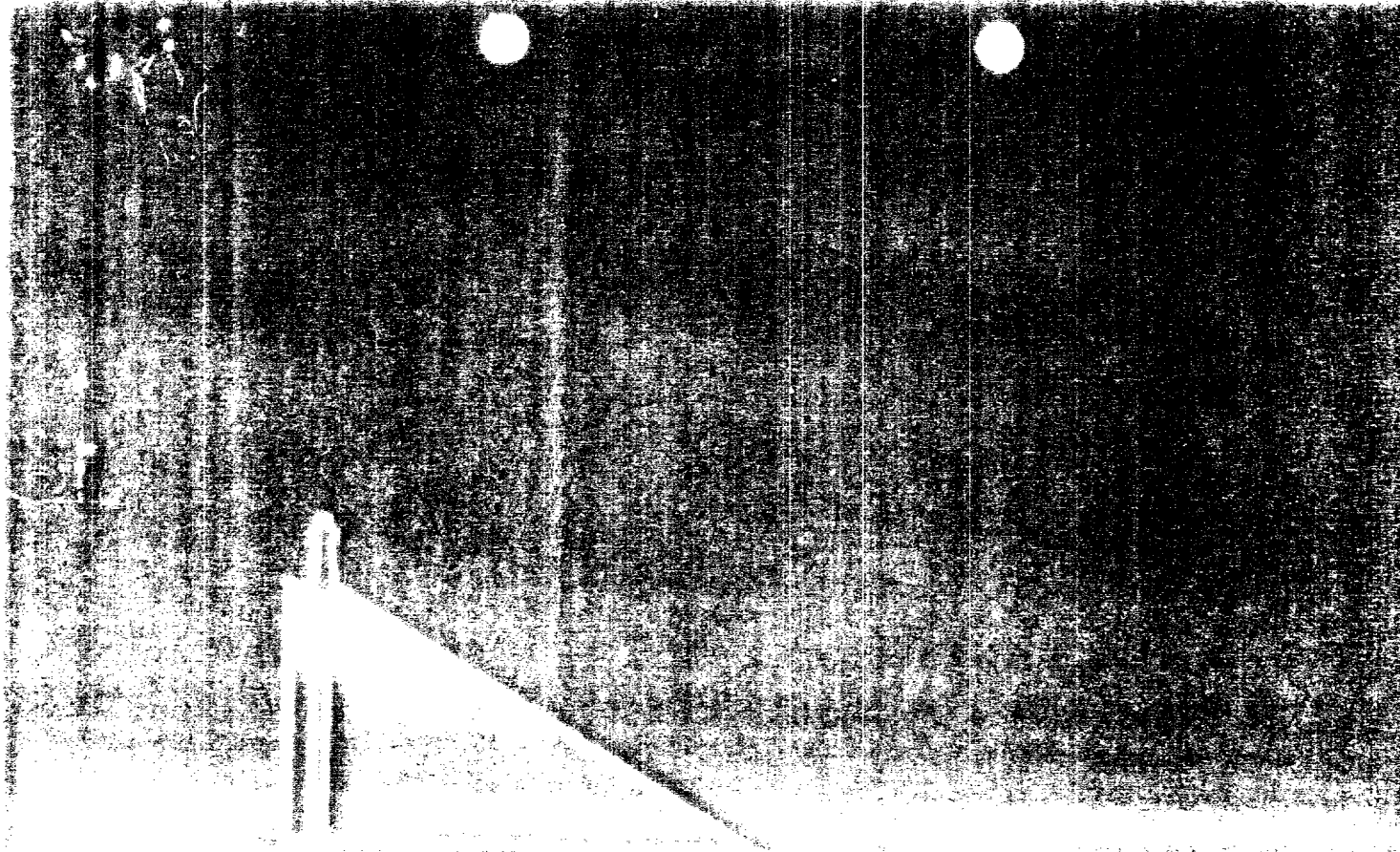
Reduction in Disposal Cost = \$5,100 - \$500 = \$4,600/mo

Payout of Installation =  $\frac{\$20,000}{\$4,600/\text{mo reduction}}$  = 4.35 months

MARSHALL PIPE & SUPPLY CO.  
Case No. 9574  
2/15/89 Examiner Hearing  
Exhibit No. 9

T. D. Wilcox  
2/7/89





Halliburton  
Reservoir  
Evaluation  
System

*Handwritten signature*  
11/10/00



# Halliburton Reservoir Evaluation System



**HALLIBURTON SERVICES**  
Duncan, Oklahoma 72828  
A Halliburton Company

MARSHALL PIPE & SUPPLY CO.  
Case No. 9574  
2/15/89 Examiner Hearing  
Exhibit No. 10



# HALLIBURTON SERVICES

TICKET NO. 40757600

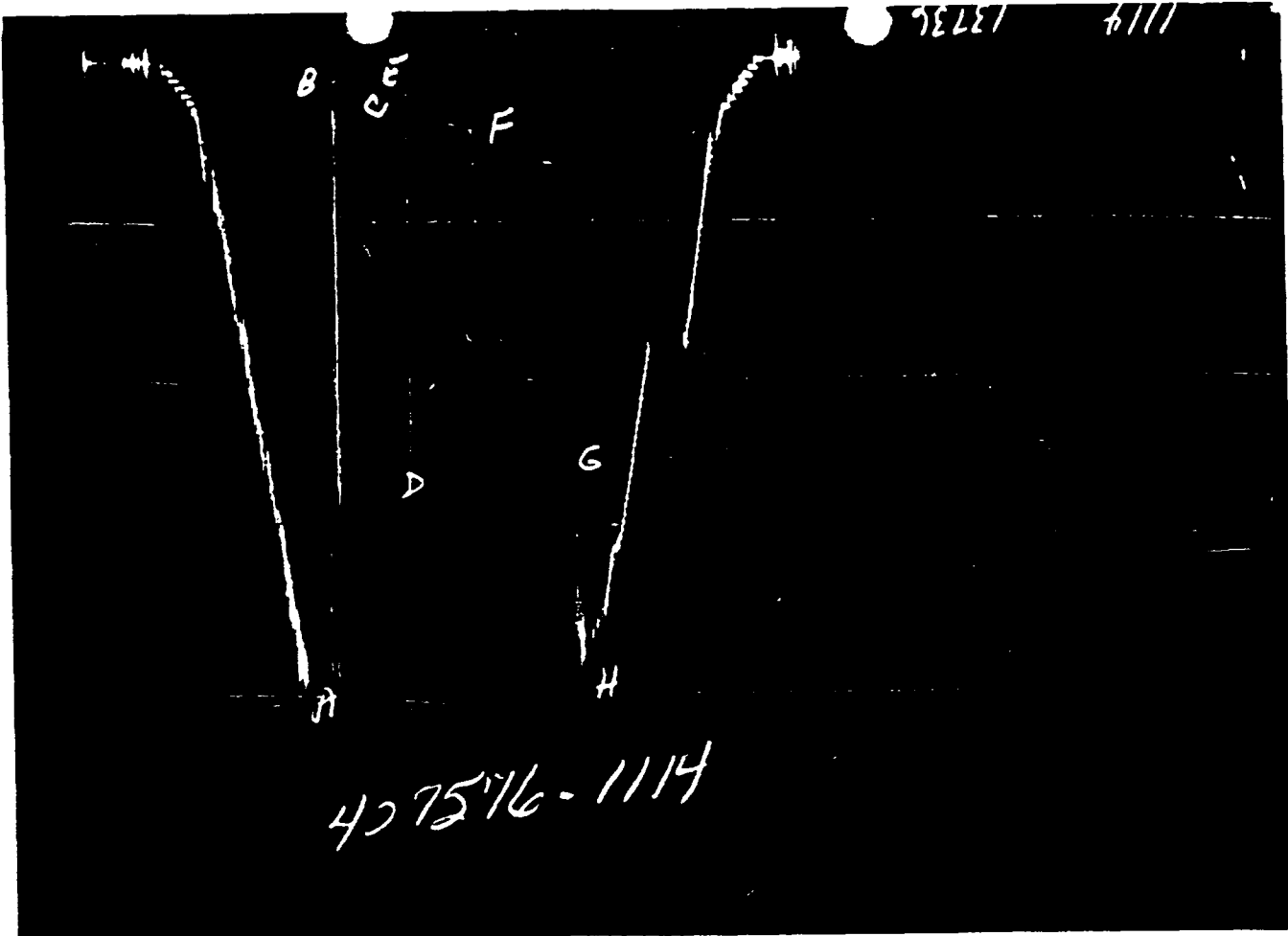
18-MAY-88

ARTESIA

## FORMATION TESTING SERVICE REPORT

LEGAL LOCATION SEC. - TWP. - RANG.	34-2S-29E	WELL NO.	1	TEST NO.	1	TESTED INTERVAL	7099.0 - 7200.0	LEASER NAME	MRSHILL, PIPE & SUPPLY COMPANY
FIELD AREA	HILDCAT	COUNTY	ROOSEVELT	STATE	NEW MEXICO	IC			

12736 1114

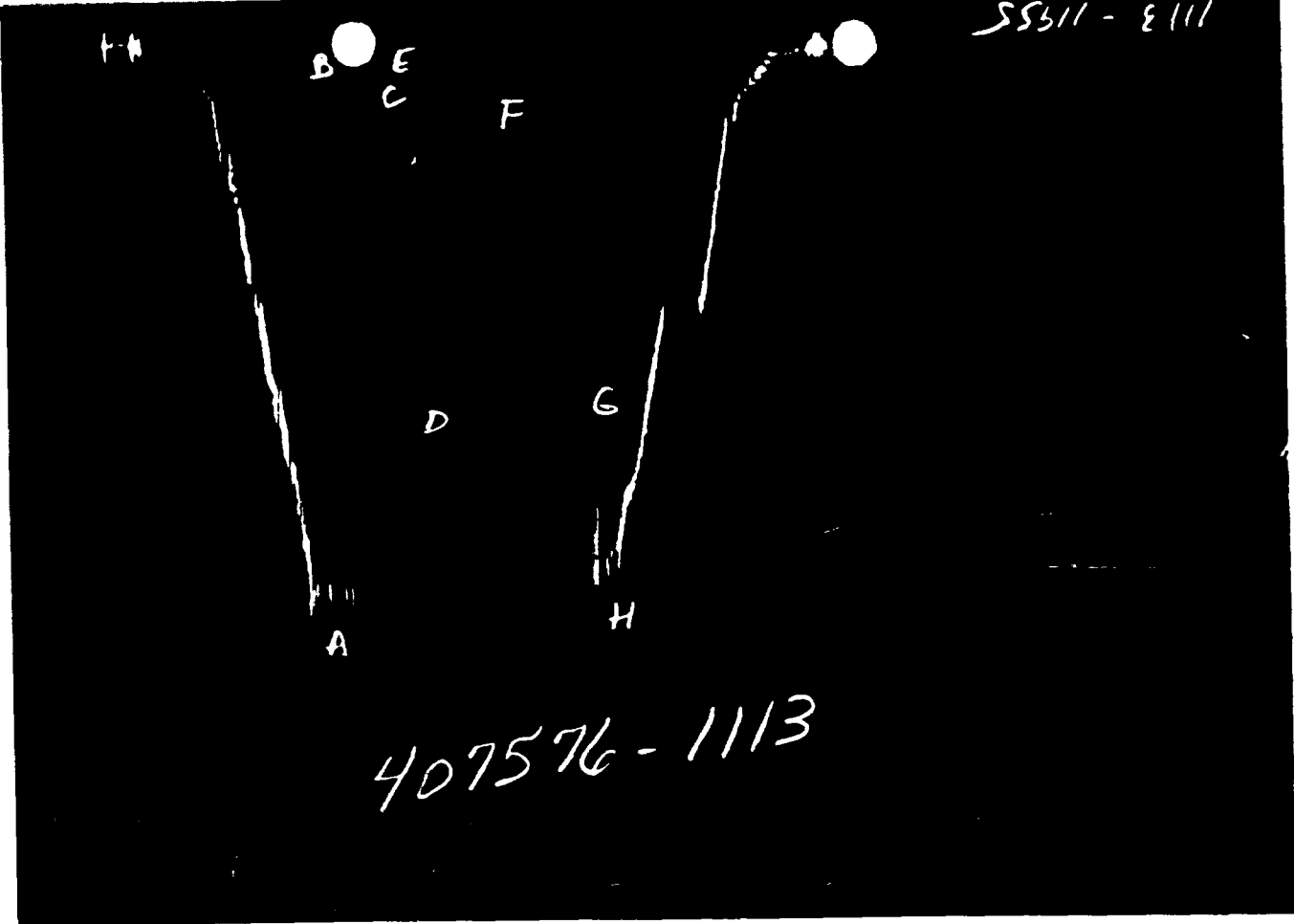


427576-1114

GAUGE NO: 1114 DEPTH: 7078.0 BLANKED OFF: NO HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	3724	3746.8			
B	INITIAL FIRST FLOW	128	108.9			
C	FINAL FIRST FLOW	288	293.3	30.0	29.6	F
C	INITIAL FIRST CLOSED-IN	288	293.3			
D	FINAL FIRST CLOSED-IN	2463	2458.3	60.0	58.5	C
E	INITIAL SECOND FLOW	192	202.9			
F	FINAL SECOND FLOW	431	437.4	75.0	76.1	F
F	INITIAL SECOND CLOSED-IN	431	437.4			
G	FINAL SECOND CLOSED-IN	2495	2500.0	120.0	120.9	C
H	FINAL HYDROSTATIC	3725	3647.4			

55311 - 8111



407576 - 1113

GAUGE NO: 1113 DEPTH: 7197.0 BLANKED OFF: YES HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	3898	3817.4			
B	INITIAL FIRST FLOW	163	187.9			
C	FINAL FIRST FLOW	344	358.3	30.0	29.6	F
C	INITIAL FIRST CLOSED-IN	344	358.3			
D	FINAL FIRST CLOSED-IN	2502	2519.4	60.0	58.5	C
E	INITIAL SECOND FLOW	236	255.5			
F	FINAL SECOND FLOW	489	499.8	75.0	76.1	F
F	INITIAL SECOND CLOSED-IN	489	499.8			
G	FINAL SECOND CLOSED-IN	2555	2559.8	120.0	120.9	C
H	FINAL HYDROSTATIC	3718	3711.6			



## EQUIPMENT &amp; HOLE DATA

FORMATION TESTED: ~~XXXXXXXXXX~~  
 NET PAY (ft): \_\_\_\_\_  
 GROSS TESTED FOOTAGE: 101.0  
 ALL DEPTHS MEASURED FROM: 4359' KB  
 CASING PERFS. (ft): \_\_\_\_\_  
 HOLE OR CASING SIZE (in): 7.875  
 ELEVATION (ft): 4359.0 GROUND LEVEL  
 TOTAL DEPTH (ft): 7200.0  
 PACKER DEPTH(S) (ft): 7093, 7099  
 FINAL SURFACE CHOKE (in): \_\_\_\_\_  
 BOTTOM HOLE CHOKE (in): 0.750  
 MUD WEIGHT (lb/gal): 9.60  
 MUD VISCOSITY (sec): 50  
 ESTIMATED HOLE TEMP. (°F): \_\_\_\_\_  
 ACTUAL HOLE TEMP. (°F): 138 @ 7196.0 ft

TICKET NUMBER: 40757600

DATE: 5-12-88 TEST NO: 1

TYPE DST: OPEN HOLE

HALLIBURTON CAMP:  
ARTESIA

TESTER: STAN MC KEE

WITNESS: JACK HOUSTON

DRILLING CONTRACTOR:  
HOUSTON DRILLING COMPANYFLUID PROPERTIES FOR  
RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
MUD PIT	0.080 @ 82 °F	80000 ppm
TOP RECOVERY	0.080 @ 82 °F	80000 ppm
MIDDLE RECOVERY	0.050 @ 82 °F	11000 ppm
BOTTOM RECOVERY	0.200 @ 84 °F	30000 ppm
SAMPLER	0.200 @ 84 °F	30000 ppm
	@ _____ °F	_____ ppm

## SAMPLER DATA

Psig AT SURFACE: 400.0

~~XXXXXXXXXX~~

cc OF OIL: \_\_\_\_\_

cc OF WATER: ~~XXXXXXXXXX~~

cc OF MUD: \_\_\_\_\_

TOTAL LIQUID cc: ~~XXXXXXXXXX~~

## HYDROCARBON PROPERTIES

OIL GRAVITY (°API): \_\_\_\_\_ @ \_\_\_\_\_ °F  
 GAS/OIL RATIO (cu.ft. per bbl): \_\_\_\_\_  
 GAS GRAVITY: \_\_\_\_\_

## CUSHION DATA

TYPE AMOUNT WEIGHT

## RECOVERED :

2200 FEET OF GAS  
 375 FEET OF GAS CUT MUD  
 625 FEET OF GAS CUT SALT WATER  
 1000 FEET TOTAL LIQUID RECOVERY

MEASURED FROM  
TESTER VALVE

## REMARKS :

SLID 4' TO BOTTOM WHEN TEST TOOL OPENED - ~~NO GAS TO SURFACE DURING TEST~~NOTE: COMPLETE COMPANY NAME LISTED AS MARSHALL PIPE AND SUPPLY COMPANY,  
OIL PRODUCERS.



TICKET NO: 40757600

CLOCK NO: 13735 HOUR: 24



GAUGE NO: 1114

DEPTH: 7078.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \cdot \Delta P}{t + \Delta P}$	$\log \frac{t + \Delta P}{\Delta P}$
<b>FIRST FLOW</b>					
B 1	0 0	108.9			
2	5 0	123.5	14.7		
3	10 0	216.8	93.2		
4	15 0	264.4	47.6		
5	20 0	291.1	26.7		
6	25 0	293.2	2.1		
C 7	29.5	293.3	0.2		
<b>FIRST CLOSED-IN</b>					
C 1	0.0	293.3			
2	1.0	327.9	34.5	1.0	1.483
3	2.0	347.2	53.9	1.9	1.202
4	3.0	370.7	77.3	2.7	1.038
5	4.0	393.2	99.9	3.5	0.925
6	5.0	418.8	125.4	4.3	0.840
7	6.0	443.4	150.1	5.0	0.773
8	7.0	472.2	178.8	5.6	0.719
9	8.0	502.0	208.7	6.3	0.671
10	9.0	534.1	240.8	6.9	0.631
11	10.0	564.5	271.2	7.5	0.599
12	12.0	639.2	345.9	8.5	0.540
13	14.0	735.5	442.1	9.5	0.493
14	15.0	830.3	537.0	10.4	0.455
15	18.0	950.8	657.4	11.2	0.422
16	20.0	1094.2	800.8	11.9	0.394
17	22.0	1249.0	955.6	12.6	0.370
18	24.0	1428.6	1135.3	13.3	0.348
19	26.0	1614.5	1321.2	13.8	0.330
20	28.0	1810.3	1517.0	14.4	0.313
21	30.0	1982.3	1669.0	14.9	0.298
22	35.0	2221.1	1927.8	15.0	0.288
23	40.0	2332.9	2039.6	17.0	0.240
24	45.0	2395.7	2102.4	17.9	0.219
25	50.0	2423.5	2135.2	18.5	0.202
26	55.0	2449.7	2155.4	19.2	0.187
D 27	58.5	2458.3	2165.0	19.6	0.178
<b>SECOND FLOW</b>					
E 1	0 0	202.9			
2	5 0	220.4	17.6		
3	10 0	269.7	49.2		
4	15 0	294.4	24.8		
5	20 0	310.8	16.3		
6	25 0	327.7	16.9		
7	30 0	343.0	15.3		
8	35 0	355.5	13.4		
9	40 0	367.8	11.3		
10	45 0	378.4	10.6		

REF	MINUTES	PRESSURE	ΔP	$\frac{t \cdot \Delta P}{t + \Delta P}$	$\log \frac{t + \Delta P}{\Delta P}$
<b>SECOND FLOW - CONTINUED</b>					
11	50 0	390.2	11.8		
12	55 0	399.8	9.6		
13	60 1	410 0	10.2		
14	65 0	418.8	8.8		
15	70 0	427.8	9.0		
F 16	75 1	437.4	9.6		
<b>SECOND CLOSED-IN</b>					
F 1	0 0	437.4			
2	1 0	567.6	130.3	1.0	2.032
3	2 0	696.5	259.1	1.9	1.735
4	3 0	928.8	491.4	2.9	1.559
5	4 0	1120.3	683.0	3.8	1.439
6	5 0	1495.4	1058.1	4.8	1.344
7	6 0	1700.2	1262.8	5.7	1.267
8	7 0	1828.4	1391.1	6.6	1.207
9	8 0	1942.7	1505.3	7.4	1.155
10	9 0	2033.3	1596.0	8.3	1.104
11	10 0	2101.1	1663.7	9.1	1.063
12	12 0	2201.0	1763.6	10.8	0.990
13	14 0	2250.2	1822.9	12.4	0.931
14	15 0	2303.4	1866.1	13.9	0.880
15	18 0	2332.7	1895.4	15.4	0.837
16	20 0	2355.3	1919.0	16.8	0.798
17	22 0	2375.5	1938.2	18.2	0.764
18	24 0	2390.3	1952.9	19.5	0.733
19	25 0	2400.6	1963.3	20.9	0.705
20	28 0	2411.3	1973.9	22.1	0.679
21	30 0	2419.4	1982.1	23.4	0.655
22	35 0	2435.0	1998.6	26.3	0.604
23	40 0	2448.4	2011.1	29.0	0.561
24	45 0	2455.5	2019.5	31.6	0.525
25	50 0	2464.2	2026.8	33.9	0.493
26	55 0	2469.6	2032.3	36.2	0.466
27	60 0	2474.7	2037.4	38.3	0.441
28	70 0	2481.9	2044.5	42.1	0.400
29	80 0	2483.1	2050.7	45.5	0.366
30	90 0	2492.2	2054.9	48.6	0.337
31	100 0	2495.7	2058.4	51.4	0.313
32	110 0	2497.8	2060.5	53.9	0.292
G 33	120 9	2500 0	2062 7	55.4	0.273

REMARKS:

TICKET NO: 40757600  
 CLOCK NO: 11955 HOUR: 24





















GAUGE NO: 1113  
 DEPTH: 7197.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \cdot \Delta P}{t \cdot \Delta P}$	$\log \frac{t \cdot \Delta P}{t \cdot \Delta P}$
FIRST FLOW					
B	1	0 0	187.9		
	2	5 0	189.0	1.1	
	3	10 0	275.8	86.8	
	4	15 0	325.3	49.5	
	5	20 0	357.4	32.1	
	6	25 0	358.9	1.5	
C	7	29.6	358.3	-0.5	
FIRST CLOSED-IN					
C	1	0 0	358.3		
	2	1 0	379.5	21.2	1.0 1.482
	3	2 0	400.2	41.9	1.9 1.201
	4	3 0	421.5	63.6	2.7 1.035
	5	4 0	447.1	89.8	3.5 0.924
	6	5 0	470.7	112.4	4.3 0.841
	7	6 0	498.8	140.5	5.0 0.775
	8	7 0	524.9	166.6	5.7 0.718
	9	8 0	555.6	197.3	6.3 0.670
	10	9 0	585.8	227.5	6.9 0.633
	11	10 0	619.4	261.1	7.5 0.598
	12	12 0	693.7	335.4	8.5 0.541
	13	14 0	781.1	422.8	9.5 0.494
	14	16 0	887.6	529.2	10.4 0.455
	15	18 0	1005.5	647.1	11.2 0.422
	16	20 0	1143.1	784.8	11.9 0.394
	17	22 0	1291.9	933.6	12.6 0.371
	18	24 0	1460.5	1102.2	13.3 0.348
	19	26 0	1637.3	1279.0	13.8 0.330
	20	28 0	1817.6	1459.3	14.4 0.313
	21	30 0	1997.8	1639.5	14.9 0.298
	22	35 0	2257.9	1839.6	15.0 0.285
	23	40 0	2390.5	2032.2	17.0 0.240
	24	45 0	2454.3	2095.9	17.9 0.219
	25	50 0	2487.6	2129.2	18.6 0.202
	26	55 0	2509.1	2150.8	19.2 0.187
D	27	58.5	2519.4	2161.1	19.6 0.178
SECOND FLOW					
E	1	0 0	255.5		
	2	5 0	293.4	37.9	
	3	10 0	339.1	45.7	
	4	15 0	361.5	22.5	
	5	20 0	378.0	16.5	
	6	24.9	393.3	15.2	
	7	30 0	407.8	14.5	
	8	35 0	420.5	12.7	
	9	40 0	431.5	11.1	
	10	45 0	442.4	10.9	

REF	MINUTES	PRESSURE	ΔP	$\frac{t \cdot \Delta P}{t \cdot \Delta P}$	$\log \frac{t \cdot \Delta P}{t \cdot \Delta P}$
SECOND FLOW - CONTINUED					
	11	50 0	453.3	10.9	
	12	55 0	463.2	10.0	
	13	60 0	472.7	9.4	
	14	65 0	481.7	9.1	
	15	70 0	491.2	9.4	
F	16	76.1	499.8	8.7	
SECOND CLOSED-IN					
F	1	0 0	499.8		
	2	1 0	603.5	103.6	1.0 2.024
	3	2 0	728.0	228.2	2.0 1.727
	4	3 0	908.5	408.7	2.9 1.555
	5	4 0	1108.6	608.8	3.9 1.434
	6	5 0	1297.0	797.2	4.8 1.345
	7	6 0	1508.4	1008.5	5.7 1.270
	8	7 0	1701.9	1202.1	6.6 1.215
	9	8 0	1867.4	1367.5	7.4 1.152
	10	9 0	1978.3	1478.5	8.3 1.107
	11	10 0	2062.0	1562.1	9.1 1.053
	12	12 0	2188.2	1688.4	10.8 0.991
	13	14 0	2273.9	1774.0	12.4 0.932
	14	16 0	2335.2	1836.4	13.9 0.890
	15	18 0	2370.0	1870.2	15.4 0.867
	16	20 0	2401.4	1901.5	16.8 0.799
	17	22 0	2424.5	1924.7	18.2 0.763
	18	24 0	2440.2	1940.4	19.6 0.732
	19	26 0	2454.8	1955.0	20.9 0.704
	20	28 0	2465.5	1965.6	22.1 0.679
	21	30 0	2474.4	1974.5	23.3 0.659
	22	35 0	2494.0	1994.1	26.3 0.604
	23	40 0	2505.5	2005.7	29.0 0.551
	24	45 0	2515.0	2015.1	31.6 0.525
	25	50 0	2522.6	2022.8	33.9 0.499
	26	55 0	2528.1	2028.3	36.2 0.455
	27	60 0	2533.7	2033.8	38.3 0.441
	28	70 0	2541.9	2042.0	42.1 0.400
	29	80 0	2547.2	2047.4	45.5 0.355
	30	90 0	2551.3	2051.5	48.6 0.337
	31	100 0	2554.8	2055.0	51.4 0.313
	32	110 0	2557.7	2057.9	53.9 0.292
G	33	120.9	2559.8	2060.0	56.4 0.273

REMARKS:

		O.D.	I.D.	LENGTH	DEPTH	
1		DRILL PIPE	4.000	3.340	6492.0	
3		DRILL COLLARS	5.812	2.000	454.0	
50		IMPACT REVERSING SUB	5.750	2.870	1.0	6946.0
3		DRILL COLLARS	5.812	2.000	118.0	
5		CROSSOVER	5.750	2.870	1.0	
13		DUAL CIP SAMPLER	5.000	0.750	7.0	
60		HYDROSPRING TESTER	5.000	0.750	5.0	7076.0
80		AP RUNNING CASE	5.000	2.250	4.0	7078.0
15		JAR	5.000	1.750	5.0	
16		VR SAFETY JOINT	5.000	1.000	3.0	
70		OPEN HOLE PACKER	7.000	1.530	6.0	7093.0
70		OPEN HOLE PACKER	7.000	1.530	6.0	7099.0
19		ANCHOR PIPE SAFETY JOINT	5.750	1.500	5.0	
5		CROSSOVER	5.750	2.870	1.0	
3		DRILL COLLARS	5.812	2.000	61.0	
5		CROSSOVER	5.750	2.870	1.0	
20		FLUSH JOINT ANCHOR	5.750	2.870	27.0	
81		BLANKED-OFF RUNNING CASE	5.750		4.0	7197.0
TOTAL DEPTH					7200.0	

EQUIPMENT DATA

# NOMENCLATURE

B	= Formation Volume Factor	(Res Vol/Std Vol)
$c_t$	= System Total Compressibility	(Vol/Vol)/psi
DR	= Damage Ratio	
h	= Estimated Net Pay Thickness	Ft
k	= Permeability	md
m	{ = (Liquid) Slope Extrapolated Pressure Plot	psi/cycle
	{ = (Gas) Slope Extrapolated m(P) Plot	MM psi <sup>2</sup> /cp/cycle
m(P*)	= Real Gas Potential at P*	MM psi <sup>2</sup> /cp
m(P <sub>i</sub> )	= Real Gas Potential at P <sub>i</sub>	MM psi <sup>2</sup> /cp
AOF <sub>1</sub>	= Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF <sub>2</sub>	= Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P*	= Extrapolated Static Pressure	Psig
P <sub>f</sub>	= Final Flow Pressure	Psig
Q	= Liquid Production Rate During Test	BPD
Q <sub>1</sub>	= Theoretical Liquid Production w/Damage Removed	BPD
Q <sub>g</sub>	= Measured Gas Production Rate	MCFD
r <sub>i</sub>	= Approximate Radius of Investigation	Ft
r <sub>w</sub>	= Radius of Well Bore	Ft
S	= Skin Factor	
t	= Total Flow Time Previous to Closed-in	Minutes
Δt	= Closed-in Time at Data Point	Minutes
T	= Temperature Rankine	°R
φ	= Porosity (fraction)	
μ	= Viscosity of Gas or Liquid	cp
Log	= Common Log	

## EQUATIONS FOR DST LIQUID WELL ANALYSIS

Transmissibility	$\frac{kh}{\mu} = \frac{162.6 QB}{m}$	$\frac{\text{md-ft}}{\text{cp}}$
Indicated Flow Capacity	$kh = \frac{kh}{\mu} \mu$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[ \frac{P^* - P_i}{m} - \text{LOG} \left( \frac{k (t/60)}{\phi \mu c_i r_w^2} \right) + 3.23 \right]$	
Damage Ratio	$DR = \frac{P^* - P_i}{P^* - P_i - 0.87 mS}$	
Theoretical Potential w/Damage Removed	$Q_i = Q DR$	BPD
Approx. Radius of Investigation	$r_i = 0.032 \sqrt{\frac{k (t/60)}{\phi \mu c_i}}$	ft

## EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{.001637 Q_o T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[ \frac{m(P^*) - m(P_i)}{m} - \text{LOG} \left( \frac{k (t/60)}{\phi \mu c_i r_w^2} \right) + 3.23 \right]$	
Damage Ratio	$DR = \frac{m(P^*) - m(P_i)}{m(P^*) - m(P_i) - 0.87 mS}$	
Indicated Flow Rate (Maximum)	$AOF_1 = \frac{Q_o m(P^*)}{m(P^*) - m(P_i)}$	MCFD
Indicated Flow Rate (Minimum)	$AOF_2 = Q_o \sqrt{\frac{m(P^*)}{m(P^*) - m(P_i)}}$	MCFD
Approx. Radius of Investigation	$r_i = 0.032 \sqrt{\frac{k (t/60)}{\phi \mu c_i}}$	ft