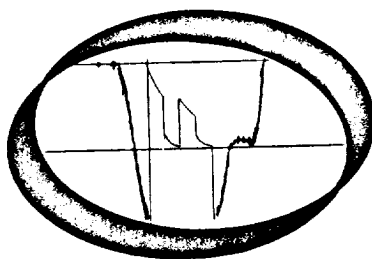
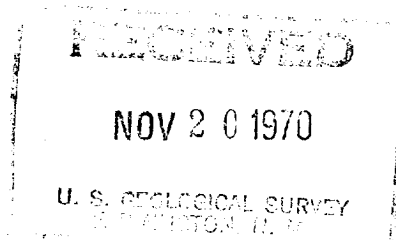


Formation Testing Service Report



HALLIBURTON SERVICES
DUNCAN, OKLAHOMA

LEASE NAME

52

WELL NO.

1-21

TEST NO.

6

TESTED INTERVAL

6680'-6850'

LEASE OWNER/COMPANY NAME

APACHE CORPORATION

FLUID SAMPLER DATA				Date <u>10-12-70</u>		Ticket Number <u>217813</u>	
Sampler Pressure _____ P.S.I.G. at Surface Recovery: Cu. Ft. Gas <u>SAMPLER TAKEN TO</u> cc. Oil <u>TEFTELLER INC.</u> cc. Water _____ cc. Mud _____ Tot. Liquid cc. _____				Kind of Job <u>OPEN HOLE</u>		Halliburton District <u>FARMINGTON</u>	
				Tester <u>MR. SMITH</u>		Witness <u>MR. LUHMAN</u>	
				Drilling Contractor <u>MESA DRILLERS</u>		<u>IC/dr S</u>	
EQUIPMENT & HOLE DATA							
				Formation Tested _____			
				Elevation <u>6129'</u>		Ft.	
				Net Productive Interval _____		Ft.	
				All Depths Measured From <u>Rotary Kelly Bushing</u>			
				Total Depth <u>6850'</u>		Ft.	
				Main Hole/Casing Size <u>7 7/8"</u>			
				Drill Collar Length <u>538'</u>		<u>2 1/2"</u>	
				Drill Pipe Length <u>6101'</u>		<u>3.826"</u>	
				Packer Depth(s) <u>6675'-6680'</u>		Ft.	
				Depth Tester Valve <u>6645'</u>		Ft.	
Gravity _____ * API @ _____ * F.		Gas/Oil Ratio _____ cu. ft./bbl.		RESISTIVITY		CHLORIDE CONTENT	
Recovery Water	_____ @ _____ * F.	_____ ppm					
Recovery Mud	_____ @ _____ * F.						
Recovery Mud Filtrate	_____ @ _____ * F.	_____ ppm					
Mud Pit Sample	_____ @ _____ * F.						
Mud Pit Sample Filtrate	_____ @ _____ * F.	_____ ppm					
Mud Weight	<u>9.7</u> vis <u>48</u> cp						
TYPE		AMOUNT		Depth Back Ft. Pres. Valve		Surface Choke <u>1"-1"</u> Bottom Choke <u>3/4"</u>	
Cushion							
Recovered	<u>478</u>	Feet of	<u>gas cut drilling mud</u>	Meo. From Tester Valve			
Recovered		Feet of					
Recovered		Feet of					
Recovered		Feet of					
Recovered		Feet of					
Remarks <u>Opened tool for 5 minute first flow with a good blow increasing to a strong blow. Closed tool for 62 minute first closed in pressure. Reopened tool for 45 minute second flow with a good blow increasing to a strong blow, turned to flow line, measure 10 lbs. through 2" pipe= 2,310 MCF. NON FLAMABLE Closed tool for 88 minute second closed in pressure.</u>							
TEMPERATURE		Gauge No. <u>786</u>		Gauge No. <u>730</u>		Gauge No. _____	
		Depth: <u>6661</u> Ft.		Depth: <u>6846'</u> Ft.		Depth: _____ Ft.	
		<u>24 Hour Clock</u>		<u>12 Hour Clock</u>		<u>Hour Clock</u>	
Est. _____ * F.		Blanked Off -		Blanked Off -		Blanked Off	
<u>6843'</u>						Tool _____ A.M.	
Actual <u>138°F.</u>						Opened <u>4:13--P.M.</u>	
		Pressures		Pressures		Pressures	
	Field	Office	Field	Office	Field	Office	Reported
Initial Hydrostatic	<u>3383.9</u>	<u>3398</u>	<u>3489.1</u>	<u>3504</u>			Minutes
First Period	Flow Initial	<u>241.0</u>	<u>499</u>	<u>346.7</u>	<u>699</u>		
	Flow Final	-	<u>262</u>	<u>360.0</u>	<u>356</u>		
	Closed in	<u>3284.2</u>	<u>3321</u>	<u>3382.2</u>	<u>3402</u>		
Second Period	Flow Initial	<u>295.7</u>	<u>301</u>	<u>400.0</u>	<u>395</u>		
	Flow Final	<u>376.3</u>	<u>371</u>	<u>480.0</u>	<u>485</u>		
	Closed in	<u>3276.1</u>	<u>3301</u>	<u>3355.5</u>	<u>3376</u>		
Third Period	Flow Initial						
	Flow Final						
	Closed in						
Final Hydrostatic	<u>3383.9</u>	<u>3380</u>	<u>3462.4</u>	<u>3462</u>			

FORMATION TEST DATA

LITTLE'S 33455 11M 4/66-68, 24-70

Legal Location Sec. - Twp. - Rng.

21-26N-19W

Field Area

WILDCAT

County

SAN JUAN

State

NEW MEXICO

NAVAJO TRIBAL 52

Well No. 1-21

Test No. 6

6680'-6850'

Tested Interval

APACHE CORPORATION

Lease Owner/Company Name

Gauge No. 786		Depth		6661'		Clock No. 6585		24 hour		Ticket No. 217813	
First Flow Period		First Closed In Pressure		Second Flow Period		Second Closed In Pressure		Third Flow Period		Third Closed In Pressure	
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	Time Defl. .000"	PSIG Temp. Corr.
0 .000	499	.000		.000	301	.000		.000			
1 .003	250	.020		.0302	313	.0275					
2 .006	251	.040		.0604	340	.0550					
3 .009	255	.060		.0906	353	.0825					
4 .012	259	.080		.1208	356	.1100					
5 .015	262	.100		.1510	371	.1375					
6		.120				.1650					
7		.140				.1925					
8		.160				.2200					
9		.180				.2475					
10		.207				.2750					
11						.3020					
12											
13											
14											
15											

Gauge No. 730		Depth		6846'		Clock No. 4491		12 hour	
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$
0 .000	699	.000		.000	395	.000		.000	
1 .0066	548	.0414		.0628	407	.0558			
2 .0132	364	.0828		.1256	439	.1116			
3 .0198	341	.1242		.1884	452	.1674			
4 .0264	355	.1656		.2512	453	.2232			
5 .0330	356	.2070		.3140	485	.2790			
6		.2484				.3348			
7		.2898				.3906			
8		.3312				.4464			
9		.3726				.5022			
10		.4280				.5580			
11						.6140			
12									
13									
14									
15									

Reading Interval 1		6		9		8		Minutes	
REMARKS:		*Last interval equal to 8 minutes							

	O. D.	I. D.	LENGTH	DEPTH
Reversing Sub	6"	3"	1'	
Water Cushion Valve				
Drill Pipe	4½" FH	3.826"	6101'	
Drill Collars	6½"	2½"	538'	
Handling Sub & Choke Assembly				
Dual CIP Valve				
Dual CIP Sampler				
Hydro-Spring Tester	5"	¾"	4'	6645'
Multiple CIP Sampler	5"		3'	
Extension Joint	5"	1"	4'	
AP Running Case	5"		4'	6661'
Hydraulic Jar	5"	1"	6'	
VR Safety Joint	5"	1"	3'	
Pressure Equalizing Crossover				
Packer Assembly	6 ¾"	3"	6'	6675'
Distributor	5"	2"	2'	
Packer Assembly	7"	3"	4'	6680'
Flush Joint Anchor	5 ¾"	3 ½"	14'	
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars	6½"	2½"	140'	
Flush Joint Anchor	5 ¾"	3½"	12'	
Blanked-Off B.T. Running Case	5 ¾"		4'	6846'

NOMENCLATURE

b	= Approximate Radius of Investigation	Feet
b_1	= Approximate Radius of Investigation (Net Pay Zone h_1)	Feet
D.R.	= Damage Ratio	—
E	= Elevation	Feet
GD	= B.T. Gauge Depth (From Surface Reference)	Feet
h	= Interval Tested	Feet
h_1	= Net Pay Thickness	Feet
K	= Permeability	md
K_1	= Permeability (From Net Pay Zone h_1)	md
m	= Slope Extrapolated Pressure Plot ($\text{Psi}^2/\text{cycle Gas}$)	psi/cycle
OF_1	= Maximum Indicated Flow Rate	MCF/D
OF_2	= Minimum Indicated Flow Rate	MCF/D
OF_3	= Theoretical Open Flow Potential with/Damage Removed Max.	MCF/D
OF_4	= Theoretical Open Flow Potential with/Damage Removed Min.	MCF/D
P_s	= Extrapolated Static Pressure	Psig.
P_f	= Final Flow Pressure	Psig.
P_{o1}	= Potentiometric Surface (Fresh Water *)	Feet
Q	= Average Adjusted Production Rate During Test	bbls/day
Q_1	= Theoretical Production w/Damage Removed	bbls/day
Q_g	= Measured Gas Production Rate	MCF/D
R	= Corrected Recovery	bbls
r_w	= Radius of Well Bore	Feet
t	= Flow Time	Minutes
t_o	= Total Flow Time	Minutes
T	= Temperature Rankine	$^{\circ}\text{R}$
Z	= Compressibility Factor	—
μ	= Viscosity Gas or Liquid	CP
Log	= Common Log	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given,
Fresh Water Corrected to 100° F.