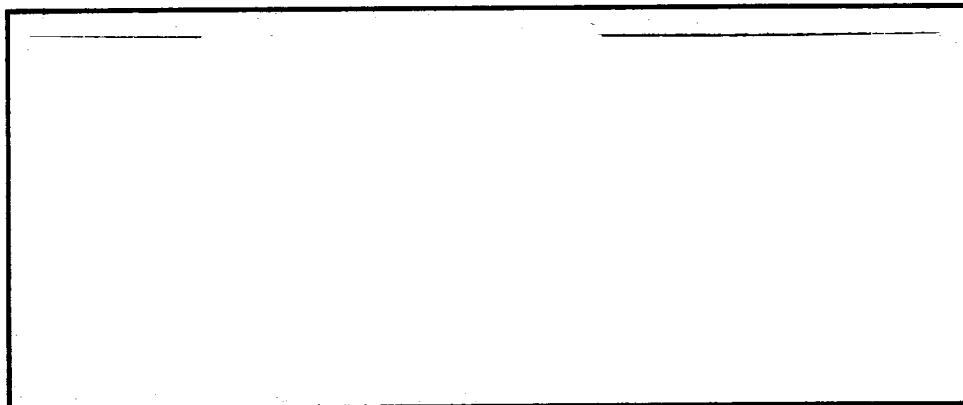




DRILL STEM TEST REPORT

HALLIBURTON RESERVOIR SERVICES



NOMENCLATURE

B	= Formation Volume Factor	(Res Vol/Std Vol)
C_t	= System Total Compressibility	(Vol/Vol)/psi
DR	= Damage Ratio	
h	= Estimated Net Pay	Ft

k	= Permeability	md
m	$\left\{ \begin{array}{l} \text{(Liquid) Slope Ex} \\ \text{(Gas) Slope Extrapolated to } m(P^*) \text{ Plot} \end{array} \right.$	psi/cycle MM psi²/cp/cycle
$m(P^*)$	= Real Gas Potential at P^*	MM psi ² /cp
$m(P_i)$	= Real Gas Potential at P_i	MM psi ² /cp
AOF_1	= Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF_2	= Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P^*	= Extrapolated Static Pressure	Psig
P_i	= Final Flow Pressure	Psig
Q	= Liquid Production Rate During Test	BPD
Q_1	= Theoretical Liquid Production w/Damage Removed	BPD
Q_g	= Measured Gas Production Rate	MCFD
r	= Approximate Radius of Investigation	Ft
r_w	= 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	

STATE 10
LEASE NAME
WELL NO. 1
TEST NO. 1
10930.0 - 10970.0
TESTED INTERVAL
M AND W PETROLEUM CORPORATION
LEASE OWNER/COMPANY NAME

LEGAL LOCATION
SEC. - TWP. - RNG. 10 - 9 S - 32 E
FIELD AREA
WILDCAT-WEST CROSSROADS
COUNTY
LEB
STATE
NEW MEXICO

M AND W PETROLEUM CORPORATION

LEASE : STATE 10

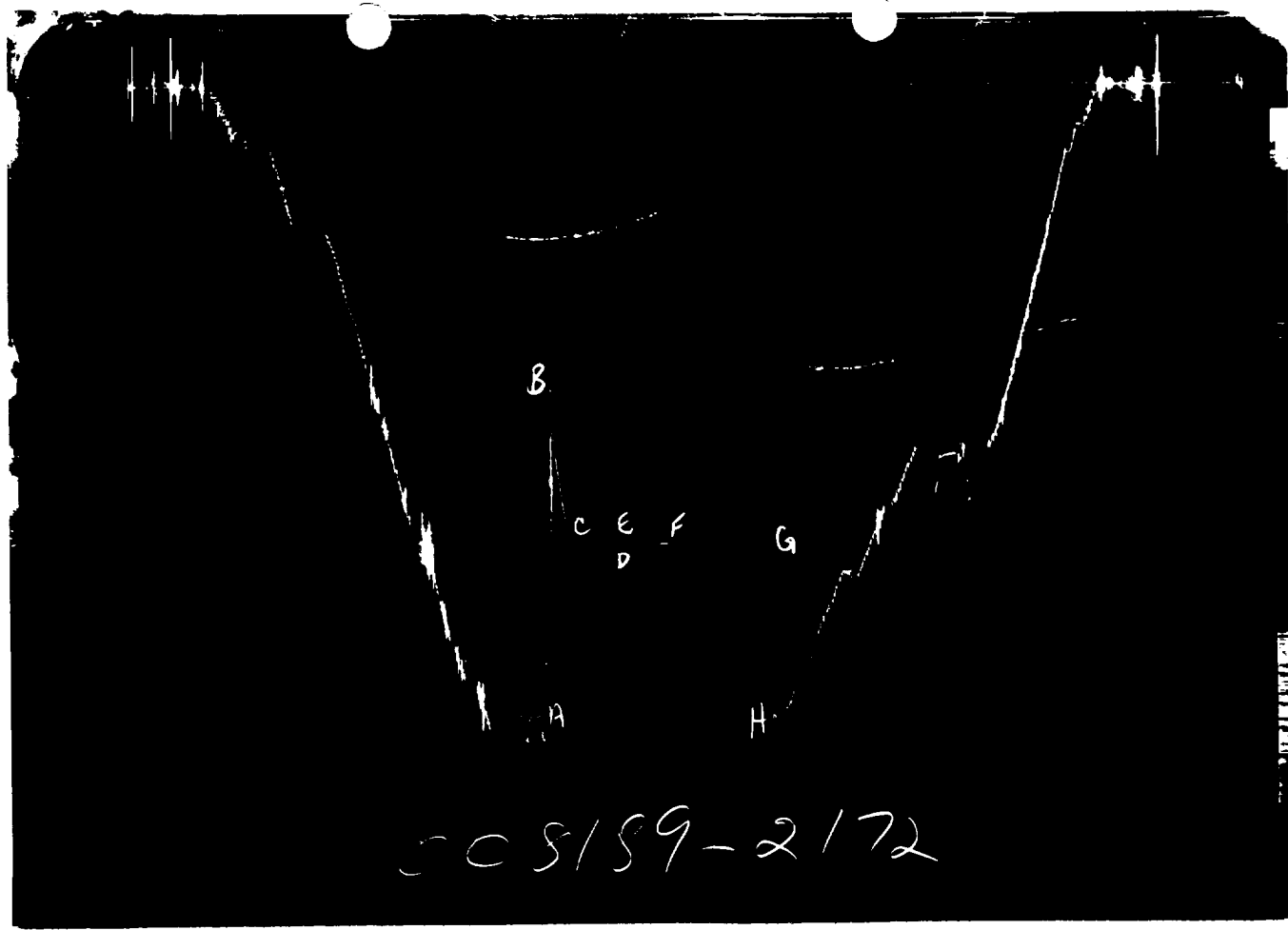
WELL NO. : 1
TEST NO. : 1

TICKET NO. 00818900
02-JUL-93
HOBBS



GAUGE NO: 2173 DEPTH: 10912.0 BLANKED OFF: NO HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	5741	5553.0			
B	INITIAL FIRST FLOW	2526	2388.8			
C	FINAL FIRST FLOW	4004	3940.0	30.0	30.3	F
C	INITIAL FIRST CLOSED-IN	4004	3940.0			
D	FINAL FIRST CLOSED-IN	4004	3997.6	60.0	57.5	C
E	INITIAL SECOND FLOW	4004	3968.1			
F	FINAL SECOND FLOW	4004	3993.6	60.0	62.2	F
F	INITIAL SECOND CLOSED-IN	4004	3993.6			
G	FINAL SECOND CLOSED-IN	4004	3997.6	120.0	120.0	C
H	FINAL HYDROSTATIC	5592	5527.8			



GAUGE NO: 2172 DEPTH: 10967.0 BLANKED OFF: YES HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	5827	5589.5			
B	INITIAL FIRST FLOW	2607	2904.5	30.0	30.3	F
C	FINAL FIRST FLOW	4064	3987.4			
C	INITIAL FIRST CLOSED-IN	4064	3987.4	60.0	57.5	C
D	FINAL FIRST CLOSED-IN	4064	4014.9			
E	INITIAL SECOND FLOW	4064	4007.5	60.0	62.2	F
F	FINAL SECOND FLOW	4064	4014.9			
F	INITIAL SECOND CLOSED-IN	4064	4014.9	120.0	120.0	C
G	FINAL SECOND CLOSED-IN	4064	4014.9			
H	FINAL HYDROSTATIC	5654	5562.6			

EQUIPMENT & HOLE DATA

FORMATION TESTED: DEVONIANNET PAY (ft): 26.0GROSS TESTED FOOTAGE: 40.0 PACKER TO T.D.ALL DEPTHS MEASURED FROM: K.B.

CASING PERFS. (ft): _____

HOLE OR CASING SIZE (in): 8.500ELEVATION (ft): 4455.0TOTAL DEPTH (ft): 10970.0PACKER DEPTH(S) (ft): 10925. 10930

FINAL SURFACE CHOKE (in): _____

BOTTOM HOLE CHOKE (in): 0.750MUD WEIGHT (lb/gal): 9.70MUD VISCOSITY (sec): 54

ESTIMATED HOLE TEMP. (°F): _____

ACTUAL HOLE TEMP. (°F): 172 @ 10967.0 ftTICKET NUMBER: 00818900DATE: 06-25-93 TEST NO: 1TYPE DST: OPEN HOLE

FIELD CAMP:

HOBBSTESTER: WAYNE FLETCHERWITNESS: MAX HALL

DRILLING CONTRACTOR:

NORTON DRILLING RIG #8FLUID PROPERTIES FOR
RECOVERED MUD & WATER

SOURCE

RESISTIVITY

CHLORIDES

MUD PIT (5.7 PH) 0.120 @ 76 °F 39000 ppmSAMPLER (6.2 PH) 0.119 @ 76 °F 40000 ppmCHANGE #1 3.030 @ 76 °F 5500 ppmCHANGE #2 0.115 @ 76 °F 41500 ppmTOP FLUID 3.000 @ 76 °F 5000 ppm

_____ @ _____ °F _____ ppm

SAMPLER DATA

P_{sig} AT SURFACE: 300.0

cu.ft. OF GAS: _____

cc OF OIL: 2350.0cc OF WATER: 50.0

cc OF MUD: _____

TOTAL LIQUID cc: 2400.0

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): 42.8 @ 60 °F

GAS/OIL RATIO (cu.ft. per bbl): _____

GAS GRAVITY: _____

CUSHION DATA

TYPE AMOUNT WEIGHT

FRESHWATER (FT.) 2000.0 8.33

RECOVERED :

2000 FT. OF FRESHWATER CUSHION

744 FT. OF GAS CUT MUD WITH OIL

4959 FT. OF OIL AND GAS CUT MUD WITH SOME FREE OIL

1406 FT. OF POSSIBLE FORMATION WATER OR MUD FILTRATE

-----SEE REMARKS-----

MEASURED FROM
TESTER VALVE

REMARKS:

NOTE: OVER 100 BBLs. OF MUD WAS LOST WHILE DRILLING FORMATION. A PORTION OF THE RECOVERED FLUID MAY HAVE BEEN SOME OF THE MUD LOST.

UNABLE TO PERFORM CALCULATION SERVICES DUE TO THE RANGE OF THE PRESSURE CHANGES AFTER THE FIRST FLOW PERIOD BEING LESS THAN GAUGE RESOLUTION. NO ANALYSIS PLOTS ARE POSSIBLE.

TYPE & SIZE MEASURING DEVICE : _____					TICKET NO: 00818900
TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
06-25-93					
1700					DN LOCATION; SAFETY MEETING
2100					PICKED UP TOOLS
2230					STARTED IN THE HOLE WITH TOOLS
2330					INSTALLED WATER CUSHION AND
					CONTINUED RUNNING IN THE HOLE
06-26-93					
0525	B.H.				TOOL OPENED WITH 6" BLOW IN BUCKET
0526	B.H.	2.0			
0527	B.H.	2.0			
0528	B.H.	3.0			
0530	B.H.	4.0			
0535	B.H.	10.0			
0540	B.H.	14.0			
0545	B.H.	20.0			OPENED THRU 1/4" CHOKE
0550	1/4	22.0			
0555	1/4	15.0			CLOSED TOOL
0655	1/4	B.H.			TOOL OPENED WITH 2" BLOW IN BUCKET
0700	B.H.	1.5			
0705	B.H.	1.0			
0710	B.H.				5" BLOW IN BUCKET
0715	B.H.				2" BLOW
0720	B.H.				1" BLOW
0725	B.H.				1" BLOW
0730	B.H.				3/4" BLOW
0735	B.H.				1/4" BLOW
0740	B.H.				1/4" BLOW
0745	B.H.				1/8" BLOW
0750	B.H.				1/8" BLOW
0755	B.H.				CLOSED TOOL WITH 1/8" BLOW
0955					OPENED BYPASS AND PULLED OUT OF
					THE HOLE
1300					RIGGED UP AND REVERSED OUT
1430					PULLED OUT OF HOLE
1900					OUT OF HOLE; READ CHARTS AND LOADED
					TOOLS

TICKET NO: 00818900

CLOCK NO: 26881 HOUR: 24

GAUGE NO: 2173

DEPTH: 10912.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta P}{t + \Delta P}$	$\log \frac{t + \Delta P}{\Delta P}$
FIRST FLOW					
B 1	0.0	2388.8			
2	1.0	2561.4	172.5		
3	2.0	2652.6	101.3		
4	3.0	2739.3	76.6		
5	4.0	2812.5	73.2		
6	5.0	2856.0	43.5		
7	6.0	2920.0	63.9		
8	7.0	2983.2	63.3		
9	8.0	3040.8	57.6		
10	9.0	3103.3	62.4		
11	10.0	3159.8	56.5		
12	12.0	3276.6	116.9		
13	14.0	3389.5	112.8		
14	16.0	3484.9	95.4		
15	18.0	3590.3	105.4		
16	20.0	3678.8	88.5		
17	22.0	3750.9	72.1		
18	24.0	3814.3	63.4		
19	26.0	3864.4	50.2		
20	28.0	3901.9	37.4		
C 21	30.3	3940.0	38.1		
FIRST CLOSED-IN					
C 1	0.0	3940.0			
2	1.0	3997.6	57.7	1.0	1.500
3	2.0	3997.6	57.7	1.9	1.206
4	3.0	3997.6	57.7	2.7	1.049
5	4.0	3997.6	57.7	3.5	0.934
6	5.0	3997.6	57.7	4.3	0.850
7	10.0	3997.6	57.7	7.5	0.604
8	20.0	3997.6	57.7	12.0	0.401
9	30.0	3997.6	57.7	15.1	0.303
10	40.0	3997.6	57.7	17.2	0.245
11	50.0	3997.6	57.7	18.9	0.206
D 12	57.5	3997.6	57.7	19.8	0.184
SECOND FLOW					
E 1	0.0	3968.1			
2	1.0	3972.6	4.5		
3	2.0	3979.5	6.8		
4	3.0	3984.6	5.1		
5	4.0	3987.8	3.2		
6	5.0	3990.1	2.4		
7	6.0	3992.3	2.1		
8	7.0	3993.4	1.1		
9	8.0	3993.4	0.0		
10	9.0	3993.4	0.0		
11	10.0	3993.4	0.0		

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta P}{t + \Delta P}$	$\log \frac{t + \Delta P}{\Delta P}$
SECOND FLOW - CONTINUED					
12	20.0	3993.4	0.0		
13	30.0	3993.4	0.0		
14	40.0	3993.4	0.0		
15	50.0	3993.4	0.0		
F 16	62.2	3993.6	0.2		
SECOND CLOSED-IN					
F 1	0.0	3993.6			
2	1.0	3997.6	4.1	1.0	1.953
3	2.0	3997.6	4.1	1.9	1.679
4	3.0	3997.6	4.1	2.9	1.507
5	4.0	3997.6	4.1	3.8	1.387
6	5.0	3997.6	4.1	4.8	1.287
7	10.0	3997.6	4.1	9.0	1.010
8	20.0	3997.6	4.1	16.4	0.750
9	30.0	3997.6	4.1	22.7	0.611
10	60.0	3997.6	4.1	36.4	0.405
11	90.0	3997.6	4.1	45.6	0.307
G 12	120.0	3997.6	4.1	52.2	0.248

REMARKS:

TICKET NO: 00818900

CLOCK NO: 28262 HOUR: 24

GAUGE NO: 2172

DEPTH: 10967.0

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
FIRST FLOW					
B 1	0.0	2904.5			
2	1.0	2955.5	50.9		
3	2.0	3000.4	44.9		
4	3.0	3058.9	58.5		
5	4.0	3119.3	60.5		
6	5.0	3173.6	54.2		
7	6.0	3217.4	43.8		
8	7.0	3258.6	41.3		
9	8.0	3309.0	50.3		
10	9.0	3358.7	49.7		
11	10.0	3399.1	40.4		
12	12.0	3485.3	86.2		
13	13.9	3579.5	94.2		
14	16.0	3657.7	78.2		
15	18.0	3737.3	79.5		
16	20.0	3795.6	58.4		
17	22.0	3860.1	64.4		
18	24.0	3896.2	36.1		
19	26.0	3930.1	33.9		
20	28.0	3956.1	25.9		
C 21	30.3	3987.4	31.4		

FIRST CLOSED-IN

C 1	0.0	3987.4			
2	1.0	4009.9	22.5	1.0	1.500
3	2.0	4012.3	24.9	1.9	1.207
4	3.0	4014.0	26.6	2.7	1.046
5	4.0	4014.0	26.6	3.6	0.929
6	5.0	4014.0	26.6	4.3	0.849
7	10.0	4014.9	27.5	7.5	0.604
8	20.0	4014.9	27.5	12.1	0.400
9	30.0	4014.9	27.5	15.1	0.303
10	40.0	4014.9	27.5	17.2	0.245
11	50.0	4014.9	27.5	18.9	0.206
D 12	57.5	4014.9	27.5	19.8	0.184

SECOND FLOW

E 1	0.0	4007.5			
2	1.0	4001.9	-5.6		
3	2.0	4004.3	2.4		
4	3.0	4008.6	4.3		
5	4.0	4011.8	3.3		
6	5.0	4014.0	2.2		
7	6.0	4014.7	0.7		
8	7.0	4014.9	0.2		
9	8.0	4014.9	0.0		
10	9.0	4014.9	0.0		
11	10.0	4014.9	0.0		

REF	MINUTES	PRESSURE	ΔP	$\frac{t \times \Delta t}{t + \Delta t}$	$\log \frac{t + \Delta t}{\Delta t}$
SECOND FLOW - CONTINUED					
12	20.0	4014.9	0.0		
13	30.0	4014.9	0.0		
14	40.0	4014.9	0.0		
15	50.0	4014.9	0.0		
F 16	62.2	4014.9	-0.0		
SECOND CLOSED-IN					
F 1	0.0	4014.9			
2	1.0	4014.9	0.0	1.0	1.976
3	2.0	4014.9	0.0	2.0	1.673
4	3.0	4014.9	0.0	2.9	1.500
5	4.0	4014.9	0.0	3.9	1.378
6	5.0	4014.9	0.0	4.7	1.290
7	10.0	4014.9	0.0	9.0	1.010
8	20.0	4014.9	0.0	16.5	0.750
9	30.0	4014.9	0.0	22.6	0.511
10	60.0	4014.9	0.0	36.4	0.405
11	90.0	4014.9	0.0	45.6	0.307
G 12	120.0	4014.9	0.0	52.2	0.248

REMARKS:

		O.D.	I.D.	LENGTH	DEPTH
1		4.500	3.825	10028.0	
3		6.250	2.250	740.0	
50		6.000	2.750	1.0	10768.0
3		6.250	2.250	120.0	
5		6.063	2.375	1.0	
5		5.750	2.750	1.0	
5		5.813	2.313	1.0	
62		5.000	0.750	9.0	10800.0
14		5.000	0.870	5.0	
14		5.000	0.870	5.0	
80		5.000	2.250	4.0	10912.0
15		5.000	1.750	5.0	
16		5.000	1.000	3.0	
70		7.750	1.530	5.0	10925.0
70		7.750	1.530	5.0	10930.0
19		5.750	1.500	4.0	
20		5.750	3.000	29.0	
81		5.750		4.0	10957.0
TOTAL DEPTH					10970.0

EQUIPMENT DATA

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	$S = 1.151 \left[\frac{P^* - P_i}{m} - \text{LOG} \left(\frac{k (t/60)}{\phi \mu c_f r_w^2} \right) + 3.23 \right]$	
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	$r_i = 0.032 \sqrt{\frac{k (t/60)}{\phi \mu c_f}}$	ft

EQUATIONS FOR DST GAS WELL ANALYSIS

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

Because of the uncertainty of variable well conditions and the necessity of relying on facts and supporting services furnished by others, HRS is unable to guarantee the accuracy of any chart interpretation, research analysis, job recommendation or other data furnished by HRS. HRS personnel will use their best efforts in gathering such information and their best judgment in interpreting it but customer agrees that HRS shall not be responsible for any damages arising from the use of such information except where due to HRS gross negligence or willful misconduct in the preparation of furnishing of information.