

H A L L I B U R T O N   S E R V I C E S  
FORMATION TESTING   SERVICE REPORT

16-AUG-89

COMPANY NAME:    ARROYO PETROLEUM

DRILLING CONTRACTOR:    WHITE AND ELLIS DRILLING COMPANY RIG #5

TICKET NUMBER:    80802700

TEST DATE:        8-11-89

LEASE NAME:        MEANS "B"

WELL NUMBER:      3

TEST NUMBER:      1

JOB TYPE:         OPEN HOLE

LEGAL LOCATION:    20-30S-5E

COUNTY:            COWLEY

STATE:             KANSAS    SM

HALLIBURTON CAMP:    WINFIELD

FIELD AREA:

ELEVATION:         1317.0 FEET

NET PAY:            0.0 FEET

HOLE SIZE:         7.9 INCH(ES)

TESTED INTERVAL:    2926.0 FEET -    2945.0 FEET

NOTICE:

THESE CALCULATIONS ARE BASED UPON INFORMATION FURNISHED BY YOU AND TAKEN FROM DRILL STEM TEST PRESSURE CHARTS, AND ARE FURNISHED YOU FOR YOUR INFORMATION. IN FURNISHING SUCH CALCULATIONS AND EVALUATIONS BASED THEREON, HALLIBURTON IS MERELY EXPRESSING ITS OPINION. YOU AGREE THAT HALLIBURTON MAKES NO WARRANTY EXPRESS OR IMPLIED AS TO THE ACCURACY OF SUCH CALCULATIONS OR OPINIONS, AND THAT HALLIBURTON SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER DUE TO NEGLIGENCE OR OTHERWISE, IN CONNECTION WITH SUCH CALCULATIONS AND OPINIONS.

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TICKET NUMBER: 80802700  
TEST DATE: 8-11-89

EQUIPMENT & HOLE DATA

FORMATION TESTED: MISSISSIPPI  
NET PAY:  
GROSS TESTED FOOTAGE: 19.0 FT.  
ALL DEPTHS MEASURED FROM: R KELLY BUSHING  
CASING PERFORATIONS:  
HOLE/CASING SIZE: 7.9 IN.  
ELEVATION: 1317.0 FT. GROUND LEVEL  
TOTAL DEPTH: 2945.0 FT.  
PACKER DEPTH(S): 2926.0 FT.  
FINAL SURFACE CHOKE:  
BOTTOM HOLE CHOKE: 0.750 IN.  
MUD WEIGHT: 9.00 LB/GAL  
MUD VISCOSITY: 58.00 SEC.  
ESTIMATED HOLE TEMPERATURE: 103.0 F  
ACTUAL HOLE TEMPERATURE: 0.0 F @ 0.0 FT.

HYDROCARBON PROPERTIES

OIL GRAVITY:  
GAS/OIL RATIO:  
GAS GRAVITY:

SAMPLER DATA

SURFACE PRESSURE:  
GAS VOLUME:  
OIL VOLUME:  
WATER VOLUME:  
MUD VOLUME:  
TOTAL LIQUID VOLUME:

TESTER(S):

LEE HALL

WITNESS(ES):

DENNIS H. REES

TICKET NUMBER: 80802700  
TEST DATE: 8-11-89

FLUID PROPERTIES FOR RECOVERED MUD AND WATER

SOURCE	RESISTIVITY	CHLORIDES
	0.000 @	0.0 F 0.0 PPM
	0.000 @	0.0 F 0.0 PPM
	0.000 @	0.0 F 0.0 PPM
	0.000 @	0.0 F 0.0 PPM
	0.000 @	0.0 F 0.0 PPM
	0.000 @	0.0 F 0.0 PPM

CUSHION DATA

TYPE	AMOUNT	WEIGHT
	0.0	0.00
	0.0	0.00

RECOVERED (MEASURED FROM TESTER VALVE):

1704 FEET OF GAS  
30 FEET OF MUD  
180 FEET OF VERY HEAVY OIL AND GAS CUT MUD

REMARKS:

HALLIBURTON SERVICES

TICKET NUMBER: 80802700

TEST DATE: 8-11-89

GAUGE NUMBER: 737

GAUGE DEPTH: 2941.0

BLANKED OFF: YES

CLOCK HOUR: 12

DESCRIPTION	PRESSURE		TIME		
	REPORTED	CALCULATED	REPORTED	CALCULATED	TYPE
A INITIAL HYDROSTATIC	1462	1425.9			
B INITIAL FIRST FLOW	35	25.5			
C FINAL FIRST FLOW	52	59.4	30.0	29.1	F
C INITIAL FIRST CLOSED-IN	52	59.4			
D FINAL FIRST CLOSED-IN	636	629.6	50.0	49.8	C
E INITIAL SECOND FLOW	52	52.2			
F FINAL SECOND FLOW	86	84.2	60.0	59.8	F
F INITIAL SECOND CLOSED-IN	86	84.2			
G FINAL SECOND CLOSED-IN	619	616.6	60.0	61.3	C
H FINAL HYDROSTATIC	1393	1395.2			

HALLIBURTON SERVICES

TICKET NUMBER: 80802700  
 TEST DATE: 8-11-89

GAUGE NUMBER: 397  
 GAUGE DEPTH: 2911.0

BLANKED OFF: NO  
 CLOCK HOUR: 12

DESCRIPTION	PRESSURE		TIME		
	REPORTED	CALCULATED	REPORTED	CALCULATED	TYPE
A INITIAL HYDROSTATIC	0	1410.2			
B INITIAL FIRST FLOW	0	7.4			
C FINAL FIRST FLOW	0	49.5	30.0	29.1	F
C INITIAL FIRST CLOSED-IN	0	49.5			
D FINAL FIRST CLOSED-IN	0	615.1	50.0	49.8	C
E INITIAL SECOND FLOW	0	43.3			
F FINAL SECOND FLOW	0	75.3	60.0	59.8	F
F INITIAL SECOND CLOSED-IN	0	75.3			
G FINAL SECOND CLOSED-IN	0	605.4	60.0	61.3	C
H FINAL HYDROSTATIC	0	1377.7			

TICKET NUMBER: 80802700  
TEST DATE: 8-11-89

TYPE AND SIZE MEASURING DEVICE:

TIME	CHOKE SIZE	SURFACE PRESSURE (PSI)	GAS RATE (MCF)	LIQUID RATE (BPD)	REMARKS
8-11-89					
0225					ON LOCATION, WENT BACK TO WINFIELD TO GET CONNECTIONS NEEDED FOR TEST
0355					BACK ON LOCATION
0413					STARTED MAKING UP TOOLS
0445					TOOL IN TABLE
0630	B.H.				ON BOTTOM, TOOL OPENED, VERY GOOD BLOW ON BUBBLE HOSE
0635					4" IN BUCKET
0641					HOSE ON BOTTOM OF BUCKET
0700					CLOSED TOOL
0750	B.H.				OPENED TOOL, BLOW TO BOTTOM OF BUCKET IMMEDIATELY, NO GAS TO THE SURFACE
0850					CLOSED TOOL
0950					OPENED BYPASS, STARTED OUT OF HOLE
1145					TOOL IN TABLE
1230					TOOL LOADED ON TRUCK

HALLIBURTON SERVICES

TICKET NUMBER: 80802700

TEST DATE: 8-11-89

CLOCK NUMBER: 3459  
HOUR: 12

GAUGE NUMBER: 397  
GAUGE DEPTH: 2911.0

REFERENCE	TIME (MINUTES )	PRESSURE (PSI )	DP	(T*DT) ----- (T+DT)	(T+DT) LOG----- DT
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FIRST FLOW

B	1	0.0	7.4		
	2	3.0	20.0	12.6	
	3	6.0	24.3	4.3	
	4	9.0	28.1	3.7	
	5	12.0	34.3	6.3	
	6	15.0	37.2	2.9	
	7	18.0	40.6	3.4	
	8	21.0	43.2	2.6	
	9	24.0	46.1	2.9	
	10	27.0	48.2	2.1	
C	11	29.1	49.5	1.3	

FIRST CLOSED-IN

C	1	0.0	49.5		
	2	1.0	64.9	15.4	1.0
	3	2.0	81.9	32.4	1.8
	4	3.0	103.3	53.8	2.7
	5	4.0	122.8	73.2	3.5
	6	5.0	143.7	94.2	4.3
	7	6.0	162.0	112.5	5.0
	8	7.0	179.3	129.8	5.7
	9	8.0	200.9	151.3	6.3
	10	9.0	220.7	171.2	6.9
	11	10.0	241.6	192.1	7.5
	12	12.0	277.4	227.8	8.5
	13	14.0	316.4	266.9	9.5
	14	16.0	351.2	301.7	10.3
	15	18.0	387.0	337.5	11.1
	16	20.0	418.4	368.8	11.9
	17	22.0	444.2	394.7	12.5
	18	24.0	469.5	420.0	13.1
	19	26.0	491.9	442.4	13.7
	20	28.0	511.6	462.1	14.3
	21	30.0	528.3	478.8	14.8
	22	35.0	562.6	513.1	15.9
	23	40.0	586.7	537.1	16.9
	24	45.0	603.9	554.3	17.7
D	25	49.8	615.1	565.5	18.4

SECOND FLOW

HALLIBURTON SERVICES

TICKET NUMBER: 80802700  
 TEST DATE: 8-11-89

CLOCK NUMBER: 3459  
 HOUR: 12

GAUGE NUMBER: 397  
 GAUGE DEPTH: 2911.0

REFERENCE	TIME (MINUTES )	PRESSURE (PSI )	DP	(T*DT) ----- (T+DT)	(T+DT) LOG----- DT
E	1	0.0	43.3		
	2	5.0	61.9	18.6	
	3	10.0	66.6	4.7	
	4	15.0	70.6	4.0	
	5	20.0	74.2	3.6	
	6	25.0	78.1	3.9	
	7	30.0	80.3	2.2	
	8	35.0	79.3	-1.0	
	9	40.0	79.0	-0.4	
	10	45.0	79.0	0.0	
	11	50.0	78.6	-0.4	
	12	55.0	78.6	0.0	
F	13	59.8	75.3	-3.3	

SECOND CLOSED-IN

F	1	0.0	75.3		
	2	1.0	88.9	13.5	1.0
	3	2.0	110.3	35.0	1.9
	4	3.0	131.4	56.1	2.9
	5	4.0	151.9	76.5	3.8
	6	5.0	170.8	95.4	4.7
	7	6.0	189.8	114.5	5.6
	8	7.0	210.3	135.0	6.5
	9	8.0	228.7	153.4	7.3
	10	9.0	247.7	172.4	8.2
	11	10.0	264.8	189.4	9.0
	12	12.0	299.5	224.1	10.6
	13	14.0	331.7	256.3	12.1
	14	16.0	359.3	284.0	13.6
	15	18.0	386.8	311.4	15.0
	16	20.0	409.5	334.1	16.3
	17	22.0	431.8	356.4	17.6
	18	24.0	450.7	375.3	18.9
	19	26.0	469.7	394.3	20.1
	20	28.0	486.0	410.7	21.3
	21	30.0	500.1	424.7	22.4
	22	35.0	529.4	454.1	25.1
	23	40.0	552.4	477.1	27.6
	24	45.0	570.1	494.7	29.9
	25	50.0	584.1	508.8	32.0
	26	55.0	594.8	519.4	34.0
G	27	61.3	605.4	530.0	36.3

HALLIBURTON SERVICES

TICKET NUMBER: 80802700

TEST DATE: 8-11-89

CLOCK NUMBER: 17423

HOUR: 12

GAUGE NUMBER: 737

GAUGE DEPTH: 2941.0

REFERENCE	TIME (MINUTES )	PRESSURE (PSI )	DP	(T*DT) ----- (T+DT)	(T+DT) LOG----- DT
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FIRST FLOW

B	1	0.0	25.5		
	2	3.0	33.0	7.5	
	3	6.0	35.8	2.8	
	4	9.0	39.5	3.6	
	5	12.0	46.3	6.9	
	6	15.0	47.4	1.0	
	7	18.0	50.3	2.9	
	8	21.0	52.8	2.5	
	9	24.0	54.9	2.1	
	10	27.0	57.6	2.8	
C	11	29.1	59.4	1.8	

FIRST CLOSED-IN

C	1	0.0	59.4			
	2	1.0	75.6	16.2	0.9	1.491
	3	2.0	97.6	38.2	1.8	1.197
	4	3.0	117.8	58.4	2.7	1.025
	5	4.0	135.3	75.8	3.5	0.920
	6	5.0	157.4	97.9	4.3	0.832
	7	6.0	177.7	118.3	5.0	0.767
	8	7.0	195.4	136.0	5.6	0.714
	9	8.0	215.1	155.7	6.3	0.667
	10	9.0	235.8	176.3	6.9	0.627
	11	10.0	256.3	196.8	7.5	0.591
	12	12.0	295.5	236.1	8.5	0.534
	13	14.1	334.7	275.2	9.5	0.487
	14	16.0	368.3	308.9	10.3	0.451
	15	18.0	400.9	341.5	11.1	0.418
	16	20.0	431.1	371.6	11.8	0.391
	17	22.0	458.0	398.6	12.5	0.366
	18	24.0	482.4	423.0	13.2	0.345
	19	26.0	504.7	445.3	13.7	0.326
	20	28.0	523.5	464.1	14.3	0.310
	21	30.0	541.0	481.6	14.8	0.294
	22	35.0	574.5	515.1	15.9	0.263
	23	40.0	599.4	540.0	16.9	0.237
	24	45.0	617.3	557.9	17.7	0.217
D	25	49.8	629.6	570.2	18.4	0.200

SECOND FLOW

HALLIBURTON SERVICES

TICKET NUMBER: 80802700

TEST DATE: 8-11-89

CLOCK NUMBER: 17423

HOUR: 12

GAUGE NUMBER: 737

GAUGE DEPTH: 2941.0

REFERENCE	TIME (MINUTES )	PRESSURE (PSI )	DP	(T*DT) ----- (T+DT)	(T+DT) LOG----- DT
E	1	0.0	52.2		
	2	5.0	70.7	18.4	
	3	10.0	74.9	4.2	
	4	15.0	78.2	3.4	
	5	20.0	82.3	4.0	
	6	25.0	86.3	4.0	
	7	30.0	88.1	1.8	
	8	35.0	88.1	0.0	
	9	40.0	87.5	-0.6	
	10	45.0	87.5	0.0	
	11	50.0	87.5	0.0	
	12	55.0	87.5	0.0	
F	13	59.8	84.2	-3.4	

SECOND CLOSED-IN

F	1	0.0	84.2			
	2	1.0	104.7	20.6	1.0	1.947
	3	2.0	124.5	40.4	2.0	1.647
	4	3.0	141.8	57.6	2.9	1.492
	5	4.0	163.3	79.1	3.8	1.367
	6	5.0	183.1	98.9	4.8	1.271
	7	6.0	200.4	116.2	5.6	1.198
	8	7.0	220.2	136.0	6.5	1.134
	9	8.0	237.0	152.9	7.4	1.083
	10	9.0	252.9	168.7	8.2	1.036
	11	10.0	268.9	184.7	9.0	0.996
	12	12.0	305.3	221.1	10.6	0.923
	13	14.0	336.4	252.2	12.1	0.867
	14	16.0	363.8	279.7	13.5	0.818
	15	18.0	391.9	307.7	14.9	0.774
	16	20.0	417.3	333.1	16.3	0.735
	17	22.0	439.9	355.7	17.6	0.702
	18	24.0	458.5	374.3	18.9	0.672
	19	26.0	476.7	392.5	20.1	0.645
	20	28.0	493.8	409.6	21.3	0.620
	21	30.0	509.3	425.2	22.4	0.598
	22	35.0	539.6	455.5	25.1	0.549
	23	40.0	562.4	478.2	27.6	0.508
	24	45.0	580.2	496.0	29.9	0.474
	25	50.0	594.8	510.6	32.0	0.444
	26	55.0	605.9	521.8	34.0	0.417
G	27	61.3	616.6	532.4	36.3	0.389

TOOL EQUIPMENT

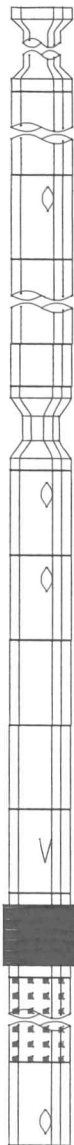
O.D.

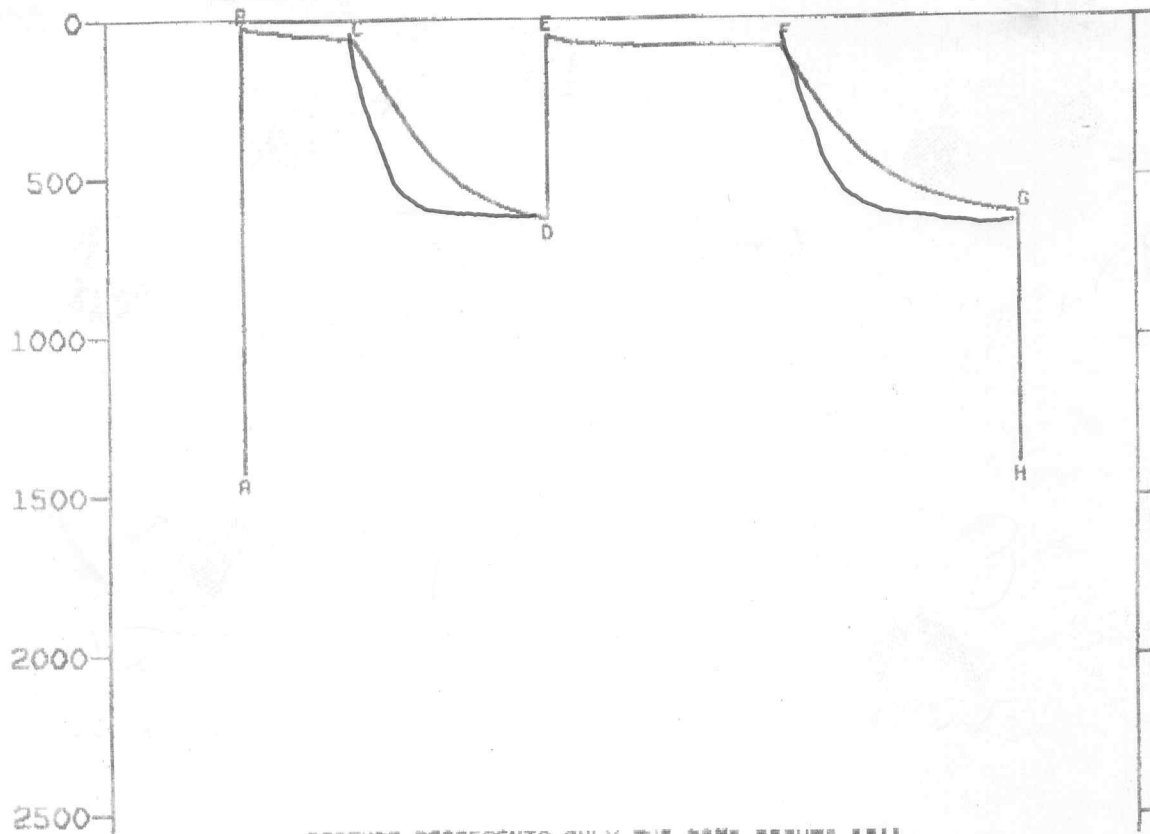
I.D.

LENGTH

DEPTH

		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE	4.500	3.826	2653.0	
3	DRILL COLLARS	6.250	2.250	120.0	
50	IMPACT REVERSING SUB	5.750	2.750	1.0	2773.5
3	DRILL COLLARS	6.250	2.250	120.0	
5	CROSSOVER	5.750	2.750	1.0	
11	HANDLING SUB AND CHOKE ASSEMBLY	5.870	3.000	5.0	
12	DUAL CIP VALVE	5.030	0.870	5.0	
60	HYDROSPRING TESTER	5.000	0.750	5.0	2909.0
80	AP RUNNING CASE	5.000	2.250	4.0	2911.0
15	JAR	5.000	1.750	5.0	
16	VR SAFETY JOINT	5.000	1.000	3.0	
70	OPEN HOLE PACKER	6.750	1.530	6.0	2926.0
20	FLUSH JOINT ANCHOR	5.000	2.370	13.0	
81	BLANKED-OFF RUNNING CASE	5.000	0.000	4.0	2941.0
	TOTAL DEPTH				2945.0

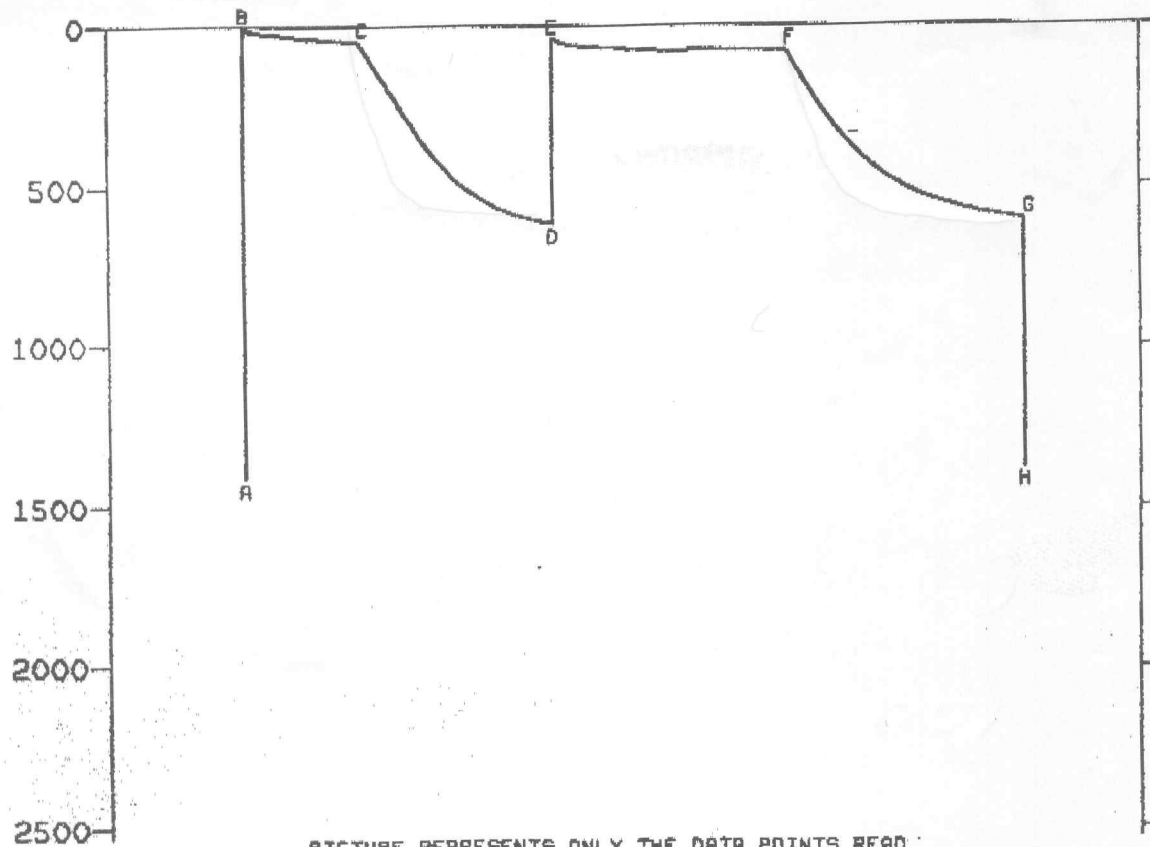




PICTURE REPRESENTS ONLY THE DATA POINTS READ - NOT INTENDED TO REPRODUCE ACTUAL CHART

GAUGE NO: 737 DEPTH: 2941.0 BLANKED OFF: YES HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1462	1425.9			
B	INITIAL FIRST FLOW	35	25.5			
C	FINAL FIRST FLOW	52	59.4	30.0	29.1	F
C	INITIAL FIRST CLOSED-IN	52	59.4			
D	FINAL FIRST CLOSED-IN	636	629.6	50.0	49.8	C
E	INITIAL SECOND FLOW	52	52.2			
F	FINAL SECOND FLOW	86	84.2	60.0	59.8	F
F	INITIAL SECOND CLOSED-IN	85	84.2			
G	FINAL SECOND CLOSED-IN	619	616.6	60.0	61.3	C
H	FINAL HYDROSTATIC	1393	1395.2			



PICTURE REPRESENTS ONLY THE DATA POINTS READ  
NOT INTENDED TO REPRODUCE ACTUAL CHART

GAUGE NO: 397 DEPTH: 2911.0 BLANKED OFF: NO HOUR OF CLOCK: 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC		1410.2			
B	INITIAL FIRST FLOW		7.4			
C	FINAL FIRST FLOW		49.5	30.0	29.1	F
C	INITIAL FIRST CLOSED-IN		49.5			
D	FINAL FIRST CLOSED-IN		615.1	50.0	49.8	C
E	INITIAL SECOND FLOW		43.3			
F	FINAL SECOND FLOW		75.3	60.0	59.8	F
F	INITIAL SECOND CLOSED-IN		75.3			
G	FINAL SECOND CLOSED-IN		605.4	60.0	61.3	C
H	FINAL HYDROSTATIC		1377.7			