HALLIBURTON LOGGING SERVICES, INC.

SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

5" = 100'

FINAL PRINT

COMPANY ______________
WELL ______________
FIELD ______________
COUNTY __________ ST __

COMPANY	NAHAMA AND WEAGANT ENERGY CO.
WELL	C.E.R. NO. 41-21-64
FIELD	MIST
COUNTY	COLUMBIA
STATE	OR
API NO.	36-009-00273
LOCATION	1137.6 FEET SOUTH AND 485.9 FEET WEST FROM THE NORTHEAST CORNER OF: SEC. 21 TWP 6N RGE 4W
OTHER SERVICES	DIPMETER DIG/AVL/GR

PERMANENT DATUM G.L. ELEV. 1089.9
LOG MEASURED FROM K.B. 11.5 FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM KELLY BUSHING
ELEV.: K.B. 1101.4 D.F. ------ G.L. 1089.9

DATE	11/06/90		
RUN NO.	ONE		
DEPTH-DRILLER	2121		
DEPTH-LOGGER	2124		
BTM. LOG INTER.	2124		
TOP LOG INTER.	524		
CASING-DRILLER	9 5/8@524	@	@
CASING-LOGGER	524		
BIT SIZE	8 1/2		
TYPE FLUID IN HOLE	GEL/POLYMER		
DENS. : VISC.	9.3 : 35	:	:
PH : FLUID LOSS	8.5 : 5.6	:	:
SOURCE OF SAMPLE	CIRCULATED		
RM @ MEAS. TEMP.	6.0 @50	@	@
RMF @ MEAS. TEMP.	5.5 @52	@	@
RMC @ MEAS. TEMP.	4.5 @56	@	@
SOURCE RMF : RMC	CIRC. : CIRC.	:	:
RM @ BHT	3.45 @92.	@	@
TIME SINCE CIRC.	6.5 HOURS		
TIME ON BOTTOM	10:06 PM		
MAX. REC. TEMP.	92. @BHT	@	@
EQUIP. : LOCATION	2890 : MDLND	:	:
RECORDED BY	D.MCDANIEL		
WITNESSED BY	J.VAUGHAN	M.CHALMERS	T.THOMAS

Fold Here

Service Ticket No.: 44359 API Serial No.: 36-009-00273 PGM Version: 2.60 B

Change in Mud Type or Additional Samples		
Date/Sample No.	11/06/90 : ONE	/ / :
Depth-Driller		
Type Fluid in Hole		
Dens. : Visc.	:	:
pH. : Fluid Loss	:	:
Source of Sample		
Rm @ Meas.Temp.	@	@
Rmf @ Meas.Temp.	@	@
Rmc @ Meas.Temp.	@	@
Source: Rmf : Rmc	:	:
Rm @ BHT	3.45 @92.	@
Rmf @ BHT	3.27 @92.	@
Rmc @ BHT	2.86 @92.	@

RESISTIVITY SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA

Run No	Tool Type & No	Pad Type	Tool Pos.	Other
ONE	DUAL #W109437	N/A	1.5"S.O.	M412
ONE	SGRD #W108946	N/A	1.5"S.O.	M405

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	N/A	Run No.	ONE	Run No.	ONE
Serial No.	W108580	Serial No.	W109088	Serial No.	W109740	Serial No.	W108749
Model No.	M432	Model No.	M305	Model No.	M465	Model No.	M434
Diameter	3 5/8	No.of Cent.	FOUR	Diameter	4 1/2	Diameter	3 5/8
Detector Model No.	M432	Spacing	1 FOOT	Log Type	GAMMA	Log Type	THERMAL
Type	SCINT.			Source Type	CS137	Source Type	AM241BE
Length	4 IN.	LSA	YES	Serial No.	047	Serial No.	25
Distance To Source	N/A	FWDA	NO	Strength	1.5 CU	Strength	19 CU

LOGGING DATA

Run No.	Depth From	Depth To	Speed Ft/Min	Gamma Scale L	Gamma Scale R	Acoustic Scale L	Acoustic Scale R	Acoustic Matrix	Density Scale L	Density Scale R	Density Matrix	Neutron Scale L	Neutron Scale R	Neutron Matrix
ONE	2124	524	30	0	150				1.65	2.65	2.65	60.	0.	SAND
					GAPI						GM/CC	P.U.	P.U.	
									60.	0.	2.65			
									P.U.	P.U.	GM/CC			

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 4 1/2 INCH CASING.
REPEAT SECTION 1 FOOT OFF DEPTH TO DIG/AVL/GR LOG.

CREW ON LOCATION:EMERSON,PORTMAN, AND WELLS.
THANK YOU FOR USING HALLIBURTON LOGGING SERVICES!

Halliburton Logging Services, Inc. does not guarantee the accuracy of any interpretation of log data, conversion of log data to physical rock parameters or recommendations which may be given by HLS personnel or which may appear on the log or in any other form. Any user of such data, interpretations, conversions or recommendations agrees that HLS is not responsible except where due to gross negligence or wilful misconduct, for any loss, damages, or expenses resulting from the use thereof.

GAMMA SHOP CALIBRATION SUMMARY
PERFORMED: 10:35:12 09/21/90 LAST SHOP CALIBRATION: 12:18:26 08/24/90
SERIAL NUMBER: 108580 PROGRAM VERSION: 2.60 B
MODEL: #432 FIELD CALIBRATOR: #67
PERFORMED BY: M.SCHWARTZ

	MEASURED	CALIBRATED	UNITS
BACKGROUND	22	22	GAPI
BACKGROUND+CALIBRATOR	268	269	GAPI
CALIBRATOR	246	247	GAPI

GAMMA BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 18:15:56 11/06/90 LAST SHOP CALIBRATION: 10:35:12 09/21/90
FIELD CALIBRATOR: #67

	SHOP	FIELD	UNITS
BACKGROUND	22	27	GAPI
BACKGROUND+CALIBRATOR	269	283	GAPI
CALIBRATOR	247	256	GAPI

GAMMA AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 20:02:49 11/06/90 LAST SHOP CALIBRATION: 10:35:12 09/21/90

	BEFORE	AFTER	UNITS
BACKGROUND	27	23	GAPI
BACKGROUND+CALIBRATOR	283	272	GAPI
CALIBRATOR	256	249	GAPI

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DUAL SPACE NEUTRON SHOP CALIBRATION SUMMARY
PERFORMED: 09:51:09 10/26/90 LAST SHOP CALIBRATION: 10:27:41 09/21/90
SERIAL NUMBER: 108749 PROGRAM VERSION: 2.60 B
MODEL: #434 FIELD CALIBRATOR: #4916 SOURCE: #25
PERFORMED BY: JOHNSON

PRIMARY CALIBRATOR

	MEASURED	CALIBRATED	UNITS
RATIO	6.403	6.446	
POROSITY	24.109	24.309	%

FIELD CHECK BLOCK

	MEASURED	DEFINED	UNITS
CHECK RATIO	7.107	7.154	
CHECK POROSITY	27.393	27.618	%

DUAL SPACE NEUTRON BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 21:14:01 11/06/90 LAST SHOP CALIBRATION: 09:51:09 10/26/90
FIELD CALIBRATOR: #4916 SOURCE: #25

	SHOP	FIELD	UNITS
CHECK RATIO	7.154	7.219	
CHECK POROSITY	27.617	27.921	%

DUAL SPACE NEUTRON AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 23:53:15 11/06/90 LAST SHOP CALIBRATION: 09:51:09 10/26/90

	BEFORE	AFTER	UNITS
CHECK RATIO	7.219	7.181	
CHECK POROSITY	27.921	27.741	%

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SDL CALIPER SHOP CALIBRATION SUMMARY
PERFORMED: 10:52:52 10/26/90 LAST SHOP CALIBRATION: 11:20:56 09/21/90
SERIAL NUMBER: 63 PROGRAM VERSION: 2.60 B
MODEL: #465
PERFORMED BY: JOHNSON

	MEASURED	CALIBRATED	UNITS
VALUE 1	8.123	8.000	INCHES
VALUE 2	15.934	16.000	INCHES

SDL CALIPER BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 21:08:43 11/06/90 LAST SHOP CALIBRATION: 10:52:52 10/26/90

	SHOP	FIELD	UNITS
VALUE 1	8.000	7.777	INCHES

SDL CALIPER AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 23:47:52 11/06/90 LAST SHOP CALIBRATION: 10:52:52 10/26/90

	BEFORE	AFTER	UNITS
VALUE 1	7.777	8.116	INCHES

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SPECTRAL DENSITY SHOP CALIBRATION SUMMARY
PERFORMED: 10:45:15 10/26/90 LAST SHOP CALIBRATION: 11:15:32 09/21/90
SERIAL NUMBER: 109740 PROGRAM VERSION: 2.60 B
MODEL: #465 FIELD CALIBRATOR: #AL SOURCE: #047
PERFORMED BY: JOHNSON

PRIMARY CALIBRATOR

	MEASURED	CALIBRATED	UNITS
AL BLOCK			
AL DENSITY	2.606	2.604	gm/cc
AL CORRECTION	.052	.050	gm/cc
AL Pe SHORT	3.248	3.199	
AL Pe LONG	3.235	3.239	
AL BLOCK W/SLEEVE			
AL DENSITY	2.596	2.597	gm/cc
AL CORRECTION	-.050	-.049	gm/cc
AL Pe SHORT	6.081	6.009	
AL Pe LONG	6.044	6.039	
MAGNESIUM BLOCK			
MAGNESIUM DENSITY	1.680	1.677	gm/cc
MAGNESIUM CORRECTION	.023	.017	gm/cc
MAGNESIUM Pe SHORT	3.230	3.182	
MAGNESIUM Pe LONG	3.002	3.007	

CALIBRATION COEFFICIENTS

	EXPECTED RANGE	CALIBRATED	UNITS
SHORT SPACE			
DENSITY SLOPE	-6.40 - -7.60	-6.838	gm/cc
DENSITY INTERCEPT	27.0 - 37.0	31.861	gm/cc
Pe SLOPE	1.20 - 2.30	1.705	
Pe INTERCEPT	-2.20 - -4.00	-2.411	
LONG SPACE			
DENSITY SLOPE	-1.29 - -1.39	-1.346	gm/cc
DENSITY INTERCEPT	7.00 - 8.10	7.671	gm/cc
Pe SLOPE	1.30 - 2.50	1.881	
Pe INTERCEPT	-0.70 - -2.10	-1.160	

FIELD CHECK BLOCK

	MEASURED	DEFINED	UNITS
AL SLIDE			
AL DENSITY	1.653	1.652	gm/cc
AL CORRECTION	-.049	-.051	gm/cc
AL Pe SHORT	4.557	4.498	
AL Pe LONG	4.249	4.250	
ALUMINUM SLIDE IN			
AL DENSITY	2.155	2.158	gm/cc
AL CORRECTION	-.000	-.001	gm/cc
AL Pe SHORT	4.761	4.700	
AL Pe LONG	3.867	3.869	
BRASS SLIDE			
BRASS DENSITY	2.360	2.369	gm/cc
BRASS CORRECTION	-.367	-.360	gm/cc
BRASS Pe SHORT	5.931	5.860	
BRASS Pe LONG	3.589	3.592	

SPECTRAL DENSITY BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED: 21:17:02 11/06/90 LAST SHOP CALIBRATION: 10:45:15 10/26/90
FIELD CALIBRATOR: #AL SOURCE: #047

ALUMINUM SLIDE IN	SHOP	FIELD	UNITS
ALUMINUM DENSITY	2.158	2.155	gm/cc
ALUMINUM CORRECTION	-.001	-.000	gm/cc
ALUMINUM PE SHORT	4.700	4.763	
ALUMINUM PE LONG	3.869	3.947	

SPECTRAL DENSITY AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED: 23:55:49 11/06/90 LAST SHOP CALIBRATION: 10:45:15 10/26/90

ALUMINUM SLIDE IN	BEFORE	AFTER	UNITS
ALUMINUM DENSITY	2.155	2.160	gm/cc
ALUMINUM CORRECTION	-.000	-.000	gm/cc
ALUMINUM PE SHORT	4.763	4.780	
ALUMINUM PE LONG	3.947	4.092	

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H L S CALIBRATION SUMMARY TABLE

SERVICE or SIGNAL	SHOP	BEFORE	AFTER	CHANGE	TOLERANCE
GAMMA	247	256	249	6	+/- 9.0
DSN POROSITY	27.617	27.921	27.741	.180	+/-.90
CALIPER VALUE 1	8.000	7.777	8.116	-.338	+/- 0.50
BULK DENSITY	2.158	2.155	2.160	-.004	+/-.015
DENSITY CORRECTION	-.001	-.000	-.000	-.000	+/-.015
DENSITY PE SHORT	4.700	4.763	4.780	-.016	+/-.30
DENSITY PE LONG	3.869	3.947	4.092	-.144	+/-.30

#	TIME	FT	EVENT		REMARKS
			PRE-LOGGING DATA		
1	20:54:32	00000	DATE OF LOG: MMDD	11 6	
2	21: 5:54	01000	PLS SOFTWARE REVISION	2.60	
3	21:39:28	01316	IS THIS A CASED HOLE? (Y/N)	N	
4	21:39:28	01316	CASING SIZE O.D. (INCHES)	5.500	
5	21:39:28	01316	CASING WEIGHT? (POUNDS/FT)	17.000	
6	21:39:28	01316	CASING SIZE O.D. (INCHES)	5.500	
7	21:39:28	01316	BIT SIZE? (INCHES)	7.875	
8	21:39:28	01316	MATRIX DENSITY? (1.5<RHOM<4.5)	2.710	
9	21:39:28	01316	FLUID DENSITY (.10<RHOF<1.2)	1.000	
10	21:39:28	01316	MUD DENSITY (#/GAL)	9.500	
11	21:39:28	01316	ANY BARITE IN MUD? (Y/N)	Y	
12	21:39:28	01316	UN-FILTERED PE DATA? (Y/N)	N	
13	21:39:28	01316	DSN BAD HOLE CORRECTION? (Y/N)	Y	
14	21:39:28	01316	DSN STANDOFF? (INCHES)	0.000	
15	21:39:28	01316	LITHOLOGY:L=1,S=2,D=3,LS=4,LD=5	1	
16	21:39:28	01316	FOR "F": DSN=1, DEN=2, CROSS=3	2	
17	21:39:28	01316	FOR "F" USE: (.5<A<2.5)	1.000	
18	21:39:28	01316	FOR "F" USE: (1.2<M<2.5)	2.000	
19	21:39:28	01316	CASING SIZE O.D. (INCHES)	4.500	
20	21:39:28	01316	BIT SIZE? (INCHES)	8.500	
21	21:39:28	01316	MATRIX DENSITY? (1.5<RHOM<4.5)	2.650	
22	21:39:28	01316	MUD DENSITY (#/GAL)	9.300	
23	21:39:28	01316	LITHOLOGY:L=1,S=2,D=3,LS=4,LD=5	2	
24	21:39:28	01316	FOR "F" USE: (.5<A<2.5)	8.100-1	
25	21:41:25	01669	"HALTING" END OF SECTION		
26	21:50:36	01793	SDL OPEN MANDREL.		
27	21:51:49	01777	"HALTING" END OF SECTION		
28	21:53: 2	01753	LOGGING SECTION NO.	2	
29	22: 0:23	01518	"HALTING" END OF SECTION		
30	22: 1: 4	01496	SDL CLOSE MANDREL.		
31	22: 5:54	01466	SDL OPEN MANDREL.		
32	22: 7: 1	02128	LOGGING SECTION NO.	3	
33	23: 2: 2	00510	"HALTING" END OF SECTION		
34	23: 3:24	00489	SDL CLOSE MANDREL.		