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 L.F. NO.13-35-65

FIELD MIST

COUNTY COLUMBIA

STATE OR

API NO. 36-009-00272
LOCATION :
2224 FEET NORTH AND
1193 FEET EAST FROM THE
SOUTHWEST CORNER OF:
SEC. 35 TWP 6N RGE 5W

OTHER SERVICES
DIG/AVL
DIPMETER

PERMANENT DATUM G.L. ELEV. 654.2
LOG MEASURED FROM K.B. 11.5FT.ABOVE PERM.DATUM
DRILLING MEASURED FROM KELLY BUSHING

ELEV.:K.B. 665.7
D.F. ----
G.L. 654.2

DATE	11/16/90			
RUN NO.	ONE			
DEPTH-DRILLER	2150			
DEPTH- LOGGER	2157			
BTM. LOG INTER.	2154			
TOP LOG INTER.	442			
CASING-DRILLER	8 5/8@442	@	@	@
CASING- LOGGER	442			
BIT SIZE	7 7/8			
TYPE FLUID IN HOLE	GEL/POLYMER			
DENS. : VISC	10.1 :54	:	:	:
PH : FLUID LOSS	9.0 :4.0	:	:	:
SOURCE OF SAMPLE	CIRCULATED			
RM @ MEAS. TEMP.	2.2 @50	@	@	@
RMF @ MEAS. TEMP.	3.1 @41	@	@	@
RMC @ MEAS. TEMP.	2.2 @46	@	@	@
SOURCE RMF : RMC	CIRC.:CIRC.	:	:	:
RM @ BHT	1.15 @102	@	@	@
TIME SINCE CIRC.	5.5 HOURS			
TIME ON BOTTOM	5:00 AM			
MAX. REC. TEMP.	102 @BHT	@	@	@
EQUIP. : LOCATION	2890 :WDLND	:	:	:
RECORDED BY	B.JOHNSON			
WITNESSED BY	J.VAUGHAN	T.THOMAS		

Fold Here

Service Ticket No.: 44428 API Serial No.: 36-009-00272 PGM Version: 2.60 B

Change in Mud Type or Additional Samples

Date/Sample No.	11/16/90: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	1.15 @102	@
Rmf @ BHT	1.36 @102	@
Rmc @ BHT	1.06 @102	@

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	DUSL #W109432	N/A	1.5"S.O.	M412
ONE	SGRD #W108932	N/A	1.5"S.O.	M405

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	ONE	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

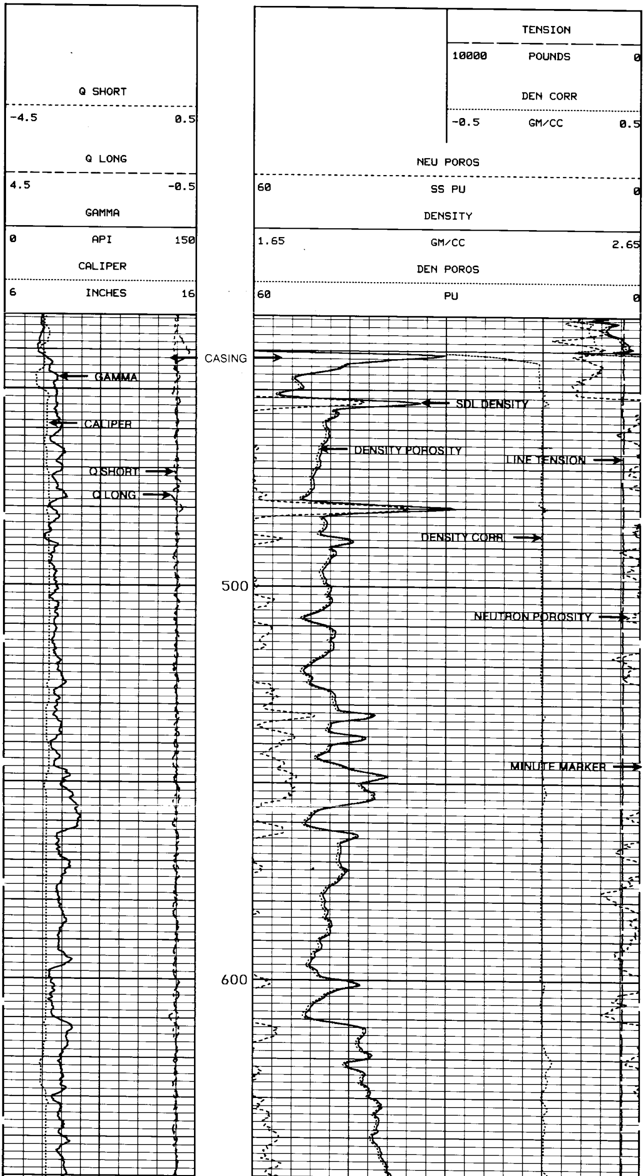
LOGGING DATA

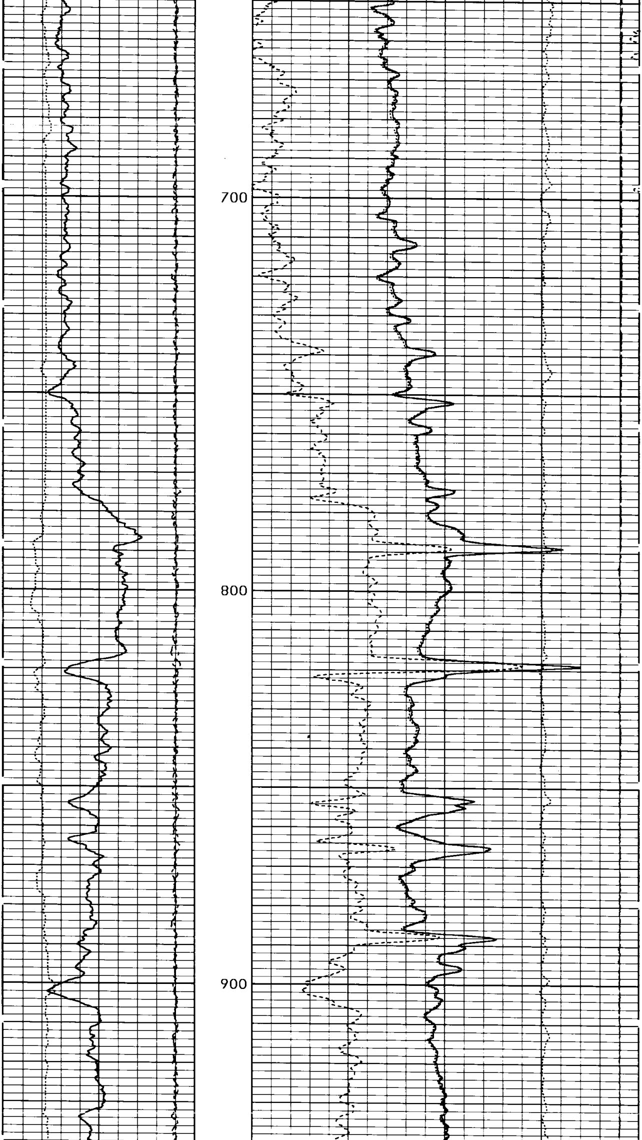
GENERAL				GAMMA		ACOUSTIC			DENSITY			NEUTRON		
Run	Depth		Speed	Scale		Scale			Scale			Scale		
No.	From	To	Ft/Min	L	R	L	R	Matrix	L	R	Matrix	L	R	Matrix
ONE	2157	442	30	0	150	175	75	57	60PU	0PU	SAND	60PU	0PU	SAND
					API			US/FT	1.65	2.65	2.65			
											G/CC			

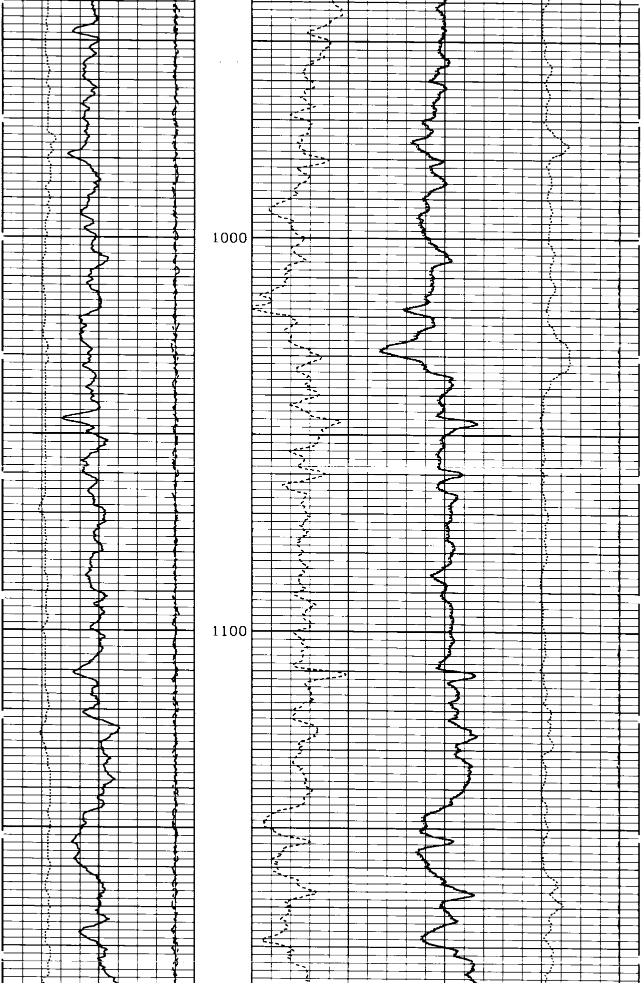
Remarks:

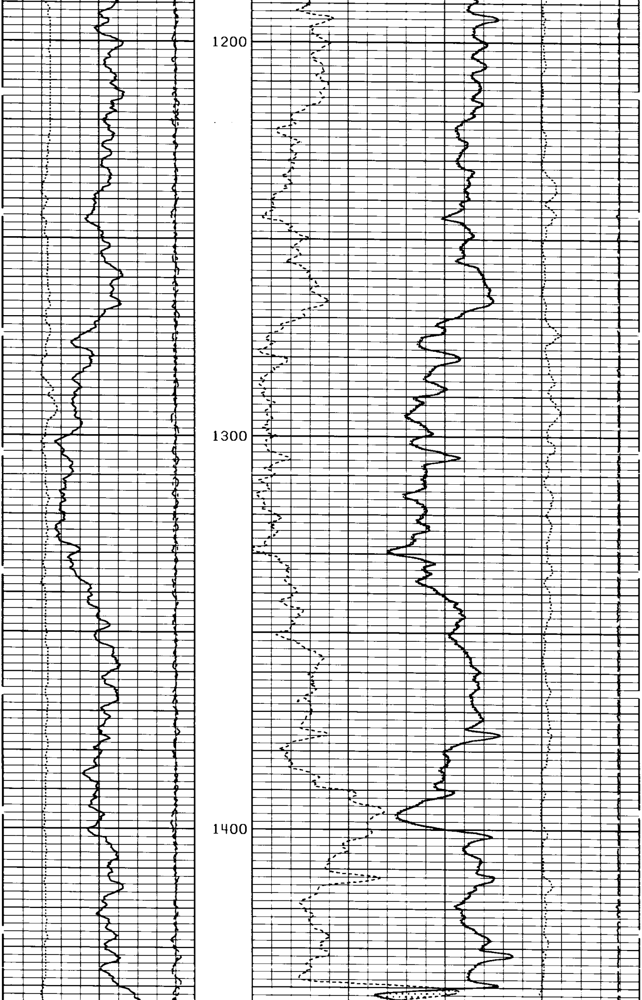
CREW ON LOCATION: EMERSON, JEFFREY.
THANK YOU FOR USING HALLIBURTON LOGGING SERVICES!

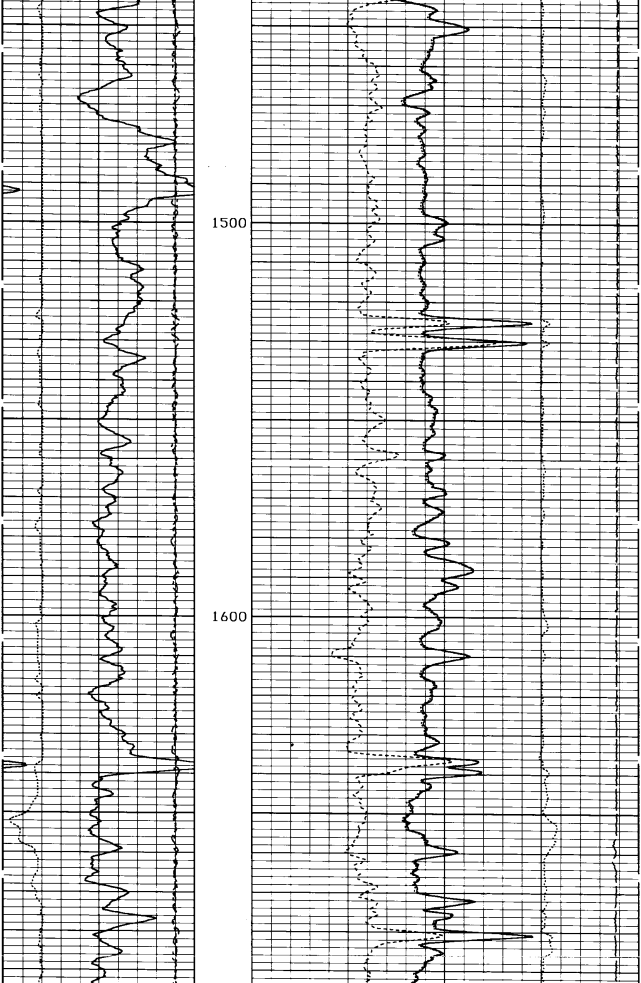
Halliburton Logging Services, Inc. does not guarantee the accuracy of any interpretation of log data, conversion of log data to physical rock parameters or recommendations which may be given by HLS personnel or which may appear on the log or in any other form. Any user of such data, interpretations, 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.

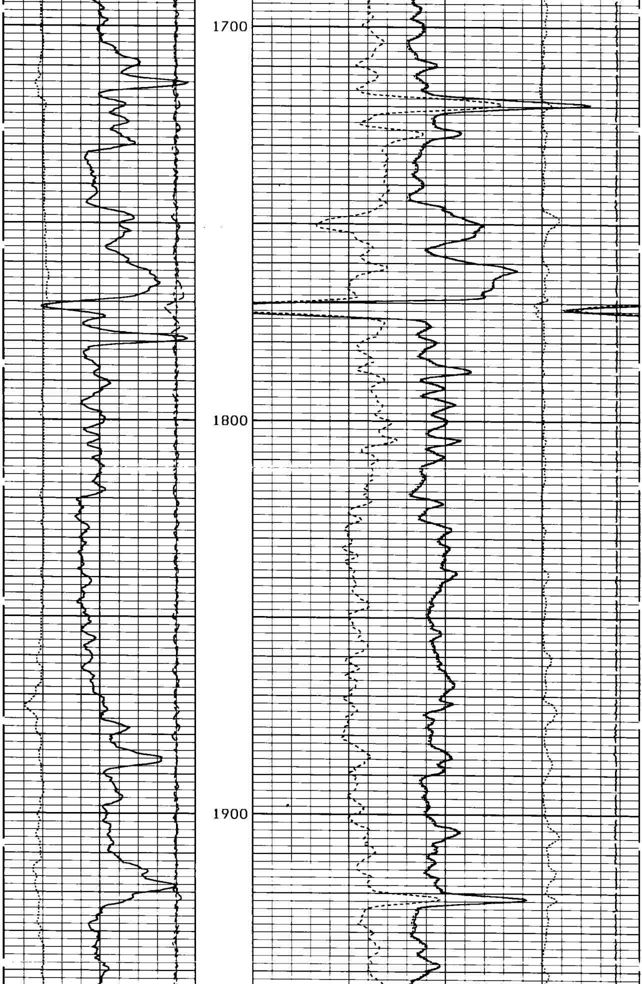


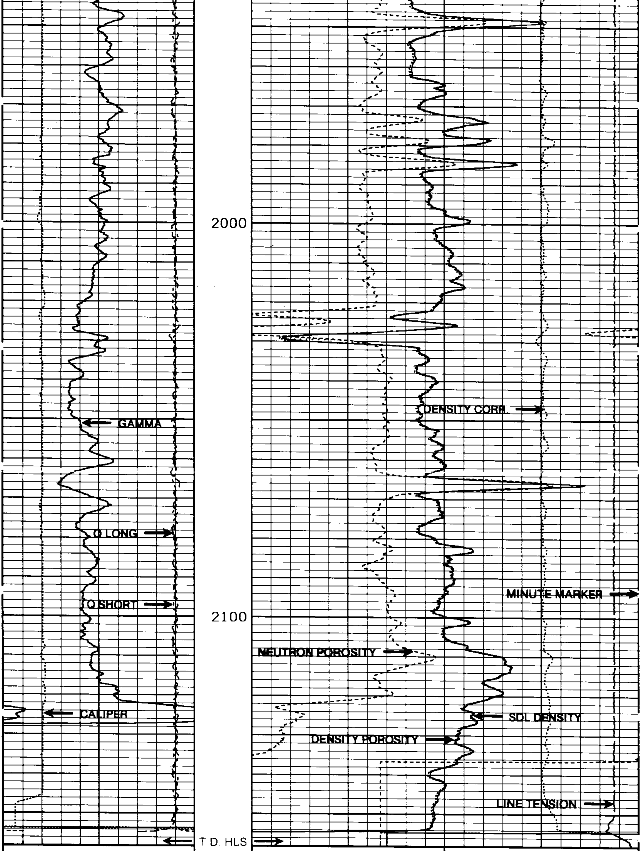










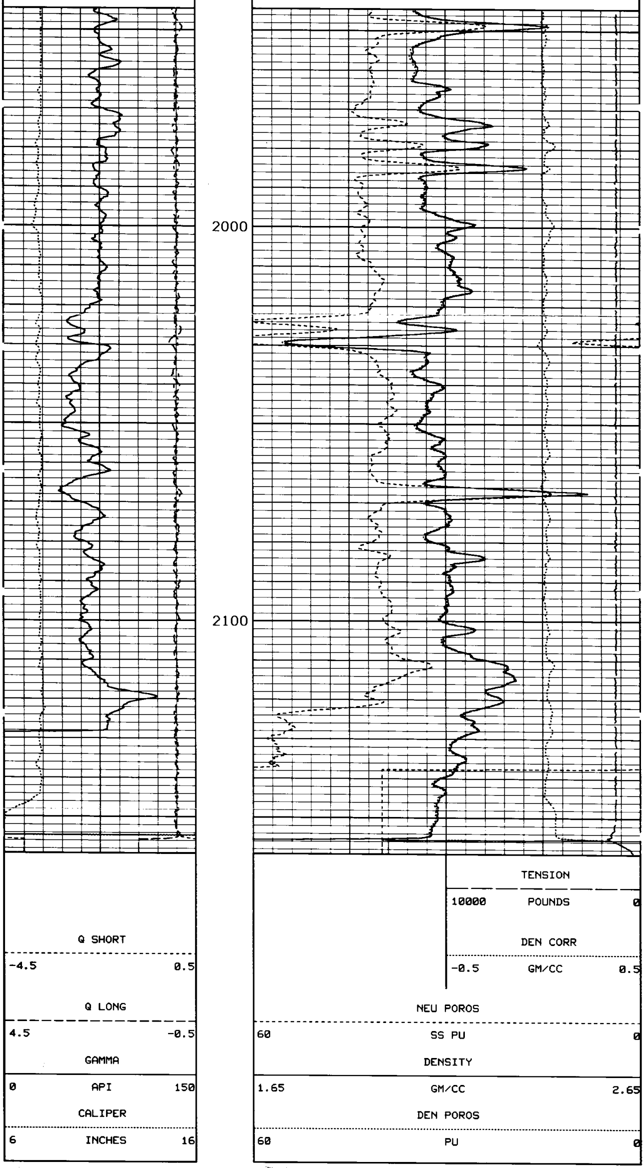


REPEAT SECTION

	TENSION	
10000	POUNDS	0
	DEN CORR	
-0.5	GM/CC	0.5

	Q SHORT	
-4.5		0.5
	Q LONG	
4.5		-0.5
	GAMMA	
0	API	150
	CALIPER	
6	INCHES	16

	NEU POROS	
60	SS PU	0
	DENSITY	
1.65	GM/CC	2.65
	DEN POROS	
60	PU	0



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                      GAMMA   SHOP CALIBRATION SUMMARY
PERFORMED:  13:45:55  11/14/90    LAST SHOP CALIBRATION:    10:35:12  09/21/90
SERIAL NUMBER: 108580             PROGRAM VERSION: 2.60 B
MODEL: #432           FIELD CALIBRATOR: #67
PERFORMED BY: JOHNSON

                         MEASURED        CALIBRATED           UNITS
                         --------        ----------           -----
BACKGROUND                  18               18                GAPI
BACKGROUND+CALIBRATOR      270              265                GAPI
CALIBRATOR                 252              247                GAPI

                      GAMMA  BEFORE SURVEY FIELD CHECK SUMMARY
PERFORMED:  00:40:46  11/16/90    LAST SHOP CALIBRATION:    13:45:55  11/14/90
FIELD CALIBRATOR: #67

                           SHOP            FIELD              UNITS
                         --------        ----------           -----
BACKGROUND                  18               31                GAPI
BACKGROUND+CALIBRATOR      265              275                GAPI
CALIBRATOR                 247              244                GAPI

                      GAMMA  AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  03:11:18  11/16/90    LAST SHOP CALIBRATION:    13:45:55  11/14/90

                          BEFORE            AFTER             UNITS
                         --------        ----------           -----
BACKGROUND                  31               26                GAPI
BACKGROUND+CALIBRATOR      275              272                GAPI
CALIBRATOR                 244              247                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:  04:14:39  11/16/90    LAST SHOP CALIBRATION:    09:51:09  10/26/90
FIELD CALIBRATOR: #4916         SOURCE: #25

                           SHOP             FIELD             UNITS
                         --------         ---------          ------
CHECK RATIO                 7.154           7.283
CHECK POROSITY             27.617          28.223               %


                DUAL SPACE NEUTRON AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  06:50:25  11/16/90    LAST SHOP CALIBRATION:    09:51:09  10/26/90

                          BEFORE            AFTER             UNITS
                         --------         ---------           -----
CHECK RATIO                 7.283           7.280
CHECK POROSITY             28.223          28.208               %

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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
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                        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:  04:10:16  11/16/90    LAST SHOP CALIBRATION:   10:52:52  10/26/90

                          SHOP            FIELD            UNITS
                        --------        ---------          -----
VALUE 1                    8.000            7.635          INCHES

                  SDL CALIPER  AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  06:45:32  11/16/90    LAST SHOP CALIBRATION:   10:52:52  10/26/90

                         BEFORE           AFTER            UNITS
                        --------        ---------          -----
VALUE 1                    7.635            7.750          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
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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:  04:20:45  11/16/90   LAST SHOP CALIBRATION:   10:45:15  10/26/90
FIELD CALIBRATOR: #AL          SOURCE: #047


ALUMINUM SLIDE IN         SHOP           FIELD          UNITS
-----------------       --------       ---------        -----
ALUMINUM DENSITY          2.158          2.165          gm/cc
ALUMINUM CORRECTION       -.001           .004          gm/cc
ALUMINUM PE SHORT         4.700          4.879
ALUMINUM PE LONG          3.869          4.223

          SPECTRAL DENSITY AFTER SURVEY FIELD CHECK SUMMARY
PERFORMED:  06:52:37  11/16/90   LAST SHOP CALIBRATION:   10:45:15  10/26/90


ALUMINUM SLIDE IN         BEFORE         AFTER          UNITS
-----------------       --------       -------          -----
ALUMINUM DENSITY          2.165          2.163          gm/cc
ALUMINUM CORRECTION        .004          -.000          gm/cc
ALUMINUM PE SHORT         4.879          4.791
ALUMINUM PE LONG          4.223          4.163


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                          H L S CALIBRATION SUMMARY TABLE
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   SERVICE or SIGNAL         SHOP      BEFORE     AFTER     CHANGE   TOLERANCE
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GAMMA                      247        244        247        -3         +/- 9.0
DSN POROSITY                27.617     28.223     28.208     .015      +/-.90
CALIPER VALUE 1              8.000      7.635      7.750    -.114      +/- 0.50
BULK DENSITY                 2.158      2.165      2.163     .001      +/-.015
DENSITY CORRECTION           -.001       .004      -.000     .004      +/-.015
DENSITY PE SHORT             4.700      4.879      4.791     .087      +/-.30
DENSITY PE LONG              3.869      4.223      4.163     .060      +/-.30
```

#	TIME	FT	EVENT	REMARKS
			PRE-LOGGING DATA	
1	3:45:10	00000	DATE OF LOG: MMDD 1116	
2	4: 6:43	01031	PLS SOFTWARE REVISION 2.60	
3	4:45:52	01900	IS THIS A CASED HOLE? (Y/N) N	
4	4:45:52	01901	CASING SIZE O.D. (INCHES) 5.500	
5	4:45:53	01903	CASING WEIGHT? (POUNDS/FT) 17.000	
6	4:45:54	01906	CASING SIZE O.D. (INCHES) 5.500	
7	4:45:54	01907	BIT SIZE? (INCHES) 7.875	
8	4:45:55	01911	MATRIX DENSITY? (1.5<RHOM<4.5) 2.710	
9	4:45:56	01912	FLUID DENSITY (.10<RHOF<1.2) 1.000	
10	4:45:56	01914	MUD DENSITY (#/GAL) 9.500	
11	4:45:56	01915	ANY BARITE IN MUD? (Y/N) Y	
12	4:45:56	01916	UN-FILTERED PE DATA? (Y/N) N	
13	4:45:57	01919	DSN BAD HOLE CORRECTION? (Y/N) Y	
14	4:45:57	01919	DSN STANDOFF? (INCHES) 0.000	
15	4:45:58	01921	LITHOLOGY:L=1,S=2,D=3,LS=4,LD=5 1	
16	4:45:58	01922	FOR "F": DSN=1, DEN=2, CROSS=3 2	
17	4:45:59	01924	FOR "F" USE: (.5<A<2.5) 1.000	
18	4:45:59	01924	FOR "F" USE: (1.2<M<2.5) 2.000	
19	4:46:47	02082	MATRIX DENSITY? (1.5<RHOM<4.5) 2.650	
20	4:46:54	02103	MUD DENSITY (#/GAL) 10.100	
21	4:47: 8	02153	LITHOLOGY:L=1,S=2,D=3,LS=4,LD=5 2	
22	4:47:17	02179	FOR "F" USE: (.5<A<2.5) 8.100-1	
23	4:47:18	02186	>ACTIVATION DEPTH NOW	
24	4:49:17	02572	"HALTING" END OF SECTION	
25	4:51:52	03055	SDL OPEN MANDREL.	
26	4:52:53	02159	LOGGING SECTION NO. 1	
27	5: 0: 6	01944	"HALTING" END OF SECTION	
28	5: 0:46	01923	SDL CLOSE MANDREL.	
29	5: 2:37	01895	SDL OPEN MANDREL.	
30	5: 3:58	02158	LOGGING SECTION NO. 2	
31	6: 1:11	00431	"HALTING" END OF SECTION	
32	6: 2: 4	00400	SDL CLOSE MANDREL.	