COMPANY NORTHWEST NATURAL GAS
WELL OM 33D-3-65
FIELD MIST (FLORA POOL STORAGE)
COUNTY COLUMBIA STATE OR

HALLIBURTON

SCANNED

QUAD COMBO
HRI/BCS/SDL/DSN

5"=100'

COMPANY NORTHWEST NATURAL GAS
WELL OM 33D-3-65
FIELD MIST (FLORA POOL STORAGE)
COUNTY COLUMBIA STATE OR

API No. 36-009-00238
Location 1013.04' N 0.05' 24" E
1652.79' N 89 54' 36" W
FROM THE EAST 1/4
OF SECTION 3 WB&M
X: 1293064.38
Y: 874027.80
Sect 3 Twp 6N Rge 5W

Other Services
EMIT-A

Permanent Datum G.L. Elev 1078.3'
Log measured from K.B. 14.0' above perm. datum
Drilling measured from K.B.

Elev. K.B. 1092.3'
D.F
G.L. 1078.3'

Date	JUN-11-2007			
Run No.	ONE			
Depth – Driller	3281'			
Depth – Logger	3282'			
Bottom – Logged Interval	3273'			
Top – Logged Interval	1571'			
Casing – Driller	8.625" @ 1570'	@	@	@
Casing – Logger	1571'			
Bit Size	7.875"			
Type Fluid in Hole	GEL			
Dens | Visc.	9.2 | 57.0	|	|	|
Ph | Fluid Loss	8.4 | 5.0	|	|	|
Source of Sample	FLOWLINE			
Rm @ Meas. Temp.	1.550 @ 63 F	@	@	@
Rmf @ Meas. Temp.	1.790 @ 56 F	@	@	@
Rmc @ Meas. Temp.	1.300 @ 58 F	@	@	@
Source Rmf | Rmc	MEAS | MEAS	|	|	|
Rm @ BHT	1.141 @ 88 F	@	@	@
Time Since Circ.	06-10 1700			
Time on Bottom	06-11 0025			
Max. Rec. Temp.	88 F @ TD	@	@	@
Equip. | Location	49599 | WDLD	|	|	|
Recorded By	G. ROUSSEAU			
Witnessed By	J. MEYER	C. ROTH	E. VADER	

Service Ticket No 5[illegible]59527 API Serial No 36-009-00238 PGM Version [illegible]

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLES				
Date | Sample No				
Depth – Driller				
Type Fluid in Hole				
Dens. | Visc.	|		|	
Ph | Fluid Loss	|		|	
Source of Sample				
Rm @ Meas. Temp.	1.550	@ 63 F	@	
Rmf @ Meas. Temp.	1.790	@ 56 F	@	
Rmc @ Meas. Temp.	1.300	@ 58 F	@	
Source Rmf | Rmc	MEAS	| MEAS	|	
Rm @ BHT	1.141	@ 88 F	@	
Rmf @ BHT	1.186	@ 88 F	@	
Rmc @ BHT	0.888	@ 88 F	@	

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	HRIT #2[illegible]32	NA	1.50" SO	NA

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	A-[illegible]80	Serial No.	460[illegible] 264	Serial No.	I714M74[illegible]	Serial No.	05
Model No.	NGRT	Model No.	305B BCS	Model No.	SDLT-DA	Model No.	DSNT-X
Diameter	3.635"	No. of Cent.	TWO	Diameter	5.500"	Diameter	3.625"
Detector Model No.	432	Spacing	2 FEET	Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	CS-137	Source Type	AM241BE
Length	4.00"	LSA [Y / N]	NO	Serial No.	2694GW	Serial No.	DSN-307
Distance to Source	[illegible]	FWDA [Y / N]	NO	Strength	1.5 CI	Strength	15.0 CI

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	3282'	1571'	60	0	150				1.65	2.65	2.65	60	0	SAND
				AP[I	API				GMCC	GMCC	GMCC	%	%	

DIRECTIONAL INFORMATION

Maximum Deviation	3.17	deg. @	3103'	KOP	1580'

Remarks.

MAGNETIC DECLINATION 19.1 DEGREES.
RUN 1: HRID-BCSD-FACT, RUN 2: SDLT-DSNT-NGRT.
RUN 1, RUN2 MERGED FOR FINAL PRESENTATION.

CREW: M. EMERSON, I. PYLES, S. FANCHER.

RIG: TD DRILLING NO. 101.

HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.

HALLIBURT.

HALLIBURTON

Version No: | hc:3.0
Data File: MER1.cls
Format File: 5.QUAD.spc
Plot Time: 2007-06-11 03:33:20
Database Time: 03:24:37

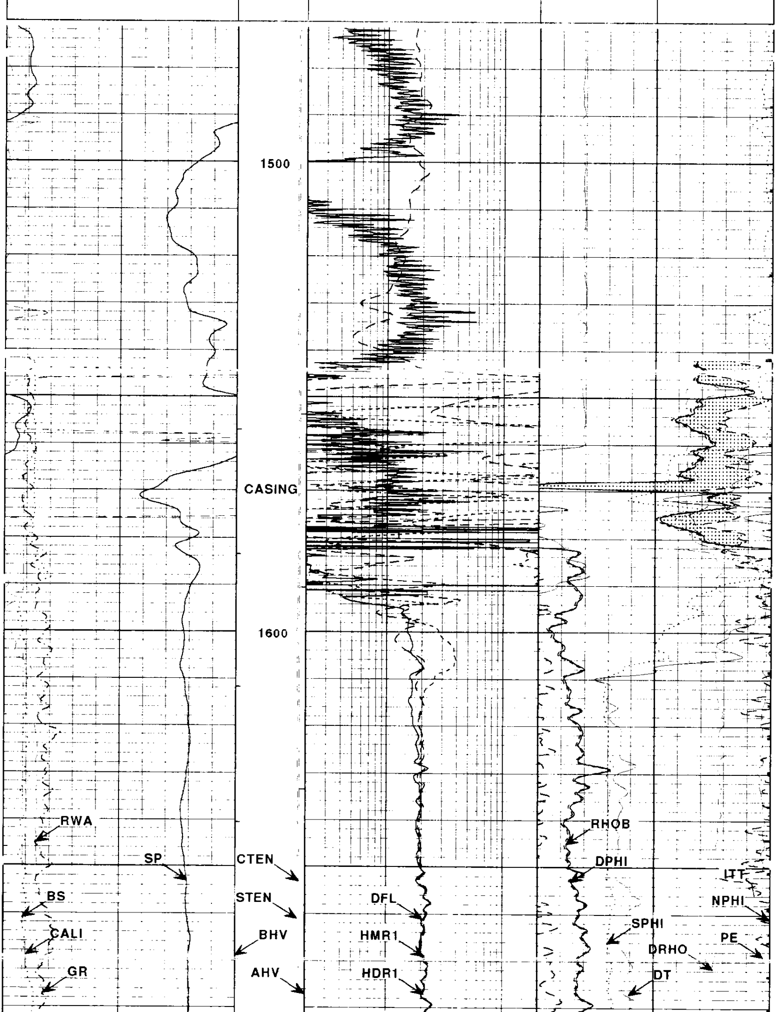
Top Depth: 1471.00
Bottom Depth: 3292.25

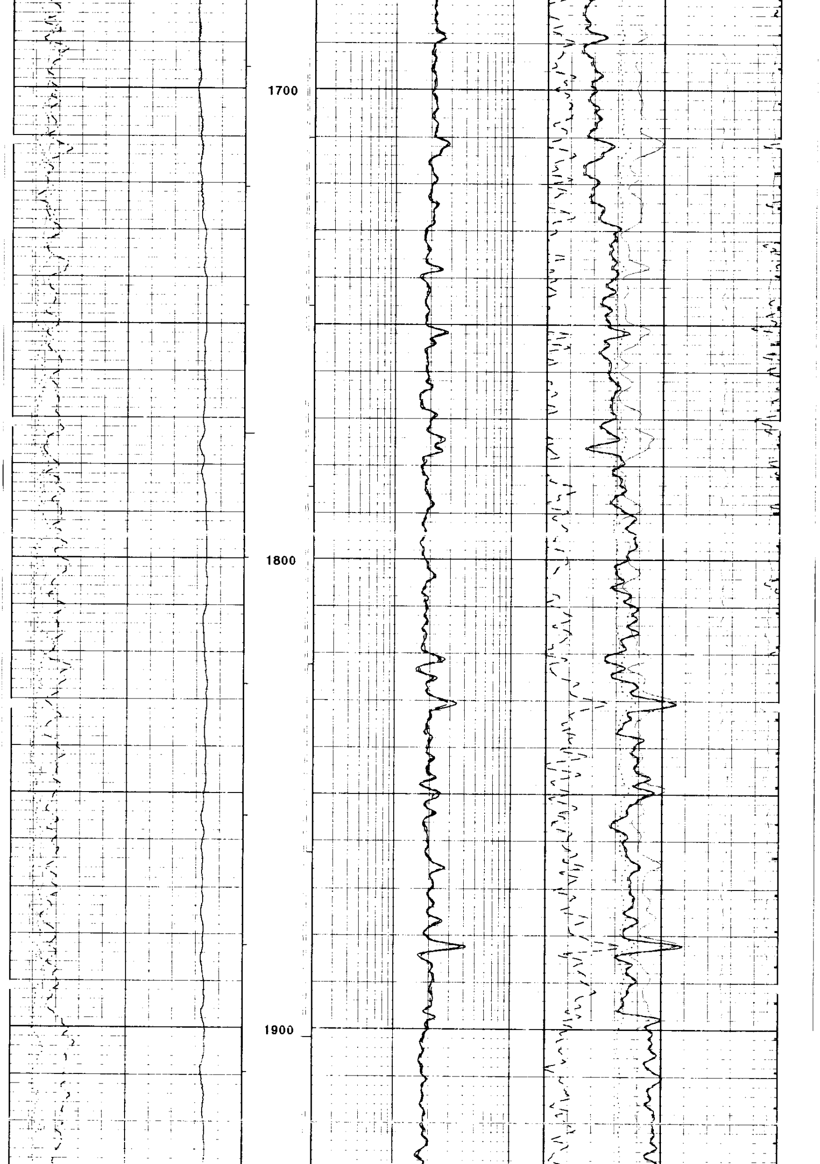
Curve	Left	Unit	Right
GR	0	API	150
CALI	7	INCH	17
BS	7	INCH	17
SP		-]10[+	
RWA	0	OHMM	3

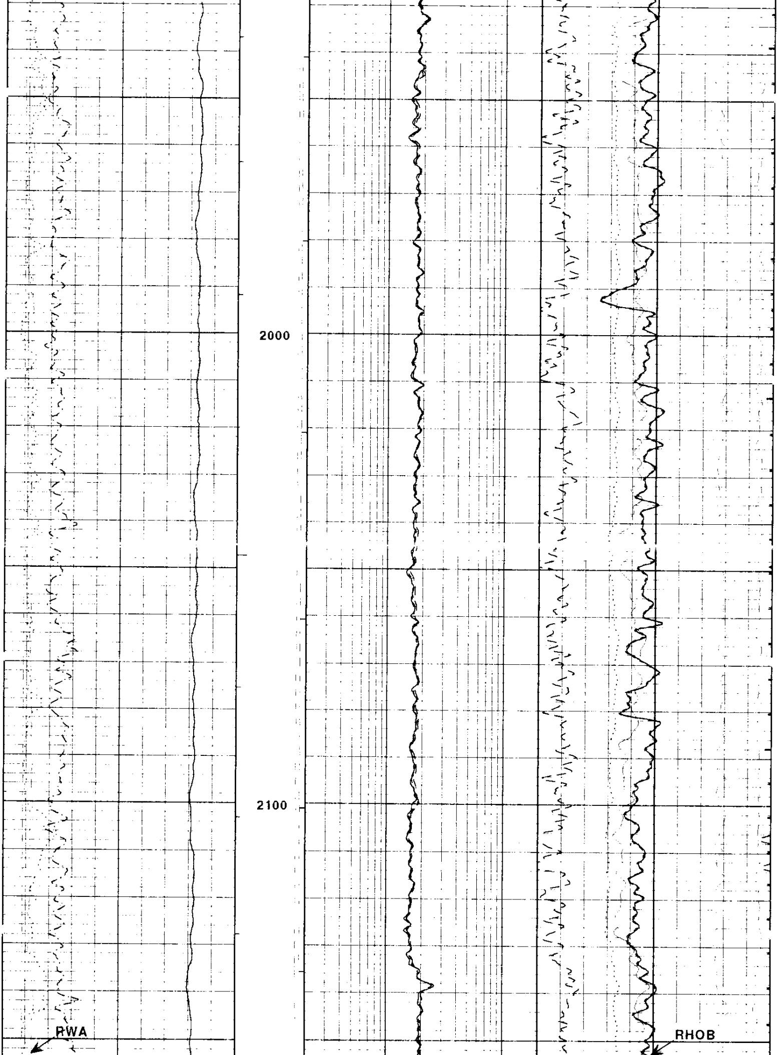
Curve	Left	Unit	Right
AHV	100	FT3	0
BHV	0	FT3	100
STEN	10500		500
CTEN	10000		0
1:240		FT.	

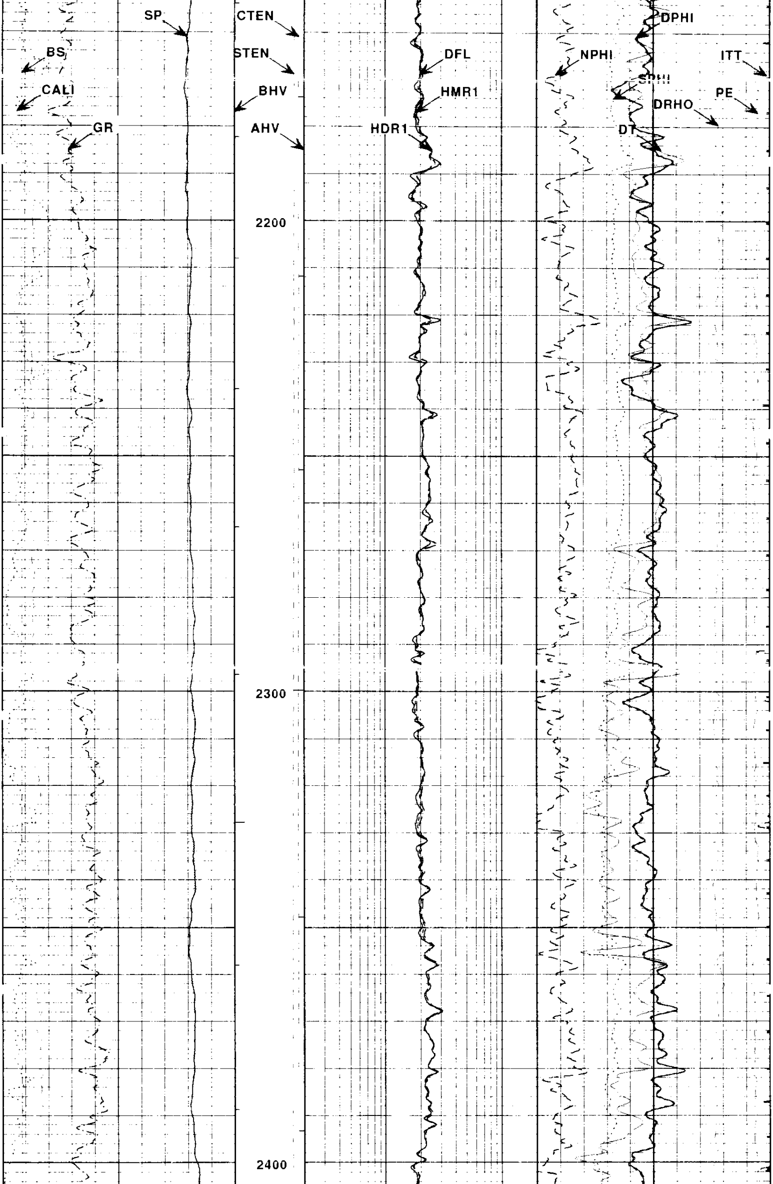
Curve	Left	Unit	Right
HDR1	0.2	OHMM	20
HMR1	0.2	OHMM	20
DFL	0.2	OHM	20

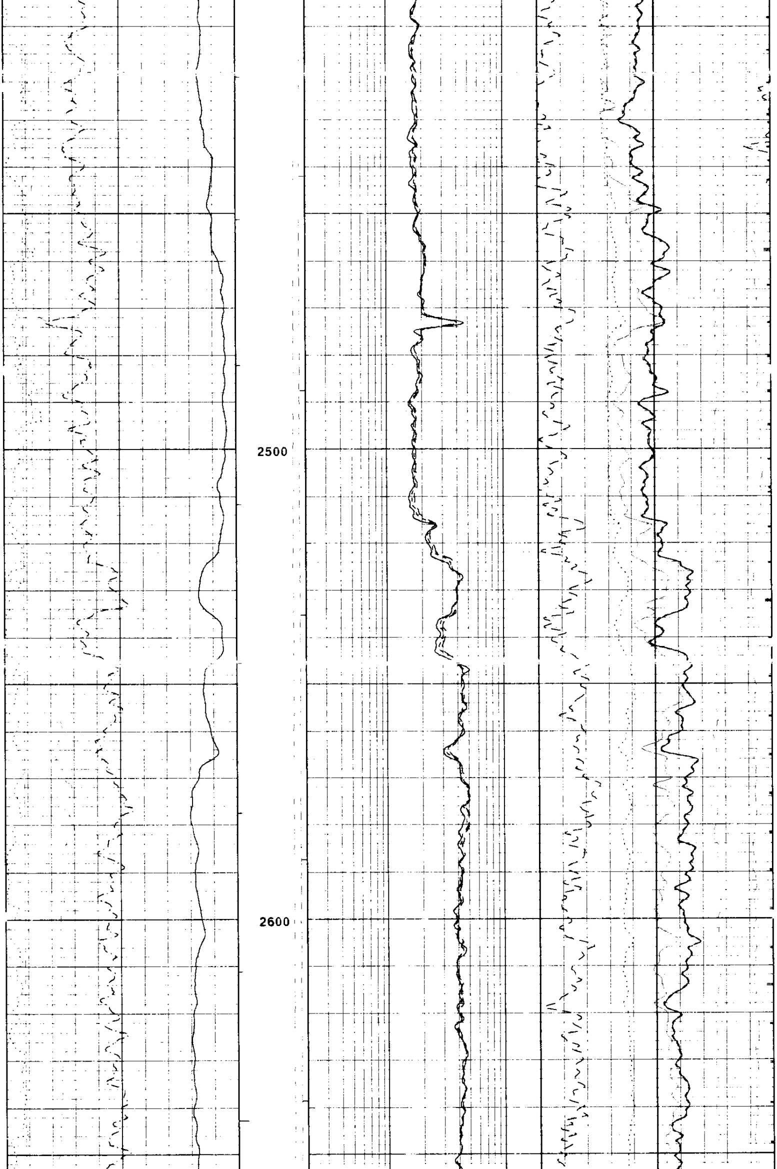
Curve	Left	Unit	Right
DT	175	US.F	75
SPHI	60.	%	0
NPHI	60.	%	0
DPHI	60.	%	0
RHOB	1.65	G/CC	2.65
DRHO	-0.5	G/CC	0.5
PE	12		2
ITT			

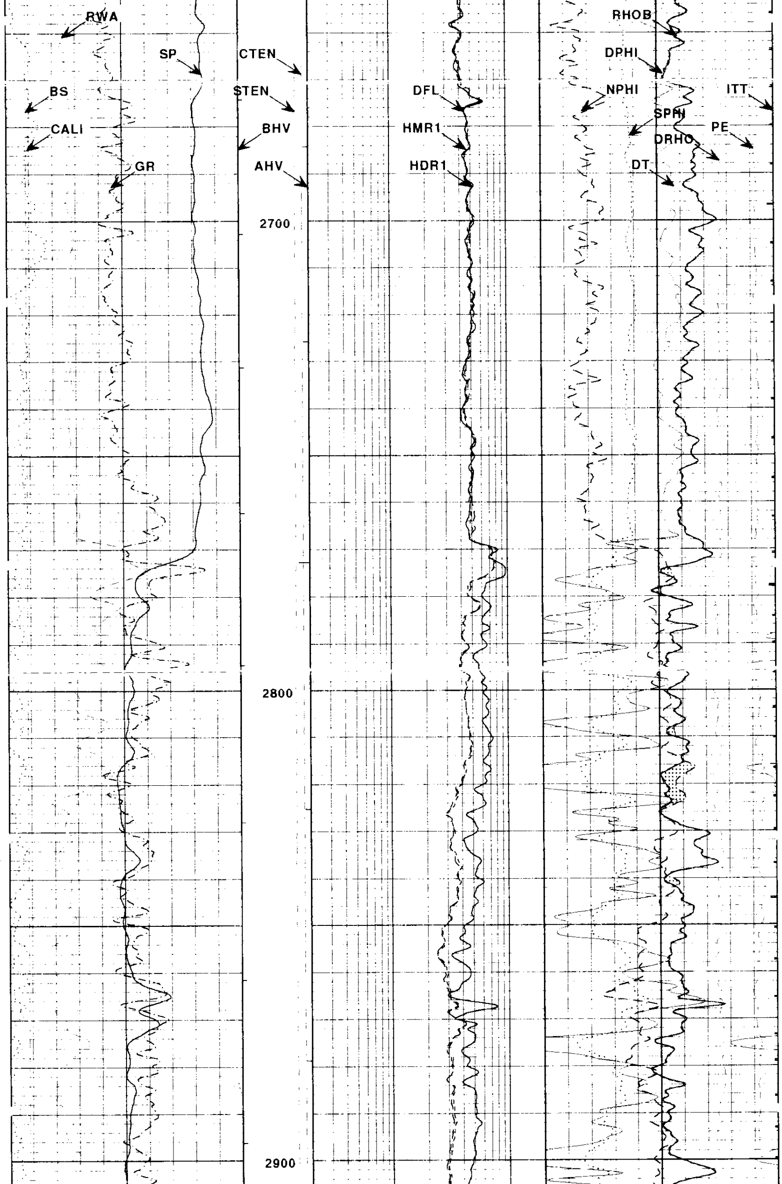


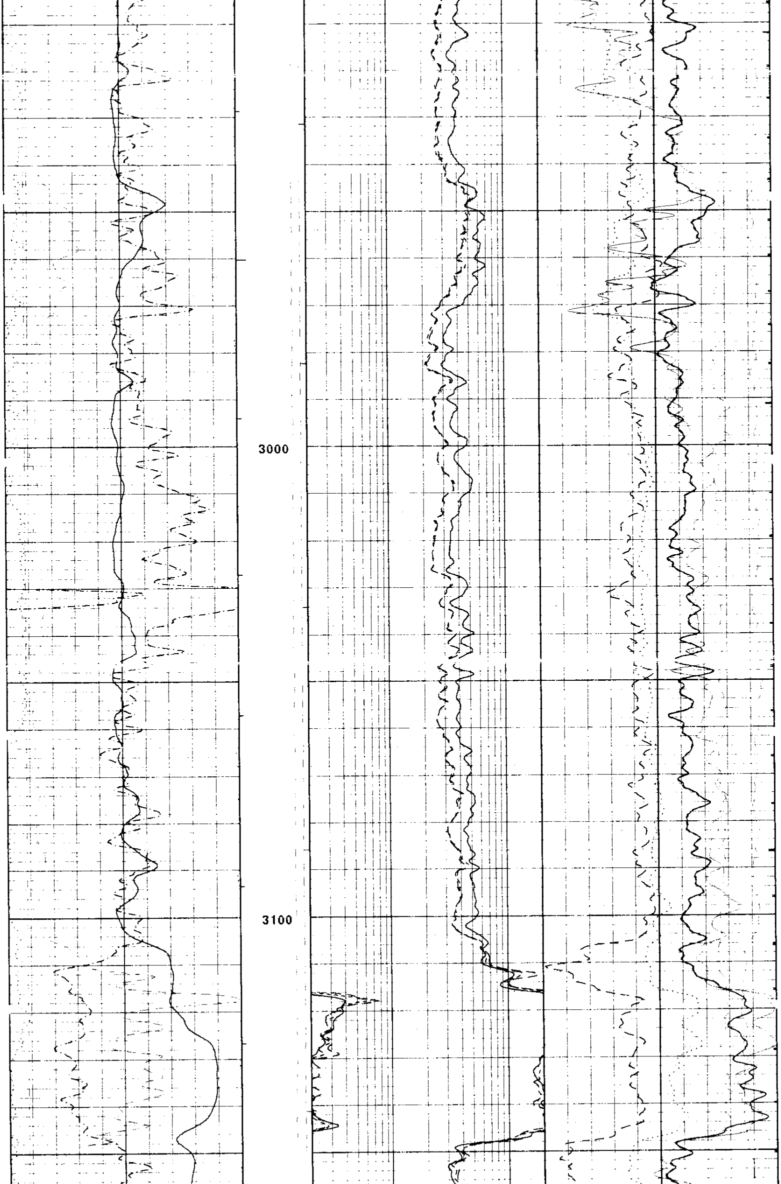


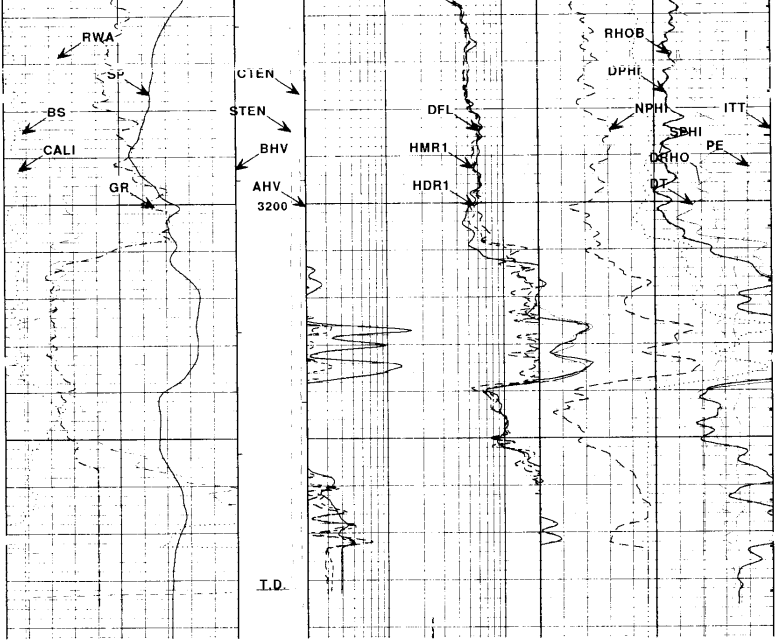












ITT

PE
12 2

DRHO
-0.5 G/CC 0.5

RWA
0 OHMM 3

1:240
FT.

RHOB
1.65 G/CC 2.65

SP
-]10[+

CTEN
10000 0

DPHI
60. % 0

BS
7 INCH 17

STEN
10500 500

DFL
0.2 OHM 20

NPHI
60. % 0

CALI
7 INCH 17

BHV
0 FT3 100

HMR1
0.2 OHMM 20

SPHI
60. % 0

GR
0 API 150

AHV
100 FT3 0

HDR1
0.2 OHMM 20

DT
175 US/F 75

HALLIBURTON

Version No: | hc:3.0
Data File: MER1.cls
Format File: 5.QUAD.spc
Plot Time: 2007-06-11 03:33:09
Database Time: 03:24:37

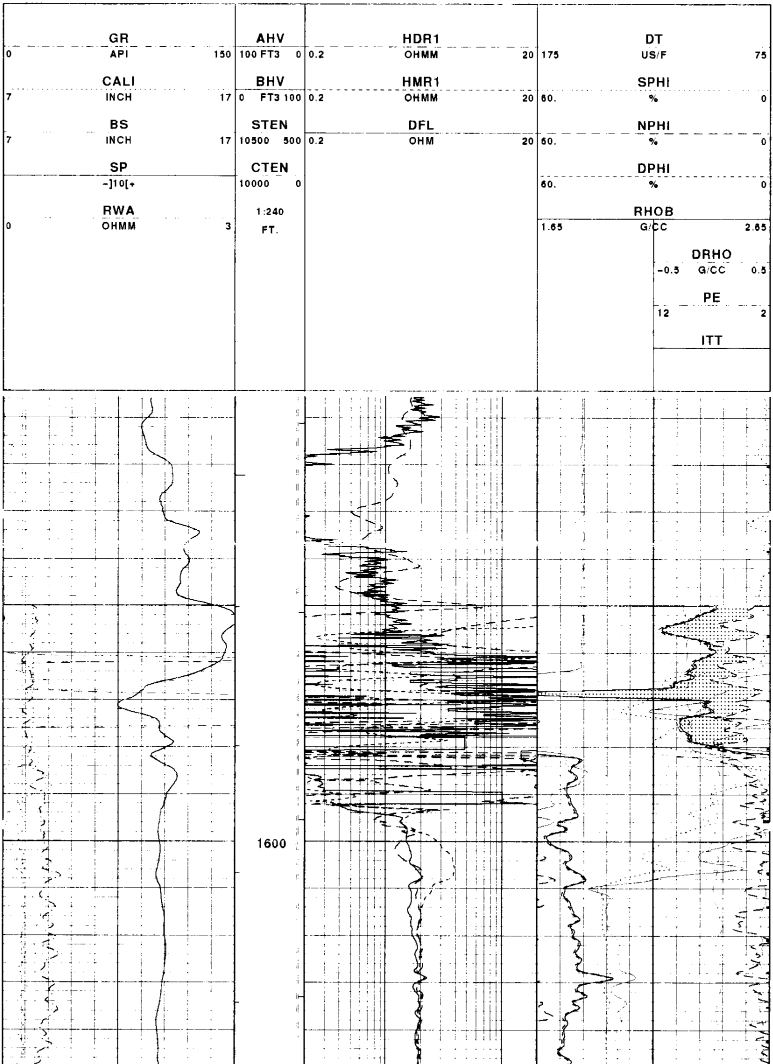
Top Depth: 1471.00
Bottom Depth: 3292.25

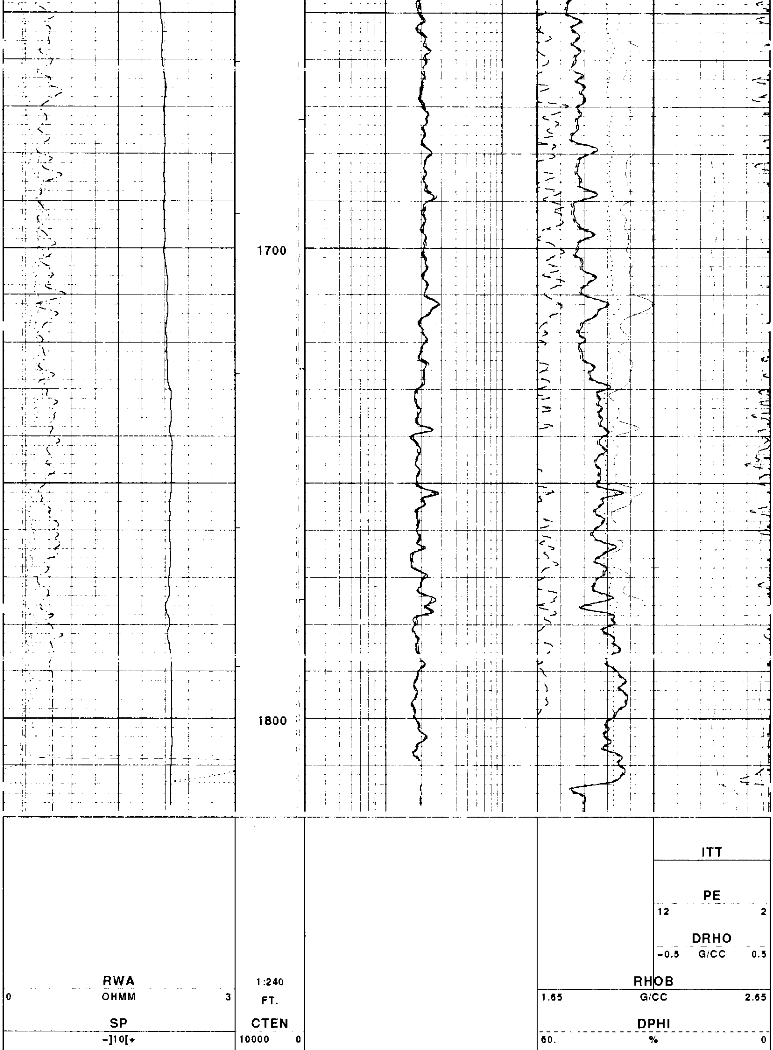
REPEAT SECTION

HALLIBURTON

Version No: | hc:3.0
Data File: REPEAT.MER1.cls
Format File: 5 QUAD.spe
Plot Time: 2007-06-11 03:33:52
Database Time: 03:26:40

Top Depth: 1505.00
Bottom Depth: 1819.83





	BS			STEN			DFL			NPHI	
7	INCH	17	10500		500	0.2	OHM	20	60.	%	0
	CALI			BHV			HMR1			SPHI	
7	INCH	17	0	FT3	100	0.2	OHMM	20	60.	%	0
	GR			AHV			HDR1			DT	
0	API	150	100	FT3	0	0.2	OHMM	20	175	US/F	75

HALLIBURTON

Version No: | hc:3.0
Data File: REPEAT.MER1 cls
Format File: 5.QUAD.spc
Plot Time: 2007-06-11 03:33:49
Database Time: 03:26:40

Top Depth: 1505.00
Bottom Depth: 1819.63

Current EXCELL-2000 Parameter Values
Depth: 189.750
Date: 10-Jun-2007 23:32:
Service Number: 2241
Software Version: 5.7

Mnemonic	Tool	Parameter Description	Value	Units
PERF	DITSHD	PERFORATED INTERVAL	NO	
TD	DITSHD	TOTAL DEPTH	0.	FT
CS_ANT	DITSHD	CASING DEPTH (FOR ANNOTATION)	0.	FT
ANTSPA	DITSHD	ANNOTATION LABEL SPACING	500.	Ft
FWSTOK	BCS	DO FWST CALCULATIONS?	YES	
WYLIE	BCS	ACOUSTIC POROSITY EQUATION	HLSP	
DTSHA	BCS	DELTA T SHALE	100.	uSec/Ft.
DTMAT	BCS	DELTA T MATRIX	55.5	uSec/Ft.
DTFLU	BCS	DELTA T FLUID?	189.	uSec/Ft.
RHOMAT	BCS	MATRIX DENSITY	2.65	Grams/CC
RHOFLU	SHARED	FLUID DENSITY	1.	Grams/CC
DTFT	BCS	USE 1 OR 2 FT DT FOR POROSITY	2	Feet
ARCHA	SHARED	ARCHIE A	0.81	
ARCHM	SHARED	ARCHIE M	2.	
FSEL	SHARED	POROSITY SELECTION FOR F	ACOU	
USEFIX	BCS	USE MINIMUM FIXED THRESHOLD.	NO	
USENOI	BCS	USE NOISE THRESHOLD FOR PICK.	NO	
TDU_OK	TDUF	USE TDU DISPLAY CONTROLS?	YES	
XPHLOC	XP_RWA	CROSSPLOT SELECTION FOR XPOR	XPLT	
CASED	SHARED	IS THE HOLE CASED?	NO	
FACTOK	FACMAN	DO FACT CALCULATIONS?	YES	
BS	FACMAN	BIT SIZE	7.875	Inches
AHVOK	FACMAN	DO ANNULAR VOLUME CALCULATION?	YES	
CASEOD	FACMAN	CASING DIAMETER (OD)	4.5	Inches
HRI_OK	HRIDE	DO HRI INDUCTION CALCULATION?	YES	
DFL_OK	HRIDE	DO DFL CALCULATIONS?	YES	
PYRITE	HRIDE	PYRITE SWITCH	NO	OHMM
CASING	HRIDE	CASING DEPTH	0.	Feet
HRIDSP	HRIDE	SPIKE REDUCTION FILTER TYPE?	DELT	
HRITC	HRIDE	HRI TEMPERATURE CORRECTION	NONE	
CTEM	HRIDE	CONST TEMPERATURE	75.	DegF
BHT	HRIDE	BOTTOM HOLE TEMPERATURE	99.	Degrees F.
TSURF	HRIDE	SURFACE TEMPERATURE	60.	Degrees F
BHD	HRIDE	BOTTOM HOLE DEPTH	3281.	Feet
SP	HRIDE	USE DIGITAL SP?	NO	
SP_OF	HRIDE	SPONTANEOUS POTENTIAL OFFSET	0.	
RMUD	HRIDE	MUD RESIST AT SURFACE (0=Air)	2.	OHMM
TRM	HRIDE	TEMPERATURE OF MUD	75.	DEGF
RRMIN	HRIDE	MINIMUM RESISTIVITY FOR MAP?	0.2	OHMM
RRMAX	HRIDE	MAXIMUM RESISTIVITY FOR MAP?	200.	OHMM

EXCELL-2000 Calibration Report
Date: 11-Jun-2007 06:14:

```
                EMI NAVIGATION ACCELEROMETER SHOP CALIBRATION SUMMARY
    PERFORMED: 30-Aug-2006 08:48  LAST SHOP CALIBRATION: 30-Aug-2006 08:30
    SERIAL NUMBER: PK009          MODEL: EMI-A
    TRUCK UNIT NUMBER:            PROGRAM VERSION: 5.8
    PERFORMED BY: T
--------------------------------------------------------------------------------

         THIS IS THE SHOP STEP TO ESTABLISH ACCELEROMETER ZERO

             ACCELEROMETER-X     ACCELEROMETER-Y     ACCELEROMETER-Z
          MEASURED CALIBRATED MEASURED CALIBRATED MEASURED CALIBRATED  UNITS
          -------- ---------- -------- ---------- -------- ----------  -----
VERTICAL:  -0.0011    0.0000  -0.0016    0.0000    1.0011    1.0000      G

             ACCELEROMETER
          MEASURED CALIBRATED UNITS
          -------- ---------- -----
TOTAL:      1.0011    1.0000  G

TEMP:         83.8            DEG F
```

```
                EMI NAVIGATION MAGNETOMETER SHOP CALIBRATION SUMMARY
    PERFORMED: 30-Aug-2006 08:57  LAST SHOP CALIBRATION: 30-Aug-2006 08:45
    SERIAL NUMBER: PK009          MODEL: EMI-A
    NAV STAND SN: 11751
    TRUCK UNIT NUMBER:            PROGRAM VERSION: 5.8
    PERFORMED BY: T
--------------------------------------------------------------------------------

             MAGNETOMETER-X       MAGNETOMETER-Y       MAGNETOMETER-Z
          MEASURED CALIBRATED  MEASURED CALIBRATED  MEASURED CALIBRATED UNITS
          -------- ----------  -------- ----------  -------- ---------- -----
MINIMUM:   -0.9997   -1.0000    -0.9984   -1.0000    -0.9990   -1.0000    H
MAXIMUM:    0.9985    1.0000     0.9982    1.0000     1.0004    1.0000    H
TOTAL H:  ------------------->   1.0041    1.0044   <-------------------    H

TEMP:         84.3                                                      DEG F
```

```
                  EMI CALIPER PACKAGE SHOP CALIBRATION SUMMARY
    PERFORMED: 08-Jun-2007 18:09  LAST SHOP CALIBRATION:
    SERIAL NUMBER: PK009          MODEL: EMI-A
    LARGE JIG SN: WDLD            SMALL JIG SN: WDLD
    TRUCK UNIT NUMBER: 10549599   PROGRAM VERSION: 5.7
    PERFORMED BY: G. ROUSSEAU
--------------------------------------------------------------------------------

                CALIPER 1-4         CALIPER 2-5         CALIPER 3-6
            MEASURED CALIBRATED MEASURED CALIBRATED MEASURED CALIBRATED  UNITS
            -------- ---------- -------- ---------- -------- ----------  -----
LARGE 15":    14.830     14.830   14.830     14.830   14.830     14.830  INCH
SMALL  7":     6.923      6.923    6.923      6.923    6.923      6.923  INCH

              PRESSURE PAD
          MEASURED CALIBRATED
          -------- ----------
CLOSED:      0.000      0.000
OPENED:      0.000      1.000
```

EMI CALIPER PACKAGE BEFORE SURVEY FIELD CHECK SUMMARY

PERFORMED: 10-Jun-2007 17:03 LAST SHOP CALIBRATION: 08-Jun-2007 18:09

	CALIPER 1-4		CALIPER 2-5		CALIPER 3-6		
	SHOP	FIELD	SHOP	FIELD	SHOP	FIELD	UNITS
FIELD RING:	6.923	7.016	6.923	7.036	6.923	7.068	INCH

EMI CALIPER PACKAGE AFTER SURVEY FIELD CHECK SUMMARY

PERFORMED: 11-Jun-2007 06:06 LAST SHOP CALIBRATION: 08-Jun-2007 18:09

	CALIPER 1-4		CALIPER 2-5		CALIPER 3-6		
	BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	UNITS
FIELD RING:	7.016	7.017	7.036	7.038	7.068	7.062	INCH

EMI-A DIPMETER PROCESSING SHOP CALIBRATION SUMMARY

PERFORMED: 08-Jun-2007 18:27 LAST SHOP CALIBRATION: 08-Jun-2007 18:18
SERIAL NUMBER: PK009 MODEL: EMI-A
TRUCK UNIT NUMBER: 10549599 PROGRAM VERSION: 5.7
PERFORMED BY: G. ROUSSEAU

************** PAD RESISTIVITIES ********************

	MEASURED	CALIBRATED	MEASURED	CALIBRATED	MEASURED	CALIBRATED	UNITS
PADS #1-3:	0.448	0.450	0.448	0.450	0.508	0.450	OHM-M
PADS #4-6:	0.641	0.450	0.447	0.450	0.447	0.450	OHM-M
CALO #1-3:	0.429		0.421		2.207		OHM-M
CALO #4-6:	2.162		0.425		0.427		OHM-M
TEMP:	109.4						DEG F

	RELATIVE PAD VOLTS MEASURED	CALIBRATED
AIR:	1.022	1.000
ZERO:	-0.024	0.000
CALIBRATE:	0.803	0.811

EMI-A DIPMETER PROCESSING BEFORE SURVEY FIELD CHECK SUMMARY

PERFORMED: 10-Jun-2007 17:00 LAST SHOP CALIBRATION: 08-Jun-2007 18:27

	SHOP	BEFORE	UNITS
REFLVL PAD 1:	0.433	0.432	OHM-M
REFLVL PAD 2:	0.423	0.423	OHM-M
REFLVL PAD 3:	1.904	1.902	OHM-M
REFLVL PAD 4:	1.491	1.490	OHM-M
REFLVL PAD 5:	0.429	0.429	OHM-M
REFLVL PAD 6:	0.431	0.431	OHM-M

EMI-A DIPMETER PROCESSING AFTER SURVEY FIELD CHECK SUMMARY

PERFORMED: 11-Jun-2007 06:09 LAST SHOP CALIBRATION: 08-Jun-2007 18:27

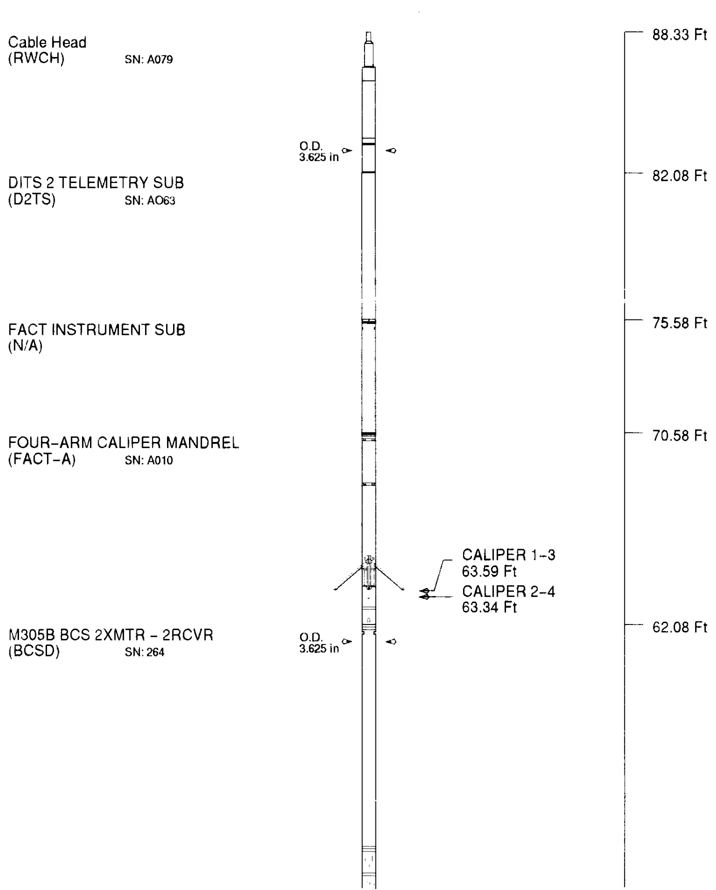
	SHOP	BEFORE	AFTER	UNITS
REFLVL PAD 1:	0.433	0.432	0.432	OHM-M
REFLVL PAD 2:	0.423	0.423	0.423	OHM-M
REFLVL PAD 3:	1.904	1.902	1.902	OHM-M
REFLVL PAD 4:	1.491	1.490	1.490	OHM-M
REFLVL PAD 5:	0.429	0.429	0.429	OHM-M
REFLVL PAD 6:	0.431	0.431	0.431	OHM-M

EXCELL-2000 Calibration Summary Table
Date: 11-Jun-2007 06:14:

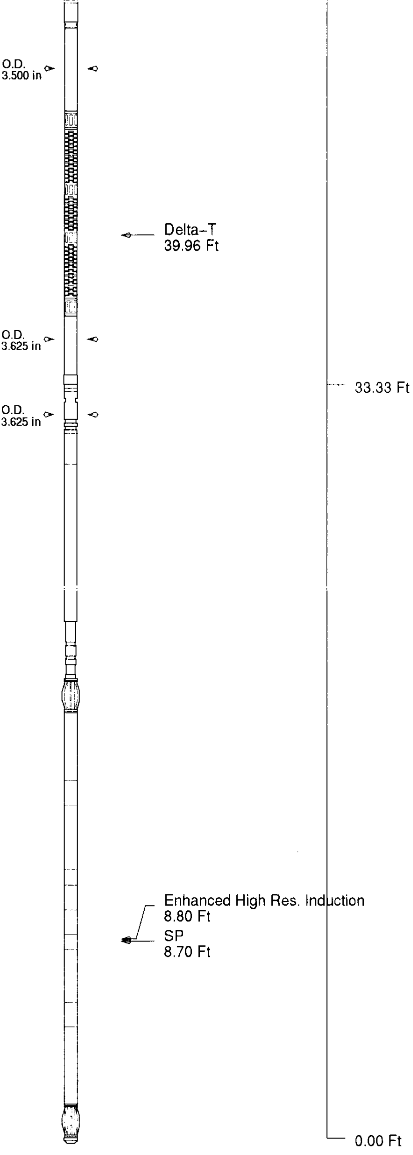
Service or Signal	Shop	Before	After	Change	Tolerance

Excell 2000 Tool String Diagram

HIGH RES. INDUCTION BOREHOLE COMPENSATED SONIC



ENHANCED HIGH RESOLUTION IND.
(HRI) SN: 211_132



Tool Mnemonic	Length (Ft)	Weight In Air (lbs)	Logging Speed (Ft/min)
RWCH	6.25	135.00	N/A
D2TS	6.50	100.00	N/A
N/A	5.00	86.00	N/A
FACT-A	8.50	210.00	60.00
BCSD	28.75	515.00	60.00
HRI	33.33	445.00	100.00
Tool String	88.33	1491.00	60.00

COMPANY	NORTHWEST NATURAL GAS		
WELL	OM 33D-3-65		
FIELD	MIST (FLORA POOL STORAGE)		
COUNTY	COLUMBIA	STATE	OR

HALLIBURTON

QUAD COMBO
HRI/BCS/SDL/DSN

5"=100