

HALLIBURTON

15-41485

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State of New Mexico, Eddy County

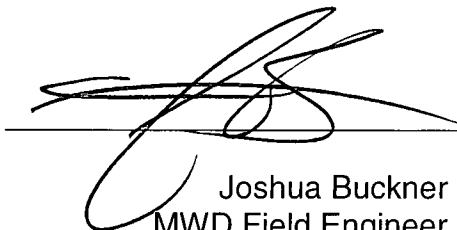
I, Joshua Buckner, certify that I am employed by Halliburton Energy Services, Inc. (AKA Sperry Drilling) and that on the dates of February 25, 2014 through March 15, 2014, I did conduct or supervise the taking of a MWD Directional surveys for the well Hayhurst 17 Federal 1H from 495' MD to 12083' MD. This data is true, correct, complete and within the limitations of the tools as set forth by Halliburton Energy Services, Inc. (AKA Sperry Drilling). I am authorized and qualified to make this report and this survey was conducted at the request of Chevron USA, Inc. for the Hayhurst 17 Federal 1H well, API No. 30-015-41845 in Eddy County, New Mexico. I have reviewed this report and find that it conforms to the principles and procedures as set forth by Halliburton Energy Services, Inc. (AKA Sperry Drilling).

NM OIL CONSERVATION

ARTESIA DISTRICT

JUN 13 2014

RECEIVED



Joshua Buckner
MWD Field Engineer

Chevron USA, Inc.

Hayhurst 17 Federal 1H

Ensign 767

Eddy County, New Mexico

API# 30-015-41845

February 25, 2014 – March 15, 2014

HD-XX-0901131719

NM OIL CONSERVATION
ARTESIA DISTRICT

JUN 13 2014

RECEIVED

Sperry Drilling

MWD End of Well Report

Submitted by Joshua Buckner

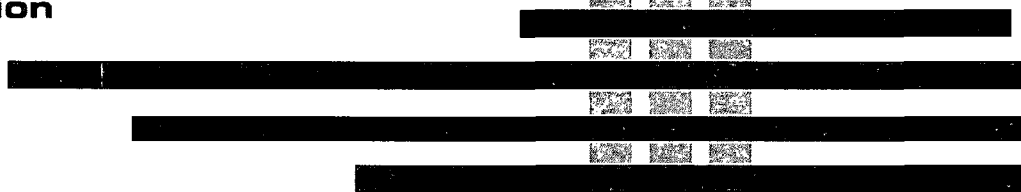
3950 Interwood South Parkway

Houston, TX 77032

Ph: 281.986.4400

HALLIBURTON

**Drilling and Formation
Evaluation**





End of Well Report for Cheveron USA, Inc.

Rig : Ensign 767
Well Name : Hayhurst 17 Federal 1H
Field Name : Cottonwood Draw; Bone Spring
Country : USA
Job Number : HD-XX-0901131719
Job Start Date : 25-Feb-14
API Number : 30-015-41845



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GENERAL INFORMATION

Company : Chevron USA, Inc.
Rig : Ensign 767
Well : Hayhurst 17 Federal 1H
Field : Cottonwood Draw; Bone Spring
Lease Name : NMN113954
State : New Mexico
County : Eddy
Country : USA
API Number : 30-015-41845
Sperry Drilling Job Number : HD-XX-0901131719
Job Start Date : 25-Feb-14
Job End Date : 15-Mar-14
North Reference : Grid
Total Correction (deg) : 7.605
Dip Angle (deg) : 59.908
Total Magnetic Field (nT) : 48220
Date of Magnetic Data : 25 February, 2014
Well Head coordinates N : 32 deg. 8 min 13.41 sec North
Well Head coordinates E : 104 deg. 13 min 11.27 sec West
Vertical section direction (deg): 172.98
Unit Number : 11900009
MWD Engineers : Joshua Buckner, Chad Stich

Company Representatives : John Akin, Jarod White,
Company Geologist: : Ryan Jensen,



OPERATIONAL OVERVIEW

SPERRY DRILLING SERVICES WAS CONTRACTED BY CHEVRON USA, INC. TO PROVIDE DIRECTIONAL DRILLING AND M/LWD SERVICES FOR THE HAYHURST 17 FEDERAL 1H WELL IN EDDY COUNTY, NEW MEXICO. TOOLS AND CREW ARRIVED ON LOCATION 25-FEB-2014 AND RIGGED UP ACCORDINGLY.

RUN 100:

02-26-14 PICKED UP 8" DGWD TOOLS. DRILLED FROM 422' MD TO 657' MD.

02-26-14 POOH TO PICK UP LATERAL ASSYMBLY, 100% MWD RUN.

RUN 200:

02-26-14 PICKED UP 8" DGWD TOOLS. DRILLED FROM 657' MD TO 2042' MD.

02-28-14 POOH TO RUN INTERMEDIATE CASING, 100% MWD RUN.

RUN 300:

03-01-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 2042' MD TO 5795' MD.

03-05-14 POOH TO RUN CHANGE MWD TOOL AND PICK UP CURVE ASSEMBLY, 100% MWD RUN.

RUN 400:

03-05-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 5795' MD TO 7290' MD.

03-07-14 POOH TO RUN CHANGE BIT AND MOTOR, 100% MWD RUN.

RUN 500:

03-07-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 7290' MD TO 7508' MD.

03-08-14 POOH TO RUN CHANGE BIT AND MOTOR, 100% MWD RUN.

RUN 600:

03-08-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 7508' MD TO 11377' MD.

03-13-14 POOH DUE TO MWD FAILURE, 100% MWD RUN.

RUN 700:

03-13-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 11377' MD TO 12151' MD.

03-15-14 POOH DUE TO TD WELL, 100% MWD RUN.



SUMMARY OF MWD RUNS

Run No.	Rig Run No.	Hole Size (in)	MWD Service	Start Depth (ft)	End Depth (ft)	Drill/Wipe Distance (ft)	Run Start Date Time	Run End Date Time	BRT Hrs	Oper. Hrs	Circ.
100	0100	12.25	D/GWD	422.00	657.00	235.00	26-Feb-14 06:00	26-Feb-14 22:30	16.50	16.500	9.0
200	0200	12.25	D/GWD	657.00	2042.00	1385.00	26-Feb-14 23:00	28-Feb-14 11:00	36.00	36.000	29.0
300	0300	8.75	D/GWD	2042.00	5795.00	3753.00	01-Mar-14 20:00	05-Mar-14 02:00	78.00	78.000	62.0
400	0400	8.75	D/GWD	5795.00	7290.00	1495.00	05-Mar-14 15:30	07-Mar-14 11:00	43.50	43.500	42.0
500	0500	8.75	D/GWD	7290.00	7508.00	218.00	07-Mar-14 12:00	08-Mar-14 13:30	25.50	25.500	15.0
600	0600	8.75	D/GWD	7508.00	11377.00	3869.00	08-Mar-14 14:00	13-Mar-14 00:30	106.50	106.500	77.5
700	0700	8.75	D/GWD	11377.00	12151.00	774.00	13-Mar-14 01:30	15-Mar-14 14:00	60.50	60.500	21.5

Job No: HD-XX-0901131719 Well Name: Hayhurst 17 Federal 1H

End of Well Report

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 100	Run Start : 26-Feb-14 06:00	BRT Hrs : 16.50	Circ. Hrs : 9.00
Rig Run No. : 0100	Run End : 26-Feb-14 22:30	Hole Size (in) : 12.25	Oper. Hrs : 16.50

DRILLING DATA

Start Depth (ft) : 422.00	Footage (ft) : 235.00	Avg WOB (klb) : 15.0	Avg ROP (fph) : 35.00
End Depth (ft) : 657.00	Avg Flow Rate(gpm) : 625	Avg TOB (ft-lb) : 6500	Avg SPP (psig) : 1600
Drilling Hrs (hr) : 8.000	Avg RPM (rpm) : 70	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 10.05	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf/ft ²) : 3.00
Chlorides (ppm) : 180000	Max Temp (degF) : 82.02	% Solids (%) : 0.70	% Sand (%) : 0.10
pH (pH) : 9.50	Fluid Loss(mptm) : 4	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 8	Type : D/GWD	Min. Inc. (deg): 0.00	Min. Inc. Depth (ft) : 0.00
Final Az. (deg) : 0.00	Max Op. Press. (psig) 357	Max. Inc. (deg): 0.00	Max. Inc. Depth (ft) : 0.00
MWD Real Time % : 60		MWD Recorded % : 100	

COMMENTS

RUN 100:
02-26-14 PICKED UP 8" DGWD TOOLS. DRILLED FROM 422' MD TO 657' MD.
02-26-14 POOH TO DUE TO MWD FAILURE, 100% MWD RUN.

(1) X-Over Sub
7.75 in OD / 2.87 in ID
SN : DR9193

(2) NMDC
8.00 in OD / 3.25 in ID
SN : DR19453

(3) MWD

(4) NMDC
6.56 in OD / 3.25 in ID
SN : DR20813

(5) Integral Blade
8.00 in OD / 2.81 in ID
SN : FDT10477

(6) Float Sub
7.75 in OD / 2.88 in ID
SN : DR9991

(7) 8" SperryDrill Lobe 6/7 - 4.0
stg
8.00 in OD / 5.25 in ID
SN : 12225601

(8) PDC
8.00 in OD / 2.25 in ID
SN : 775403



Length (ft)	Cumulative Length (ft)
(1) 2.85	106.33
(2) 30.82	103.48
(3) 5.79	72.66
(4) 29.02	66.87
(5) 6.38	37.85
(6) 3.65	31.47
(7) 26.82	27.82
(8) 1.00	1.00

Length
(ft)

Sensor Dist
From Bit
(ft)



HOS
8.00 in OD / 3.25 in ID
SN : HSS1230612
*[1]Positive Pulser - SN : 11050334
*[2]PCM Sonde - SN : 11400863
*[3]PCDC Sonde - SN : 11833345

5.79

[2] 68.59

[3] 63.17

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 200	Run Start : 26-Feb-14 23:00	BRT Hrs : 36.00	Circ. Hrs : 29.00
Rig Run No. : 0200	Run End : 28-Feb-14 11:00	Hole Size (in) : 12.25	Oper. Hrs : 36.00

DRILLING DATA

Start Depth (ft) : 657.00	Footage (ft) : 1385.00	Avg WOB (klb) : 11.0	Avg ROP (fph) : 70.00
End Depth (ft) : 2042.00	Avg Flow Rate (gpm) : 660	Avg TOB (ft-lb) : 5000	Avg SPP (psig) : 2000
Drilling Hrs (hr) : 25.029	Avg RPM (rpm) : 70	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 10.05	Viscosity (spqt) : 29.00	PV (cP) : 2	YP (lbf/ft ²) : 3.00
Chlorides (ppm) : 177000	Max Temp (degF) : 126.52	% Solids (%) : 1.80	% Sand (%) : 0.10
pH (pH) : 10.30	Fluid Loss (mptm) : 25	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 8	Type : D/GWD	Min. Inc. (deg) : 0.47	Min. Inc. Depth (ft) : 1435.00
Final Az. (deg) : 87.90	Max Op. Press. (psig) : 1072.46	Max. Inc. (deg) : 2.26	Max. Inc. Depth (ft) : 1814.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

RUN 200:
02-26-14 PICKED UP 8" DGWD TOOLS. DRILLED FROM 657' MD TO 2042' MD.
02-28-14 POOH TO RUN INTERMEDIATE CASING, 100% MWD RUN.

(1) X-Over Sub
7.75 in OD / 2.87 in ID
SN : DR9193

(2) NMDC
8.00 in OD / 3.25 in ID
SN : DR19453

(3) MWD

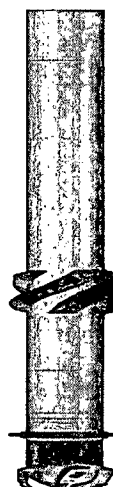
(4) NMDC
6.56 in OD / 3.25 in ID
SN : DR20813

(5) Integral Blade
8.00 in OD / 2.81 in ID
SN : FDT10477

(6) Float Sub
7.75 in OD / 2.88 in ID
SN : DR9991

(7) 8" SperryDrill Lobe 6/7 - 4.0
stg
8.00 in OD / 5.25 in ID
SN : 12225601

(8) PDC
8.00 in OD / 2.25 in ID
SN : 775403



Length (ft)	Cumulative Length (ft)
(1) 2.85	106.33
(2) 30.82	103.48
(3) 5.79	72.66
(4) 29.02	66.87
(5) 6.38	37.85
(6) 3.65	31.47
(7) 26.82	27.82
(8) 1.00	1.00

HOS

8.00 in OD / 3.25 in ID

SN : HSS1230612

*[1]Positive Pulser - SN : 12169049

*[2]PCM Sonde - SN : 11680707

*[3]PCDC Sonde - SN : 11902046



Length (ft)	Sensor Dist From Bit (ft)
5.79	[2] 68.59
	[3] 63.17

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 300	Run Start : 01-Mar-14 20:00	BRT Hrs : 78.00	Circ. Hrs : 62.00
Rig Run No. : 0300	Run End : 05-Mar-14 02:00	Hole Size (in) : 8.75	Oper. Hrs : 78.00

DRILLING DATA

Start Depth (ft) : 2042.00	Footage (ft) : 3753.00	Avg WOB (klb) : 6.0	Avg ROP (fph) : 70.00
End Depth (ft) : 5795.00	Avg Flow Rate(gpm) : 575	Avg TOB (ft-lb) : 7000	Avg SPP (psig) : 2100
Drilling Hrs (hr) : 59.500	Avg RPM (rpm) : 70	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.30	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 73000	Max Temp (degF) : 126.52	% Solids (%) : 2.10	% Sand (%) : 0.10
pH (pH) : 10.50	Fluid Loss(mptm) : 5	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : D/GWD	Min. Inc. (deg): 0.25	Min. Inc. Depth (ft) : 3441.00
Final Az. (deg) : 175.46	Max Op. Press. (psig) 3150	Max. Inc. (deg): 0.69	Max. Inc. Depth (ft) : 2299.00
MWD Real Time % : 75		MWD Recorded % : 100	

COMMENTS

RUN 300:

03-01-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 2042' MD TO 5795' MD.
03-05-14 POOH TO RUN CHANGE MWD TOOL AND PICK UP CURVE ASSEMBLY, 100% MWD RUN.

	Length (ft)	Cumulative Length (ft)		Length (ft)	Sensor Dist From Bit (ft)
(1) X-Over Sub 6.75 in OD / 2.68 in ID SN : DR22359					
(2) NMDC 6.31 in OD / 2.88 in ID SN : DR18625	(1) 3.58	118.89			
(3) MWD	(2) 29.55	115.31	HOS		[2] 79.88
(4) NMDC 6.81 in OD / 2.88 in ID SN : DR8438	(3) 6.40	85.76	6.75 in OD / 2.88 in ID SN : 11633627		[3] 75.76
(5) Pony Collar 6.75 in OD / 2.69 in ID SN : DR9032	(4) 30.31	79.36	*[1]Positive Pulser - SN : 11967617	6.40	[4] 70.26
(6) Integral Blade 6.81 in OD / 2.94 in ID SN : ST150419	(5) 13.15	49.05	*[2]PCM Sonde - SN : 11680866		
(7) Float Sub 6.75 in OD / 2.88 in ID SN : DR9029	(6) 5.74	35.90	*[3]PCG Sonde - SN : 11293275		
(8) 6 3/4" SperryDrill Lobe 6/7 - 5.0 stg 6.75 in OD / 4.50 in ID SN : 11733586	(7) 4.01	30.16	*[4]PCDC Sonde - SN : 11638604		
(9) PDC 6.75 in OD / 2.25 in ID SN : 11983413	(8) 25.15	26.15			
	(9) 1.00	1.00			

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 400	Run Start : 05-Mar-14 15:30	BRT Hrs : 43.50	Circ. Hrs : 42.00
Rig Run No. : 0400	Run End : 07-Mar-14 11:00	Hole Size (in) : 8.75	Oper. Hrs : 43.50

DRILLING DATA

Start Depth (ft) : 5795.00	Footage (ft) : 1495.00	Avg WOB (klb) : 40.0	Avg ROP (fph) : 60.00
End Depth (ft) : 7290.00	Avg Flow Rate(gpm) : 575	Avg TOB (ft-lb) : 2500	Avg SPP (psig) : 1650
Drilling Hrs (hr) : 41.000	Avg RPM (rpm) : 20	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.10	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 89000	Max Temp (degF) : 124.30	% Solids (%) : 0.50	% Sand (%) : 0.10
pH (pH) : 10.50	Fluid Loss(mptm) : 5	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : D/GWD	Min. Inc. (deg): 0.72	Min. Inc. Depth (ft) : 5291.00
Final Az. (deg) : 167.24	Max Op. Press. (psig) : 3443.5	Max. Inc. (deg): 34.79	Max. Inc. Depth (ft) : 7223.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

RUN 400:
03-05-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 5795' MD TO 7290' MD.
03-07-14 POOH TO RUN CHANGE BIT AND MOTOR, 100% MWD RUN.

(1) 5" X 3" HWDP #49.3 - NC50(IF)
5.00 in OD / 3.00 in ID

(2) NMDC
6.31 in OD / 2.88 in ID
SN : DR18625

(3) MWD
(4) NMDC
6.81 in OD / 2.88 in ID
SN : DR8438

(5) Pony Collar
6.75 in OD / 2.69 in ID
SN : DR9032

(6) Float Sub
6.75 in OD / 2.88 in ID
SN : DR9029

(7) 6 3/4" SperryDrill Lobe 6/7 -
5.0 stg
6.75 in OD / 4.50 in ID
SN : 11821693

(8) PDC
6.75 in OD / 2.25 in ID
SN : 11888544

Length
(ft)

Cumulative
Length (ft)

(1) 431.30

(2) 29.55

(3) 6.40

(4) 30.31

(5) 13.15

(6) 4.01

(7) 27.49

(8) 1.00

543.21

111.91

82.36

75.96

45.65

32.50

28.49

1.00

Length
(ft)

Sensor Dist
From Bit
(ft)

[2] 76.48

[3] 72.36

[4] 66.86

HOS

6.75 in OD / 2.88 in ID
SN : 11633627

*[1]Positive Pulser - SN : 12169049

*[2]PCM Sonde - SN : 11680707

*[3]PCG Sonde - SN : 12071272

*[4]PCDC Sonde - SN : 11902046

6.40

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 500	Run Start : 07-Mar-14 12:00	BRT Hrs : 25.50	Circ. Hrs : 15.00
Rig Run No. : 0500	Run End : 08-Mar-14 13:30	Hole Size (in) : 8.75	Oper. Hrs : 25.50

DRILLING DATA

Start Depth (ft) : 7290.00	Footage (ft) : 218.00	Avg WOB (klb) : 45.0	Avg ROP (fph) : 25.00
End Depth (ft) : 7508.00	Avg Flow Rate (gpm) : 450	Avg TOB (ft-lb) : 3000	Avg SPP (psig) : 1500
Drilling Hrs (hr) : 13.500	Avg RPM (rpm) : 0	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.20	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 92000	Max Temp (degF) : 124.30	% Solids (%) : 0.20	% Sand (%) : 0.10
pH (pH) : 10.60	Fluid Loss (mptm) : 4	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : D/GWD	Min. Inc. (deg) : 36.71	Min. Inc. Depth (ft) : 7253.00
Final Az. (deg) : 166.06	Max Op. Press. (psig) : 3591.73	Max. Inc. (deg) : 66.59	Max. Inc. Depth (ft) : 7443.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

RUN 500:
 03-07-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 7290' MD TO 7508' MD.
 03-08-14 POOH TO RUN CHANGE BIT AND MOTOR, 100% MWD RUN.

(1) 5" X 3" HWDP #49.3 - NC50(IF)
5.00 in OD / 3.00 in ID

(2) 5" X 4.276" - 19.5# 6-1/2" X 3"
NC 50 (XH)
5.00 in OD / 4.28 in ID

(3) NMDC
6.31 in OD / 2.88 in ID
SN : DR18625

(4) MWD

(5) NMDC
6.81 in OD / 2.88 in ID
SN : DR8438

(6) Pony Collar
6.75 in OD / 2.69 in ID
SN : DR9032

(7) Float Sub
6.75 in OD / 2.88 in ID
SN : DR9029

(8) 6 3/4" SperryDrill Lobe 6/7 -
5.0 stg
6.75 in OD / 4.50 in ID
SN : 10954901

(9) Tricone
6.75 in OD / 2.25 in ID
SN : RA5386

Length
(ft)

Cumulative
Length (ft)

(1) 460.12

(2) 853.45

(3) 29.55

(4) 6.40

(5) 30.31

(6) 13.15

(7) 4.01

(8) 24.96

(9) 1.00

1422.95

962.83

109.38

79.83

73.43

43.12

29.97

25.96

1.00

Length
(ft)

Sensor Dist
From Bit
(ft)

HOS

6.75 in OD / 2.88 in ID

SN : 11633627

*[1]Positive Pulsar - SN : 10877424

*[2]PCM Sonde - SN : 11620304

*[3]PCG Sonde - SN : 11680905

*[4]PCDC Sonde - SN : 10993280

[2] 73.95

[3] 69.83

[4] 64.33

6.40

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 600	Run Start : 08-Mar-14 14:00	BRT Hrs : 106.50	Circ. Hrs : 77.50
Rig Run No. : 0600	Run End : 13-Mar-14 00:30	Hole Size (in) : 8.75	Oper. Hrs : 106.50

DRILLING DATA

Start Depth (ft) : 7508.00	Footage (ft) : 3869.00	Avg WOB (klb) : 18.0	Avg ROP (fph) : 65.00
End Depth (ft) : 11377.00	Avg Flow Rate (gpm) : 550	Avg TOB (ft-lb) : 15000	Avg SPP (psig) : 2100
Drilling Hrs (hr) : 76.500	Avg RPM (rpm) : 75	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.20	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 81000	Max Temp (degF) : 146.00	% Solids (%) : 2.21	% Sand (%) : 0.10
pH (pH) : 10.50	Fluid Loss (mptm) : 4	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : D/GWD	Min. Inc. (deg) : 69.31	Min. Inc. Depth (ft) : 7466.00
Final Az. (deg) : 175.24	Max Op. Press. (psig) : 3588	Max. Inc. (deg) : 92.62	Max. Inc. Depth (ft) : 9622.00
MWD Real Time % : 90		MWD Recorded % : 100	

COMMENTS

RUN 600:
03-08-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 7508' MD TO 11377' MD.
03-13-14 POOH DUE TO MWD FAILURE, 100% MWD RUN.

(1) NMDC
6.31 in OD / 2.88 in ID
SN : DR18625

(2) MWD

(3) NMDC
6.81 in OD / 2.88 in ID
SN : DR8438

(4) Pony Collar
6.75 in OD / 2.69 in ID
SN : DR9032

(5) Float Sub
6.75 in OD / 2.88 in ID
SN : DR9029

(6) 6 3/4" SperryDrill Lobe 6/7 -
5.0 stg
6.75 in OD / 4.50 in ID
SN : 10954901

(7) PDC
6.75 in OD / 2.25 in ID
SN : 11904711

Length
(ft)

Cumulative
Length (ft)



(1) 29.55

(2) 6.40

(3) 30.31

(4) 13.15

(5) 4.01

(6) 25.23

(7) 1.00

109.65

80.10

73.70

43.39

30.24

26.23

1.00

Length
(ft)



6.40

Sensor Dist
From Bit
(ft)

[2] 74.22

[3] 70.10

[4] 64.60

HOS

6.75 in OD / 2.88 in ID

SN : 11633627

*[1]Positive Pulser - SN : 11580010

*[2]PCM Sonde - SN : 11680707

*[3]PCG Sonde - SN : 11681086

*[4]PCDC Sonde - SN : 11902046

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 700	Run Start : 13-Mar-14 01:30	BRT Hrs : 60.50	Circ. Hrs : 21.50
Rig Run No. : 0700	Run End : 15-Mar-14 14:00	Hole Size (in) : 8.75	Oper. Hrs : 60.50

DRILLING DATA

Start Depth (ft) : 11377.00	Footage (ft) : 774.00	Avg WOB (klb) : 23.0	Avg ROP (fph) : 70.00
End Depth (ft) : 12151.00	Avg Flow Rate (gpm) : 550	Avg TOB (ft-lb) : 18000	Avg SPP (psig) : 2400
Drilling Hrs (hr) : 14.500	Avg RPM (rpm) : 83	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.25	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf/ft ²) : 3.00
Chlorides (ppm) : 81000	Max Temp (degF) : 150.00	% Solids (%) : 1.70	% Sand (%) : 0.10
pH (pH) : 10.50	Fluid Loss (mptm) : 4	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : D/GWD	Min. Inc. (deg) : 89.23	Min. Inc. Depth (ft) : 11336.00
Final Az. (deg) : 175.11	Max Op. Press. (psig) : 5876	Max. Inc. (deg) : 93.80	Max. Inc. Depth (ft) : 12083.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

RUN 700:

03-13-14 PICKED UP 6.75" DGWD TOOLS. DRILLED FROM 11377' MD TO 12151' MD.

03-15-14 POOH DUE TO TD WELL, 100% MWD RUN.

(1) NMDC
6.31 in OD / 2.88 in ID
SN : DR18625

(2) MWD

(3) NMDC
6.81 in OD / 2.88 in ID
SN : DR8438

(4) Pony Collar
6.75 in OD / 2.69 in ID
SN : DR9032

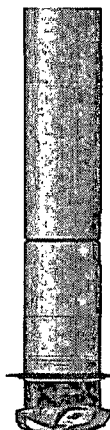
(5) Float Sub
6.75 in OD / 2.88 in ID
SN : DR9029

(6) 6 3/4" SperryDrill Lobe 6/7 -
5.0 stg
6.75 in OD / 4.50 in ID
SN : 11733588

(7) PDC
6.75 in OD / 2.25 in ID
SN : 11904711

Length
(ft)

Cumulative
Length (ft)



(1) 29.55

(2) 6.40

(3) 30.31

(4) 13.15

(5) 4.01

(6) 25.00

(7) 1.00

109.42

79.87

73.47

43.16

30.01

26.00

1.00

Length
(ft)



6.40

Sensor Dist
From Bit
(ft)

[2] 73.22

[3] 69.87

[4] 64.37

HOS

6.75 in OD / 2.88 in ID

SN : 11633627

*[1]Positive Pulser - SN : 10877424

*[2]PCM Sonde - SN : 11620304

*[3]PCG Sonde - SN : 11680905

*[4]PCDC Sonde - SN : 10993280



DIRECTIONAL SURVEY DATA

Tie-in

0.00 0.00 0.00 0.00 0.00 N 0.00 E

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100')
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	0.00
495.00	1.75	207.97	494.92	6.67 S	3.54 W	6.19	0.35
682.00	1.69	210.87	681.84	11.55 S	6.29 W	10.70	0.06
869.00	1.09	200.47	868.78	15.58 S	8.33 W	14.45	0.34
1054.00	1.21	222.69	1,053.75	18.67 S	10.27 W	17.28	0.25
1245.00	1.07	240.71	1,244.71	21.02 S	13.19 W	19.26	0.20
1435.00	0.47	118.25	1,434.70	22.26 S	14.04 W	20.38	0.72
1624.00	0.88	103.00	1,623.69	22.95 S	11.94 W	21.32	0.24
1814.00	2.26	94.93	1,813.61	23.60 S	6.79 W	22.60	0.73
1976.00	1.56	87.90	1,975.52	23.80 S	1.40 W	23.45	0.45
2109.00	0.65	75.39	2,108.49	23.54 S	1.15 E	23.50	0.70
2299.00	0.69	72.00	2,298.48	22.91 S	3.29 E	23.14	0.03
2490.00	0.60	97.11	2,489.47	22.68 S	5.38 E	23.17	0.15
2680.00	0.40	112.98	2,679.46	23.06 S	6.98 E	23.74	0.13
2870.00	0.36	139.40	2,869.46	23.77 S	7.98 E	24.57	0.09
3060.00	0.41	101.93	3,059.45	24.37 S	9.03 E	25.29	0.13
3251.00	0.28	164.15	3,250.45	24.95 S	9.82 E	25.96	0.19
3441.00	0.25	223.31	3,440.45	25.69 S	9.66 E	26.68	0.14
3631.00	0.40	229.58	3,630.45	26.42 S	8.87 E	27.30	0.08
3822.00	0.25	231.38	3,821.44	27.11 S	8.04 E	27.89	0.08
4012.00	0.37	199.85	4,011.44	27.95 S	7.51 E	28.66	0.11
4202.00	0.64	238.80	4,201.43	29.08 S	6.40 E	29.64	0.22
4392.00	0.66	252.57	4,391.42	29.95 S	4.45 E	30.27	0.08
4582.00	0.54	247.30	4,581.41	30.63 S	2.57 E	30.71	0.07
4773.00	0.52	215.36	4,772.40	31.69 S	1.24 E	31.60	0.15
4963.00	0.53	214.22	4,962.40	33.12 S	0.24 E	32.90	0.01
5154.00	0.59	175.46	5,153.39	34.83 S	0.18 W	34.55	0.20
5291.00	0.72	172.56	5,290.38	36.38 S	0.02 W	36.11	0.10
5418.00	0.91	186.35	5,417.36	38.18 S	0.03 W	37.89	0.22
5608.00	1.04	187.14	5,607.34	41.40 S	0.41 W	41.04	0.07
5792.00	1.47	237.66	5,791.30	44.32 S	2.60 W	43.67	0.62
5987.00	0.94	204.13	5,986.26	47.11 S	5.36 W	46.10	0.44
6177.00	1.55	161.18	6,176.21	50.96 S	5.17 W	49.95	0.57
6367.00	1.76	155.60	6,366.14	56.05 S	3.13 W	55.25	0.14
6558.00	1.70	138.42	6,557.05	60.84 S	0.04 W	60.38	0.27
6749.00	1.10	178.43	6,748.00	64.80 S	1.89 E	64.55	0.58
6843.00	1.55	173.48	6,841.97	66.97 S	2.06 E	66.72	0.49
6907.00	5.11	169.38	6,905.85	70.63 S	2.69 E	70.43	5.57
6938.00	8.33	166.95	6,936.64	74.17 S	3.45 E	74.04	10.43
6970.00	11.55	165.99	6,968.15	79.54 S	4.75 E	79.52	10.09
7001.00	14.92	164.54	6,998.32	86.40 S	6.56 E	86.55	10.93



DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100')
7033.00	17.94	164.46	7,029.01	95.12 S	8.98 E	95.51	9.42
7065.00	21.06	166.34	7,059.17	105.46 S	11.66 E	106.09	9.94
7096.00	23.85	165.61	7,087.82	116.94 S	14.54 E	117.84	9.04
7128.00	26.16	165.12	7,116.82	130.03 S	17.96 E	131.25	7.27
7160.00	29.23	166.26	7,145.15	144.44 S	21.62 E	146.00	9.72
7191.00	32.25	167.86	7,171.79	159.88 S	25.16 E	161.76	10.12
7223.00	34.79	167.24	7,198.47	177.13 S	28.97 E	179.35	7.98
7253.00	36.71	166.77	7,222.82	194.21 S	32.92 E	196.78	6.48
7285.00	40.43	166.41	7,247.83	213.61 S	37.54 E	216.60	11.66
7316.00	45.86	166.59	7,270.44	234.22 S	42.49 E	237.66	17.52
7348.00	51.58	167.25	7,291.54	257.64 S	47.92 E	261.56	17.95
7380.00	57.35	167.56	7,310.13	283.04 S	53.60 E	287.47	18.04
7412.00	62.08	167.28	7,326.26	310.00 S	59.62 E	314.97	14.79
7443.00	66.59	166.06	7,339.69	337.18 S	66.06 E	342.73	14.99
7466.00	69.31	165.95	7,348.32	357.87 S	71.22 E	363.89	11.81
7498.00	73.27	166.35	7,358.58	387.29 S	78.47 E	393.97	12.44
7530.00	75.86	167.20	7,367.10	417.31 S	85.53 E	424.64	8.49
7561.00	77.48	167.98	7,374.25	446.77 S	92.01 E	454.67	5.78
7593.00	79.01	169.74	7,380.77	477.51 S	98.06 E	485.91	7.19
7624.00	80.76	172.56	7,386.21	507.66 S	102.75 E	516.41	10.60
7656.00	81.19	172.71	7,391.23	539.00 S	106.81 E	548.01	1.41
7688.00	82.43	173.21	7,395.79	570.43 S	110.69 E	579.69	4.18
7720.00	85.81	174.05	7,399.07	602.06 S	114.22 E	611.51	10.88
7814.00	90.74	174.88	7,401.90	695.55 S	123.29 E	705.41	5.32
7909.00	91.85	174.77	7,399.75	790.14 S	131.85 E	800.33	1.17
8005.00	90.28	173.44	7,397.97	885.61 S	141.71 E	896.29	2.15
8100.00	90.59	172.13	7,397.25	979.85 S	153.64 E	991.29	1.41
8195.00	88.92	171.94	7,397.66	1,073.93 S	166.80 E	1086.27	1.76
8290.00	88.86	171.22	7,399.50	1,167.89 S	180.72 E	1181.22	0.76
8386.00	89.91	171.46	7,400.53	1,262.79 S	195.17 E	1277.18	1.12
8480.00	91.08	170.73	7,399.73	1,355.65 S	209.72 E	1371.12	1.47
8576.00	87.26	171.72	7,401.12	1,450.50 S	224.36 E	1467.05	4.11
8671.00	86.66	171.56	7,406.16	1,544.36 S	238.15 E	1561.89	0.65
8766.00	87.63	171.06	7,410.89	1,638.15 S	252.48 E	1656.73	1.14
8862.00	87.90	171.10	7,414.63	1,732.92 S	267.35 E	1752.60	0.29
8956.00	88.67	170.79	7,417.44	1,825.70 S	282.14 E	1846.50	0.89
9051.00	89.11	171.04	7,419.28	1,919.49 S	297.14 E	1941.42	0.52
9147.00	89.72	170.92	7,420.26	2,014.30 S	312.19 E	2037.35	0.65
9242.00	89.60	174.02	7,420.83	2,108.47 S	324.63 E	2132.34	3.26
9336.00	89.91	174.91	7,421.23	2,202.03 S	333.69 E	2226.30	1.00
9432.00	90.83	174.82	7,420.61	2,297.64 S	342.28 E	2322.25	0.97
9527.00	91.45	174.85	7,418.72	2,392.24 S	350.82 E	2417.18	0.65
9622.00	92.62	174.59	7,415.34	2,486.77 S	359.55 E	2512.07	1.26
9718.00	90.37	174.22	7,412.84	2,582.28 S	368.91 E	2608.01	2.38
9812.00	90.80	173.98	7,411.88	2,675.77 S	378.58 E	2701.98	0.52



DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100')
9908.00	91.42	173.49	7,410.02	2,771.18 S	389.06 E	2797.96	0.82
10003.00	88.40	173.25	7,410.17	2,865.53 S	400.02 E	2892.94	3.19
10098.00	88.28	174.10	7,412.93	2,959.92 S	410.48 E	2987.89	0.90
10193.00	89.08	173.73	7,415.12	3,054.35 S	420.54 E	3082.85	0.93
10288.00	90.03	173.31	7,415.86	3,148.74 S	431.27 E	3177.85	1.10
10384.00	90.77	173.52	7,415.19	3,244.11 S	442.29 E	3273.84	0.80
10479.00	91.54	172.96	7,413.27	3,338.42 S	453.47 E	3368.82	1.01
10574.00	89.48	173.46	7,412.42	3,432.75 S	464.70 E	3463.81	2.24
10670.00	89.75	173.32	7,413.07	3,528.11 S	475.75 E	3559.80	0.33
10765.00	90.80	173.23	7,412.61	3,622.45 S	486.88 E	3654.80	1.10
10859.00	91.67	173.03	7,410.59	3,715.75 S	498.12 E	3748.78	0.95
10954.00	89.44	173.53	7,409.67	3,810.09 S	509.24 E	3843.77	2.40
11049.00	89.72	173.56	7,410.36	3,904.49 S	519.92 E	3938.76	0.29
11144.00	90.86	173.49	7,409.88	3,998.88 S	530.64 E	4033.75	1.20
11239.00	88.68	175.24	7,410.26	4,093.41 S	539.96 E	4128.71	2.95
11336.00	89.23	175.61	7,412.03	4,190.08 S	547.69 E	4225.61	0.68
11431.00	89.69	175.50	7,412.92	4,284.79 S	555.05 E	4320.51	0.50
11526.00	90.31	175.43	7,412.92	4,379.49 S	562.56 E	4415.42	0.65
11621.00	91.36	175.69	7,411.54	4,474.20 S	569.91 E	4510.31	1.14
11717.00	92.61	175.36	7,408.22	4,569.85 S	577.40 E	4606.16	1.35
11812.00	91.54	175.35	7,404.78	4,664.47 S	585.09 E	4701.01	1.13
11907.00	91.69	175.32	7,402.09	4,759.12 S	592.81 E	4795.89	0.16
12003.00	92.93	175.41	7,398.22	4,854.72 S	600.56 E	4891.73	1.29
12083.00	93.80	175.11	7,393.53	4,934.31 S	607.15 E	4971.53	1.15
12151.00	93.80	175.11	7,389.02	5,001.92 S	612.93 E	5039.33	0.01

SURVEY FOOTER

SURVEYS CALCULATED USING SHORT COLLAR METHOD
 WELL ASSUMED VERTICAL AT SURFACE
 SURFACE TO 495' MD WAS DRILLED BY CUSTOMER
 SURVEYS AT 495' MD TO 12083' MD PROVIDED BY SPERRY DRILLING
 SURVEY AT 12083' MD PROJECTED TO TD AT 12151' MD
 SPERRY DRILLING ENGINEERS: JOSHUA BUCKNER, CHAD STICH.

**DIRECTIONAL SURVEY DATA NOTES**

- Calculation based on minimum curvature method.
- Survey coordinates relative to well system reference point.
- TVD values given relative to drilling measurement point.
- Vertical section relative to well head.
- Vertical section is computed along a direction of 172.98 degrees (Grid)
- A total correction of 7.60 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 12,151.00 feet is 5,039.33 feet along 173.01 degrees (Grid)

WARRANTY

HALLIBURTON ENERGY SERVICES, INC. WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON ENERGY SERVICES, INC. CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION, AND PRODUCTION OPERATION. HALLIBURTON ENERGY SERVICES, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON ENERGY SERVICES, INC. SERVICES BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON ENERGY SERVICES, INC.

**SERVICE INTERRUPT REPORT**

MWD Run Number	:100	Time / Date of Failure	:27-Feb-14 11:20
Rig Bit Number	:0100	Depth at Time of Failure (ft)	:561
MWD Run Start Time / Date	:26-Feb-14 06:00	Lost Rig Hours	:4
MWD Run End Time / Date	:26-Feb-14 10:30		

RIG ACTIVITY

Drilling ahead in the intermediate section.

DESCRIPTION OF FAILURE

HD-XX-0901131719r100: Pulses started to become intermittent between connections. After connection tool flatlined. Recycled, toggled data rate and list recycled, adjusted flow parameters both high and low, and swapped transducer. The tool continued to flatline, but it was decided to drill ahead one additional stand. The tool began to pump up data half way through the stand, but then stopped again and failed to pulse after connection. All tools tested 100% for the read, confidence tests. The Pulser tested 100% for the resistivity test and extension tests before and after flushing. The collar and tool string collected a waxy cornstarch material that is thought to be salt build up. There were no other issues recognized in the post run analyses.

ACTION TAKEN

All tools were failed because the source of the failure could not be determined.

OPERATION IMPACT

Was forced to POOH and change BHA.

REASON FOR FAILURE

Unknown.

**SERVICE INTERRUPT REPORT**

MWD Run Number	:300	Time / Date of Failure	:02-Mar-14 01:00
Rig Bit Number	:0300	Depth at Time of Failure (ft)	:1000
MWD Run Start Time / Date	:01-Mar-14 08:00	Lost Rig Hours	:2
MWD Run End Time / Date	:05-Mar-14 02:00		

RIG ACTIVITY

TIH with new BHA.

DESCRIPTION OF FAILURE

HD-XX-0901131719r300: The baffle plate that is put on top of the MWD tool for compression and debris mitigation was left out of the collar while testing the tool at surface. Typically after the tool is tested the baffle is supposed to be replaced, and the additional collar is then made up on top of the MWD collar. In this instance the baffle was not replaced and was left in front of the driller console unintentionally. Once discovered at approximately 1000' we were forced to make a short trip to replace it properly and then trip back to bottom.

ACTION TAKEN

From this time on an MWD personnel will be on the floor until the MWD tool is made up completely with the baffle and upper collar.

OPERATION IMPACT

Was forced to POOH and properly install baffle plate.

REASON FOR FAILURE

Oversight on the rig floor.

SERVICE INTERRUPT REPORT

MWD Run Number	:300	Time / Date of Failure	:03-Mar-14 11:00
Rig Bit Number	:0300	Depth at Time of Failure (ft)	:4275
MWD Run Start Time / Date	:01-Mar-14 08:00	Lost Rig Hours	:1
MWD Run End Time / Date	:05-Mar-14 02:00		

RIG ACTIVITY

Drilling ahead in the intermediate section.

DESCRIPTION OF FAILURE

HD-XX-0901131719r300: Troubleshooting for poor detection at the transducer; Discovered that the transducer line was cut.

ACTION TAKEN

Line was spliced and re-ran in a more suitable location; continued drilling.

OPERATION IMPACT

Was forced to stop drilling in order to troubleshoot and resolve the problem

REASON FOR FAILURE

Hazardous conditios on the rig floor.

**SERVICE INTERRUPT REPORT**

MWD Run Number	:300	Time / Date of Failure	:04-Mar-14 06:00
Rig Bit Number	:0300	Depth at Time of Failure (ft)	:5370
MWD Run Start Time / Date	:01-Mar-14 08:00	Lost Rig Hours	:10
MWD Run End Time / Date	:05-Mar-14 02:00		

RIG ACTIVITY

Drilling ahead in intermediate section.

DESCRIPTION OF FAILURE

HD-XX-0901131719r300: Tool suddenly stopped pulsing, troubleshooting began: recylce, alter flow parameters, change data rate, swap transducer; The tool still did not pulse. Once on surface the tool was covered in a concrete like material that upon review by the mud logger was made up of quartz, sand, and a metal alloy or possibly magnetite (Images and samples included). The tool was then tested and it was discovered that the pulser failed to pass the resistance test. It is not entirely clear if the environmental material aided in the failure of the tool, but it is being considered until proven otherwise.

ACTION TAKEN

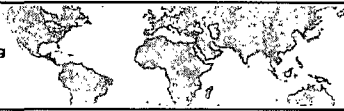
Continued to drill ahead for an additional ~400' without the MWD tool being operational, and then the rig tripped to swap out MWD and pick-up the curve assembly. The rig tripped in the hole with the new BHA and wiped ~400' at 175'/hr to retrieve gamma data.

OPERATION IMPACT

Was forced to POOH and replace toolstring.

REASON FOR FAILURE

Pulser failed resistance test during post run diagnostics.

**SERVICE INTERRUPT REPORT**

MWD Run Number	:600	Time / Date of Failure	:12-Mar-14 09:00
Rig Bit Number	:0600	Depth at Time of Failure (ft)	:11318
MWD Run Start Time / Date	:08-Mar-14 02:00	Lost Rig Hours	:12
MWD Run End Time / Date	:13-Mar-14 12:30		

RIG ACTIVITY

Drilling ahead just after a 1.5 hour rig service.

DESCRIPTION OF FAILURE

HD-XX-0901131719r600: While drilling ahead the tool stopped pulsing. All troubleshooting procedures were followed : data rate change, list swap, checked surface equipment. It was then decided to drill ahead for one stand and try see if that would help to flow any possible debris off of the top-end. Finally, a sweep was pumped in as a last attempt. The tool was then tested follow the trip out, and the pulser failed the resistance test.

ACTION TAKEN

Tools returned to shop for further diagnostics.

OPERATION IMPACT

Was forced to POOH to replace MWD toolstring.

REASON FOR FAILURE

Pulser failed resistance test during post run diagnostics.

HALLIBURTON

Sperry Drilling



Halliburton / Sperry Drilling
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