

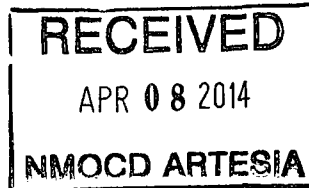
Chevron

Skeen 2 State 2H ST01

Eddy County, NM

Ensign 767

API# 30-015-41047-0100



November 3, 2013 – November 29, 2013

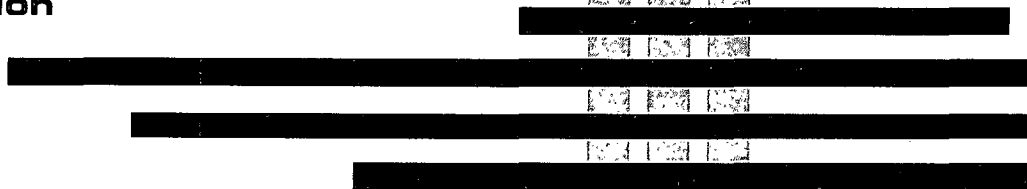
HD-MJ-0900870277

Sperry Drilling

End of Well Report

HALLIBURTON

**Drilling and Formation
Evaluation**





End of Well Report for Chevron

Rig : Ensign 767
Well Name : Skeen 2 State 2H ST01
Field Name : Delaware River
Country : USA
Job Number : HD-XX-0900870277
Job Start Date : 03-Nov-13
API Number : 30-015-41047-01

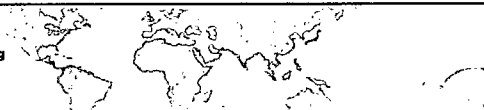


TABLE OF CONTENTS

1. General Information
2. Operational Overview
3. Summary of MWD Runs
4. Bitrun Summary
5. Directional Survey Data

GENERAL INFORMATION

Company	: Chevron
Rig	: Ensign 767
Well	: Skeen 2 State 2H ST01
Field	: Delaware River
State	: New Mexico
County	: Eddy County
Country	: USA
API Number	: 30-015-41047-01
Sperry Drilling Job Number	: HD-XX-0900870277
Job Start Date	: 03-Nov-13
Job End Date	: 29-Nov-13
North Reference	: Grid
Total Correction (deg)	: 7.577
Dip Angle (deg)	: 59.873
Total Magnetic Field (nT)	: 48227
Date of Magnetic Data	: 04 November, 2013
Well Head coordinates N	: 32 deg. 4 min 42.07 sec North
Well Head coordinates E	: 104 deg. 9 min 45.61 sec West
Vertical section direction (deg)	: 181.13
Unit Number	: 11310664
MWD Engineers	: Alexis Vargas, Robert Martin
Company Representatives	: Bill LaLonde
Company Geologist:	: Greg Minnery



OPERATIONAL OVERVIEW

HALLIBURTON / SPERRY DRILLING WAS CONTRACTED BY CHEVRON TO PERFORM DIRECTIONAL DRILLING AND MWD SERVICES FOR THE SKEEN 2 STATE 2H ST01 WELL IN EDDY COUNTY, NEW MEXICO. EQUIPMENT AND PERSONNEL ARRIVED ON LOCATION ON 03-NOV-13.

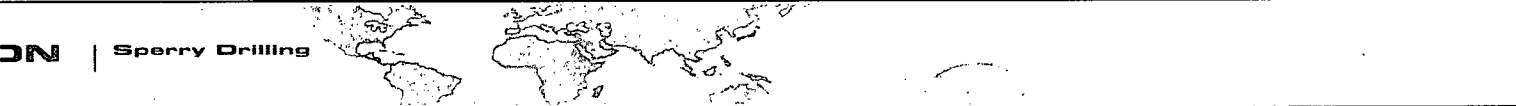
RUN 100 09-NOV-13: DRILLED FROM 454' MD / 454' TVD TO 2275' MD / 2274' TVD. POOH DUE TO TD WELL SECTION. MOTOR BEND 1.50°. 100% MWD RUN.

RUN 200 16-NOV-13: DRILLED FROM 2275' MD / 2274' TVD TO 8050' MD / 8047' TVD. POOH DUE TO TD WELL SECTION. MOTOR BEND 1.50°. 95% MWD RUN.

RUN 300 21-NOV-13: DRILLED FROM 7246' MD / 7243' TVD TO 7573' MD / 7565' TVD. POOH DUE TO LOW BUILD RATE. MOTOR BEND 2.00°. 100% MWD RUN.

RUN 400 23-NOV-13: DRILLED FROM 7573' MD / 7565' TVD TO 8144' MD / 7828' TVD. POOH DUE TO TD WELL SECTION. MOTOR BEND 2.38°. 100% MWD RUN.

RUN 500 28-NOV-13: DRILLED FROM 8144' MD / 7828' TVD TO 12619' MD / 7792' TVD. POOH DUE TO TD. MOTOR BEND 1.50°. 100% MWD RUN.



Start Depth (ft)	End Depth (ft)	Drill/Wipe Distance (ft)	Run Start Date Time	Run End Date Time	ERT Hrs	Oper. Hrs	Circ. Hrs	Max Temp. (degF)	Serv Int.	Trip for MWD	Failure Type
454.00	2275.00	1821.00	05-Nov-13 07:00	09-Nov-13 20:00	109.00	109.000	39.000	138.20	No	No	N/A
2275.00	8050.00	5775.00	11-Nov-13 01:30	17-Nov-13 00:00	142.50	142.500	115.000	134.60	Yes	No	N/A
7246.00	7573.00	327.00	19-Nov-13 12:00	21-Nov-13 16:00	52.00	52.000	34.500	131.00	No	No	N/A
7573.00	8144.00	571.00	21-Nov-13 16:30	24-Nov-13 06:00	61.50	61.500	46.000	131.00	No	No	N/A
8144.00	12619.00	4475.00	24-Nov-13 07:00	29-Nov-13 11:00	124.00	124.000	83.500	141.80	No	No	N/A



BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 100	Run Start : 05-Nov-13 07:00	BRT Hrs : 109.00	Circ. Hrs : 39.00
Rig Run No. : 2	Run End : 09-Nov-13 20:00	Hole Size (in) : 12.25	Oper. Hrs : 109.00

DRILLING DATA

Start Depth (ft) : 454.00	Footage (ft) : 1821.00	Avg WOB (klb) : 16.0	Avg ROP (fph) : 38.00
End Depth (ft) : 2275.00	Avg Flow Rate(gpm) : 703	Avg TOB (ft-lb) : 9187	Avg SPP (psig) : 2679
Drilling Hrs (hr) : 31.000	Avg RPM (rpm) : 37	Avg Bend (ft-lb) : 1.50	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 10.30	Viscosity (spqt) : 27.00	PV (cP) : 2	YP (lbf/ft ²) : 3.00
Chlorides (ppm) : 185000	Max Temp (degF) : 138.20	% Solids (%) : 2.50	% Sand (%) : 0.10
pH (pH) : 10.00	Fluid Loss(mptm) : 0.5	% Oil (%) : 0.00	O:W : N/A

MWD PERFORMANCE

Tool OD (in) : 8	Type : DWD	Min. Inc. (deg): 0.94	Min. Inc. Depth (ft) : 470.00
Final Az. (deg) : 66.51	Max Op. Press. (psig) : 1230	Max. Inc. (deg): 3.11	Max. Inc. Depth (ft) : 2065.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

09-NOV-13: DRILLED FROM 454' MD / 454' TVD TO 2275' MD / 2274' TVD. POOH DUE TO TD WELL SECTION. MOTOR BEND 1.50°. 100% MWD RUN.

	Length (ft)	Cumulative Length (ft)		Length (ft)	Sensor Dist From Bit (ft)
(1) Drill Pipe 5.00 in OD / 3.25 in ID		2275.00			
(2) 5" X 3" HWDP #49.3 - NC50(IF) 5.00 in OD / 3.00 in ID					
(3) Jar 6.50 in OD / 2.88 in ID					
(4) 5" X 3" HWDP #49.3 - NC50(IF) 5.00 in OD / 3.00 in ID	(1) 1648.26		X-Over Sub 8.00 in OD / 2.56 in ID SN: 88609H	2.00	
(5) X-Over Sub 6.50 in OD / 2.50 in ID SN: RIG					
(6) 6 1/2" X 2.5" - 96.1# Drill Collar 6.50 in OD / 2.50 in ID SN: RIG	(2) 31.50	626.74			
(7) X-Over Sub 7.75 in OD / 2.88 in ID SN: RIG	(3) 30.00	595.24	HOS 8.00 in OD / 3.31 in ID SN: 11799949	6.25	
(8) 8" X 3.25" - 142.7# Drill Collar 8.00 in OD / 3.25 in ID SN: RIG	(4) 31.50	565.24	*Positive Pulser - SN: 10551149		
(9) MWD	(5) 2.57	533.74			
(10) Integral Blade 7.94 in OD / 2.88 in ID	(6) 362.43	531.17			
(11) Float Sub 8.06 in OD / 2.88 in ID SN: DR1384					
(12) 8" SperryDrill Lobe 6/7 - 4.0 stg 8.00 in OD / 5.25 in ID SN: 11689830 *Pad	(7) 2.57	168.74	HOC 7.94 in OD / 2.88 in ID SN: 11672315	30.82	[2] 61.81
(13) PDC 8.00 in OD / 2.88 in ID SN: 7144063	(8) 90.86	166.17	*[1]TM Sonde 2.0" - SN: 12232222 *[2]DM Sonde 2.0" - SN: 12128482		
	(9) 39.07	75.31			
	(10) 4.89	36.24			
	(11) 3.47	31.35			
	(12) 26.63	27.88			
	(13) 1.25	1.25			



BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 200	Run Start : 11-Nov-13 01:30	BRT Hrs : 142.50	Circ. Hrs : 115.00
Rig Run No. : 3	Run End : 17-Nov-13 00:00	Hole Size (in) : 8.75	Oper. Hrs : 142.50

DRILLING DATA

Start Depth (ft) : 2275.00	Footage (ft) : 5775.00	Avg WOB (klb) : 30.0	Avg ROP (fph) : 73.00
End Depth (ft) : 8050.00	Avg Flow Rate(gpm) : 546	Avg TOB (ft-lb) : 2043	Avg SPP (psig) : 2043
Drilling Hrs (hr) : 82.000	Avg RPM (rpm) : 62	Avg Bend (ft-lb) : 1.50	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.00	Viscosity (spqt) : 27.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 85000	Max Temp (degF) : 134.60	% Solids(%) : 0.70	% Sand (%) : 0.10
pH (pH) : 11.10	Fluid Loss(mptm) : 1	% Oil (%) : 0.00	O:W : N/A

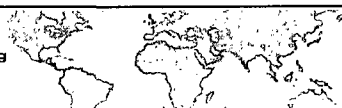
MWD PERFORMANCE

Tool OD (in) : 6.75	Type : DGWD	Min. Inc. (deg): 0.38	Min. Inc. Depth (ft) : 3973.00
Final Az. (deg) : 255.26	Max Op. Press. (psig) 3850	Max. Inc. (deg): 4.70	Max. Inc. Depth (ft) : 6637.00
MWD Real Time % : 95		MWD Recorded % : 95	

COMMENTS

16-NOV-13: DRILLED FROM 2275' MD / 2274' TVD TO 8050' MD / 8047' TVD. POOH DUE TO TD WELL SECTION. MOTOR BEND 1.50°. 95% MWD RUN.

	Length (ft)	Cumulative Length (ft)		Length (ft)	Sensor Dist From Bit (ft)
(1) Drill Pipe 5.00 in OD / 3.00 in ID					
(2) 5" X 3" HWDP #49.3 - NC50(IF) 5.00 in OD / 3.00 in ID		8050.00			
(3) Jar 6.50 in OD / 2.88 in ID			HOS 6.75 in OD / 3.25 in ID SN: 11342303 *Positive Pulser - SN: 10437967	5.96	
(4) 5" X 3" HWDP #49.3 - NC50(IF) 5.00 in OD / 3.00 in ID	(1) 7152.13				
(5) X-Over Sub 6.50 in OD / 2.50 in ID SN: RIG					
(6) 6 1/2" X 2.5" - 96.1# Drill Collar 6.50 in OD / 2.50 in ID SN: RIG		897.87			
(7) X-Over Sub 6.75 in OD / 2.81 in ID SN: DR21088					[2] 60.42
(8) MWD	(2) 151.56		HOC 6.75 in OD / 3.31 in ID SN: 10911042 *[1]TM Sonde 2.0" - SN: 10831315 *[2]GM Sonde 2.0" - SN: 10505258 *[3]DM Sonde 2.0" - SN: 12271001	29.40	[3] 54.42
(9) Integral Blade 6.81 in OD / 2.88 in ID SN: 50419					
(10) Float Sub 6.75 in OD / 2.81 in ID SN: DR4916	(3) 32.53	746.31			
(11) 6 3/4" SperryDrill Lobe 7/8 - 2.9 stg 6.75 in OD / 4.47 in ID SN: 1066691		713.78			
(12) PDC 5.94 in OD / 1.75 in ID SN: 7146503	(4) 273.92				
	(5) 2.57	439.86			
		437.29			
	(6) 362.43				
	(7) 3.29	74.86			
		71.57			
	(8) 35.36				
	(9) 5.74	36.21			
	(10) 3.59	30.47			
		26.88			
	(11) 25.88				
	(12) 1.00	1.00			



BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 300	Run Start : 19-Nov-13 12:00	BRT Hrs : 52.00	Circ. Hrs : 34.50
Rig Run No. : 4	Run End : 21-Nov-13 16:00	Hole Size (in) : 8.75	Oper. Hrs : 52.00

DRILLING DATA

Start Depth (ft) : 7246.00	Footage (ft) : 327.00	Avg WOB (klb) : 35.4	Avg ROP (fph) : 15.80
End Depth (ft) : 7573.00	Avg Flow Rate(gpm) : 480.6	Avg TOB (ft-lb) : 2119.6	Avg SPP (psig) : 1950.4
Drilling Hrs (hr) : 28.000	Avg RPM (rpm) : 6.8	Avg Bend (ft-lb) : 2.00	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.50	Viscosity (spqt) : 27.00	PV (cP) : 2	YP (lbf/ft ²) : 3.00
Chlorides (ppm) : 118000	Max Temp (degF) : 131.00	% Solids (%) : 0.90	% Sand (%) : 0.10
pH (pH) : 11.00	Fluid Loss(mptm) : 1	% Oil (%) : 0.00	O:W : N/A

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : DGWD	Min. Inc. (deg): 0.83	Min. Inc. Depth (ft) : 7269.00
Final Az. (deg) : 190.07	Max Op. Press. (psig) 3737	Max. Inc. (deg): 15.32	Max. Inc. Depth (ft) : 7522.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

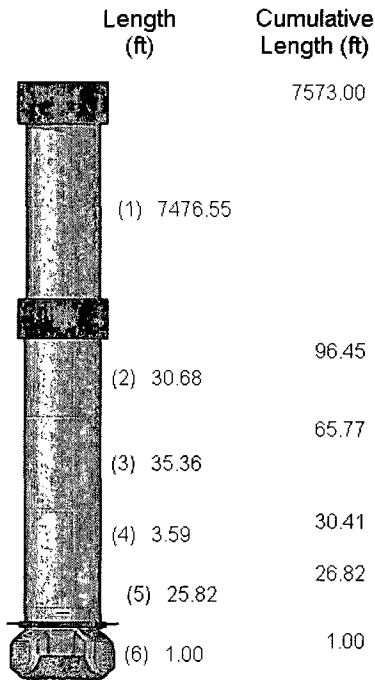
21-NOV-13: DRILLED FROM 7246' MD / 7243' TVD TO 7573' MD / 7565' TVD. POOH DUE TO LOW BUILD RATE. MOTOR BEND 2.00°. 100% MWD RUN.

(1) Drill Pipe
5.00 in OD / 3.00 in ID
(2) NMDC
6.75 in OD / 3.31 in ID
SN: 11672350

(3) MWD
(4) Float Sub
6.75 in OD / 2.81 in ID
SN: DR4916

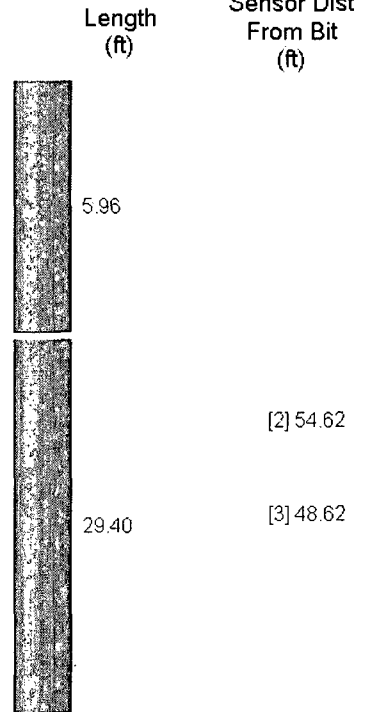
(5) 6 3/4" SperryDrill Lobe 7/8 -
2.9 stg
6.75 in OD / 4.47 in ID
SN: 11111747

(6) Tricone
8.75 in OD / 1.75 in ID
SN: 5233087



HOS
6.75 in OD / 3.25 in ID
SN: 11342303
*Positive Pulser - SN: 11647940

HOC
6.31 in OD / 3.31 in ID
SN: 10911042
*[1]TM Sonde 2.0" - SN: 12232222
*[2]GM Sonde 2.0" - SN: 11406100
*[3]DM Sonde 2.0" - SN: 12128482



BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 400	Run Start : 21-Nov-13 16:30	BRT Hrs : 61.50	Circ. Hrs : 46.00
Rig Run No. : 5	Run End : 24-Nov-13 06:00	Hole Size (in) : 8.75	Oper. Hrs : 61.50

DRILLING DATA

Start Depth (ft) : 7573.00	Footage (ft) : 571.00	Avg WOB (klb) : 37.75	Avg ROP (fph) : 16.43
End Depth (ft) : 8144.00	Avg Flow Rate (gpm) : 514	Avg TOB (ft-lb) : 4906	Avg SPP (psig) : 2186
Drilling Hrs (hr) : 37.000	Avg RPM (rpm) : 12.38	Avg Bend (ft-lb) : 2.38	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.50	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 114000	Max Temp (degF) : 131.00	% Solids (%) : 1.10	% Sand (%) : 0.10
pH (pH) : 11.00	Fluid Loss (mptm) : 1	% Oil (%) : 0.00	O:W : N/A

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : DGWD	Min. Inc. (deg) : 18.77	Min. Inc. Depth (ft) : 7553.00
Final Az. (deg) : 181.13	Max Op. Press. (psig) : 3867	Max. Inc. (deg) : 88.95	Max. Inc. Depth (ft) : 8092.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

23-NOV-13: DRILLED FROM 7573' MD / 7565' TVD TO 8144' MD / 7828' TVD. POOH DUE TO TD WELL SECTION. MOTOR BEND 2.38°. 100% MWD RUN.

(1) Drill Pipe
5.00 in OD / 3.00 in ID

(2) NMDC
6.75 in OD / 3.31 in ID
SN: 11672350

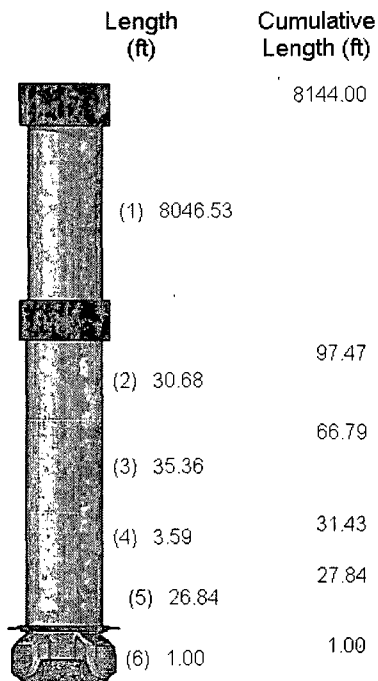
(3) MWD

(4) Float Sub
6.75 in OD / 2.81 in ID
SN: DR4916

(5) 6 3/4" SperryDrill Lobe 7/8 -
2.9 stg

6.75 in OD / 4.47 in ID
SN: 11747073

(6) Tricone
8.75 in OD / 1.75 in ID
SN: RA0999



HOS

6.75 in OD / 3.25 in ID
SN: 11342303

*Positive Pulser - SN: 11512242

HOC

6.31 in OD / 3.31 in ID
SN: 10911042

*[1]TM Sonde 2.0" - SN: 10718706

*[2]GM Sonde 2.0" - SN: 11351525

*[3]DM Sonde 2.0" - SN: 10493091

Length
(ft)

Sensor Dist
From Bit
(ft)



5.96

29.40

[2] 55.64

[3] 49.64

BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 500	Run Start : 24-Nov-13 07:00	BRT Hrs : 124.00	Circ. Hrs : 83.50
Rig Run No. : 6	Run End : 29-Nov-13 11:00	Hole Size (in) : 8.75	Oper. Hrs : 124.00

DRILLING DATA

Start Depth (ft) : 8144.00	Footage (ft) : 4475.00	Avg WOB (klb) : 19.0	Avg ROP (fph) : 58.00
End Depth (ft) : 12619.00	Avg Flow Rate(gpm) : 514	Avg TOB (ft-lb) : 7047	Avg SPP (psig) : 1919
Drilling Hrs (hr) : 69.000	Avg RPM (rpm) : 34	Avg Bend (ft-lb) : 1.50	

MUD DATA

Mud Type : Salt Water Gel			
Weight (ppg) : 9.50	Viscosity (spqt) : 29.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 105000	Max Temp (degF) : 141.80	% Solids(%) : 1.00	% Sand (%) : 0.10
pH (pH) : 10.00	Fluid Loss(mptm) : 1	% Oil (%) : 0.00	O:W : N/A

MWD PERFORMANCE

Tool OD (in) : 6.75	Type : DGWD	Min. Inc. (deg): 88.64	Min. Inc. Depth (ft) : 9296.00
Final Az. (deg) : 177.11	Max Op. Press. (psig) 3849	Max. Inc. (deg): 93.37	Max. Inc. Depth (ft) : 8536.00
MWD Real Time % : 100		MWD Recorded % : 100	

COMMENTS

28-NOV-13: DRILLED FROM 8144' MD / 7828' TVD TO 12619' MD / 7792' TVD. POOH DUE TO TD. MOTOR BEND 1.50°. 100% MWD RUN.

(1) Drill Pipe
5.00 in OD / 3.00 in ID
(2) Flex Collar
6.81 in OD / 3.31 in ID
SN: DR10509

(3) MWD

(4) Float Sub
7.75 in OD / 2.81 in ID
SN: DR4916

(5) 6 3/4" SperryDrill Lobe 6/7 -
5.0 stg
6.75 in OD / 4.50 in ID
SN: 10437855

(6) PDC
6.00 in OD / 1.75 in ID
SN: 1741861



Length
(ft)

Cumulative
Length (ft)

(1) 12479.12

12619.00

(2) 30.90

139.88

(3) 80.41

108.98

(4) 3.59

28.57

(5) 23.98

24.98

(6) 1.00

1.00

NMDC

6.75 in OD / 3.25 in ID
SN: 11672351

HOS

6.75 in OD / 3.25 in ID
SN: 11342303

*Positive Pulser - SN: 11647940

HOC

6.63 in OD / 3.25 in ID
SN: 11672356

*[1]TM Sonde 2.0" - SN: 12232222

*[2]GM Sonde 2.0" - SN: 11406100

*[3]DM Sonde 2.0" - SN: 12128482

Pony

6.75 in OD / 3.00 in ID
SN: DR5214

Length
(ft)

Sensor Dist
From Bit
(ft)

30.37

5.96

30.68

13.40

[2] 67.46

[3] 61.46



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')
470.00	0.94	313.45	469.98	2.64 N	2.79 W	-2.59	0.20
650.00	1.24	326.78	649.95	5.28 N	4.92 W	-5.18	0.22
835.00	1.68	316.53	834.89	8.92 N	7.88 W	-8.76	0.28
1020.00	2.23	303.06	1,019.78	12.85 N	12.76 W	-12.59	0.38
1113.00	1.77	286.50	1,112.72	14.24 N	15.65 W	-13.93	0.78
1208.00	2.42	280.99	1,207.66	15.04 N	19.03 W	-14.66	0.71
1399.00	1.40	272.30	1,398.55	15.90 N	25.32 W	-15.40	0.55
1493.00	1.48	265.51	1,492.52	15.85 N	27.68 W	-15.30	0.20
1684.00	0.43	61.63	1,683.50	16.00 N	29.51 W	-15.42	0.99
1874.00	2.18	87.72	1,873.45	16.49 N	25.28 W	-15.98	0.95
2065.00	3.11	83.89	2,064.24	17.18 N	16.50 W	-16.85	0.50
2160.00	2.64	70.55	2,159.13	18.18 N	11.88 W	-17.95	0.86
2210.00	2.29	66.51	2,209.08	18.97 N	9.88 W	-18.77	0.78
2360.00	1.86	47.23	2,358.98	21.81 N	5.34 W	-21.70	0.54
2455.00	1.32	56.30	2,453.95	23.47 N	3.30 W	-23.40	0.62
2644.00	1.30	32.34	2,642.90	26.49 N	0.34 W	-26.48	0.29
2835.00	1.62	44.08	2,833.83	30.27 N	2.71 E	-30.32	0.23
3025.00	0.90	37.73	3,023.79	33.38 N	5.49 E	-33.48	0.39
3215.00	1.00	59.24	3,213.76	35.40 N	7.82 E	-35.55	0.19
3404.00	0.76	58.73	3,402.74	36.90 N	10.32 E	-37.10	0.13
3594.00	0.68	29.53	3,592.73	38.54 N	11.96 E	-38.77	0.20
3784.00	0.53	348.97	3,782.72	40.39 N	12.35 E	-40.62	0.23
3973.00	0.38	225.05	3,971.71	40.80 N	11.74 E	-41.03	0.42
4163.00	0.48	170.11	4,161.71	39.57 N	11.44 E	-39.79	0.21
4353.00	0.39	193.79	4,351.70	38.16 N	11.42 E	-38.37	0.11
4544.00	0.72	143.56	4,542.69	36.56 N	11.98 E	-36.79	0.29
4735.00	0.65	190.84	4,733.68	34.52 N	12.49 E	-34.76	0.29
4924.00	0.75	183.35	4,922.67	32.22 N	12.21 E	-32.46	0.07
5115.00	1.16	217.93	5,113.64	29.44 N	10.95 E	-29.65	0.36
5305.00	1.03	219.15	5,303.61	26.60 N	8.69 E	-26.77	0.07
5495.00	1.42	227.62	5,493.56	23.69 N	5.88 E	-23.80	0.23
5685.00	0.77	213.14	5,683.53	21.03 N	3.44 E	-21.10	0.37
5876.00	1.37	231.75	5,874.49	18.55 N	0.94 E	-18.56	0.36
6066.00	1.86	197.75	6,064.42	14.21 N	1.78 W	-14.17	0.55
6257.00	1.50	211.66	6,255.34	9.13 N	4.03 W	-9.05	0.28
6448.00	1.46	197.83	6,446.28	4.69 N	6.09 W	-4.57	0.19
6637.00	4.70	173.01	6,634.99	5.30 S	5.88 W	5.41	1.81
6827.00	2.49	147.42	6,824.61	16.51 S	2.71 W	16.56	1.41
6923.00	1.72	161.91	6,920.55	19.64 S	1.14 W	19.66	0.97
7018.00	2.10	154.40	7,015.49	22.57 S	0.06 E	22.56	0.47
7113.00	1.36	166.23	7,110.45	25.23 S	1.08 E	25.20	0.86

**DIRECTIONAL SURVEY DATA**

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (%/100)
7208.00	1.47	160.40	7,205.42	27.47 S	1.75 E	27.43	0.19
7303.00	0.97	197.32	7,300.40	29.38 S	1.92 E	29.34	0.96
7398.00	0.76	242.33	7,395.39	30.44 S	1.12 E	30.41	0.72
7493.00	1.41	255.26	7,490.37	31.03 S	0.56 W	31.03	0.72
8050.00	1.41	255.26	8,047.21	34.51 S	13.80 W	34.78	0.00

SURVEY FOOTER

SURVEYS CALCULATED USING SHORT COLLAR METHOD
TIE-ON SURVEY ASSUMED VERTICAL AT SURFACE
SURVEYS FROM 470.00' MD TO 7493.00' MD ARE PROVIDED BY SPERRY DRILLING MWD
SURVEY AT 7493.00' MD HAS BEEN PROJECTED TO TD AT 8050.00' MD
SPERRY ENGINEERS: ALEXIS VARGAS, ROBERT MARTIN

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 181.13 degrees (Grid)
- A total correction of 7.58 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 8,050.00 feet is 37.17 feet along 201.79 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.



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)
100.00	0.50	252.15	100.00	0.13 S	0.42 W	0.14	0.50
200.00	0.78	252.96	199.99	0.47 S	1.48 W	0.50	0.28
300.00	0.89	273.04	299.98	0.63 S	2.91 W	0.68	0.31
400.00	0.87	303.13	399.97	0.17 S	4.32 W	0.25	0.46
470.00	0.94	313.45	469.96	0.52 N	5.18 W	-0.41	0.25
650.00	1.24	326.78	649.93	3.15 N	7.31 W	-3.01	0.22
835.00	1.68	316.53	834.87	6.79 N	10.27 W	-6.59	0.28
1020.00	2.23	303.06	1,019.76	10.72 N	15.15 W	-10.42	0.38
1113.00	1.77	286.50	1,112.71	12.11 N	18.04 W	-11.75	0.78
1208.00	2.42	280.99	1,207.64	12.91 N	21.42 W	-12.49	0.71
1399.00	1.40	272.30	1,398.53	13.77 N	27.71 W	-13.22	0.55
1493.00	1.48	265.51	1,492.51	13.72 N	30.07 W	-13.13	0.20
1684.00	0.43	61.63	1,683.49	13.87 N	31.90 W	-13.24	0.99
1874.00	2.18	87.72	1,873.43	14.36 N	27.67 W	-13.81	0.95
2065.00	3.11	83.89	2,064.23	15.05 N	18.89 W	-14.68	0.50
2160.00	2.64	70.55	2,159.11	16.06 N	14.27 W	-15.77	0.86
2210.00	2.29	66.51	2,209.06	16.84 N	12.27 W	-16.59	0.78
2360.00	1.86	47.23	2,358.96	19.69 N	7.73 W	-19.53	0.54
2455.00	1.32	56.30	2,453.93	21.34 N	5.69 W	-21.22	0.62
2644.00	1.30	32.34	2,642.88	24.36 N	2.73 W	-24.31	0.29
2835.00	1.62	44.08	2,833.82	28.14 N	0.32 E	-28.14	0.23
3025.00	0.90	37.73	3,023.77	31.25 N	3.10 E	-31.30	0.39
3215.00	1.00	59.24	3,213.75	33.27 N	5.43 E	-33.37	0.19
3404.00	0.76	58.73	3,402.72	34.77 N	7.93 E	-34.92	0.13
3594.00	0.68	29.53	3,592.71	36.41 N	9.57 E	-36.59	0.20
3784.00	0.53	348.97	3,782.70	38.26 N	9.96 E	-38.45	0.23
3973.00	0.38	225.05	3,971.70	38.68 N	9.35 E	-38.85	0.42
4163.00	0.48	170.11	4,161.69	37.45 N	9.05 E	-37.62	0.21
4353.00	0.39	193.79	4,351.69	36.03 N	9.03 E	-36.20	0.11
4544.00	0.72	143.56	4,542.68	34.43 N	9.59 E	-34.61	0.29
4735.00	0.65	190.84	4,733.67	32.39 N	10.10 E	-32.59	0.29
4924.00	0.75	183.35	4,922.65	30.09 N	9.82 E	-30.28	0.07
5115.00	1.16	217.93	5,113.63	27.31 N	8.56 E	-27.48	0.36
5305.00	1.03	219.15	5,303.59	24.47 N	6.30 E	-24.59	0.07
5495.00	1.42	227.62	5,493.55	21.56 N	3.49 E	-21.63	0.23
5685.00	0.77	213.14	5,683.51	18.90 N	1.05 E	-18.92	0.37
5876.00	1.37	231.75	5,874.48	16.42 N	1.45 W	-16.39	0.36
6066.00	1.86	197.75	6,064.41	12.08 N	4.17 W	-11.99	0.55
6257.00	1.50	211.66	6,255.32	7.01 N	6.42 W	-6.88	0.28
6448.00	1.46	197.83	6,446.26	2.56 N	8.47 W	-2.39	0.19
6637.00	4.70	173.01	6,634.97	7.43 S	8.27 W	7.59	1.81



DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (%/100)
6827.00	2.49	147.42	6,824.59	18.64 S	5.10 W	18.73	1.41
6923.00	1.72	161.91	6,920.53	21.77 S	3.53 W	21.83	0.97
7018.00	2.10	154.40	7,015.48	24.69 S	2.33 W	24.74	0.47
7113.00	1.36	166.23	7,110.43	27.36 S	1.31 W	27.38	0.86
7208.00	1.47	160.40	7,205.40	29.60 S	0.64 W	29.60	0.19
7269.00	0.83	166.52	7,266.39	30.76 S	0.27 W	30.76	1.07
7395.00	6.81	191.82	7,392.06	38.97 S	1.59 W	39.00	4.82
7426.00	7.32	196.80	7,422.82	42.66 S	2.54 W	42.71	2.57
7458.00	9.68	197.41	7,454.47	47.18 S	3.93 W	47.25	7.36
7490.00	12.38	191.92	7,485.88	53.11 S	5.45 W	53.21	9.06
7522.00	15.32	190.07	7,516.94	60.63 S	6.89 W	60.75	9.28
7553.00	18.77	184.47	7,546.58	69.64 S	8.00 W	69.78	12.33
7585.00	22.73	186.23	7,576.50	80.92 S	9.07 W	81.08	12.51
7617.00	27.41	183.41	7,605.47	94.43 S	10.18 W	94.61	15.09
7648.00	32.63	182.34	7,632.31	109.91 S	10.95 W	110.11	16.94
7679.00	37.79	183.50	7,657.63	127.76 S	11.87 W	127.96	16.78
7711.00	43.01	181.03	7,681.99	148.47 S	12.66 W	148.69	17.06
7743.00	47.11	181.13	7,704.59	171.11 S	13.09 W	171.34	12.81
7807.00	54.11	180.89	7,745.18	220.54 S	13.96 W	220.77	10.94
7839.00	57.62	180.79	7,763.13	247.02 S	14.35 W	247.25	10.97
7902.00	65.60	181.18	7,793.06	302.39 S	15.31 W	302.63	12.68
7934.00	71.19	179.59	7,804.84	332.13 S	15.50 W	332.37	18.06
7965.00	76.26	180.02	7,813.52	361.87 S	15.40 W	362.11	16.41
7997.00	80.19	179.15	7,820.05	393.19 S	15.17 W	393.42	12.55
8029.00	83.82	180.11	7,824.50	424.88 S	14.97 W	425.09	11.73
8060.00	88.03	180.77	7,826.71	455.79 S	15.21 W	456.00	13.74
8092.00	88.95	181.13	7,827.55	487.77 S	15.74 W	487.99	3.10
8154.00	89.14	181.09	7,828.59	549.75 S	16.93 W	549.98	0.31
8250.00	89.91	180.15	7,829.39	645.74 S	17.97 W	645.97	1.26
8345.00	91.11	181.35	7,828.54	740.73 S	19.22 W	740.96	1.79
8441.00	92.69	180.93	7,825.36	836.65 S	21.13 W	836.91	1.70
8536.00	93.37	180.59	7,820.34	931.51 S	22.39 W	931.77	0.80
8631.00	91.36	180.22	7,816.43	1,026.42 S	23.07 W	1026.68	2.15
8725.00	89.23	180.67	7,815.94	1,120.41 S	23.79 W	1120.66	2.32
8821.00	89.35	180.18	7,817.13	1,216.40 S	24.50 W	1216.65	0.53
8916.00	89.97	180.11	7,817.69	1,311.40 S	24.74 W	1311.63	0.65
9011.00	90.40	179.31	7,817.39	1,406.40 S	24.25 W	1406.60	0.96
9105.00	90.62	178.84	7,816.55	1,500.38 S	22.73 W	1500.54	0.55
9200.00	89.69	180.49	7,816.30	1,595.37 S	22.17 W	1595.50	2.00
9296.00	88.64	182.28	7,817.69	1,691.33 S	24.49 W	1691.48	2.15
9390.00	89.01	182.72	7,819.62	1,785.22 S	28.59 W	1785.44	0.62
9485.00	89.38	182.46	7,820.95	1,880.11 S	32.88 W	1880.40	0.48
9580.00	89.81	182.57	7,821.61	1,975.02 S	37.05 W	1975.37	0.47
9675.00	89.94	181.21	7,821.82	2,069.97 S	40.18 W	2070.36	1.44
9770.00	90.89	180.57	7,821.13	2,164.95 S	41.66 W	2165.35	1.21



DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (%/100')
9865.00	91.30	180.92	7,819.31	2,259.92 S	42.90 W	2260.33	0.56
9961.00	92.04	180.26	7,816.52	2,355.88 S	43.89 W	2356.29	1.03
10056.00	91.05	179.63	7,813.97	2,450.84 S	43.80 W	2451.23	1.23
10151.00	91.11	179.39	7,812.18	2,545.82 S	42.98 W	2546.17	0.26
10246.00	91.23	178.94	7,810.23	2,640.79 S	41.59 W	2641.10	0.49
10341.00	91.48	178.52	7,807.98	2,735.74 S	39.49 W	2735.99	0.51
10436.00	90.83	179.04	7,806.06	2,830.70 S	37.46 W	2830.89	0.88
10530.00	89.41	181.39	7,805.86	2,924.69 S	37.82 W	2924.87	2.92
10626.00	89.78	182.24	7,806.53	3,020.64 S	40.86 W	3020.86	0.97
10721.00	90.12	181.55	7,806.61	3,115.58 S	44.00 W	3115.85	0.81
10816.00	90.22	182.05	7,806.32	3,210.54 S	46.99 W	3210.84	0.53
10911.00	90.56	181.14	7,805.68	3,305.50 S	49.63 W	3305.83	1.02
11006.00	90.59	181.03	7,804.74	3,400.47 S	51.42 W	3400.83	0.12
11101.00	91.20	180.08	7,803.25	3,495.46 S	52.34 W	3495.81	1.19
11197.00	90.12	182.23	7,802.14	3,591.42 S	54.27 W	3591.80	2.50
11292.00	90.31	182.19	7,801.78	3,686.35 S	57.93 W	3686.78	0.20
11387.00	90.34	181.68	7,801.25	3,781.30 S	61.13 W	3781.77	0.53
11482.00	90.99	181.64	7,800.15	3,876.25 S	63.89 W	3876.76	0.68
11577.00	89.54	182.16	7,799.71	3,971.19 S	67.04 W	3971.74	1.62
11672.00	90.06	181.82	7,800.04	4,066.14 S	70.34 W	4066.73	0.66
11767.00	90.56	182.06	7,799.53	4,161.08 S	73.55 W	4161.72	0.58
11859.00	90.96	181.08	7,798.32	4,253.04 S	76.08 W	4253.71	1.15
11954.00	91.30	180.89	7,796.45	4,348.00 S	77.71 W	4348.69	0.41
12049.00	91.95	180.02	7,793.76	4,442.96 S	78.46 W	4443.65	1.14
12144.00	90.34	179.92	7,791.86	4,537.94 S	78.42 W	4538.60	1.70
12240.00	89.85	179.53	7,791.71	4,633.94 S	77.96 W	4634.57	0.66
12335.00	89.85	179.00	7,791.96	4,728.93 S	76.74 W	4729.52	0.56
12429.00	90.00	178.20	7,792.09	4,822.90 S	74.45 W	4823.43	0.86
12524.00	90.15	177.56	7,791.96	4,917.83 S	70.94 W	4918.28	0.69
12555.00	90.03	177.11	7,791.91	4,948.80 S	69.49 W	4949.21	1.50
12619.00	90.03	177.11	7,791.88	5,012.72 S	66.27 W	5013.05	0.00

SURVEY FOOTER

SURVEYS CALCULATED USING SHORT COLLAR METHOD

TIE-ON SURVEY ASSUMED VERTICAL AT SURFACE

SURVEYS FROM 100.00' MD TO 400.00' MD ARE PROVIDED BY SCIENTIFIC DRILLING

SURVEYS FROM 470.00' MD TO 12555.00' MD ARE PROVIDED BY SPERRY DRILLING MWD

SURVEY AT 12555.00' MD HAS BEEN PROJECTED TO TD AT 12619.00' MD

SPERRY ENGINEERS: ALEXIS VARGAS, ROBERT MARTIN

**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 181.13 degrees (Grid)
- A total correction of 7.58 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 12,619.00 feet is 5,013.16 feet along 180.76 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.

HALLIBURTON

Sperry Drilling



HALLIBURTON / SPERRY DRILLING
3950 INTERWOOD SOUTH PARKWAY
HOUSTON, TEXAS 77032
OFFICE: 281.986.4400