

**Chevron USA, Inc
Hayhurst 18 Fed 1H
Eddy County, NM
Ensign 767
API# 30-015-41848-0000**

**NM OIL CONSERVATION
ARTESIA DISTRICT
AUG 15 2014**

RECEIVED

**January 26, 2014 – February 04, 2014
HD-MJ-0901037354**

**Sperry Drilling
End of Well Report**

**Submitted by Brandon Roberie
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HALLIBURTON

**Drilling and Formation
Evaluation**



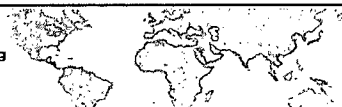
End of Well Report for Chevron USA, Inc

Rig : Ensign 767
Well Name : Hayhurst 18 Fed 1H
Field Name :
Country : USA
Job Number : HD-XX-0901037354
Job Start Date : 26-Jan-14
API Number : 30-015-41848-0000



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GENERAL INFORMATION

Company	: Chevron USA, Inc
Rig	: Ensign 767
Well	: Hayhurst 18 Fed 1H
Field	:
State	: New Mexico
County	: Eddy County
Country	: USA
API Number	: 30-015-41848-0000
Sperry Drilling Job Number	: HD-XX-0901037354
Job Start Date	: 26-Jan-14
Job End Date	: 04-Feb-14
North Reference	: Grid
Total Correction (deg)	: 7.618
Dip Angle (deg)	: 59.909
Total Magnetic Field (nT)	: 48228
Date of Magnetic Data	: 26 January, 2014
Well Head coordinates N	: 32 deg. 8 min 10.48 sec North
Well Head coordinates E	: 104 deg. 13 min 25.58 sec West
Vertical section direction (deg)	: 178.92
Unit Number	: 10947758
MWD Engineers	: Brandon Roberie, Khoa Tran
Company Representatives	: Matthew Kubachka
Company Geologist:	: Terry Belsher, Terry Belsher

**OPERATIONAL OVERVIEW**

Halliburton/Sperry Drilling was contracted by Chevrib to provide MWD Gamma, and Directional services for the well Hayhurst 18 Fed 1H in Eddy County, NM. Tools and crew arrived on location on 26-January-14 and rigged up accordingly.

Run 0100: TIH with 8" DWD tools on 1/27/14. Drilled from 425' MD to 2033' MD.
100% MWD Run. POQH on 1/30/14 to run intermediate casing.

Run 0200: TIH with 6.75" DGWD tools on 1/31/14.

100% MWD Run. POQH on 2/4/14 due to TDing pilot hole section of well. Laid down directional equipment to pick up wire line logging equipment.

Start Depth (ft)	End Depth (ft)	Drill/Wipe Distance (ft)	Run Start Date Time	Run End Date Time	BRT Hrs	Oper. Hrs	Circ. Hrs	Max Temp (degF)	Serv Int	Trip for MWD	Failure Type
425.00	2033.00	1608.00	27-Jan-14 23:30	30-Jan-14 03:30	52.00	52.000	39.000	117.73	No	No	
2033.00	7500.00	5467.00	31-Jan-14 13:00	04-Feb-14 23:30	106.50	100.000	85.000	142.25	No	No	



BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 100	Run Start : 27-Jan-14 23:30	BRT Hrs : 52.00	Circ. Hrs : 39.00
Rig Run No. : 2	Run End : 30-Jan-14 03:30	Hole Size (in) : 12.25	Oper. Hrs : 52.00

DRILLING DATA

Start Depth (ft) : 425.00	Footage (ft) : 1608.00	Avg WOB (klb) : 18.0	Avg ROP (fph) : 100.00
End Depth (ft) : 2033.00	Avg Flow Rate(gpm) : 700	Avg TOB (ft-lb) : 9000	Avg SPP (psig) : 1600
Drilling Hrs (hr) : 30.110	Avg RPM (rpm) : 72	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Saturated Brines			
Weight (ppg) : 10.20	Viscosity (spqt) : 28.00	PV (cP) : 2	YP (lbf2) : 3.00
Chlorides (ppm) : 186000	Max Temp (degF) : 117.73	% Solids (%) : 2.00	% Sand (%) : 0.10
pH (pH) : 9.50	Fluid Loss(mptm) : 90	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 8.06	Type : D/GWD	Min. Inc. (deg): 0.00	Min. Inc. Depth (ft) : 0.00
Final Az. (deg) : 86.49	Max Op. Press. (psig) 111	Max. Inc. (deg): 4.03	Max. Inc. Depth (ft) : 1696.00
MWD Real Time % : 99		MWD Recorded % : 100	

COMMENTS

Run 0100: TIH with 8" DWD tools on 1/27/14. Drilled from 425' MD to 2033' MD.
100% MWD Run. POOH on 1/30/14 to run intermediate casing.

(1) X-Over Sub
7.69 in OD / 3.56 in ID
SN : KF92432

(2) X-Over Sub
8.00 in OD / 3.00 in ID
SN : K54442

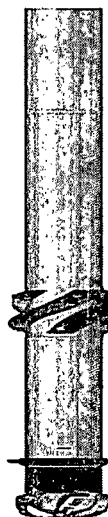
(3) MWD

(4) Integral Blade Stabilizer
9.00 in OD / 3.25 in ID
SN : ST150197

(5) Float Sub
8.13 in OD / 2.88 in ID
SN : DR13848

(6) 8" SperryDrill Lobe 6/7 - 4.0
stg
8.00 in OD / 5.25 in ID
SN : 10466469

(7) PDC
8.00 in OD / 2.88 in ID
SN : JH6260



Length (ft)	Cumulative Length (ft)
(1) 1.64	112.87
(2) 4.06	111.23
(3) 67.97	107.17
(4) 5.27	39.20
(5) 3.02	33.93
(6) 29.91	30.91
(7) 1.00	1.00

1x Non-Mag Drill Collar
8.13 in OD / 3.31 in ID
SN : DR23894

HOS
8.13 in OD / 3.31 in ID
SN : 12129597
*[1]PCDC Sonde - SN: 11297474
*[2]PCM Sonde - SN: 10868858
*[3]Positive Pulser - SN: 2

1x Non-Mag Drill Collar
8.06 in OD / 3.31 in ID
SN : DR9266

Length
(ft)

Sensor Dist
From Bit
(ft)



30.83

6.61

30.53

[1] 64.03

[2] 69.47



BIT RUN SUMMARY

RUN TIME DATA

MWD Run : 200	Run Start : 31-Jan-14 13:00	BRT Hrs : 106.50	Circ. Hrs : 85.00
Rig Run No. : 3	Run End : 04-Feb-14 23:30	Hole Size (in) : 8.75	Oper. Hrs : 100.00

DRILLING DATA

Start Depth (ft) : 2033.00	Footage (ft) : 5467.00	Avg WOB (klb) : 22.0	Avg ROP (fph) : 120.00
End Depth (ft) : 7500.00	Avg Flow Rate(gpm) : 550	Avg TOB (ft-lb) : 11600	Avg SPP (psig) : 1850
Drilling Hrs (hr) : 72.537	Avg RPM (rpm) : 82	Avg Bend (ft-lb) : NA	

MUD DATA

Mud Type : Saturated Brines			
Weight (ppg) : 9.20	Viscosity (spqt) : 29.00	PV (cP) : 2	YP (lbf/ft ²) : 3.00
Chlorides (ppm) : 64000	Max Temp (degF) : 142.25	% Solids (%) : 2.90	% Sand (%) : 0.10
pH (pH) : 10.60	Fluid Loss(mptm) : 90	% Oil (%) :	O:W :

MWD PERFORMANCE

Tool OD (in) : 6.81	Type : D/GWD	Min. Inc. (deg): 0.12	Min. Inc. Depth (ft) : 6249.00
Final Az. (deg) : 240.93	Max Op. Press. (psig) 3136	Max. Inc. (deg): 2.19	Max. Inc. Depth (ft) : 7011.00
MWD Real Time % : 99		MWD Recorded % : 100	

COMMENTS

Run 0200: TIH with 6.75" DGWD tools on 1/31/14.
 100% MWD Run. POOH on 2/4/14 due to TDing pilot hole section of well. Laid down directional equipment to pick up wire line logging equipment.

(1) 5" Drill Pipe (4 1/2 IF)
5.00 in OD / 4.11 in ID

(2) Heavy Weight
6.75 in OD / 3.00 in ID

(3) 6-3/4" Sledgehammer Jar
6.87 in OD / 2.75 in ID

(4) 5" X 3" HWDP #49.3 - NC50(IF)
5.00 in OD / 3.00 in ID

(5) X-Over Sub
6.75 in OD / 3.00 in ID
SN: Rig

(6) 6 1/2" X 3.25" - 91.7# Drill Collar
6.50 in OD / 3.25 in ID

(7) X-Over Sub
6.63 in OD / 2.82 in ID
SN: DR22840

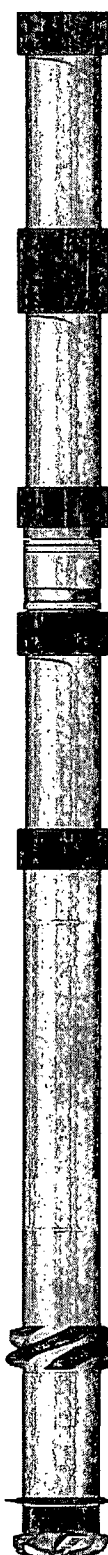
(8) MWD

(9) Integral Blade
7.00 in OD / 2.31 in ID
SN: 10092

(10) Float Sub
6.88 in OD / 2.88 in ID
SN: DR18314

(11) 7" GeoForce Lobe 6/7 - 4.5 stg
7.00 in OD / 4.95 in ID
SN: 12067778

(12) PDC
7.00 in OD / 2.82 in ID
SN: JH6492



Length (ft)	Cumulative Length (ft)
	2023.00
(1) 1027.22	
	995.78
(2) 151.78	
	844.00
(3) 32.48	
	811.52
(4) 274.54	
(5) 2.57	536.98
	534.41
(6) 453.83	
(7) 3.58	80.58
	77.00
(8) 36.57	
(9) 4.82	40.43
(10) 3.56	35.61
(11) 31.05	32.05
(12) 1.00	1.00

HOS
6.75 in OD / 3.25 in ID
SN: 11321872
*[1]PCDC Sonde - SN: 11902024
*[2]PCG Sonde - SN: 11681013
*[3]PCM Sonde - SN: 11619986
*[4]Positive Pulser - SN: 2

1x Non-Mag Drill Collar
6.81 in OD / 3.25 in ID
SN: 11801576

Length (ft)	Sensor Dist From Bit (ft)
6.25	[1] 60.48 [2] 66.09 [3] 77.31
30.32	



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
100.00	0.55	223.21	100.00	0.35 S	0.33 W	0.34	0.55
200.00	1.29	257.82	199.99	0.94 S	1.76 W	0.90	0.89
300.00	2.20	269.98	299.94	1.18 S	4.78 W	1.09	0.98
400.00	3.34	283.61	399.82	0.49 S	9.53 W	0.31	1.31
512.00	3.61	285.52	511.61	1.22 N	16.10 W	-1.52	0.26
596.00	2.36	276.29	595.50	2.12 N	20.37 W	-2.50	1.59
689.00	1.96	269.12	688.43	2.30 N	23.86 W	-2.75	0.52
811.00	1.67	283.56	810.37	2.69 N	27.67 W	-3.21	0.44
999.00	1.18	313.16	998.32	4.66 N	31.74 W	-5.25	0.46
1126.00	1.21	330.97	1,125.29	6.72 N	33.35 W	-7.35	0.29
1316.00	2.22	50.23	1,315.22	10.83 N	31.49 W	-11.42	1.22
1506.00	3.45	61.43	1,504.99	15.92 N	23.64 W	-16.36	0.70
1696.00	4.03	75.89	1,694.59	20.28 N	12.16 W	-20.50	0.58
1789.00	3.76	86.14	1,787.38	21.28 N	5.95 W	-21.39	0.80
1881.00	2.81	88.86	1,879.22	21.53 N	0.68 W	-21.54	1.04
1967.00	2.28	86.49	1,965.14	21.67 N	3.13 E	-21.61	0.64
2067.00	2.11	95.09	2,065.06	21.63 N	6.95 E	-21.50	0.37
2258.00	1.96	94.27	2,255.94	21.08 N	13.70 E	-20.81	0.08
2449.00	2.17	88.60	2,446.82	20.92 N	20.57 E	-20.53	0.15
2639.00	2.16	89.47	2,636.69	21.04 N	27.73 E	-20.52	0.02
2829.00	1.94	94.88	2,826.56	20.80 N	34.51 E	-20.15	0.15
3019.00	1.82	92.32	3,016.46	20.41 N	40.73 E	-19.64	0.08
3210.00	2.01	90.82	3,207.35	20.24 N	47.12 E	-19.34	0.10
3400.00	1.90	94.77	3,397.24	19.93 N	53.59 E	-18.91	0.09
3591.00	1.86	93.57	3,588.14	19.47 N	59.83 E	-18.34	0.03
3780.00	2.07	90.86	3,777.03	19.23 N	66.30 E	-17.97	0.12
3969.00	2.16	86.55	3,965.90	19.39 N	73.27 E	-18.01	0.10
4159.00	1.70	83.46	4,155.79	19.93 N	79.64 E	-18.42	0.25
4349.00	1.28	94.41	4,345.73	20.08 N	84.55 E	-18.49	0.26
4540.00	1.42	91.07	4,536.68	19.88 N	89.06 E	-18.19	0.08
4730.00	1.23	87.11	4,726.63	19.93 N	93.45 E	-18.17	0.11
4920.00	1.31	89.67	4,916.58	20.05 N	97.65 E	-18.21	0.05
5108.00	1.13	95.57	5,104.54	19.88 N	101.63 E	-17.96	0.11
5298.00	1.17	119.91	5,294.50	18.73 N	105.18 E	-16.75	0.26
5488.00	0.93	135.07	5,484.47	16.68 N	107.95 E	-14.64	0.19
5678.00	0.57	199.18	5,674.45	14.70 N	108.73 E	-12.65	0.45
5868.00	0.68	273.01	5,864.45	13.87 N	107.29 E	-11.85	0.40
6058.00	0.63	254.36	6,054.43	13.65 N	105.16 E	-11.66	0.11
6249.00	0.12	267.99	6,245.43	13.35 N	103.93 E	-11.39	0.27
6440.00	0.75	195.20	6,436.42	12.15 N	103.40 E	-10.20	0.38

DIRECTIONAL SURVEY DATA

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (%/100')
6630.00	1.15	175.51	6,626.40	9.04 N	103.23 E	-7.10	0.27
6820.00	1.32	207.73	6,816.35	5.19 N	102.36 E	-3.26	0.37
7011.00	2.19	203.35	7,007.26	0.10 S	99.88 E	1.99	0.46
7201.00	1.63	233.60	7,197.16	5.04 S	96.28 E	6.85	0.60
7392.00	1.60	240.93	7,388.09	7.94 S	91.77 E	9.66	0.11
7500.00	1.60	240.93	7,496.04	9.40 S	89.14 E	11.08	0.00

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 178.92 degrees (Grid)
- A total correction of 7.62 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 7,500.00 feet is 89.63 feet along 96.02 degrees (Grid)

SURVEYS CALCULATED USING SHORT COLLAR METHOD

WELL ASSUMED VERTICAL AT SURFACE

SURVEYS FROM 100' MD TO 400' MD PROVIDED BY SCIENTIFIC DRILLING

SURVEYS FROM 512' MD TO 7392' MD PROVIDED BY SPERRY DRILLING

SURVEY AT 7392' MD HAS BEEN PROJECTED TO TD AT 7500' MD

SPERRY DRILLING ENGINEERS: BRANDON ROBERIE & KHOA TRAN

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