



Earth Science Agency

Duck Club 12W-20-12C

Well Site Geology

End of Well Summary

November 27, 2018

Prepared for:

Extraction Oil & Gas, Inc.

370 17th Street, Suite 5300

Denver, CO 80202

Plan

Duck Club 12W-20-12C ST1 is a horizontal well that was designed to target a 23' thick window of the Codell. The well is in the Wattenberg Field of the Denver-Julesburg (DJ) Basin located in Adams, CO. The well plan called for a kick off point of 7600' MD. The curve was to be built using build rates of 10° per 100' landing at 8494' MD and 7575' TVD. The lateral was to be 9606' MD in length (LP to TD) with a vertical section azimuth of 257.51° and an average inclination of 89.72°. TD was to be 18100' MD and 7622' TVD.

Actual

The well spud at 1643' MD at 1839 hrs on 11/21/2018, kicked off at 7607' MD, 6976' TVD at 1732 hrs on 11/22/2018 , and landed at 8554' MD, 7564' TVD at 2353 hrs on 11/22/2018 with an 86.13° INC, placing the wellbore at 9' above the top of the Codell payzone. The original borehole was drilled to a depth of 15924' MD at 0840 hrs on 11/25/2018 when the bit and part of the motor was lost down hole. A sidetrack was initiated at 14890' MD at 0004 hrs on 11/26/2018. Horizontal TD was reached at 18064' MD, 7628' TVD at 2155 hrs on 11/26/2018, placing the wellbore 2' above the top of the Codell payzone. The lateral length of the well is 9510' MD (96' shorter than plan; LP to TD).

Summary

Gamma correlation with the Brighton CO 1 type log was good. Bed dips in the lateral section ranged from 6.29° down to 4.46° up, and averaged 89.7°. Eight faults were encountered during the lateral ranging from 3' down-throw to a 38' up-throw. Approximately 8710' (91.6%) of the wellbore is in the Codell payzone, 800' (8.4%) is above in the Fort Hays. Gas peaked at 3378 u.

Well Info			
Operator:	Extraction Oil & Gas		
Well:	Duck Club 12W-20-12C ST1		
API:	05-001-10158		
AFE:	18-00328		
Rig:	Patterson 901		
Spud Date:	11/21/2018		
TD Date:	11/25/2018		
County/State:	Adams, CO		
Basin/Field:	DJ Basin, Wattenberg		
Surface Location:	NWSW Sec 12, T1S, R66W		
Surface Hole:	2296' FSL, 680' FWL		
Bottom Location:	Sec 10, T1S, R66W		
Bottom Hole:	460' FSL, 2176' FEL		
GR/KB Elev:	5037' / 5066'		
Lat/Long:	39.9786, -104.73098		
Directional Company:	Atlas Drilling and Services		
Extraction Geologist:	Jared Rouse		
Onsite Personnel			
ESA Geologists:	Blake Eatherton (n)		
	Madison Miller (d)		
ESA Contact:	775-450-5988		
	geology@earthscienceagency.com		
	Login to our website for archived reports:		
	http://www.earthscienceagency.com		
Depths Logged:	6000' - Current		
Dates Logged:	11/21/2018 - Today		
Well Data			
Type Log:	Brighton CO 1	Avg. Bed Dip:	89.7

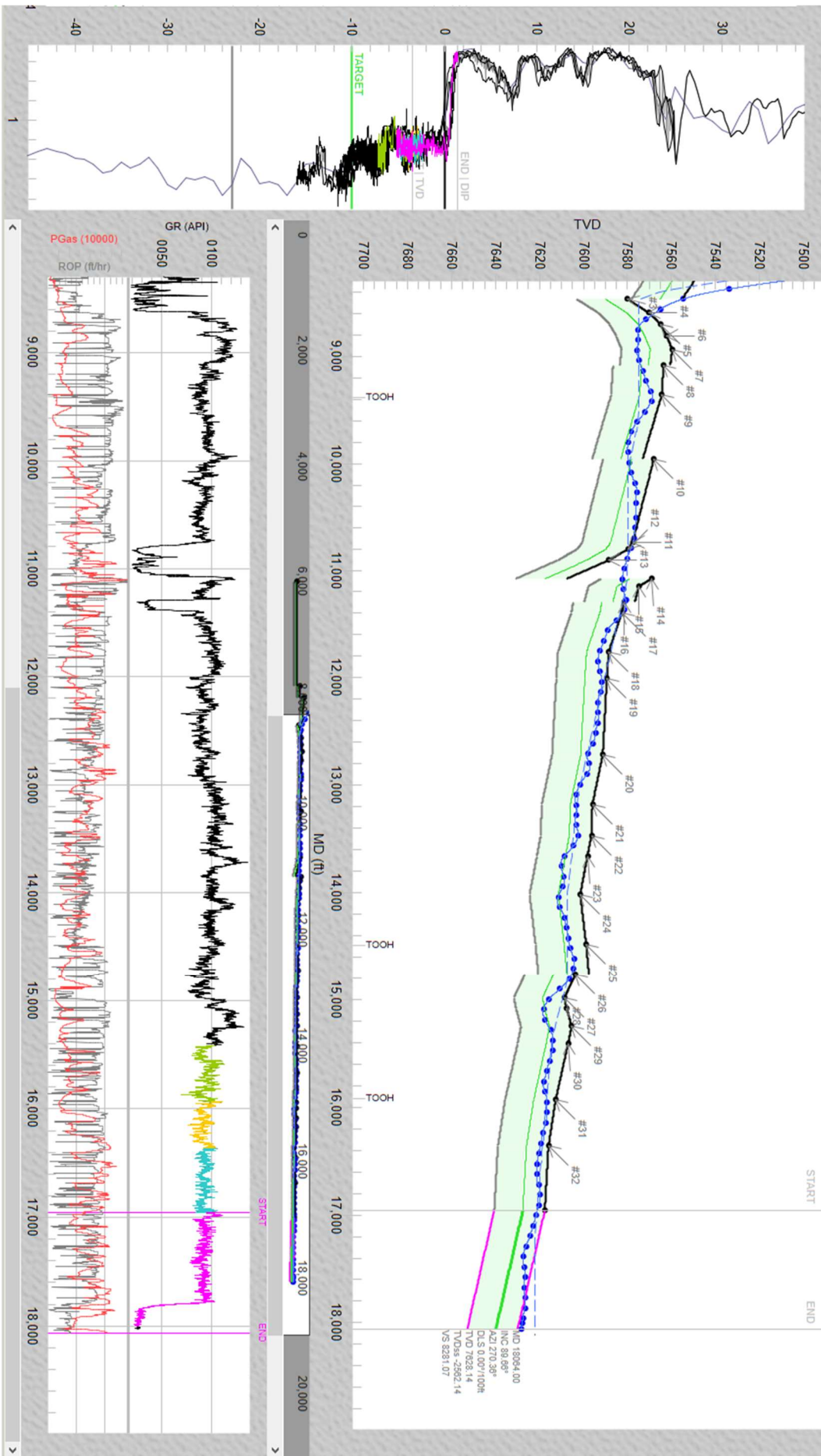
Plan/Target Changes						
Plan #	MD Issued	Target				
SH1	Pre-Spud	LP	VS=-1052'	TVD=7575'	INC=90°	
		TD	VS=8321'	TVD=7622'	INC=°	
DJ	9000'	Raised targets 5' TVD				
DJ	12300'	Lowered targets 5' TVD				
MRW	13800'	Raised targets 3' TVD				
MRW	14200'	Raised targets 5' TVD				
DJ	15000'	Lowered targets 5' TVD				
MRW	15870'	Removed waypoint at 16300' MD				
MM	16625'	Lowered targets 3' TVD				
Zone Summary						
Zone	Length (MD)		Percent			
In:	8710		91.6%			
Out Top:	800		8.4%			
Out Base:	0		0.0%			
Lateral Summary						
			MD	VS	TVD	
Actual LP:			8,554	-999	7,564	
Actual TD:			18,064	8,281	7,628	
Actual Lateral Length:			9,510	9,280	-	
Plan Lateral Length:			9,606	9,373	-	
Net Gain/-Loss of Lateral Length:			-96	-93	-	
Out of Payzone						
Out Top/Base		MD Out	TVD Out	MD In	TVD In	Length Out
Top: drilled into Ft. Hays		10,713	7,577	11,081	7,582	368
Top: faulted into Ft. Hays		11,295	7,581	11,425	7,584	130
Top: drilled into Ft. Hays		17,762	7,627	18,064		302
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
Faults						
MD	Throw					
7795	Fault: 18' up-throw; went from Sharon Springs to A Chalk					
8002	Fault: 35' up-throw; went from B Chalk to B Marl					
8467	Fault: 25' down-throw; stayed in Ft. Hays					
9088	Fault: 3' down-throw; stayed in Codell					
9953	Fault: 4' up-throw; stayed in Codell					
11081	Fault: 38' up-throw; went from Ft. Hays to Codell					
11295	Fault: 5' down-throw; went from Codell to Ft. Hays					
14765	Fault: 6' down-throw; stayed in Codell					

Stratigraphic Position				
Payzone	at TD		at LP	
	TVD	Wellbore (H/-L)	TVD	Wellbore (H/-L)
Top:	7,630	2	7,573	9
Target:	7,640	12	7,583	19
Base:	7,653	25	7,596	32
Formation Tops				
Formations	MD	TVD	VS	Thickness
Sharon Springs:	7,785	7,149	-1,575	
Niobrara:	Fault			
A Chalk:	Fault			
A Marl:	7,814	7,176	-1,565	144
B2 Chalk:	7,978	7,319	-1,487	19
B Marl:	8,002	7,338	-1,473	28
C Chalk:	8,039	7,366	-1,449	34
C Marl:	8,085	7,400	-1,419	125
Ft. Hays:	8,347	7,525	-1,196	44
Payzone - Codell:	8,618	7,569	-936	
Carlile:				

MD Start 16957.00 MD End 18064.00
Thick 23.00 TVD 7617.55
Dp Azi 270.00 270 Dp 0.64 0.64
AppDip 1806.4 AppInc 257.51 VSA 0.975 Key 30X
Note ☐ Auto-copy ☒ Restore

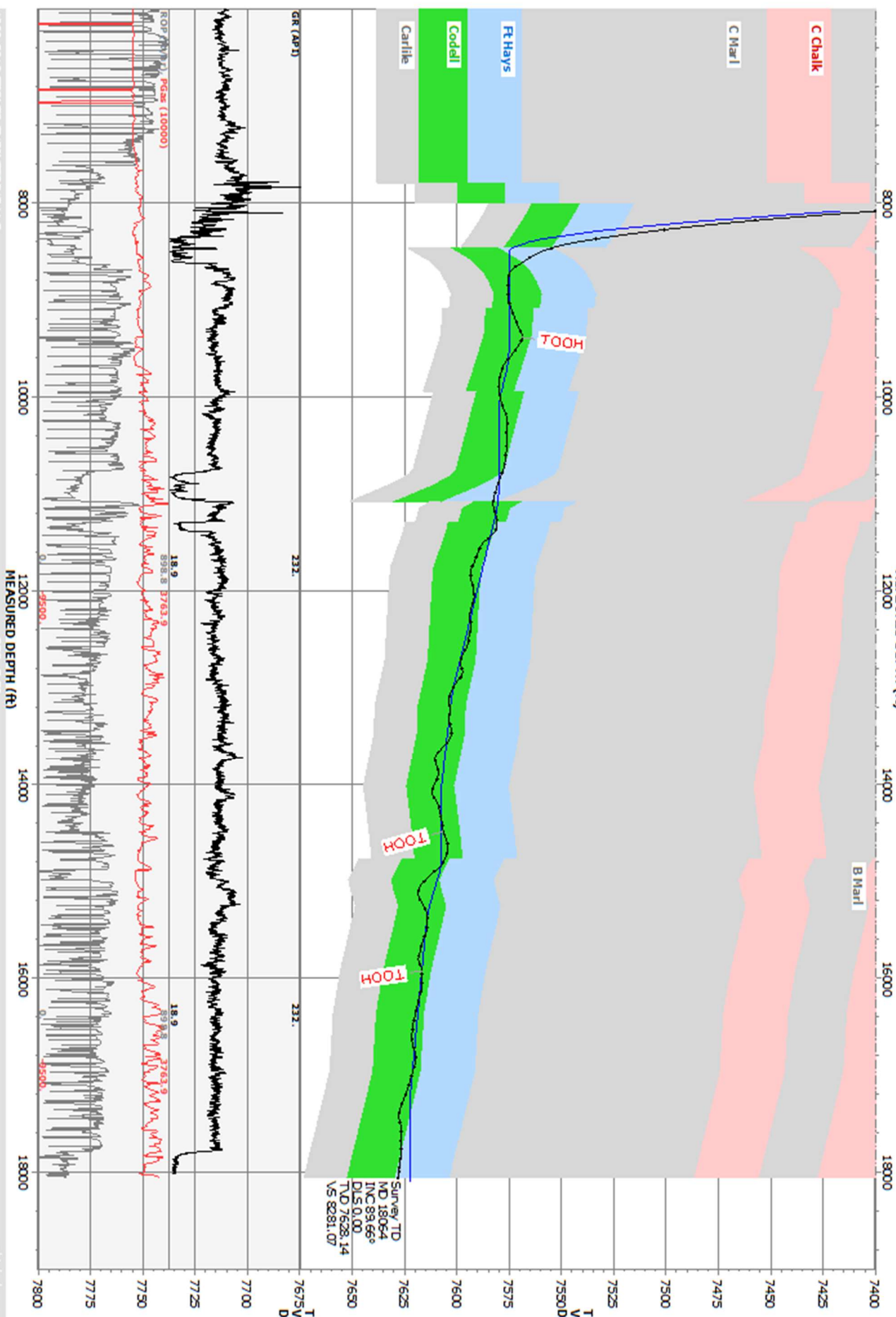
Plot GRID 0

CTRL (pan) ALT(TVD-room) See Right-Click



Operator **Extraction**
Well Name Duck Club 12W-20-12C ST1

Analyst Blue Spikes
Units feet Well ID 05-001-10158
MEASURED DEPTH (ft)
Survey #1
Comment #1



Duck Club 12W-20-12C ST1

