

COG Operating LLC, Nightcap 6 Federal 1H

COG Operating, LLC respectfully requests the following modifications to the approved drilling plan due to final rig selection with slight changes in anticipated formation depths and extending the lateral length to 12,021' vertical section.

1. Geologic Formations

TVD of target	9350'	Pilot hole depth	NA
MD at TD:	21150'	Deepest expected fresh water:	223'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone?	Hazards
Quaternary Fill	Surface	Water	
Rustler	857'	Water	
Top of Salt	948'	Salt	
Tansill	2489'	Barren	
Yates	2599'	Oil/Gas	
Seven Rivers	2766'	Oil/Gas	
Capitan Reef	2879'	Water	Possible lost circ
Delaware Group (CC)	4359'	Oil/Gas	Possible lost circ
Bone Spring	7315'	Oil/Gas	
2 nd Bone Spring Sand	9195'	Target Zone	
3 rd Bone Spring Sand	10043'	Oil/Gas	

2. Casing Program

Surface casing is 20" casing per original APD

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.
	From	To				
17.5"	0'	270-2770'	13.375"	61	J55	STC
12.25"	0'	4350-4380'	9.625"	40	J55	LTC
8.75"	0'	21150'	5-1/2"	17	P110	BTC

1st inter. product

- Will set DV tool in 9-5/8" string a minimum of 50' below previous shoe or @ ~ 2820'.

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3. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld. ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Inter. 1 13-3/8"	1300	13.5	1.75	9.2	13	Lead: Class C + 4% Gel + 1% CaCl ₂
	350	14.8	1.34	6.4	6	Tail: Class C + 1% CaCl ₂
Inter. 2 Stg 1	350	12.9	1.92	10.0	12	Lead: Class C Lite (65:35:6) + 5% Salt + 5# Kolseal
	250	14.8	1.34	6.4	6	Tail: Class C
Inter. 2 Stg 2	520	12.9	1.92	10.0	12	Lead: Class C Lite (65:35:6) + 5% Salt + 5# Kolseal
	150	14.8	1.34	6.4	6	Tail: Class C + 1% CaCl ₂
Prod.	790	10.3	3.52	21.3	75	Lead: Halliburton Tuned Lite w/ 2# kolseal, 1.5# salt, 1/4# D-Air 5000, 1/8# PEF, etc
	2950	14.4	1.25	5.7	22	Tail: 50:50:2 H blend (FR, Retarder, FL adds as necessary)

Production casing cement will tie in at least 50' above the top of the Capitan Reef. Planned TOC @ 2800'.

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Intermediate 1 (13-3/8")	0'	40%
Intermediate 2 (9-5/8") – Stage 1	2820'	102%
Intermediate 2 (9-5/8") – Stage 2	0'	>200%
Production	2800'	42%

Pilot hole depth: NA

KOP: 8856'

4. Pressure Control Equipment

N	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	Are anchors required by manufacturer? No.

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8. Other facets of operation

Is this a walking operation? No.

Will be pre-setting casing? No.

Will well be hydraulically fractured? Yes.

Attachments

- Directional Plan
- Flex hose certification