

COG Operating LLC, Nightcap 6 Federal 4H

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 10,765' vertical section.

1. Geologic Formations

TVD of target	9350'	Pilot hole depth	NA
MD at TD:	19908'	Deepest expected fresh water:	223'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards
Quaternary Fill	Surface	Water	
Rustler	829'	Water	
Top of Salt	917'	Salt	
Tansill	2616'	Barren	
Yates	2739'	Oil/Gas	
Seven Rivers	2900'	Oil/Gas	
Capitan Reef	3017'	Water	Possible lost circ
Delaware Group (CC)	4342'	Oil/Gas	Possible lost circ
Bone Spring	7260'	Oil/Gas	
2 nd Bone Spring Sand	9188'	Target Zone	
3 rd Bone Spring Sand	10040'	Oil/Gas	

2. Casing Program

See
COA

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.
	From	To				
26"	0'	915'	20"	94	J55	STC
17.5"	0'	2200 2910'	13.375"	61	J55	STC
12.25"	0'	4345 4380'	9.625"	40	J55	LTC
8.75"	0'	19908'	5-1/2"	17	P110	BTC

- Will set DV tool in 9-5/8" string a minimum of 50' below previous shoe or @ ~ 2960'.

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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
Surf	1100	13.5	1.75	9.2	13	Lead: Class C + 4% Gel + 2% CaCl ₂
	500	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl ₂
Inter. 1 13-3/8"	1360	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	300	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	545	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.	750	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
	2650	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 @ 2960'. ✓ (Error on original COAs. This is the correct tie back)

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

Casing String	TOC	% Excess
Surface (20")	0'	88%
Intermediate 1 (13-3/8")	0'	40%
Intermediate 2 (9-5/8") – Stage 1	2960'	102%
Intermediate 2 (9-5/8") – Stage 2	0'	>200%
Production	2960' OK	42%

Pilot hole depth: NA

KOP: 8863'

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