

**EOG RESOURCES, INC.**  
**VALIANT 24 FED COM #710H**

**1. GEOLOGIC NAME OF SURFACE FORMATION:**

Permian

**2. ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:**

Rustler	936'
Tamasrisk Anhydrite	1,010'
Top of Salt	1,248'
Base of Salt	4,674'
Lamar	4,908'
Bell Canyon	4,921'
Cherry Canyon	5,866'
Brushy Canyon	7,521'
Bone Spring Lime	9,061'
Leonard Shale	9,097'
1 <sup>st</sup> Bone Spring Sand	10,011'
2 <sup>nd</sup> Bone Spring Shale	10,236'
2 <sup>nd</sup> Bone Spring Sand	10,577'
3 <sup>rd</sup> Bone Spring Carb	11,069'
3 <sup>rd</sup> Bone Spring Sand	11,728'
Wolfcamp	12,178'
TD	12,306'

**3. ESTIMATED DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS:**

Upper Permian Sands	0- 400'	Fresh Water
Cherry Canyon	5,866'	Oil
Brushy Canyon	7,521'	Oil
Leonard Shale	9,097'	Oil
1 <sup>st</sup> Bone Spring Sand	10,011'	Oil
2 <sup>nd</sup> Bone Spring Shale	10,236'	Oil
2 <sup>nd</sup> Bone Spring Sand	10,577'	Oil
3 <sup>rd</sup> Bone Spring Carb	11,069'	Oil
3 <sup>rd</sup> Bone Spring Sand	11,728'	Oil
Wolfcamp	12,178'	Oil

No other Formations are expected to give up oil, gas or fresh water in measurable quantities. Surface fresh water sands will be protected by setting 9.625" casing at 1,045' and circulating cement back to surface.

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**4. CASING PROGRAM - NEW**

Hole Size	Interval	Csg OD	Weight	Grade	Conn	DF <sub>min</sub> Collapse	DF <sub>min</sub> Burst	DF <sub>min</sub> Tension
12.25"	0' - 1,045'	9.625"	40#	J-55	LTC	1.125	1.25	1.60
8.75"	0' - 11,180'	7.625"	26.4#	HCP-110	Ultra SFC	1.125	1.25	1.60
6.75"	0' - 10,680'	5.5"	20#	HCP-110	LTC	1.125	1.25	1.60
6.75"	10,680' - 11,180'	5.5"	20#	HCP-110	VAM SFC	1.125	1.25	1.60
6.75"	11,180' - 19,906'	5.5"	20#	HCP-110	LTC	1.125	1.25	1.60

Variance is requested to waive the centralizer requirements for the 7-5/8" FJ casing in the 8-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 8-3/4" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive any centralizer requirements for the 5-1/2" FJ casing in the 6-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 6-3/4" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive the annular clearance requirements for the 5-1/2" casing by 7-5/8" casing annulus to the proposed top of cement.

EOG requests permission to allow deviation from the 0.422" annulus clearance requirement from Onshore Order #2 under the following conditions:

- Annular clearance to meet or exceed 0.422" between intermediate casing ID and production casing coupling only on the first 500' overlap between both casing strings.
- Annular clearance less than 0.422" is acceptable for the curve and lateral portions of the production open hole section.

EOG Resources also requests approval to implement Casing Design B (pg. 8-9). BLM will be notified of elected design at spud.

**Cementing Program:**

Depth	No. Sacks	Wt. ppg	Yld Ft <sup>3</sup> /sk	Slurry Description
1,045' 9-5/8"	960	13.5	1.73	Lead: Class C + 4.0% Bentonite + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	80	14.8	1.34	Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 845')
11,180' 7-5/8"	430	14.2	1.11	1 <sup>st</sup> Stage (Tail): Class C + 0.6% Halad-9 + 0.45% HR-601 + 3% Microbond (TOC @ 7,500')
	1,000	12.7	2.30	2 <sup>nd</sup> Stage (Bradenhead squeeze): Class C + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
19,906' 5-1/2"	740	14.2	1.31	Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 10,680')

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<b>Additive</b>	<b>Purpose</b>
Bentonite	Lightweight/Lost circulation prevention
Calcium Chloride	Accelerator
Cello-flake	Lost circulation prevention
Sodium Metasilicate	Accelerator
PreMag-M	Expansive agent
Sodium Chloride	Accelerator
FL-62	Fluid loss control
Halad-344	Fluid loss control
Halad-9	Fluid loss control
HR-601	Retarder
Microbond	Expansive Agent

EOG requests to pump a two stage cement job on the 7-5/8" intermediate casing string with the first stage being pumped conventionally with the calculated top of cement at the Brushy Canyon (7,521') and the second stage performed as a bradenhead squeeze with planned cement from the Brushy Canyon to surface. If necessary, a top out consisting of 1,000 sacks of Class C cement + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (2.30 yld, 12.91 ppg) will be executed as a contingency. The final cement top will be verified by Echo-meter.

EOG will include the Echo-meter verified fluid top and the volume of displacement fluid above the cement slurry in the annulus in all post-drill sundries on wells utilizing this cement program.

EOG will report to the BLM the volume of fluid (limited to 5 bbls) used to flush intermediate casing valves following backside cementing procedures.

Note: Cement volumes based on bit size plus at least 25% excess in the open hole plus 10% excess in the cased-hole overlap section.

**5. MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL:**

Variance is requested to use a co-flex line between the BOP and choke manifold (instead of using a 4" OD steel line).

The minimum blowout preventer equipment (BOPE) shown in Exhibit #1 will consist of a single ram, mud cross and double ram-type (10,000 psi WP) preventer and an annular preventer (5,000-psi WP). Both units will be hydraulically operated and the ram-type will be equipped with blind rams on bottom and drill pipe rams on top.

Variance is requested to use a 5,000 psi annular BOP with the 10,000 psi BOP stack.

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Pipe rams and blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets.

A hydraulically operated choke will be installed prior to drilling out of the intermediate casing shoe.

**6. TYPES AND CHARACTERISTICS OF THE PROPOSED MUD SYSTEM:**

During this procedure we plan to use a Closed-Loop System and haul contents to the required disposal.

The applicable depths and properties of the drilling fluid systems are as follows.

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0 – 1,045'	Fresh - Gel	8.6-8.8	28-34	N/c
1,045' – 11,180'	Oil Base	10.0-10.2	28-34	N/c
11,180' – 11,863'	Oil Base	8.7-9.4	58-68	N/c - 6
11,863' – 19,906' Lateral	Oil Base	10.0-14.0	58-68	3 - 6

The highest mud weight needed to balance formation is expected to be 11.5 ppg. In order to maintain hole stability, mud weights up to 14.0 ppg may be utilized.

An electronic pit volume totalizer (PVT) will be utilized on the circulating system, to monitor pit volume, flow rate, pump pressure and stroke rate.

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the wellsite at all times.

**7. AUXILIARY WELL CONTROL AND MONITORING EQUIPMENT:**

- (A) A kelly cock will be kept in the drill string at all times.
- (B) A full opening drill pipe-stabbing valve (inside BOP) with proper drill pipe connections will be on the rig floor at all times.
- (C) H<sub>2</sub>S monitoring and detection equipment will be utilized from surface casing point to TD.

**8. LOGGING, TESTING AND CORING PROGRAM:**

Open-hole logs are not planned for this well.

GR-CCL Will be run in cased hole during completions phase of operations.

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**9. ABNORMAL CONDITIONS, PRESSURES, TEMPERATURES AND POTENTIAL HAZARDS:**

The estimated bottom-hole temperature (BHT) at TD is 181 degrees F with an estimated maximum bottom-hole pressure (BHP) at TD of 8,949 psig and a maximum anticipated surface pressure of 6,242 psig (based on 14.0 ppg MW). No hydrogen sulfide or other hazardous gases or fluids have been encountered, reported or are known to exist at this depth in this area. Severe loss circulation is expected from 7,300' to Intermediate casing point.

**10. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS:**

The drilling operation should be finished in approximately one month. If the well is productive, an additional 60-90 days will be required for completion and testing before a decision is made to install permanent facilities.

- (A) EOG Resources requests the option to contract a Surface Rig to drill, set surface casing, and cement on the subject well. After WOC 8 hours or 500 psi compressive strength (whichever is greater), the Surface Rig will move off so the wellhead can be installed. A welder will cut the casing to the proper height and weld on the wellhead (both "A" and "B" sections). The weld will be tested to 1000 psi. All valves will be closed and a wellhead cap will be installed (diagram attached). If the timing between rigs is such that EOG Resources would not be able to preset the surface, the Primary Rig will MIRU and drill the well in its entirety per the APD.

**11. WELLHEAD:**

A multi-bowl wellhead system will be utilized.

After running the 9-5/8" surface casing, a 9-5/8" BOP/BOPE system with a minimum working pressure of 10,000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 10,000 psi pressure test. This pressure test will be repeated at least every 30 days, as per Onshore Order No. 2

The minimum working pressure of the BOP and related BOPE required for drilling below the surface casing shoe shall be 10,000 psi.

The multi-bowl wellhead will be installed by vendor's representative(s). A copy of the installation instructions for the Cactus Multi-Bowl WH system has been sent to the NM BLM office in Carlsbad, NM.

The wellhead will be installed by a third party welder while being monitored by WH vendor's representative.

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All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.

A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

Casing strings will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

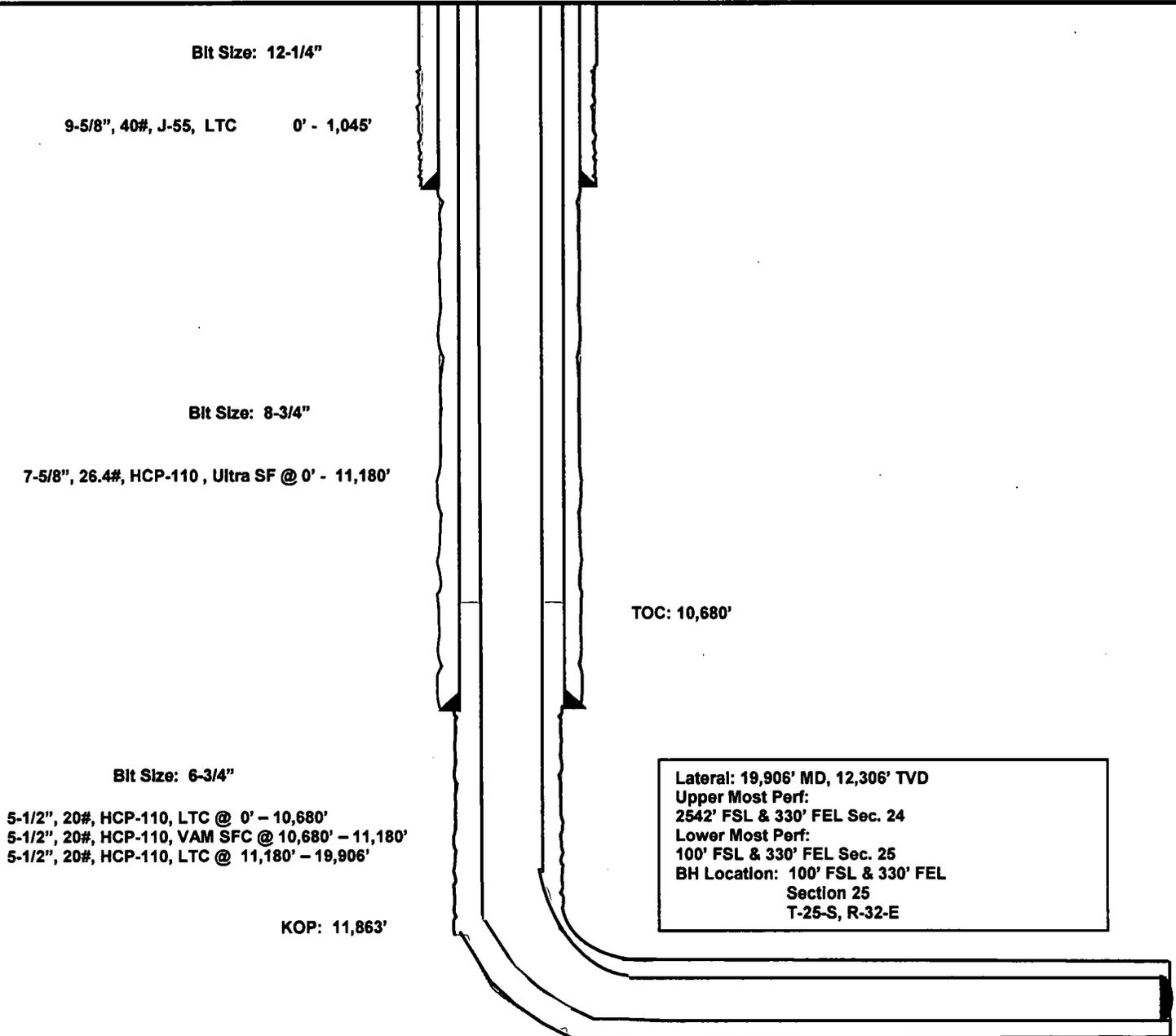
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1833' FSL  
456' FEL  
Section 24  
T-25-S, R-32-E

Proposed Wellbore  
Design A

KB: 3,487'  
GL: 3,462'

API: 30-025-\*\*\*\*\*



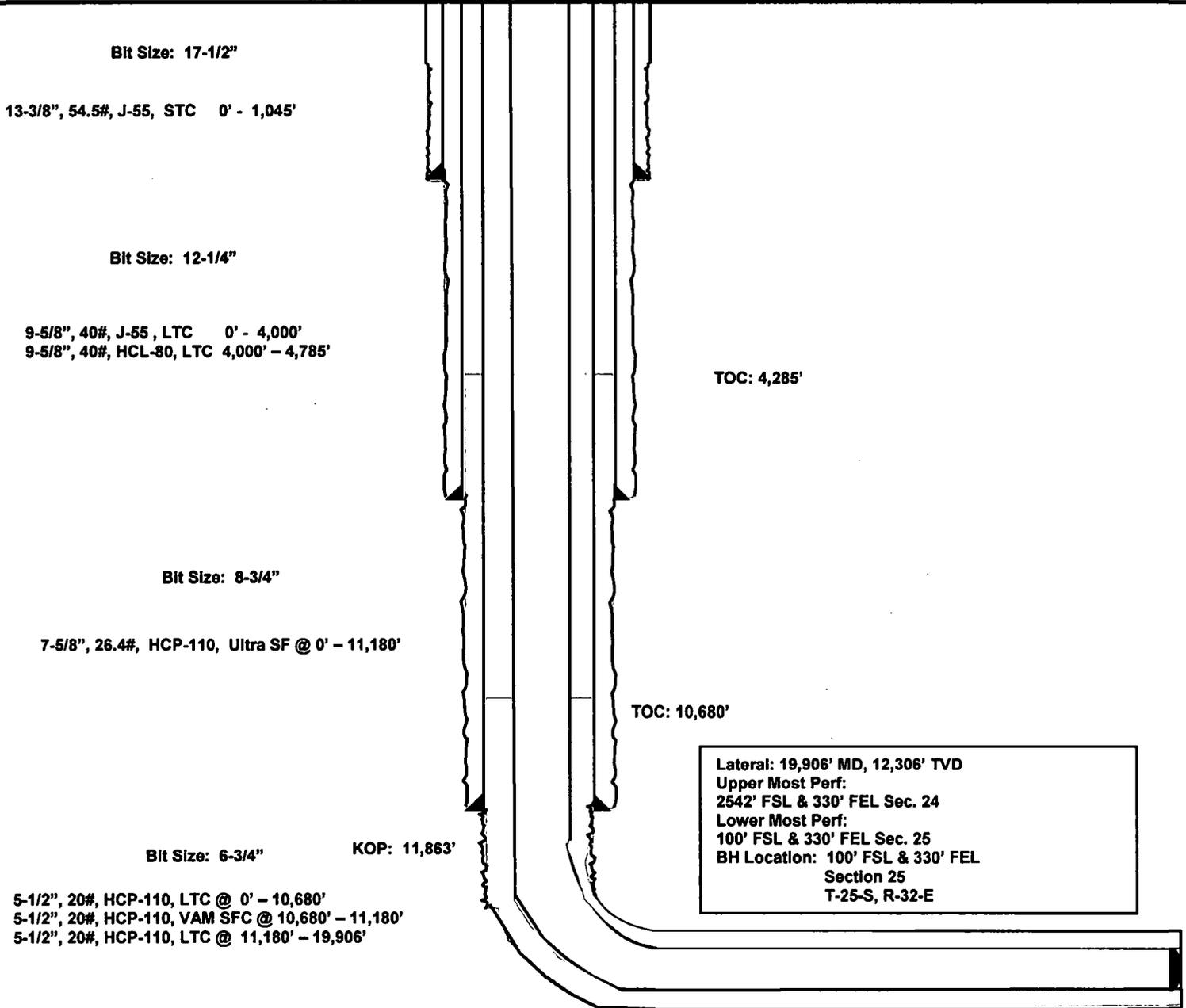
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1833' FSL  
456' FEL  
Section 24  
T-25-S, R-32-E

Proposed Wellbore  
Design B

KB: 3,487'  
GL: 3,462'

API: 30-025-\*\*\*\*\*



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**Design B**

**Casing Program:**

Hole Size	Interval	Csg OD	Weight	Grade	Conn	DF <sub>min</sub> Collapse	DF <sub>min</sub> Burst	DF <sub>min</sub> Tension
17.5"	0 – 1,045'	13.375"	54.5#	J-55	STC	1.125	1.25	1.60
12.25"	0 – 4,000'	9.625"	40#	J-55	LTC	1.125	1.25	1.60
12.25"	4,000' – 4,785'	9.625"	40#	HCL-80	LTC	1.125	1.25	1.60
8.75"	0 – 11,180'	7.625"	26.4#	HCP-110	Ultra SF	1.125	1.25	1.60
6.75"	0' – 10,680'	5.5"	20#	HCP-110	LTC	1.125	1.25	1.60
6.75"	10,680'–11,180'	5.5"	20#	HCP-110	VAM SFC	1.125	1.25	1.60
6.75"	11,180' – 19,906'	5.5"	20#	HCP-110	LTC	1.125	1.25	1.60

**Cement Program:**

Depth	No. Sacks	Wt. lb/gal	Yld Ft <sup>3</sup> /sk	Slurry Description
1,045' 13-3/8"	610	13.5	1.74	Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	160	14.8	1.35	Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 845')
4,785' 9-5/8"	760	12.7	2.22	Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	310	14.8	1.32	Tail: Class C + 10% NaCl + 3% MagOx (TOC @ 3,820')
11,180' 7-5/8"	200	10.8	3.67	Lead: Class C + 3% CaCl <sub>2</sub> + 3% Microbond (TOC @ 4,285')
	90	14.8	2.38	Tail: Class H + 0.6% Halad-9 + 0.45% HR-601 + 3% Microbond (TOC @ 9,680')
19,906' 5-1/2"	740	14.8	1.31	Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% (TOC @ 10,680')

As a contingency, EOG requests the option to pump a two stage cement job on the 7-5/8" intermediate casing string with the first stage being pumped conventionally with the calculated top of cement at the Brushy Canyon (7,521') and the second stage performed as a bradenhead squeeze with planned cement from the Brushy Canyon to surface. If necessary, a top out consisting of 1,000 sacks of Class C cement + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (2.30 yld, 12.91 ppg) will be executed as a contingency. The final cement top will be verified by Echo-meter.

**Mud Program:**

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0 – 1,045'	Fresh - Gel	8.6-8.8	28-34	N/c
1,045' – 4,785'	Brine	10.0-10.2	28-34	N/c
4,785' – 11,180'	Oil Base	8.7-9.4	58-68	N/c - 6
11,180' – 19,906' Lateral	Oil Base	10.0-11.5	58-68	3 - 6