

**EOG RESOURCES, INC.**  
**BARLOW 34 FED COM NO. 703H**

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

Permian

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

Rustler	805'
Top of Salt	1,135'
Base of Salt / Top Anhydrite	4,765'
Base Anhydrite	5,010'
Lamar	5,010'
Bell Canyon	5,035'
Cherry Canyon	6,080'
Brushy Canyon	7,660'
Bone Spring Lime	9,215'
1 <sup>st</sup> Bone Spring Sand	10,155'
2 <sup>nd</sup> Bone Spring Shale	10,345'
2 <sup>nd</sup> Bone Spring Sand	10,660'
3 <sup>rd</sup> Bone Spring Carb	11,130'
3 <sup>rd</sup> Bone Spring Sand	11,730'
Wolfcamp	12,200'
TD	12,420'

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

Upper Permian Sands	0- 400'	Fresh Water
Cherry Canyon	6,080'	Oil
Brushy Canyon	7,660'	Oil
1 <sup>st</sup> Bone Spring Sand	10,155'	Oil
2 <sup>nd</sup> Bone Spring Shale	10,345'	Oil
2 <sup>nd</sup> Bone Spring Sand	10,660'	Oil
3 <sup>rd</sup> Bone Spring Carb	11,130'	Oil
3 <sup>rd</sup> Bone Spring Sand	11,730'	Oil
Wolfcamp	12,200'	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 10.75" casing at 830' 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
14.75"	0 – 830'	10.75"	40.5#	J55	STC	1.125	1.25	1.60
9.875"	0 – 1,000'	7.625"	29.7#	HCP-110	LTC	1.125	1.25	1.60
9.875"	1,000' – 3,000'	7.625"	29.7#	P-110EC	SLIJ II	1.125	1.25	1.60
8.75"	3,000' – 11,300'	7.625"	29.7#	HCP-110	FlushMax III	1.125	1.25	1.60
6.75"	0' – 10,800'	5.5"	20#	P-110EC	DWC/C-IS MS	1.125	1.25	1.60
6.75"	10,800'-17,106'	5.5"	20#	P-110EC	VAM SFC	1.125	1.25	1.60

Variance is requested to wave 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 wave 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.

**Cementing Program:**

Depth	No. Sacks	Wt. ppg	Yld Ft <sup>3</sup> /ft	Mix Water Gal/sk	Slurry Description
10-3/4" 830'	325	13.5	1.73	9.13	Class C + 4.0% Bentonite + 0.6% CD-32 + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	200	14.8	1.34	6.34	Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate
7-5/8" 11,300'	250	14.8	1.38	6.48	Class C + 5% Gypsum + 3% CaCl <sub>2</sub> pumped via Bradenhead (TOC @ Surface)
	2000	14.8	1.38	6.48	Class C + 5% Gypsum + 3% CaCl <sub>2</sub> pumped via Bradenhead
	550	14.4	1.20	4.81	50:50 Class H:Poz + 0.25% CPT20A + 0.40% CPT49 + 0.20% CPT35 + 0.80% CPT16A + 0.25% CPT503P pumped Conventionally
5-1/2" 17,106'	850	14.1	1.26	5.80	Class H + 0.1% C-20 + 0.05% CSA-1000 + 0.20% C-49 + 0.40% C-17 (TOC @ 10,800')

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.

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**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 (5000-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. All BOPE will be tested in accordance with Onshore Oil & Gas order No. 2.

Before drilling out of the surface casing, the ram-type BOP and accessory equipment will be tested to 5000/ 250 psig and the annular preventer to 3500/ 250 psig. The surface casing will be tested to 1500 psi for 30 minutes.

Before drilling out of the intermediate casing, the ram-type BOP and accessory equipment will be tested to 5000/ 250 psig and the annular preventer to 3500/ 250 psig. The intermediate casing will be tested to 2000 psi for 30 minutes.

Pipe rams will be operationally checked each 24-hour period. 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 – 830'	Fresh - Gel	8.6-8.8	28-34	N/c
830' – 11,300'	Brine	8.8-10.0	28-34	N/c
11,300' – 17,106' 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.

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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.

**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 7427 psig (based on 11.5 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. 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.

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**11. WELLHEAD:**

A multi-bowl wellhead system will be utilized.

After running the 10-3/4" surface casing, a 13-5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 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 5000 psi.

The multi-bowl wellhead will be installed by vendor's representative(s). A copy of the installation instructions for the Stream Flo FBD100 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.

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.

Both the surface and intermediate 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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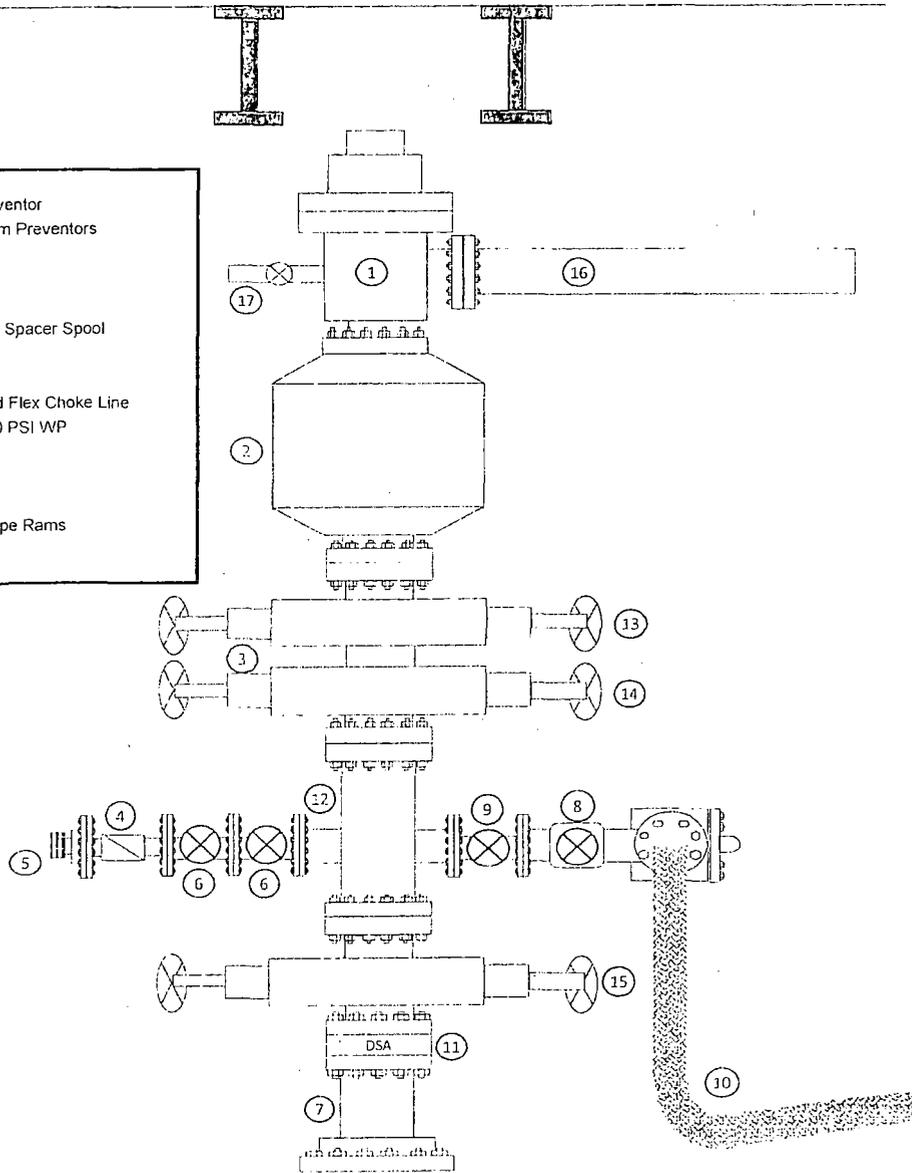
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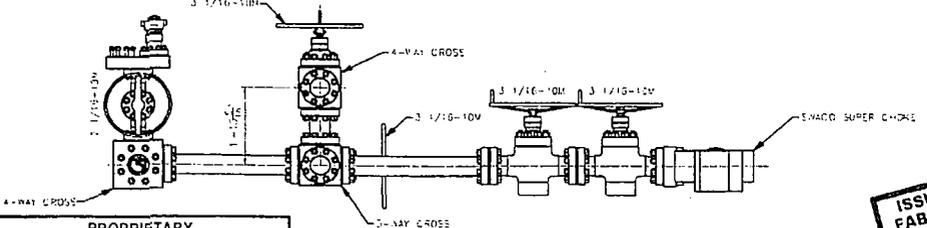
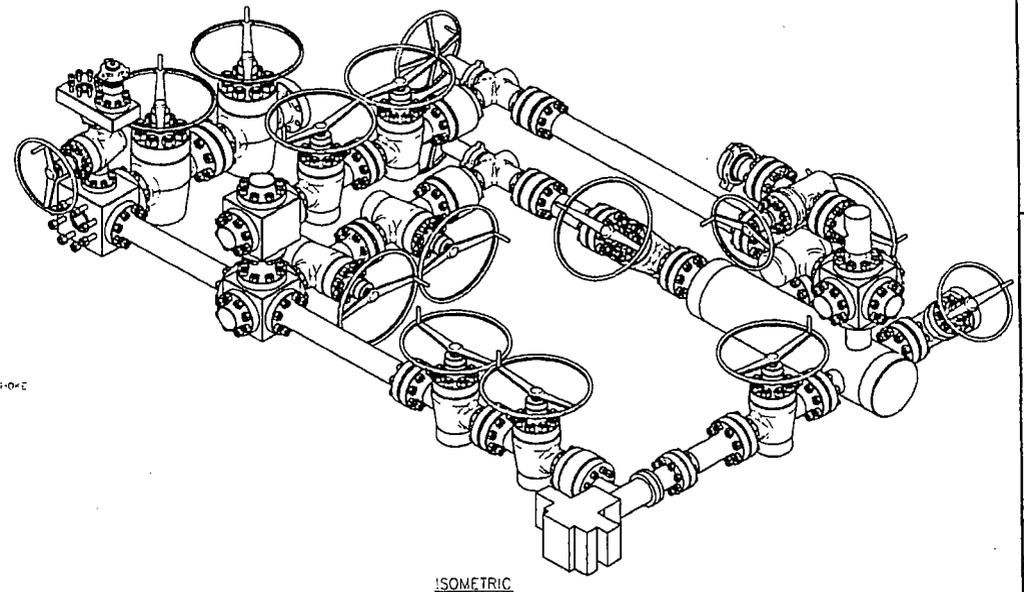
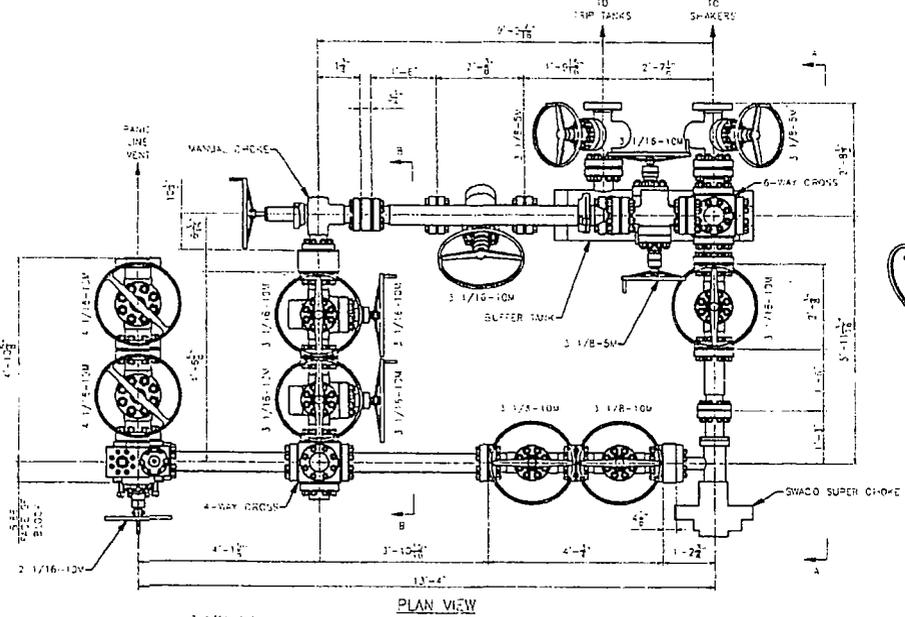
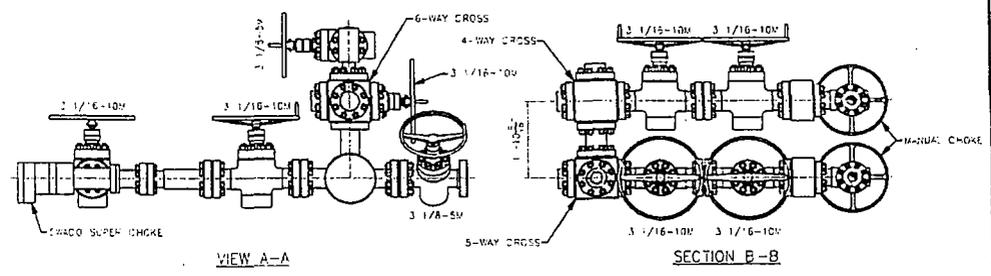
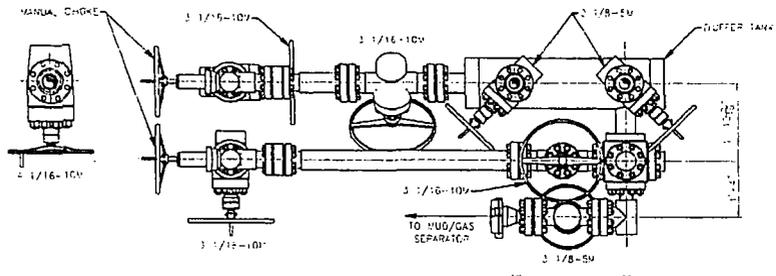
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# Exhibit 1 EOG Resources 10M BOPE

Rig Floor

- |  |
|--|
| 1. 13 5/8" Rotating Head                                       |
| 2. Hydril 13 5/8" 10,000 PSI WP GK Annular Preventor           |
| 3. 13 5/8" Cameron Type "U" 10,000 PSI WP Ram Preventors       |
| 4. 2 1/16" - 10,000 PSI WP Check Valve                         |
| 5. 10,000 PSI WP - 1502 Union to kill line                     |
| 6. 2 1/16" - 10,000 PSI WP Manual Valves                       |
| 7. 13 5/8" 3,000 PSI WP x 13 5/8" 5,000 PSI WP Spacer Spool    |
| 8. 4 1/16" 10,000 PSI WP HCR Valve                             |
| 9. 4 1/16" 10,000 PSI WP Manual Valve                          |
| 10. 6" OD x 3" ID 10,000 PSI WP Steel Armoured Flex Choke Line |
| 11. DSA - 13 5/8" 10,000 PSI WP x 13 5/8" 5,000 PSI WP         |
| 12. Mud Cross - 13 5/8" 10,000 PSI WP                          |
| 13. Blind Rams   |
| 14. Pipe Rams  |
| 15. 13 5/8" Cameron Type "U" 10,000 PSI WP Pipe Rams           |
| 16. Flow Line  |
| 17. 2" Fill Line   |





**PROPRIETARY**  
 THE DRAWING AND THE IDEAS AND CONCEPTS INCLUDED IN THIS DRAWING ARE PROPRIETARY AND ARE NOT TO BE REPRODUCED, DISTRIBUTED OR DISCLOSED IN ANY MANNER WITHOUT THE PRIOR WRITTEN CONSENT OF A DULY AUTHORIZED OFFICER OF HELMERICH & PAYNE INTERNATIONAL DRILLING CO.

**ISSUED FOR FABRICATION**  
 February-10-2014  
 DRAFTSMAN *MWL*  
 ENGINEER *[Signature]*

STANDARD TOLERANCES		UNFINISHED	
1. FABRICATION DIMENSIONS	±.00" TO ±.01"	±.010"	±.015"
2. MACHINED DIMENSIONS	±.005" TO ±.010"	±.005"	±.007"
	±.010" TO ±.020"	±.007"	±.009"
	±.020" TO ±.050"	±.009"	±.011"
	±.050" TO ±.100"	±.011"	±.013"
	±.100" TO ±.200"	±.013"	±.015"
	±.200" TO ±.500"	±.015"	±.017"
	±.500" TO ±.1000"	±.017"	±.019"
	±.1000" TO ±.2000"	±.019"	±.021"
	±.2000" TO ±.5000"	±.021"	±.023"
	±.5000" TO ±.10000"	±.023"	±.025"
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	±.20000000" TO ±.50000000"	±.045"	±.047"
	±.50000000" TO ±.100000000"	±.047"	±.049"
	±.100000000" TO ±.200000000"	±.049"	±.051"
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	±.10000000000" TO ±.20000000000"	±.061"	±.063"
	±.20000000000" TO ±.50000000000"	±.063"	±.065"
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	±.20000000000000000000000000000000" TO ±.50000000000000000000000000000000"	±.189"	±.191"
	±.50000000000000000000000000000000" TO ±.100000000000000000000000000000000"	±.191"	±.193"
	±.100000000000000000000000000000000" TO ±.200000000000000000000000000000000"	±.193"	±.195"
	±.200000000000000000000000000000000" TO ±.500000000000000000000000000000000"	±.195"	±.197"
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	±.5000000000000000000000000000000000" TO ±.10000000000000000000000000000000000"	±.203"	±.205"
	±.10000000000000000000000000000000000" TO ±.20000000000000000000000000000000000"	±.205"	±.207"
	±.20000000000000000000000000000000000" TO ±.50000000000000000000000000000000000"	±.207"	±.209"
	±.50000000000000000000000000000000000" TO ±.100000000000000000000000000000000000"	±.209"	±.211"
	±.100000000000000000000000000000000000" TO ±.200000000000000000000000000000000000"	±.211"	±.213"
	±.200000000000000000000000000000000000" TO ±.500000000000000000000000000000000000"	±.213"	±.215"
	±.500000000000000000000000000000000000" TO ±.1000000000000000000000000000000000000"	±.215"	±.217"
	±.1000000000000000000000000000000000000" TO ±.2000000000000000000000000000000000000"	±.217"	±.219"
	±.2000000000000000000000000000000000000" TO ±.5000000000000000000000000000000000000"	±.219"	±.221"
	±.5000000000000000000000000000000000000" TO ±.10000000000000000000000000000000000000"	±.221"	±.223"
	±.10000000000000000000000000000000000000" TO ±.20000000000000000000000000000000000000"	±.223"	±.225"
	±.20000000000000000000000000000000000000" TO ±.50000000000000000000000000000000000000"	±.225"	±.227"
	±.50000000000000000000000000000000000000" TO ±.100000000000000000000000000000000000000"	±.227"	±.229"
	±.100000000000000000000000000000000000000" TO ±.200000000000000000000000000000000000000"	±.229"	±.231"
	±.200000000000000000000000000000000000000" TO ±.500000000000000000000000000000000000000"	±.231"	±.233"
	±.500000000000000000000000000000000000000" TO ±.1000000000000000000000000000000000000000"	±.233"	±.235"
	±.1000000000000000000000000000000000000000" TO ±.2000000000000000000000000000000000000000"	±.235"	±.237"
	±.2000000000000000000000000000000000000000" TO ±.5000000000000000000000000000000000000000"	±.237"	±.239"
	±.5000000000000000000000000000000000000000" TO ±.100"	±.239"	±.241"
	±.100" TO ±.2000"	±.241"	±.243"
	±.200" TO ±.500"	±.243"	±.245"
	±.500" TO ±.1000"	±.245"	±.247"
	±.1000" TO ±.200"	±.247"	±.249"
	±.2000" TO ±.5000"	±.249"	±.251"
	±.5000" TO ±.100"	±.251"	±.253"
	±.100" TO ±.2000"	±.253"	±.255"
	±.200" TO ±.500"	±.255"	±.257"
	±.5000000000000000		

Barlow 34 Fed Com #703H

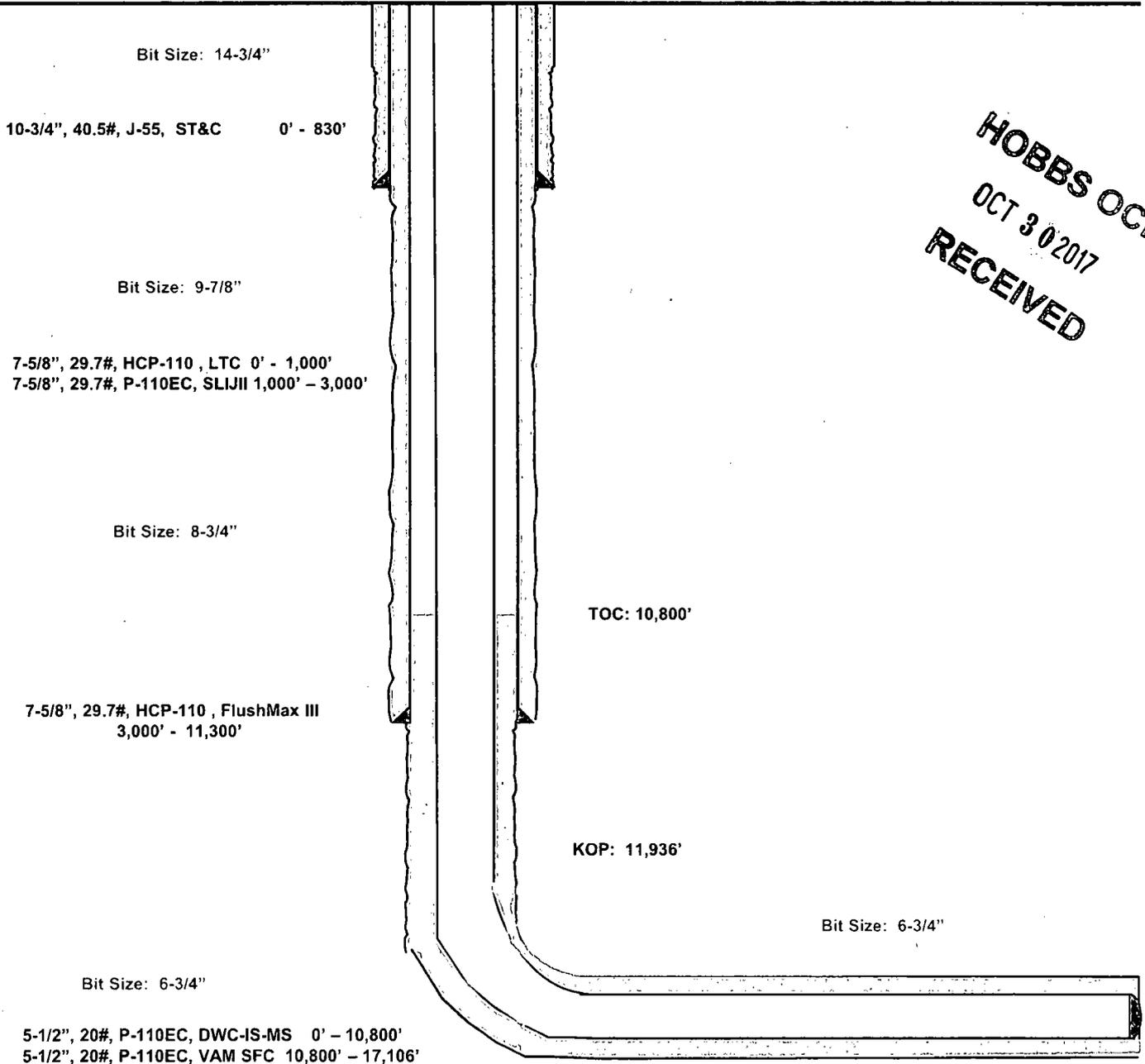
Lea County, New Mexico  
Proposed Wellbore

300' FSL  
695' FWL  
Section 34  
T-26-S, R-33-E

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

KB: 3,286'  
GL: 3,361'

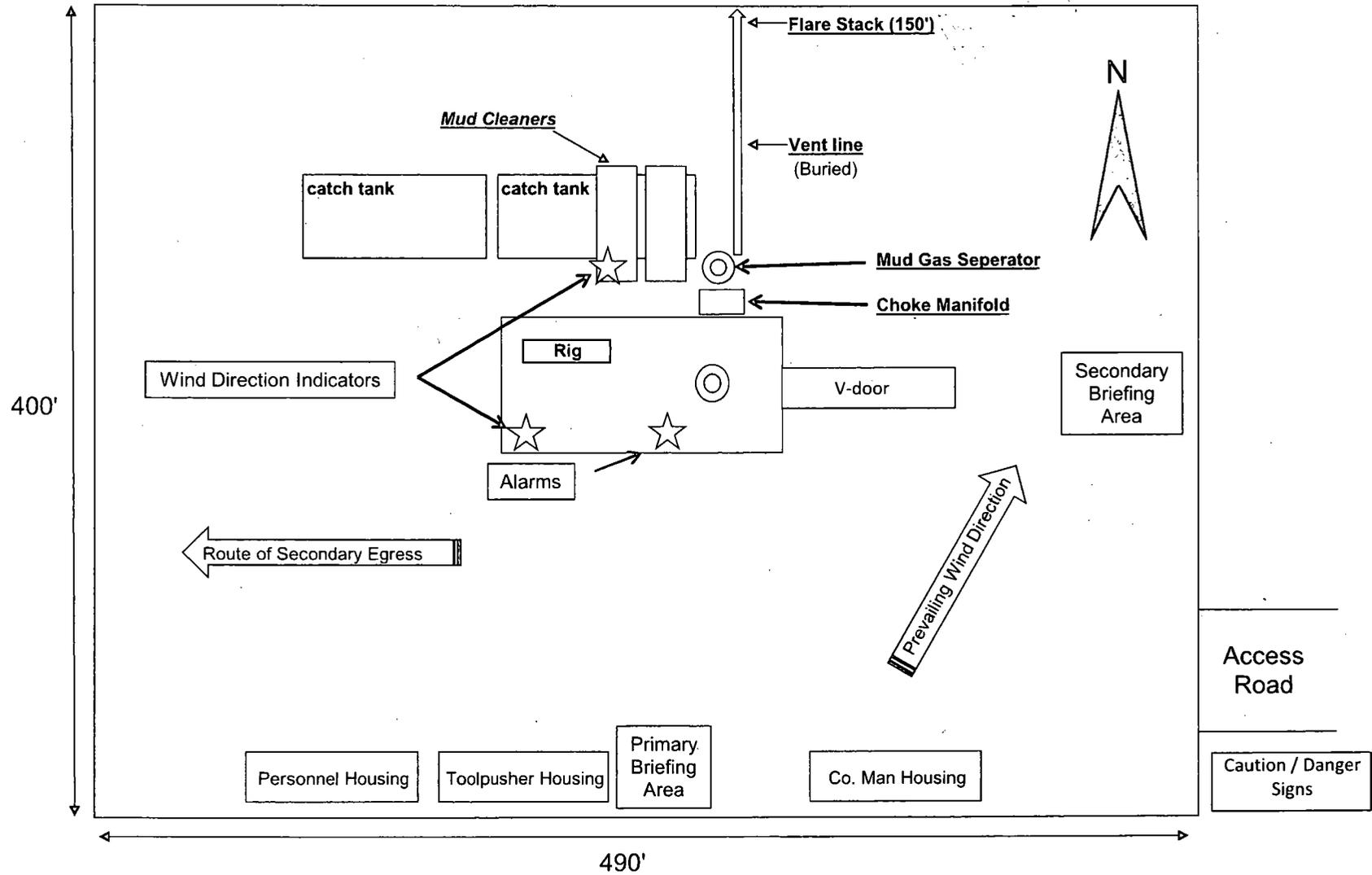
HOBBS OCD  
OCT 30 2017  
RECEIVED



Lateral: 17,106' MD, 12,420' TVD  
Upper Most Perf:  
330' FSL & 1002' FWL Sec. 34  
Lower Most Perf:  
2326' FSL & 997' FWL Sec. 27  
BH Location: 2426' FSL & 996' FWL  
Section 27  
T-26-S, R-33-E

Exhibit 4  
EOG Resources  
Barlow 34 Fed Com #703H

Well Site Diagram



<b>OD</b> 7 5/8 in.	<b>Weight</b> 29.70 lb/ft	<b>Wall Th.</b> 0.375 in.	<b>Grade</b> VM 110 HC	<b>API Drift</b> 6.750 in.	<b>Connection</b> VAM® SLIJ-II
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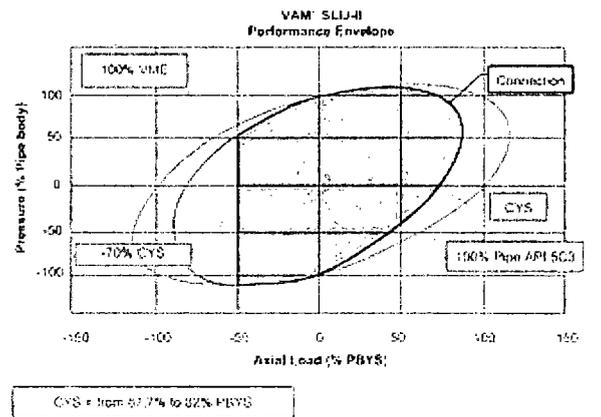
PIPE PROPERTIES	
Nominal OD	7.625 in.
Nominal ID	6.875 in.
Nominal Cross Section Area	8.541 sqin.
Grade Type	High Collapse
Min. Yield Strength	110 ksi
Max. Yield Strength	140 ksi
Min. Ultimate Tensile Strength	125 ksi

CONNECTION PROPERTIES	
Connection Type	Premium integral semi-flush
Connection OD (nom)	7.711 in.
Connection ID (nom)	6.820 in.
Make-up Loss	4.822 in.
Critical Cross Section	5.912 sqin.
Tension Efficiency	69.2 % of pipe
Compression Efficiency	48.5 % of pipe
Internal Pressure Efficiency	100 % of pipe
External Pressure Efficiency	100 % of pipe

CONNECTION PERFORMANCES	
Tensile Yield Strength	651 klb
Compression Resistance	455 klb
Internal Yield Pressure	9470 psi
Uniaxial Collapse Pressure	7890 psi
Max. Bending Capacity	TDB
Max Bending with Sealability	20 °/100 ft

FIELD TORQUE VALUES	
Min. Make-up torque	11300 ft.lb
Opti. Make-up torque	12600 ft.lb
Max. Make-up torque	13900 ft.lb

**VAM® SLIJ-II** is a semi-flush integral premium connection for all casing applications. It combines a near flush design with high performances in tension, compression and gas sealability. VAM® SLIJ-II has been validated according to the most stringent tests protocols, and has an excellent performance history in the world's most prolific HPHT wells.



Do you need help on this product? - Remember no one knows VAM® like VAM

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Over 140 VAM® Specialists available worldwide 24/7 for Rig Site Assistance

Other Connection Data Sheets are available at [www.vamservices.com](http://www.vamservices.com)

**Manufacturer: Midwest Hose & Specialty**

**Serial Number: SN#90067**

**Length: 35'**

**Size: OD = 8" ID = 4"**

**Ends: Flanges Size: 4-1/16"**

**WP Rating: 10,000 psi Anchors required by manufacturer: No**