Drilling Plan Raider Federal 301H (fka Napoleon Federal 1H)
API #: 30-025-43401
SHL: 400 FNL, 2460 FEL Section 21, T24S, R34E
BHL: 100 FSL, 2310 FEL, Section 21, T24S, R34E
Lea County, New Mexico

Ground Level:	3525		
RKB (25'):	3550		
Drilling Duration:	25 days	Lamar Top:	5340
BOP Pressure Rating:	5M	DV:	N/A
BOP Rating Depth:	10300' TVD	Avalon Shale Top:	9175

BOP Equipment Description:

The BOP and related equipment will meet or exceed the requirements of a 5M-psi system as set forth in On Shore Order No. 2. See attached BOP Schematic. A. Casinghead: 13 5/8" – 5,000 psi SOW x 13" – 5,000 psi WP Intermediate Spool: 13" – 5,000 psi WP x 11" – 5,000 psi WP Tubinghead: 11" – 5,000 psi WP x 7 1/16" – 15,000 psi WP B. Minimum Specified Pressure Control Equipment • Annular preventer • One Pipe ram, One blind ram • Drilling spool, or blowout preventer with 2 side outlets. Choke side will be a 3-inch minimum diameter, kill line shall be at least 2-inch diameter • 3 inch diameter choke line • 2 – 3 inch choke line valves • 2 inch kill line • 2 chokes with 1 remotely controlled from rig floor (see Figure 2) • 2 – 2 inch kill line valves and a check valve • Upper kelly cock valve with handle available • When the expected pressures approach working pressure of the system, 1 remote kill line tested to stack pressure (which shall run to the outer edge of the substructure and be unobstructed) • Lower kelly cock valve with handle available • Safety valve(s) and subs to fit all drill string connections in use • Inside BOP or float sub available • Pressure gauge on choke manifold • All BOPE connections subjected to well pressure shall be flanged, welded, or clamped • Fill-up line above the uppermost preventer. C. Auxiliary Equipment • Audio and visual mud monitoring equipment shall be placed to detect volume changes indicating loss or gain of circulating fluid volume. (OOS 1, III.C.2) • Gas Buster will be used below intermediate casing setting depth. • Upper and lower kelly cocks with handles, safety valve and subs to fit all drill string connections and a pressure gauge installed on choke manifold.

Requesting BOP Variance: No

BOP Testing Procedure:

The BOP test shall be performed before drilling out of the surface casing shoe and will occur at a minimum: a. when initially installed b. whenever any seal subject to test pressure is broken c. following related repairs d. at 30 day intervals e. checked daily as to mechanical operating conditions. The ram type preventer(s) will be tested using a test plug to 250 psi (low) and 5,000 psi (high) (casinghead WP) with a test plug upon its installation onto the 13" surface casing. If a test plug is not used, the ram type preventer(s) shall be tested to 70% of the minimum internal yield pressure of the casing.

The annular type preventer(s) shall be tested to 50% of its working pressure. Pressure will be maintained for at least 10 minutes or until provisions of the test are met, whichever is longer. • A Sundry Notice (Form 3160 5), along with a copy of the BOP test report, shall be submitted to the local BLM office within 5 working days following the test. • If the bleed line is connected into the buffer tank (header), all BOP equipment including the buffer tank and associated valves will be rated at the required BOP pressure. • The BLM office will be provided with a minimum of four (4) hours' notice of BOP testing to allow witnessing. The BOP configuration, choke manifold layout, and accumulator system, will be in compliance with Onshore Order 2 for a 5,000 psi system. A remote accumulator will be used. Pressures, capacities, and specific placement and use of the manual and/or hydraulic controls, accumulator controls, bleed lines, etc., will be identified at the time of the BLM witnessed BOP test. Any remote controls will be capable of both opening and closing all preventers and shall be readily accessible.

String Detail:

	Conductor	Surface	Intermediate	Production
Hole Size	26	17.5	12.25	8.5
Top Setting Depth MD	0	0	0	0
Top Setting Depth TVD	0	0	0	0
Top Setting Depth MSL	3525	3525	3525	3525
Bottom Setting Depth MD	120	1300	5340	14833.78
Bottom Setting Depth TVD	120	1300	5340	10300
Bottom Setting Depth MSL	3405	2225	-1815	-6775
Calculated Casing Length MD	120	1300	5340	14833.78
Casing Size	20	13.375	9.625	5.5
Grade	H-40	J-55	J-55	P-110
Weight	94.0	54.5	40	20.0
Joint Type	WELD	BTC	LTC	TMK UP DQX
Condition	NEW	NEW	NEW	NEW
Standard				
Tapered String		NO	NO	NO
Collapse Design Safety Factor		1.76	1.31	2.08
Collapse Design Safety Factor type		DRY	1/3 FULL	DRY
Burst Design Safety Factor		4.26	1.42	2.36
Joint Tensile Design Safety Factor type		DRY	DRY	DRY
Joint Tensile Design Safety Factor		7.25	2.43	3.11
Body Tensile Design Safety Factor type		DRY	DRY	DRY
Body Tensile Design Safety Factor		12.04	2.95	3.11

Safety Factor Notes:					
13 3/8 Surface	**9 5/8 Intermediate**	**5 1/2 Production.1**	**API SF**	**BLM SF**	
1,130	2,570	11,110	1.125	1.125	**Collapse**
2,730	3,950	12,640	1.10	1.0	**Burst**
	0.8550				
514,000	520,000	641,000	1.80	1.6	**JT tensile**
853,000	630,000	641,000	1.80	1.6	**Body Tensile**

Cement Detail:

		Top MD Segment	Bottom MD Segment	Cement Type	Additives	Quantity (sks)	Yield (cu.ft./sk)	Density	Volume (cu.ft.)	Excess (%)
Conductor										
	LEAD	0	120	Grout	Bentonite 4% BWOC, Cellophane #/sx, CaCl2 2% BWOC.	121	1.49	12.9	181	NA
	TAIL	NA	NA	NA	NA	NA	NA	NA	NA	NA
Surface										
	LEAD	0	800	Class C Premium	Premium Gel Bentonite 4%, C-45 Econolite 0.25%, Phenoseal 0.25#/sk, CaCl 1%, Defoamer C-41P 0.75%	798	1.74	13.5	1,389	150
	TAIL	800	1,300	Class C Premium	C-45 Econolite 0.10%, CaCl 2.%	522	1.33	14.8	695	100
Intermediate										
1st stage	LEAD	0	4,990	TXI Lightweight	Salt 0.81#/sk, C-45 Econolite 0.80%, Phenoseal 1.50#/sk, STE 6.0%, Citric Acid 0.20%, C-19 Fluid Loss Add've 0.10%, CSA-1000 Fluid Loss Add've 0.25%, Kol Seal 6.0#/sk,	919	3.40	10.7	3,126	100

					Defoamer C-41P 0.75%.					
1st stage	TAIL	4,990	5,340	Class H Premium	C-51 Susp Agent 0.05%, Retarder C-20 0.10%, C-503P Defoamer 0.30%	124	1.33	14.8	164	50
Production										
	LEAD	0	8,955	TXI Lightweight	Salt 9.0#/sk, Phenoseal 2.50#/sk, STE 6.0%, Citric Acid 0.20%, CSA-1000 Fluid Loss Add've 0.28%, Kol Seal 6.0#/sk, C-47B Fluid Loss Add've 0.10%, Defoamer C-503P 0.30%.	789	3.51	10.6	2,769	35
	TAIL	8,955	14,834	Class H Premium	CSA-1000 Fluid Loss Add've 0.07%, C47B Fluid Loss Add've 0.25%, Retarder C-20 0.15%	1,247	1.35	14.2	1,683	25

Mud System:

Centennial will use a closed loop system. No air or gas system will be used.

Sufficient quantities of mud materials will be on the well site at all times for the purpose of assuring well control and maintaining wellbore integrity. Surface interval will employ fresh water mud. The intermediate hole will utilize a diesel emulsified brine fluid to inhibit salt washout and prevent severe fluid losses. The production hole will employ oil base fluid to inhibit formation reactivity and of the appropriate density to maintain well control.

Mud monitoring system will be a centrifuge separation system. Open tank monitoring with EDR will be used for drilling fluids and return volumes. Open tank monitoring will be used for cement and cuttings return volumes. Mud properties will be monitored at least every 24 hours using industry accepted mud check practices.

	Top Depth	**Bottom Depth**	**Mud Type**	**Min weight(lbs./gal.)**	**Max weight (lbs./gal.)**
Surface	0	1300	FW	8.6	9.5
Intermediate	1300	5340	Brine	9.0	10.0
Production	5340	14833.78	Brine/OBM	8.8	10.0

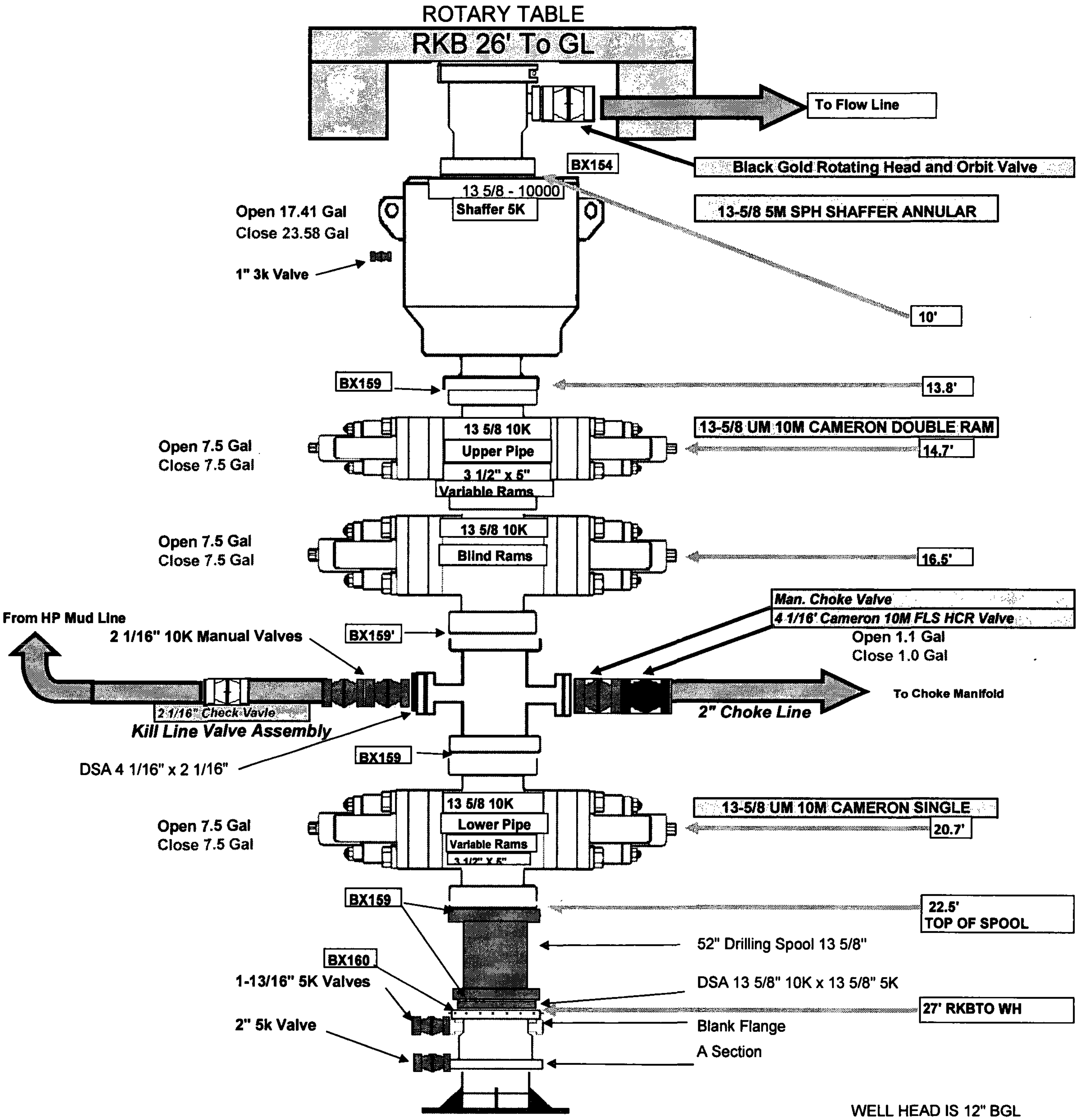
Anticipated Bottom Hole Pressure: 5346

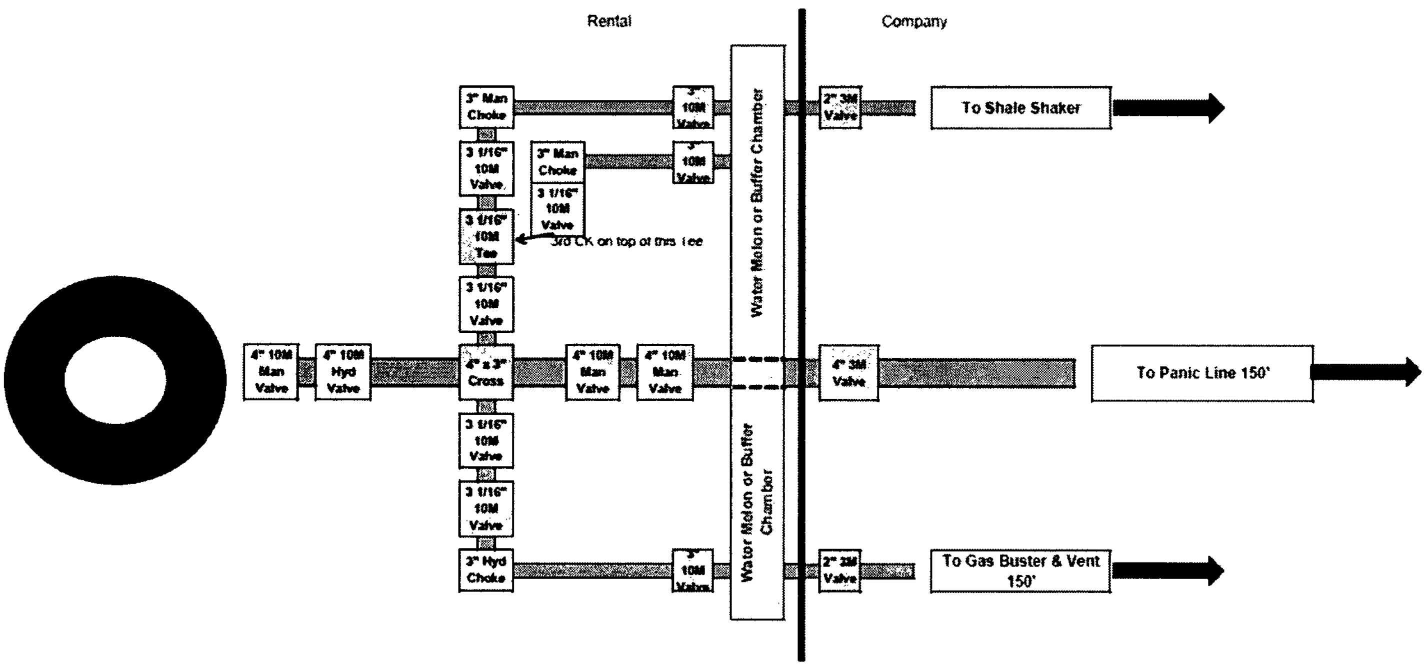
Anticipated Surface Pressure: 3080

Centennial will utilize MWD/LWD (Gamma ray logging) from intermediate hole to TD of the well.

H&P 650

Lea County, NM BOP Configuration




Rental
Company
3" Man Choke
3" 10M Valve
2" 3M Valve
To Shale Shaker
3 1/16" 10M Valve
3" Man Choke
3" 10M Valve
3 1/16" 10M Valve
3 1/16" 10M Tee
3rd CK on top of this Tee
Water Melon or Buffer Chamber
3 1/16" 10M Valve
4" 10M Man Valve
4" 10M Hyd Valve
4" x 3" Cross
4" 10M Man Valve
4" 10M Man Valve
4" 3M Valve
To Panic Line 150'
3 1/16" 10M Valve
3 1/16" 10M Valve
Water Melon or Buffer Chamber
3" Hyd Choke
3" 10M Valve
2" 3M Valve
To Gas Buster & Vent 150'

CASING ASSUMPTIONS WORKSHEET:

Centralizer Program:

Surface: - 3 welded bow spring centralizers, one on each of the bottom 3 joints, plus one on the shoe joint (4 minimum)
- No Cement baskets will be run

Production: - 1 welded bow spring