State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Tony Delfin
Deputy Cabinet Secretary

David R. Catanach, Division Director
Oil Conservation Division

New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-3 APD form.

Operator Signature Date: 4-1-16
Well information:
Operator BP, Well Name and Number Gallegos Canyon Unit 247E COM #1H
API# 30-045-35676, Section 5, Township 27 N/S, Range 12 E/W

Conditions of Approval: (See the below checked and handwritten conditions)

- ✓ Notify Aztec OCD 24hrs prior to casing & cement.
- ✓ Hold C-104 for directional survey & "As Drilled" Plat
- o Hold C-104 for NSL, NSP, DHC
- o Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- o Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
  - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
  - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
  - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- ✓ Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ✓ Submit Gas Capture Plan form prior to spudding or initiating recompletion operations
- ✓ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ✓ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ✓ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.

Charles Perrin
NMOCD Approved by Signature

5-12-2016
Date

1220 South St. Francis Drive • Santa Fe, New Mexico 87505
Phone (505) 476-3460 • Fax (505) 476-3462 • www.emnrd.state.nm.us/ocd

Form 3160-3
(August 2007)

OIL CONS. DIV DIST. 3

APR 06 2016

FORM APPROVED
OMB No. 1004-0136
Expires July 31, 2010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No. NMSF078902 NMNM 75791

6. If Indian, Allottee or Tribe Name

1a. Type of Work: ☒ DRILL ☐ REENTER

CONFIDENTIAL

7. If Unit or CA Agreement, Name and No.

1b. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.
GALLEGOS CANYON UNIT 247E COM 1H

2. Name of Operator
BP AMERICA PRODUCTION COMPANY

Contact: TOYA COLVIN
Toya.Colvin@bp.com

9. API Well No.
30-045-35676

3a. Address
501 WESTLAKE PARK BLVD. THREE ELDRIDGE PLACE
HOUSTON, TX 77079

3b. Phone No. (include area code)
Ph: 281-366-7148
HOUSTON, TX 77079

10. Field and Pool, or Exploratory
BASIN MANCOS/GALLUP

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface SESE 969FSL 1138FEL 36.599647 N Lat, 108.129894 W Lon SHL

At proposed prod. zone SESW 987FSL 1704FWL 36.599722 N Lat, 108.155754 W Lon BHL

11. Sec., T., R., M., or Blk. and Survey or Area
Sec 5 T27N R12W Mer
Sec 6, T27N, R12W

14. Distance in miles and direction from nearest town or post office*
WELL IS 10.1 MILES SOUTHEAST OF FARMINGTON, NM.

12. County or Parish
SAN JUAN

13. State
NM

15. Distance from proposed location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)
WELL IS 969 FEET FROM THE NEAREST LEASE LINE

16. No. of Acres in Lease
2160.60 152.24

17. Spacing Unit dedicated to this well
~~1280.00~~ 1264.24

18. Distance from proposed location to nearest well, drilling, completed, applied for, on this lease, ft.
WELL IS 2966 FEET FROM THE GCU 147E(MANCOS/GALLUP)

19. Proposed Depth
5125 TVD

20. BLM/BIA Bond No. on file
WY2924

21. Elevations (Show whether DF, KB, RT, GL, etc.)
5702 GL

22. Approximate date work will start
07/04/2015

23. Estimated duration
25 DAYS

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature	Name (Printed/Typed)	Date
(Electronic Submission)	TOYA COLVIN Ph: 281-366-7148	03/23/2015

Title: REGULATORY ANALYST

Approved by (Signature)	Name (Printed/Typed)	Date
/s/ Maureen Gannon		4/1/16
Title: AFM	Office: FFO	

Application approval does not warrant or certify the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Additional Operator Remarks (see next page)

This action is subject to technical and procedural review pursuant to 43 CFR 3165.3 and appeal pursuant to 43 CFR 3165.4

Electronic Submission #295712 verified by the BLM Well Information System
For BP AMERICA PRODUCTION COMPANY, sent to the Farmington

BLM'S APPROVAL OR ACCEPTANCE OF THIS ACTION DOES NOT RELIEVE THE LESSEE AND OPERATOR FROM OBTAINING ANY OTHER AUTHORIZATION REQUIRED FOR OPERATIONS ON FEDERAL AND INDIAN LANDS

DRILLING OPERATIONS AUTHORIZED ARE SUBJECT TO COMPLIANCE WITH ATTACHED "GENERAL REQUIREMENTS"

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

NMOCD

District I
1625 N. French Dr., Hobbs, NM 88240
Phone (575) 393-6161 Fax (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone (575) 748-1283 Fax (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone (505) 334-6178 Fax (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone (505) 476-3460 Fax (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-045-35676	97232	Basin Mancos

[4] Property Code	[5] Property Name	[6] Well Number
~~000570~~ 316204	Gallegos Canyon Unit 247E Com	1H

[7] OGRID No.	[8] Operator Name	[9] Elevation
000778	BP America Production Company	5702

[10] Surface Location

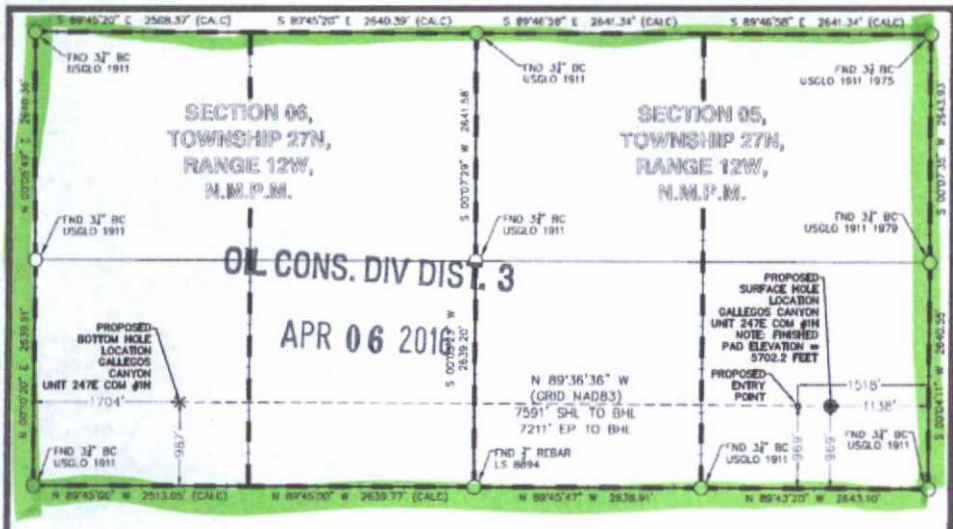
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	05	27N	12W		969	South	1138	East	San Juan

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	06	27N	12W		987	South	1704	West	San Juan

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
~~1280~~ 1264.24			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



LEGEND
FOUND MONUMENT ○
PROPOSED SURFACE HOLE LOCATION ⊛
PROPOSED BOTTOM HOLE LOCATION ×

	NMWZ NAD'83	NAD'83	TIES
PROPOSED SURFACE HOLE LOCATION (SHL)	N (Y) = 2,037,716.30' E (X) = 2,636,041.49'	LAT. = 36.59964763°N LON.= 108.12989413°W	FSL = 969' FEL = 1138'
PROPOSED ENTRY POINT (EP)	N (Y) = 2,037,718.89' E (X) = 2,635,661.50'	LAT. = 36.59965151°N LON.= 108.13118868°W	FSL = 969' FEL = 1518'
PROPOSED BOTTOM HOLE LOCATION (BHL)	N (Y) = 2,037,767.96' E (X) = 2,628,450.80'	LAT. = 36.59972238°N LON.= 108.15575418°W	FSL = 987' FWL = 1704'

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Toya Colvin 3/9/15
Signature Date

Toya Colvin
Printed Name

Toya.Colvin@bp.com
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

12-12-14
Date of Survey

Signature and Seal of Professional Surveyor

MARSHALL W. LINDEEN
NEW MEXICO
3-9-15
17078
PROFESSIONAL SURVEYOR

17078
Certificate Number

Attachment to Application for Permit to Drill.
Drilling program

BP America Production Company
US Lower 48 Onshore
200 Energy Court
Farmington, NM 87401

GCU 247E Com #1H
Mancos Horizontal Development Well
Surface Location: 969' FSL & 1138' FEL
Section 5, T27N, R12W
Ungraded GL Elev = 5702.2'
Lat. = 36.59964763° N
Long. = 108.12989413° W
NAD83
San Juan County, New Mexico

Proposed Bottom Hole Location: 987' FSL – 1704' FWL
Section 6, T27N, R12W
San Juan County, New Mexico

Drilling program written in compliance with onshore Oil and Gas Order No. 1
(III.D.3, effective May 2007) and Onshore Order No. 2 Dated November 18, 1988

a. Names and estimated tops of all geologic groups, formations, members, or zones based on an estimated GR of 5702.2'

Formation Tops	Surface (TVD)	Thickness	BHP psi/ft
Ojo Alamo Sd	46	85	0.440
Kirtland Sh	131	214	0.440
Farmington Sd	345	380	0.440
Fruitland Sh	725	305	0.386
Fruitland Sd	1030	254	0.146
Fruitland Coal	1284	23	0.117
Pictured Cliffs Sd	1307	285	0.115
Lewis Shale	1592	591	0.345
Chacra Sd	2183	661	0.344
Mesa Verde/Cliff House Sd	2844	55	0.352
Mesa Verde/Menefee Sd	2899	837	0.354
Mesa Verde/Point Lookout Sd	3736	314	0.355
Mancos Sh	4050	840	0.309
Upper Gallup Sd	4890	187	0.307
K78 MFS Sh	5077	69	0.315
Middle Gallup Silt	5146	103	0.316
K75 MFS Sh	5249	4	0.314
ChaCha SW Sd	5253		0.324

Note: Geological tops will be updated based on drilling and geology operations

Drilling Plan

Drill 12 ¼" hole to 340' then set 9 5/8" casing. Drill 8 3/4" hole with fresh water Flex Firm KA mud from 340' MD to kick off point (KOP) #1 at 500' MD and build 2 degrees per 100' to 4.96 degrees and 89.31 azimuth. Hold inclination and azimuth to 4149' MD. Then drop 2 degrees per 100' to vertical point at 4397'MD and hold vertical to 4547'MD. Trip out of hole and pick up 8 ¾" kick off assembly. KOP #2 is 4547'MD and build 9 degrees per 100' to 7" casing point at 90.6 degrees and 270.31 azimuth, 5613' MD/5200'TVD.

The 7" casing will be drilled out with a 6 1/8" drilling assembly holding angle to 90.6 degrees inclination and 270.31 degree azimuth. Drill to a total depth at 12825' MD / 5125' TVD. Adjustments may be made to the directional program based on geology.

The Bottom hole location will be in a legal location at 12825' MD/5125'TVD at 987' FSL & 1704' FWL of section 6.
A total of 7211' of horizontal hole will be drilled.

b. Estimated depth and thickness of formations, members or zones potentially containing usable water, oil, gas or prospectively valuable deposits of other minerals that the operator expects to encounter, and the operator's plans for protecting such resources.

Formation Tops	Surface (TVD)	Thickness	Contents
Ojo Alamo Sd	46	85	Fresh Water
Kirtland Sh	131	214	Wet
Farmington Sd	345	380	Wet
Fruitland Sh	725	305	Gas/Water
Fruitland Sd	1030	254	Gas
Fruitland Coal	1284	23	Gas
Pictured Cliffs Sd	1307	285	Gas
Lewis Shale	1592	591	Wet
Chacra Sd	2183	661	Wet
Mesa Verde/Cliff House Sd	2844	55	Wet/Injection
Mesa Verde/Menefee Sd	2899	837	Wet/Injection
Mesa Verde/Point Lookout Sd	3736	314	Wet/Injection
Mancos Sh	4050	840	Gas
Upper Gallup Sd	4890	187	Gas/Oil
K78 MFS Sh	5077	69	Gas/Oil
Middle Gallup Silt	5146	103	Gas/Oil
K75 MFS Sh	5249	4	Gas/Oil
ChaCha SW Sd	5253		Oil

Possible Aquifers: Ojo Alamo, base at 131'.

Oil Shale: None Expected.

Oil & Gas: Primary objective is the Mancos and Gallup formation encountered first at 4050' and 4890' TVD. Landing point will be in the Gallup Siltstone at 5200'TVD.

Protection of oil, gas, water, or other mineral bearing formations: Protection shall be accomplished by setting surface casing below base of possible aquifer and cementing surface casing to surface.

Intermediate casing will be set at 5200' TVD and cemented to surface.

c. The operator's minimum specifications for blowout prevention equipment and diverter systems to be used, including size, pressure rating, configuration and the testing procedure

and frequency. Blowout prevention equipment must meet the minimum standards outlined in Order 2.

BOP equipment and accessories will meet or exceed BLM requirements outlined in 43 CFR Part 3160.

The working pressure of all BOPE shall exceed the anticipated surface pressure to which it may be subjected, assuming a partially evacuated hole with a pressure gradient of 0.22 psi/ft.

Bottom Hole pressure = 3736' TVD x 0.355 psi/ft = 1326 psi (based on measured offset bottom hole pressures).

Maximum Surface Pressure = 1326 psi - (3736' TVD x .22 psi/ft) = 1326psi – 822 psi = 504 psi less than 2000 psi working pressure.

Therefore 2000 psi BOPE system required.

A 2000 psig double ram hydraulic BOP will be used (see attached diagram) accessories to the BOP will meet BLM requirements for a 2000 psig system, in accordance with Onshore Order #2 (111.A well requirements).

The accumulator system capacity will be sufficient to close all BOPE with a 50% safety factor. Fill line, kill line and line to the choke manifold will be 2".

BOPs will be function tested every 24 hours and will be recorded on an IADC log. Accessories to the BOPE will include upper and lower Kelly cocks with handles with a stabbing valve to fit drill pipe on the floor at all times, string float at bit, 3000 psig choke manifold with 2" adjustable and 2"positive chokes, and pressure gauge.

All BOP equipment will be hydraulically operated with controls accessible both on the rig floor.

The wellhead BOP equipment will be nippled-up on the 9-5/8" x 11" 2,000 psi WP casing head prior to drilling out from under surface casing. All ram preventers and related equipment will be tested to 2,000 psi for 10 minutes. Annular preventers will be tested to 50% of rated working pressure for 10 minutes. Surface casing will be tested to 70% of internal yield pressure. All preventers and surface casing will be tested before drilling out of surface casing. BOP equipment will be tested every 14 days, after any repairs are made to the BOP equipment, and after the BOP equipment is subjected to pressure. Annular preventers will be functionally operated at least once per week. Pipe rams will be activated daily and blind rams shall be activated each trip or at least weekly. The New Mexico Oil & Gas Conservation Commission and the BLM will be notified 24 hours in advance of testing of BOPE.

d. The operator's proposed casing program, including size, grade, weight, type of thread and coupling, the setting depth of each string, and it's condition. The operator must include the minimum design criteria, including casing loading assumptions and corresponding safety factors for

burst, collapse, and tensions (body yield and joint strength). The operator must also include the lengths and setting depth of each casing when a tapered casing string is proposed. The hole size for each wellbore section of hole drilled must be included. Special casing designs such as the use of coil tubing or expandable casing may necessitate additional information.

1. Bit Program
   12-1/4" Surface Hole = Surface to 340'
   8-3/4" = 340' to 5613' MD = 7" Casing point @ 90.60 degrees
   6-1/8" Lateral = 5613' MD to 12825' MD = Pay Zone Horizontal

2. Casing Program – all casing stings are new casing

Casing & Hole Size	Weight	Grade	Coupling	Setting Depth (MD)	Comments
9-5/8" (12-1/4")	36 ppf	J or K-55	LT&C	0' - 340'	New casing. Cement to surface. *Surface Casing maybe preset
7" (8-3/4")	23 ppf	J or K-55	LT&C	0' - 5613' MD	New Casing. Foam Cement in one stage to surface
4-1/2" (6-1/8")	11.6 ppf	P-110	LT&C	5463' - 12825' MD	New Casing –Foam Cement – Cement in one stage to Top of liner – ±150' above 7" shoe.

Casing strings below the conductor casing will be tested to .22 psi per foot of casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield.

Minimum casing design factors used:

Collapse -	1.125
Burst -	1.0
Jt. Strength -	1.20

Surface casing shall have a minimum of 1 centralizer per joint on the bottom three (3) joints, starting with the shoe joint for a total of (4) minimum centralizers. Centralizers will be placed 10' above the shoe on the shoe joint, on the 1st, 2nd and 3rd casing collars.

The intermediate casing will be centralized using 1 centralizer the first 6 jts and spaced appropriately through the curve section of the well-bore and then spaced +/- 1 centralizer / 4 jts through the remainder of the cement column, using approximately 40 centralizers.

*Surface casing maybe preset with a preset rig (MOTE).

Surface Casing Design - Evacuated/Max SICP (collaspe & burst), 100k overpull (tension)

	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
Surface	9.625	36	K55	LTC	2,020	3,520	489,000	0' - 340'
					1.125	1.000	1.200	

341 psi (Maximum Estimated SIP)

36 ppf K55 LTC

Collapse	Casing Depth	MW in	MW out	Pres in	Pres out	SF	
	340	0	9	0	156	12.98	
Burst	340	9	0	345	0	10.20	
		Mud Wt	Air Wt	Bouy Wt	BW +100k		100k over pull
Tension	340	9	12,240	10,558	110,558	4.42	
		BF					BF= 1- (MW)/65.5
		0.8626					

Intermediate Casing Design - Evacuated/Max Mud Wt (collaspe & burst), 100k overpull (tension)

Intermediate	Top Interval	Btm Interval	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
Interval 1	0	5614	7	23	K55	LTC	3,270	4,360	341,000	
							1.125	1.000	1.200	
Collapse			Depth TVD	MW in	MW out	Pres in	Pres out	SF - 1.125		
Interval 1	0	5614	5200	0	9	0	2434	1.34		
23	K55									
Burst			Depth TVD	MW in	MW out	Pres in	Pres out	SF - 1.0	Frac Pres	
Interval 1	0	5614	5200	9	0	2434	0	1.79	0	
23	K55					2434				
Tension										
				Mud Wt	Air Wt	Bouy Wt	BW +100k	SF - 1.2		
Interval 1	0	5614	5200	9	119,600	103,166	203,166	1.68		
23	K55			BF						BF= 1- (MW)/65.5
				0.8626						

Liner Casing Design - Evacuation/Max Mud Wt (collaspe), Max Frac Pres (burst) & 100k overpull (tension)

Liner	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
Interval 1	4.5	11.6	P-110	LTC	7,560	10,690	279,000	TD 12819', TVD 5125'
					1.125	1.000	1.200	

Collapse	Casing Depth (TVD)	MW in	MW out	Pres in	Pres out	SF		
	5125	0.00	9.00	0	2399	3.15		
Burst	5125	9.00	0.00	2399	0	1.20	6500	
				8899				Burst pressure = Hyd + frac pressure
Tension		Mud Wt	Air Wt	Bouy Wt	BW +100k			100k over pull
	5125	8.80	59,450	51,463	151,463	1.84		
		BF						BF= 1- (MW)/65.5
		0.8656						

e. The estimated amount and type(s) of cement expected to be used in the setting of each casing string. If stage cementing will be used, provide the setting depth of the stage tool(s) and the amount and type of cement including additives, to be used for each stage. Provide the yield of each cement slurry and the expected top of cement, with excess, for each cemented string or stage.

The proposed cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. All indications of useable water shall be reported.

- Pea Gravel or other material shall not be used to fill up around the surface casing in the event cement fall back occurs.
- The surface casing shall in all cases be cemented back to surface. In the event cement does not circulate to surface or fall back of the cement column occurs, remedial cementing shall be done to cement the casing back to surface. No more than the top 100' will be remediated with 1" line if fall back occurs. Anything more than 100' will require plan approval to remediate.
- If returns are lost and/or cement is not brought to surface and no fallback occurs, a cement bond log (CBL) will be required to determine the quality of the job prior to drilling ahead (see OO2).
- Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.
- Production liner will be cemented.

Surface Casing Single Stage Job – (0-340'MD/TVD):

Excess – 100% over gauge hole – 12-1/4" hole and 9-5/8" casing (0.3132ft3/ft)

Top of Cement - Surface

Lead #1 - (0' – 340'): 115 sx - 13.5 ppg, conventional cement containing:

VARICEM ™ CEMENT – Cement – 94.02 lbs/sx WBWOB

FE-2 – Controls Gel Thickening – 0.10% BWOB

Kol-Seal – Lost Circulation Control Agent – 5 lbs/sx WBWOB

Poly-E-Flake – Lost Circulation Control Agent – 0.125 lbs/sx WBWOB

Yield – 1.859 ft3/sx

Water requirement – 9.4 gal/sx.

Compressive strength: 24 hr – 1000 psi+

Total sacks of cement pumped = 115

Intermediate Casing – Foam Cement (Single Stage, Constant Density) - (0-5614'MD/5200'TVD):

Excess – 50% over gauge hole – 8-3/4" hole and 7" casing (0.1503 ft3/ft)

Top of Cement – Surface.

Lead #1 - (0'): 50 sx – 13.0 ppg, 35:65 Dak G, conventional cement containing:

EXTENDACEM ™ – Cement – 62.01 lbs/sx WBWOB

HALAD -766 – Retarder – 0.15% BWOW

Yield – 1.433 ft3/sx

Water requirement – 6.75 gal/sx.

Compressive strength: 24 hr – 1000 psi+

Lead #2 - (0' – 5060'): 590 sx – 13.0 ppg, 35:65 Dak G, conventional cement containing:

EXTENDASEAL ™ – Cement – 62.01 lbs/sx WBWOB

HALAD -766 – Retarder – 0.15% BWOW

Yield – 1.434 ft3/sx

Water requirement – 6.77 gal/sx.

Liquid Volume: 199 bbls

Foamed Weight - 10 ppg (Constant Density Method)

Average Foam Yield – 1.901ft3/sx

Foamed Volume: 199 bbls

Compressive strength: 24 hr – 1000 psi+

Tail #1 - (5060-5614') - 554': 100 sx – 13.5 ppg, 35:65 Dak G, conventional cement containing:

EXTENDACEM ™ – Cement – 62.01 lbs/sx WBWOB

Kol-Seal – Lost Circulation Control Agent – 5 lbs/sx WBWOB

Poly-E-Flake – Lost Circulation Control Agent – 0.125 lbs/sx WBWOB

Yield – 1.306 ft3/sx

Water requirement – 5.35 gal/sx.

Compressive strength: 24 hr – 1000 psi+

Cap Cement - (Top off Annulus): 100 sx – 15.8 ppg, conventional cement containing:

PREMIUM CEMENT – Cement – 94.02 lbs/sx WBWOB

Calcium Chloride Pellet – Accelerates Thickening Time – 2.0% BWOB

Yield – 1.174 ft3/sx

Water requirement – 5.15 gal/sx.

Compressive strength: 24 hr – 2000 psi+

Total sacks of cement pumped = 840

Cement volumes are minimums and may be adjusted based on hole conditions.

Foam Output Parameter Summary:

Stage 1

Foam Calculation Method :	Constant Density	Calculated Gas :	22160.1 scf
Annulus Back Pressure :	100 psig	Additional Gas :	40000 scf
Bottom Hole Circulating Temp :	105degF	Total Gas :	62160.1 scf
Mud Outlet Temperature :	95degF		

Fluid #	Fluid Name	Unfoamed Liquid Volume (bbl)	Beginning Density (lbm/gal)	Ending Density (lbm/gal)	Beginning Rate (scf/bbl)	Ending Rate (scf/bbl)
1	Chemical Wash	0	8.33		-6.03	-6.03
2	ExtendaCem	0	13		10.83	10.83
3	ExtendaSeal	9.1	10		11.11	13.57
3	ExtendaSeal	141	10		34.12	35.58

Production Casing (Liner) – Foam Cement (Constant Density) - (5464'MD - 12819'MD/ 5125'TVD):

Excess – 50% over gauge hole – 8-3/4" hole and 7" casing (0.1503 ft3/ft)

Top of Cement – Top of liner.

Lead #1 - (5090 – 5464'): 35 sx – 13.0 ppg, 35:65 Dak G, conventional cement containing:

EXTENDACEM ™ – Cement – 62.01 lbs/sx WBWOB

HALAD -766 – Retarder – 0.15% BWOW

Yield – 1.433 ft3/sx

Water requirement – 6.75 gal/sx.

Compressive strength: 24 hr – 1000 psi+

Lead #2 - (5464' – 12819'): 350 sx – 13.0 ppg, 35:65 Dak G, conventional cement containing:

EXTENDASEAL ™ – Cement – 62.01 lbs/sx WBWOB

HALAD -766 – Retarder – 0.15% BWOW

Yield – 1.434 ft3/sx

Water requirement – 6.77 gal/sx.

Liquid Volume: 120.5bbls

Foamed Weight - 10 ppg (Constant Density Method)

Average Foam Yield – 1.901ft3/sx

Foamed Volume: 120.5 bbls

Compressive strength: 24 hr – 1000 psi+

Tail #1 - (12819'-11661') - 1158': 100 sx – 13.5 ppg, 35:65 Dak G, conventional cement containing:

EXTENDACEM ™ – Cement – 62.01 lbs/sx WBWOB

Kol-Seal – Lost Circulation Control Agent – 5 lbs/sx WBWOB

Poly-E-Flake – Lost Circulation Control Agent – 0.125 lbs/sx WBWOB

Yield – 1.306 ft3/sx

Water requirement – 5.35 gal/sx.

Compressive strength: 24 hr – 1000 psi+

Total sacks of cement pumped = 485

Cement volumes are minimums and may be adjusted based on hole conditions.

Foam Output Parameter Summary:

Stage 1

Foam Calculation Method :	Constant Density	Calculated Gas :	33156.7 scf
Annulus Back Pressure :	100 psig	Additional Gas :	0 scf
Bottom Hole Circulating Temp :	145degF	Total Gas :	33156.7 scf
Mud Outlet Temperature :	110degF		

Fluid #	Fluid Name	Unfoamed Liquid Volume (bbl)	Beginning Density (lbm/gal)	Ending Density (lbm/gal)	Beginning Rate (scf/bbl)	Ending Rate (scf/bbl)
3	Extend aSeal	2.2	10		232.13	234.81
3	Extend aSeal	78.1	10		238.62	241.53
3	Extend aSeal	2.2	10		465.72	466.87
3	Extend aSeal	5.7	10		468.39	469.4

Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected.

All waiting on cement times shall be a minimum of 8 hours or adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

f. Type and characteristics of the proposed circulating medium or mediums proposed for the drilling of each well bore section, the quantities and types of mud and weighting material to be maintained, and the monitoring equipment to be used on the circulating system. The operator must submit the detailed information when air or gas drill is proposed.

Interval (MD)	Hole Section	Hole Size	Type	MW	VIS	FL	PV	YP	PH
0'- 340'	Surface	12-1/4"	FW/Gel	8.4-9.0	32-44	NC	8	12	9.0
340'-4547'	Vertical to KOP	8-3/4"	Flex Firm KA	8.4-9.5	38-42	6	14	12	11.0
4547'-5613'	Curve	8-3/4"	Flex Firm KA	9.0-9.5	38-42	6	14	12	11.0
5613'- 12825'	Horizontal	6-1/8"	Evolution	8.3-9.0	36-50	10	8	8	9.5

Sufficient weighting material will be on hand to weight mud up to 10.5 PPG, if required.

The formula for weight up with barite is listed below:
Sacks of Barite per 100 bbl of mud = 1470 x (W2 – W1) ÷ (35 – W2)

Where; W1 = current mud weight

W2 = new mud weight

Sacks = 1470 x (10.5 – 8.4)/ (35-10.5) = 126 sx * 5 (500bbls minimum) = 630sx

Pason Pit Volume Totalizer (PVT) equipment (or equilvant) will be on each pit to monitor pit levels. A trip tank equipped with a Pason PVT will be used to monitor trip volumes.

Possible lost circulation in the Fruitland Coal at 1284' and Pictured Cliffs Sand at 1307'. Lost circulation has been successfully mitigated with lost circulation materials in concentrations of up to 30% by volume. Intermediate casing will be set through this interval to 5613'MD.

Possible water flow in Mesa Verde (2844' -3736') due to produced water injection 5 mile to North.

A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals, including fresh water and oil-based operations. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of as outlined is surface use plane location will be lined in accordance with the Surface Use Plan of Operations.

g. The testing, logging, and coring procedures proposed, including drill stem testing procedures, equipment, and safety measures.

Testing: None planned.

Logging:

From KOP of curve to Surface casing shoe (pull GR to surface):

Triple Combo + Rt Scanner

Minimum logging requirements for the entire well shall consist of a calibrated gamma ray (GR) log scaled in API units from total measured depth to surface, with a repeat section. Maximum logging speed 3,600 feet/hour in open hole and 2,000 feet/hour in cased hole. An MWD GR log is sufficient for this requirement in the curved and lateral portions of the well.

Minimum logging requirements above the kick off point (KOP) shall consist of:

1. Multiple depth-of-investigation resistivity log from surface casing to the KOP, and

2. Compensated density-neutron logs over potential hydrocarbon producing zones or,
3. A cased hole pulsed neutron log if there are open hole compensated density-neutron, gamma ray, and multiple depth-of-investigation resistivity logs (such as medium and deep induction and shallow laterlog, or array induction logs) suitable for calibration within one-half mile. The pulsed neutron log should be run from KOP to the base of surface casing no faster than 1,800 feet/hour.

BLM shall be provided with a directional survey to establish the location of the horizontal lateral and bottom of the well including the surface reference, inclination, horizontal angle, reference, and direction turned. If reduced data are provided, the algorithm, datum, and projection should also be provided.

Submission of digital logging data shall be in Log ASCII Standard (LAS) file format.

Mud Logging:

Geologist & a manned mud-logging unit will be operational @ +/- 3,000' on the main hole to TD of the horizontal hole.

Gas detecting equipment shall be installed in the mud return system for exploratory wells and hydrocarbon gas shall be monitored for pore pressue changes from base of surface casing to TD.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume.

Coring: None.

Cement Bond Log:

Will be run after the drilling of the well has been completed and as the start of the completion process. The CBL will confirm the quality of the cement bond and the actual TOC. If either of these two data points were not satisfactory per BLM, State and standard procedure, remedial cement work, if required, will be performed after consultation and approval of a plan from both the BLM and State agencies.

A cement bond log shall be run if the well is cased for production, injection, or disposal. The logged interval should extend from at least 50 feet below the KOP, if practical, to 200 feet above the top of cement. In no case shall the cement bond log begin above the KOP.

h. The expected bottom-hole pressure and any anticipated abnormal pressures, temperatures, or potential hazards that the operator expects to encounter, such as lost circulation and hydrogen sulfide. A description or the operators plans for mitigating such hazards must be included.

Normal to subnormal pressure gradient to TD.

MASP and casing design parameters determined using 0.355 psi/ft.

Maximum expected BHP @ top of Mesa Verde Point Look Out Sand at 3736' TVD: 1326 psi

Maximum expected BHT @ 5200' TVD: ~160^{O} F

Possible lost circulation in the Fruitland Coal at 1284' and Pictured Cliffs Sand at 1307'. Lost circulation has been successfully mitigated with lost circulation materials in concentrations of up to 30% by volume. Intermediate casing will be set through this interval to 5614'MD.

Possible water flow in Mesa Verde (2844' -3736') due to produced water injection 5 mile to North.

No hydrogen sulfide gas is anticipated, however, if H_2S is encountered, the guidelines in Onshore Order No. 6 will be followed.

i. Any other facets of the proposed operation that the operator would like the BLM to considered in reviewing the application. Examples include, but are not limited to: For directional wells, proposed directional designs, plan view, and vertical section in true vertical and measured depths: Horizontal drilling; and Coil tubing Operations.

Directional Plans: Horizontal directional well, directional plans attached.

Completion:

BP plans on completing plug and perforation hydraulic fracturing for approximately 26 stages. Each stage will consist of approximately 275,000 pounds of 20/40 mesh sand and 25,000 pounds of 12/20 mesh sand pumped via nitrogen foamed gel system. Adjustments maybe be made to the number of stages and stage size based on the petrophysical properties of the target zone.

The wellbore is then opened for flowback operations. The well is placed through sales equipment once natural gas is experienced at surface.

Once stimulation operations are completed, BP intends to drill out the plugs within one to two weeks with workover rig or coil unit operations. Then 2-3/8", 4.7#, L or N-80 tubing will be landed in the wellbore for production.

Timing: BP plans to drill this well beginning July 4, 2015

It is anticipated that the drilling of this well will take approximately 25 days.

It is anticipated that completion operations will begin within 30 days after the well has been drilled depending on fracture treatment schedules with various pumping service companies.

CLOSED-LOOP SYSTEM DESIGN PLAN

The closed-loop system will consist of a series of temporary above-ground storage tanks and/or haul-off bins suitable for holding the cuttings and fluids from drilling operations. The closed- loop system will not entail temporary pits, below-grade storage tanks, below-grade sumps, or drying pads.

Design considerations include:

- The closed-loop system will be signed in accordance with 19.15.17.11 NMAC.
- The closed-loop system storage tanks will be of adequate volume to ensure confinement of all fluids and provide sufficient freeboard to prevent uncontrolled releases.
- Topsoil will be salvaged and stored for use in reclamation activities.
- The closed-loop system storage tanks will be placed in bermed secondary containment sized to contain a minimum of 110 percent of the volume of the largest storage tank.

CLOSED-LOOP SYSTEM OPERATING & MAINTENANCE PLAN

The closed-loop system will be operated and maintained to contain liquids and solids; minimize the amount of drilling fluids and cuttings that require disposal; maximize the amount of drilling fluid recycled and reused in the drilling process; isolate drilling wastes from the environment; prevent contamination of fresh water; and protect public health and the environment.

Operation and maintenance considerations include:

- Fluid levels will be maintained to provide sufficient freeboard to prevent over-topping.
- Visual inspections will be conducted on a daily basis to identify any potential leaks and to ensure that the closed-loop system storage tanks have sufficient freeboard to prevent over-topping.
- Only drilling fluids or cuttings intrinsic to, used by, or generated from, drilling operations will be stored in the closed-loop system storage tanks. Hazardous waste, miscellaneous solid waste, and/or debris will not be stored in the storage tanks.
- The OCD District Office will be notified within 48 hours of discovery of a leak in the closed-loop drilling system. Ifa leak is discovered, all liquid will be removed within 48 hours and the damage repaired.

CLOSED-LOOP SYSTEM CLOSURE PLAN

The closed-loop system will be closed in accordance with 19.15.17.13 NMAC. Closure considerations

include:

- Drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical.
- Residual fluids will be pulled from the storage tanks, mixed with saw dust or similar absorbent material, and disposed of at Industrial Ecosystem, Inc. waste disposal facilities.
- Remaining cuttings or sludges will be vacuumed from the storage tanks and disposed of at the Envirotech, Inc and/or Industrial Ecosystem, Inc. waste disposal facilities.
- Storage tanks will be removed from the well location during the rig move.
- The well pad will be reclaimed and seeded in accordance with subsections G, Hand I of 19.15.17.13 NMAC.

Company: B.P.
Project: San Juan County, NM NAD83
Site: Gallegos Canyon Unit
Well: GCU 247E Com #1H
Wellbore: OH
Design: Plan #2

PROJECT DETAILS: San Juan County, NM NAD83

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Western Zone
System Datum: Mean Sea Level
Local North: Grid

Scientific Drilling

Azimuths to Grid North
True North: 0.18°
Magnetic North: 9.86°

Magnetic Field
Strength: 50153.2snT
Dip Angle: 63.20°
Date: 2/2/2015
Model: BGGM2014

WELL DETAILS: GCU 247E Com #1H

GL 5702.2' & RKB 17' @ 5719.20ft

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	2037716.30	2636041.49	36.5996476	-108.1298941

Plan: Plan #2 (GCU 247E Com #1H/OH)

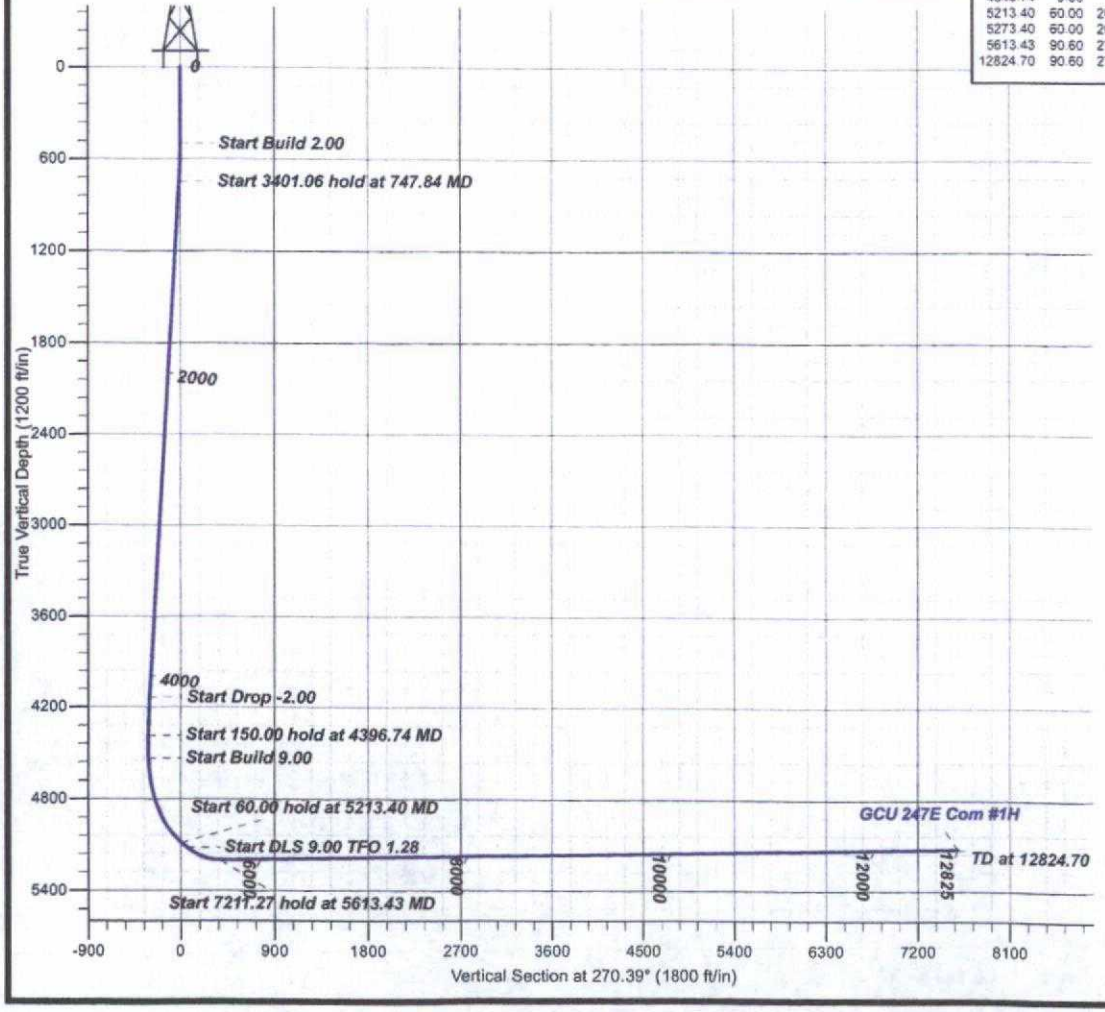
Created By: Janie Collins Date: 10:31, March 03 2015

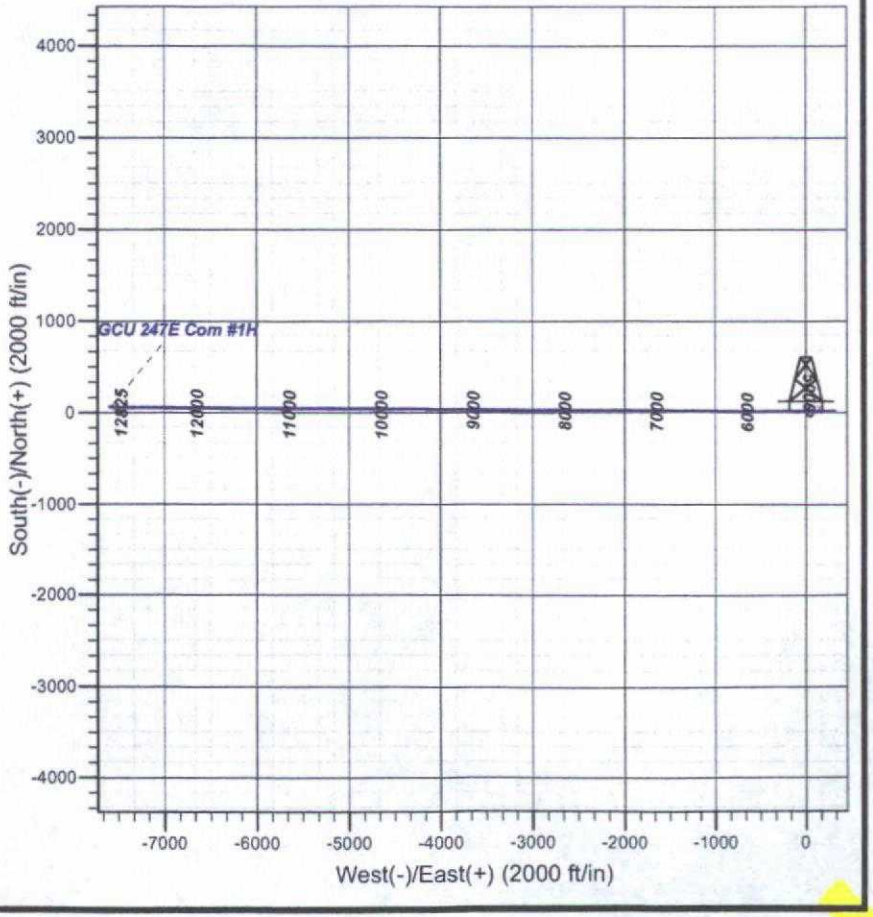
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
GCU 247E Com #1H PBHL	5125.00	51.66	-7590.71	2037767.96	2628450.80	36.5997224	-108.1557542
GCU 247E Com #1H LP	5200.00	2.59	-379.99	2037718.89	2635661.50	36.5996515	-108.1311887

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00		
747.84	4.96	89.31	747.53	0.13	10.71	2.00	89.31	-10.71		
4148.90	4.96	89.31	4135.87	3.64	304.56	0.00	0.00	-304.53		
4396.74	0.00	0.00	4383.40	3.77	315.27	2.00	180.00	-315.24		
4546.74	0.00	0.00	4533.40	3.77	315.27	0.00	0.00	-315.24		
5213.40	60.00	269.74	5084.73	2.33	-3.04	9.00	269.74	3.05		
5273.40	60.00	269.74	5114.73	2.09	-55.00	0.00	0.00	55.01		
5613.43	90.60	270.39	5200.00	2.59	-379.99	9.00	1.28	380.00		
12824.70	90.60	270.39	5125.00	51.66	-7590.71	0.00	0.00	7590.88	GCU 247E Com #1H PBHL	





B.P.

San Juan County, NM NAD83
Gallegos Canyon Unit
GCU 247E Com #1H

OH

Plan: Plan #2

Standard Planning Report

03 March, 2015

Scientific Drilling

www.scientificdrilling.com

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well GCU 247E Com #1H
Company:	B.P.	**TVD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Site:	Gallegos Canyon Unit	**North Reference:**	Grid
Well:	GCU 247E Com #1H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Project	San Juan County, NM NAD83		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Western Zone		

Site	Gallegos Canyon Unit				
Site Position:		**Northing:**	2,037,787.54 usft	**Latitude:**	36.5998437
From:	Lat/Long	**Easting:**	2,636,085.65 usft	**Longitude:**	-108.1297445
Position Uncertainty:	0.00 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-0.18 °

Well	GCU 247E Com #1H					
Well Position	**+N/-S**	-71.24 ft	**Northing:**	2,037,716.30 usft	**Latitude:**	36.5996476
	+E/-W	-44.16 ft	**Easting:**	2,636,041.49 usft	**Longitude:**	-108.1298942
Position Uncertainty		0.00 ft	**Wellhead Elevation:**	0.00 ft	**Ground Level:**	5,702.20 ft

Wellbore	OH			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	BGGM2014	2/2/2015	9.68	63.20	50,153

Design	Plan #2				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.00	0.00	0.00	270.39	

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
747.84	4.96	89.31	747.53	0.13	10.71	2.00	2.00	0.00	89.31	
4,148.90	4.96	89.31	4,135.87	3.64	304.56	0.00	0.00	0.00	0.00	
4,396.74	0.00	0.00	4,383.40	3.77	315.27	2.00	-2.00	0.00	180.00	
4,546.74	0.00	0.00	4,533.40	3.77	315.27	0.00	0.00	0.00	0.00	
5,213.40	60.00	269.74	5,084.73	2.33	-3.04	9.00	9.00	0.00	269.74	
5,273.40	60.00	269.74	5,114.73	2.09	-55.00	0.00	0.00	0.00	0.00	
5,613.43	90.60	270.39	5,200.00	2.59	-379.99	9.00	9.00	0.19	1.28	
12,824.70	90.60	270.39	5,125.00	51.66	-7,590.71	0.00	0.00	0.00	0.00	GCU 247E Com #1H

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well GCU 247E Com #1H
Company:	B.P.	**TVD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Site:	Gallegos Canyon Unit	**North Reference:**	Grid
Well:	GCU 247E Com #1H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	2.00	89.31	599.98	0.02	1.75	-1.74	2.00	2.00	0.00
700.00	4.00	89.31	699.84	0.08	6.98	-6.98	2.00	2.00	0.00
747.84	4.96	89.31	747.53	0.13	10.71	-10.71	2.00	2.00	0.00
800.00	4.96	89.31	799.50	0.18	15.22	-15.22	0.00	0.00	0.00
900.00	4.96	89.31	899.12	0.29	23.86	-23.86	0.00	0.00	0.00
1,000.00	4.96	89.31	998.75	0.39	32.50	-32.50	0.00	0.00	0.00
1,100.00	4.96	89.31	1,098.37	0.49	41.14	-41.13	0.00	0.00	0.00
1,200.00	4.96	89.31	1,198.00	0.60	49.78	-49.77	0.00	0.00	0.00
1,300.00	4.96	89.31	1,297.63	0.70	58.42	-58.41	0.00	0.00	0.00
1,400.00	4.96	89.31	1,397.25	0.80	67.06	-67.05	0.00	0.00	0.00
1,500.00	4.96	89.31	1,496.88	0.91	75.70	-75.69	0.00	0.00	0.00
1,600.00	4.96	89.31	1,596.50	1.01	84.34	-84.33	0.00	0.00	0.00
1,700.00	4.96	89.31	1,696.13	1.11	92.98	-92.97	0.00	0.00	0.00
1,800.00	4.96	89.31	1,795.76	1.22	101.62	-101.61	0.00	0.00	0.00
1,900.00	4.96	89.31	1,895.38	1.32	110.26	-110.25	0.00	0.00	0.00
2,000.00	4.96	89.31	1,995.01	1.42	118.90	-118.88	0.00	0.00	0.00
2,100.00	4.96	89.31	2,094.63	1.53	127.54	-127.52	0.00	0.00	0.00
2,200.00	4.96	89.31	2,194.26	1.63	136.18	-136.16	0.00	0.00	0.00
2,300.00	4.96	89.31	2,293.89	1.73	144.82	-144.80	0.00	0.00	0.00
2,400.00	4.96	89.31	2,393.51	1.84	153.46	-153.44	0.00	0.00	0.00
2,500.00	4.96	89.31	2,493.14	1.94	162.10	-162.08	0.00	0.00	0.00
2,600.00	4.96	89.31	2,592.76	2.04	170.74	-170.72	0.00	0.00	0.00
2,700.00	4.96	89.31	2,692.39	2.14	179.38	-179.36	0.00	0.00	0.00
2,800.00	4.96	89.31	2,792.02	2.25	188.02	-188.00	0.00	0.00	0.00
2,900.00	4.96	89.31	2,891.64	2.35	196.65	-196.63	0.00	0.00	0.00
3,000.00	4.96	89.31	2,991.27	2.45	205.29	-205.27	0.00	0.00	0.00
3,100.00	4.96	89.31	3,090.89	2.56	213.93	-213.91	0.00	0.00	0.00
3,200.00	4.96	89.31	3,190.52	2.66	222.57	-222.55	0.00	0.00	0.00
3,300.00	4.96	89.31	3,290.15	2.76	231.21	-231.19	0.00	0.00	0.00
3,400.00	4.96	89.31	3,389.77	2.87	239.85	-239.83	0.00	0.00	0.00
3,500.00	4.96	89.31	3,489.40	2.97	248.49	-248.47	0.00	0.00	0.00
3,600.00	4.96	89.31	3,589.02	3.07	257.13	-257.11	0.00	0.00	0.00
3,700.00	4.96	89.31	3,688.65	3.18	265.77	-265.75	0.00	0.00	0.00
3,800.00	4.96	89.31	3,788.28	3.28	274.41	-274.38	0.00	0.00	0.00
3,900.00	4.96	89.31	3,887.90	3.38	283.05	-283.02	0.00	0.00	0.00
4,000.00	4.96	89.31	3,987.53	3.49	291.69	-291.66	0.00	0.00	0.00
4,100.00	4.96	89.31	4,087.15	3.59	300.33	-300.30	0.00	0.00	0.00
4,148.90	4.96	89.31	4,135.87	3.64	304.56	-304.53	0.00	0.00	0.00
4,200.00	3.93	89.31	4,186.82	3.69	308.52	-308.49	2.00	-2.00	0.00
4,300.00	1.93	89.31	4,286.68	3.75	313.64	-313.60	2.00	-2.00	0.00
4,396.74	0.00	0.00	4,383.40	3.77	315.27	-315.24	2.00	-2.00	0.00
4,400.00	0.00	0.00	4,386.66	3.77	315.27	-315.24	0.00	0.00	0.00
4,500.00	0.00	0.00	4,486.66	3.77	315.27	-315.24	0.00	0.00	0.00
4,546.74	0.00	0.00	4,533.40	3.77	315.27	-315.24	0.00	0.00	0.00
4,600.00	4.79	269.74	4,586.60	3.76	313.04	-313.01	9.00	9.00	0.00
4,700.00	13.79	269.74	4,685.19	3.69	296.91	-296.88	9.00	9.00	0.00
4,800.00	22.79	269.74	4,780.03	3.54	265.55	-265.52	9.00	9.00	0.00
4,900.00	31.79	269.74	4,868.81	3.34	219.75	-219.72	9.00	9.00	0.00

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well GCU 247E Com #1H
Company:	B.P.	**TVD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Site:	Gallegos Canyon Unit	**North Reference:**	Grid
Well:	GCU 247E Com #1H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,000.00	40.79	269.74	4,949.33	3.07	160.62	-160.59	9.00	9.00	0.00
5,100.00	49.79	269.74	5,019.60	2.75	89.62	-89.60	9.00	9.00	0.00
5,200.00	58.79	269.74	5,077.91	2.38	8.50	-8.48	9.00	9.00	0.00
5,213.40	60.00	269.74	5,084.73	2.33	-3.04	3.05	9.00	9.00	0.00
5,273.40	60.00	269.74	5,114.73	2.09	-55.00	55.01	0.00	0.00	0.00
5,300.00	62.39	269.80	5,127.54	2.00	-78.30	78.31	9.00	9.00	0.23
5,400.00	71.39	270.01	5,166.75	1.85	-170.18	170.19	9.00	9.00	0.21
5,500.00	80.39	270.19	5,191.10	2.02	-267.07	267.07	9.00	9.00	0.19
5,600.00	89.39	270.37	5,200.00	2.50	-366.57	366.57	9.00	9.00	0.18
5,613.43	90.60	270.39	5,200.00	2.59	-379.99	380.00	9.00	9.00	0.17
GCU 247E Com #1H LP									
5,700.00	90.60	270.39	5,199.10	3.18	-466.56	466.57	0.00	0.00	0.00
5,800.00	90.60	270.39	5,198.06	3.86	-566.55	566.56	0.00	0.00	0.00
5,900.00	90.60	270.39	5,197.02	4.54	-666.54	666.56	0.00	0.00	0.00
6,000.00	90.60	270.39	5,195.98	5.22	-766.53	766.55	0.00	0.00	0.00
6,100.00	90.60	270.39	5,194.94	5.90	-866.53	866.55	0.00	0.00	0.00
6,200.00	90.60	270.39	5,193.90	6.58	-966.52	966.54	0.00	0.00	0.00
6,300.00	90.60	270.39	5,192.86	7.26	-1,066.51	1,066.54	0.00	0.00	0.00
6,400.00	90.60	270.39	5,191.82	7.94	-1,166.50	1,166.53	0.00	0.00	0.00
6,500.00	90.60	270.39	5,190.78	8.62	-1,266.50	1,266.53	0.00	0.00	0.00
6,600.00	90.60	270.39	5,189.74	9.30	-1,366.49	1,366.52	0.00	0.00	0.00
6,700.00	90.60	270.39	5,188.70	9.98	-1,466.48	1,466.51	0.00	0.00	0.00
6,800.00	90.60	270.39	5,187.66	10.66	-1,566.47	1,566.51	0.00	0.00	0.00
6,900.00	90.60	270.39	5,186.62	11.34	-1,666.47	1,666.50	0.00	0.00	0.00
7,000.00	90.60	270.39	5,185.58	12.03	-1,766.46	1,766.50	0.00	0.00	0.00
7,100.00	90.60	270.39	5,184.54	12.71	-1,866.45	1,866.49	0.00	0.00	0.00
7,200.00	90.60	270.39	5,183.50	13.39	-1,966.44	1,966.49	0.00	0.00	0.00
7,300.00	90.60	270.39	5,182.46	14.07	-2,066.43	2,066.48	0.00	0.00	0.00
7,400.00	90.60	270.39	5,181.42	14.75	-2,166.43	2,166.48	0.00	0.00	0.00
7,500.00	90.60	270.39	5,180.38	15.43	-2,266.42	2,266.47	0.00	0.00	0.00
7,600.00	90.60	270.39	5,179.34	16.11	-2,366.41	2,366.47	0.00	0.00	0.00
7,700.00	90.60	270.39	5,178.30	16.79	-2,466.40	2,466.46	0.00	0.00	0.00
7,800.00	90.60	270.39	5,177.26	17.47	-2,566.40	2,566.46	0.00	0.00	0.00
7,900.00	90.60	270.39	5,176.22	18.15	-2,666.39	2,666.45	0.00	0.00	0.00
8,000.00	90.60	270.39	5,175.18	18.83	-2,766.38	2,766.44	0.00	0.00	0.00
8,100.00	90.60	270.39	5,174.14	19.51	-2,866.37	2,866.44	0.00	0.00	0.00
8,200.00	90.60	270.39	5,173.10	20.19	-2,966.36	2,966.43	0.00	0.00	0.00
8,300.00	90.60	270.39	5,172.06	20.87	-3,066.36	3,066.43	0.00	0.00	0.00
8,400.00	90.60	270.39	5,171.02	21.55	-3,166.35	3,166.42	0.00	0.00	0.00
8,500.00	90.60	270.39	5,169.98	22.23	-3,266.34	3,266.42	0.00	0.00	0.00
8,600.00	90.60	270.39	5,168.94	22.91	-3,366.33	3,366.41	0.00	0.00	0.00
8,700.00	90.60	270.39	5,167.90	23.59	-3,466.33	3,466.41	0.00	0.00	0.00
8,800.00	90.60	270.39	5,166.86	24.27	-3,566.32	3,566.40	0.00	0.00	0.00
8,900.00	90.60	270.39	5,165.82	24.95	-3,666.31	3,666.40	0.00	0.00	0.00
9,000.00	90.60	270.39	5,164.78	25.63	-3,766.30	3,766.39	0.00	0.00	0.00
9,100.00	90.60	270.39	5,163.74	26.31	-3,866.30	3,866.38	0.00	0.00	0.00
9,200.00	90.60	270.39	5,162.70	27.00	-3,966.29	3,966.38	0.00	0.00	0.00
9,300.00	90.60	270.39	5,161.66	27.68	-4,066.28	4,066.37	0.00	0.00	0.00
9,400.00	90.60	270.39	5,160.62	28.36	-4,166.27	4,166.37	0.00	0.00	0.00
9,500.00	90.60	270.39	5,159.58	29.04	-4,266.26	4,266.36	0.00	0.00	0.00
9,600.00	90.60	270.39	5,158.54	29.72	-4,366.26	4,366.36	0.00	0.00	0.00
9,700.00	90.60	270.39	5,157.50	30.40	-4,466.25	4,466.35	0.00	0.00	0.00
9,800.00	90.60	270.39	5,156.46	31.08	-4,566.24	4,566.35	0.00	0.00	0.00

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well GCU 247E Com #1H
Company:	B.P.	**TVD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 5702.2' & RKB 17' @ 5719.20ft
Site:	Gallegos Canyon Unit	**North Reference:**	Grid
Well:	GCU 247E Com #1H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,900.00	90.60	270.39	5,155.42	31.76	-4,666.23	4,666.34	0.00	0.00	0.00
10,000.00	90.60	270.39	5,154.38	32.44	-4,766.23	4,766.34	0.00	0.00	0.00
10,100.00	90.60	270.39	5,153.34	33.12	-4,866.22	4,866.33	0.00	0.00	0.00
10,200.00	90.60	270.39	5,152.30	33.80	-4,966.21	4,966.33	0.00	0.00	0.00
10,300.00	90.60	270.39	5,151.26	34.48	-5,066.20	5,066.32	0.00	0.00	0.00
10,400.00	90.60	270.39	5,150.22	35.16	-5,166.19	5,166.31	0.00	0.00	0.00
10,500.00	90.60	270.39	5,149.18	35.84	-5,266.19	5,266.31	0.00	0.00	0.00
10,600.00	90.60	270.39	5,148.14	36.52	-5,366.18	5,366.30	0.00	0.00	0.00
10,700.00	90.60	270.39	5,147.10	37.20	-5,466.17	5,466.30	0.00	0.00	0.00
10,800.00	90.60	270.39	5,146.06	37.88	-5,566.16	5,566.29	0.00	0.00	0.00
10,900.00	90.60	270.39	5,145.02	38.56	-5,666.16	5,666.29	0.00	0.00	0.00
11,000.00	90.60	270.39	5,143.98	39.24	-5,766.15	5,766.28	0.00	0.00	0.00
11,100.00	90.60	270.39	5,142.94	39.92	-5,866.14	5,866.28	0.00	0.00	0.00
11,200.00	90.60	270.39	5,141.90	40.60	-5,966.13	5,966.27	0.00	0.00	0.00
11,300.00	90.60	270.39	5,140.86	41.28	-6,066.13	6,066.27	0.00	0.00	0.00
11,400.00	90.60	270.39	5,139.82	41.97	-6,166.12	6,166.26	0.00	0.00	0.00
11,500.00	90.60	270.39	5,138.78	42.65	-6,266.11	6,266.26	0.00	0.00	0.00
11,600.00	90.60	270.39	5,137.74	43.33	-6,366.10	6,366.25	0.00	0.00	0.00
11,700.00	90.60	270.39	5,136.70	44.01	-6,466.09	6,466.24	0.00	0.00	0.00
11,800.00	90.60	270.39	5,135.66	44.69	-6,566.09	6,566.24	0.00	0.00	0.00
11,900.00	90.60	270.39	5,134.62	45.37	-6,666.08	6,666.23	0.00	0.00	0.00
12,000.00	90.60	270.39	5,133.58	46.05	-6,766.07	6,766.23	0.00	0.00	0.00
12,100.00	90.60	270.39	5,132.54	46.73	-6,866.06	6,866.22	0.00	0.00	0.00
12,200.00	90.60	270.39	5,131.50	47.41	-6,966.06	6,966.22	0.00	0.00	0.00
12,300.00	90.60	270.39	5,130.46	48.09	-7,066.05	7,066.21	0.00	0.00	0.00
12,400.00	90.60	270.39	5,129.42	48.77	-7,166.04	7,166.21	0.00	0.00	0.00
12,500.00	90.60	270.39	5,128.38	49.45	-7,266.03	7,266.20	0.00	0.00	0.00
12,600.00	90.60	270.39	5,127.34	50.13	-7,366.03	7,366.20	0.00	0.00	0.00
12,700.00	90.60	270.39	5,126.30	50.81	-7,466.02	7,466.19	0.00	0.00	0.00
12,800.00	90.60	270.39	5,125.26	51.49	-7,566.01	7,566.18	0.00	0.00	0.00
12,824.70	90.60	270.39	5,125.00	51.66	-7,590.71	7,590.88	0.00	0.00	0.00
GCU 247E Com #1H PBHL									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
GCU 247E Com #1H PE - plan hits target center - Point	0.00	0.00	5,125.00	51.66	-7,590.71	2,037,767.96	2,628,450.80	36.5997224	-108.1557542
GCU 247E Com #1H LP - plan hits target center - Point	0.00	360.00	5,200.00	2.59	-379.99	2,037,718.88	2,635,661.50	36.5996515	-108.1311887

6. Well pad construction will involve preparing a level area for the equipment that will drill and complete the well. The existing well pad will be improved to accommodate a 400-foot by 600-foot level well pad area, resulting in approximately 4.617 acres of new surface disturbance. Construction of the well pad would include a 50-foot construction buffer zone around the perimeter of the pad. The total permitted area for the construction of the well pad is 5.978 acres. The final well pad size will be 5.811 acres.
7. The well pad will be constructed from the earthen materials present on-site. Well pad will be topped with gravel to stabilize the driving surface.
8. Stormwater will be diverted to flow around the well pad at the upslope (southern) side.
9. The operator has proposed a closed-loop system. No drilling pits will be used for the proposed project.
10. Construction of the well pad will take approximately two weeks.

G. Methods for Handling Waste

1. Cuttings - Drilling operations will utilize a closed-loop system with water based mud. All cuttings will be placed in roll-off bins and hauled to a commercial disposal facility or land farm. BP America will follow Onshore Oil and Gas Order No. 1 regarding the placement, operation and removal of the closed-loop systems. No blow pit will be used. Closed-loop tanks will be adequately sized for containment of all fluids.

2. Drilling Fluids

   a. Drilling fluids will be stored onsite in above-ground storage tanks. Upon termination of drilling operations, the drilling fluids will be recycled and transferred to other permitted locations or returned to the vendor for re-use, as practical. Residual fluids will be vacuumed from the storage tanks and disposed of at an appropriate waste disposal facility.
   b. Drilling fluid storage tanks will be adequately sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.

3. Flowback Water

   a. The water-based solution that flows back to the surface during and after completion operations will be placed in storage tanks on location.
   b. Flowback water will be confined to a storage tank for a period not to exceed 90 days after initial production and will be disposed of in an approved disposal facility, or recycled.

4. Spills – any spills of non-freshwater fluids will be immediately cleaned up and removed to an approved disposal site. Spills less than 10 barrels do not require reporting. Spills and releases will be reported according to NMOCD and BLM requirements.

5. Sewage – self-contained, chemical toilets will be provided for human waste disposal. The toilet holding tanks will be pumped by a 3rd party vendor, as needed, and the contents thereof disposed of in an approved sewage disposal facility. The toilets will be onsite during all operations.

Garbage and other waste material – garbage, trash, and other waste materials will be collected in a portable, self-contained and fully-enclosed trash container during drilling and completion operations. The accumulated trash will be removed, as needed, and will be disposed of at an approved landfill. No trash will be buried or burned on location. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash container will be cleaned up and removed from the well location.

Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

Exhibit #1
Typical BOP setup

Location: San Juan Basin, New Mexcio

Date: August 24, 2004
By: John Thompson (Walsh E&P)