

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 #24

API# 30-045-35675, Section 5, Township 21 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
  - Hold C-104 for NSL, NSP, DHC
  - Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
  - 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.

David R. Catanach  
NMOCD Approved by Signature

5-12-2016  
Date DC

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

APR 06 2016

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.  
NMSF078902 **I149IN08479**

6. If Indian, Allottee or Tribe Name

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

8. Lease Name and Well No.  
GALLEGOS CANYON UNIT 247E COM 2H

9. API Well No.  
**30-045-35675**

10. Field and Pool, or Exploratory  
BASIN MANCOS

1a. Type of Work:  DRILL  REENTER

**CONFIDENTIAL**

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

2. Name of Operator  
BP AMERICA PRODUCTION COMPANY  
Contact: TOYA COLVIN  
Toya.Colvin@bp.com

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

3b. Phone No. (include area code)  
281-366-9108

11. Sec., T., R., M., or Blk. and Survey or Area

At surface SESE 1007FSL 1128FEL 36.599754 N Lat, 108.129860 W Lon  
At proposed prod. zone NWNE 783FNL 1321FEL 36.609360 N Lat, 108.148532 W Lon

**SHL** Sec 5 T27N R12W Mer  
**BHL** See 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)  
THIS WELL IS 783 FEET FROM THE NEAREST LEASE LINE.

16. No. of Acres in Lease  
**319.88**

17. Spacing Unit dedicated to this well  
**1260.00 1264.24**

18. Distance from proposed location to nearest well, drilling, completed, applied for, on this lease, ft.  
WELL IS 927 FEET FROM THE NEAREST WELL

19. Proposed Depth  
**5243 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 (Electronic Submission) Name (Printed/Typed) TOYA COLVIN Ph: 281-366-7148 Date 03/23/2015

Title REGULATORY ANALYST

Approved by (Signature) Name (Printed/Typed) Date 4/6/16

Title 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)

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

**Electronic Submission #295711, verified by the BLM Well Information System For BP AMERICA PRODUCTION COMPANY, sent to the Farmington ACTION DOES NOT RELIEVE THE LESSEE AND OPERATOR FROM OBTAINING ANY OTHER AUTHORIZATION REQUIRED FOR OPERATIONS ON FEDERAL AND INDIAN LANDS**

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

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

**NMOCD**

APR 06 2016

Form C-102

**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) 334-6170 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

Revised August 1, 2011  
Submit one copy to appropriate  
District Office

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number 30-045-35675		<sup>2</sup> Pool Code 97232		<sup>3</sup> Pool Name Basin Mancos	
<sup>4</sup> Property Code 000570 3110204		<sup>5</sup> Property Name Gallegos Canyon Unit 247E Com			<sup>6</sup> Well Number 2H
<sup>7</sup> OGRID No. 000778		<sup>8</sup> Operator Name BP America Production Company			<sup>9</sup> Elevation 5702

<sup>10</sup> Surface Location

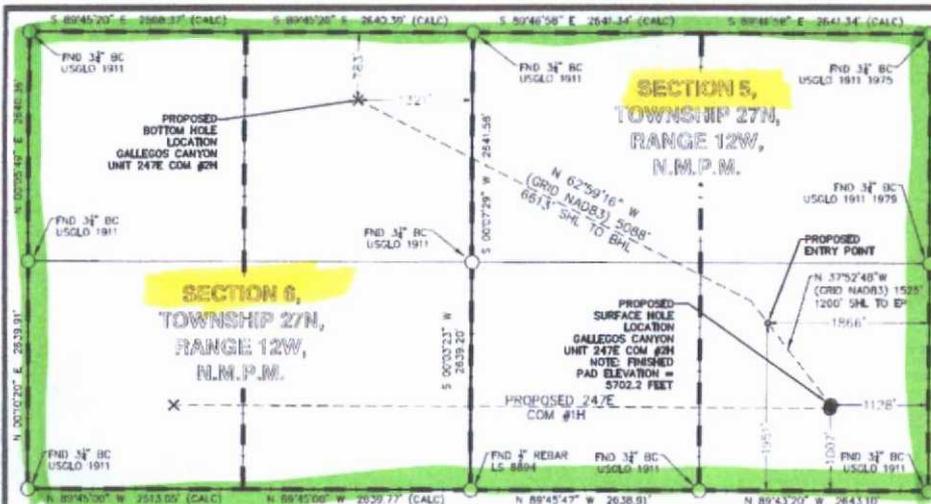
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	05	27N	12W		1007	South	1128	East	San Juan

<sup>11</sup> 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
B	06	27N	12W	2	783	North	1321	East	San Juan

<sup>12</sup> Dedicated Acres 1280 1280-24	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No.
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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 ×

	NMWS NAD'83	NAD'83	TIES
PROPOSED SURFACE HOLE LOCATION (SHL)	N (Y) = 2,037,755.04' E (X) = 2,638,051.46'	LAT. = 36.59975412°N LON. = 108.12986057°W	FSL = 1007' FEL = 1128'
PROPOSED ENTRY POINT (EP)	N (Y) = 2,038,702.20' E (X) = 2,635,314.65'	LAT. = 36.60234959°N LON. = 108.13238074°W	FSL = 1951' FEL = 1866'
PROPOSED BOTTOM HOLE LOCATION (BHL)	N (Y) = 2,041,269.76' E (X) = 2,630,582.12'	LAT. = 36.60936081°N LON. = 108.14853247°W	FNL = 783' FEL = 1321'

<sup>17</sup> 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 the 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, and, heretofore entered by the division.

Signature: *Toya Colvin* Date: 3/9/15

Toya Colvin  
Printed Name

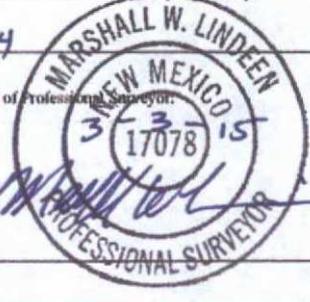
Toya.Colvin@bp.com  
E-mail Address

<sup>18</sup> SURVEYOR CERTIFICATION

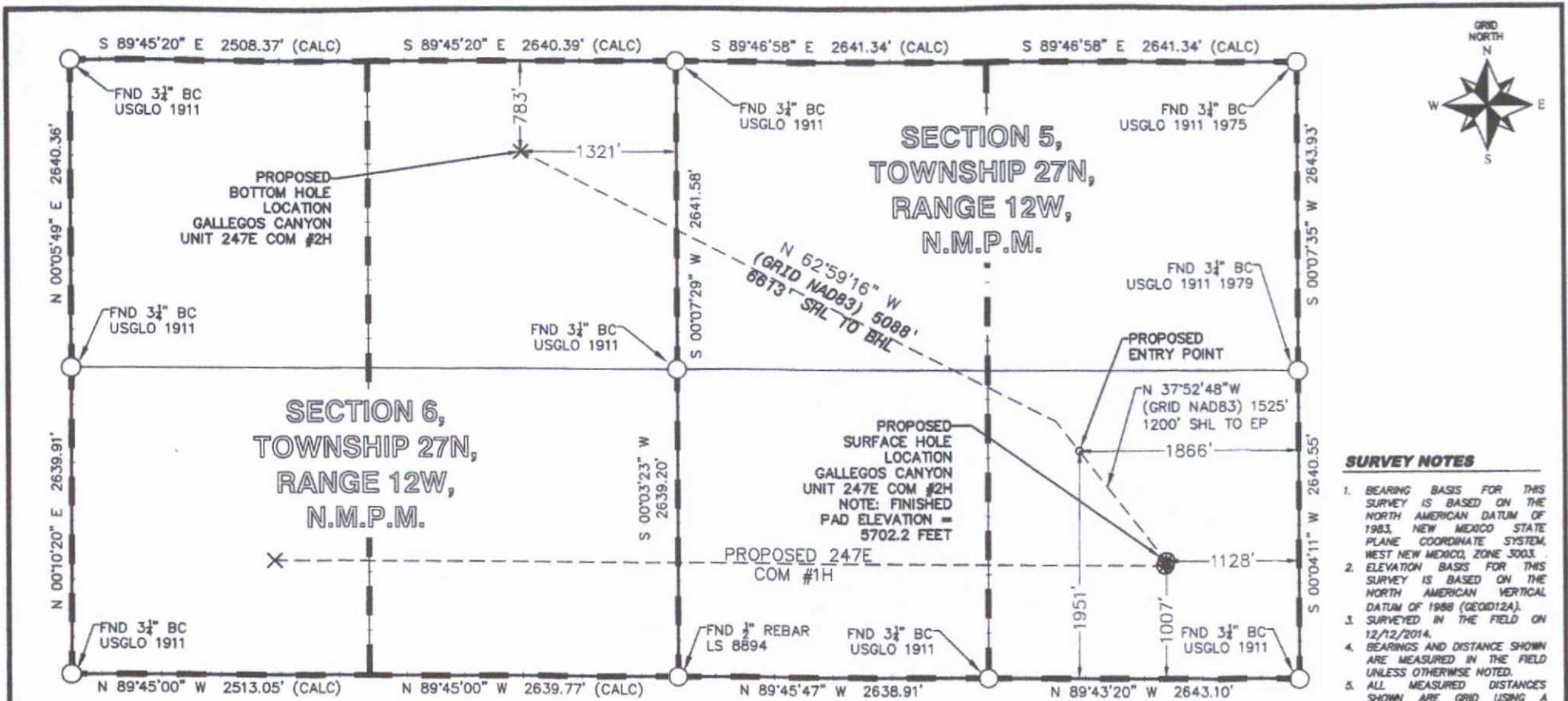
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Date of Survey: 12-12-14

Signature and Seal of Professional Surveyor:



17078  
Certificate Number

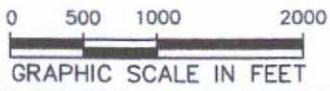


**SURVEY NOTES**

1. BEARING BASIS FOR THIS SURVEY IS BASED ON THE NORTH AMERICAN DATUM OF 1983, NEW MEXICO STATE PLANE COORDINATE SYSTEM, WEST NEW MEXICO, ZONE 3003.
2. ELEVATION BASIS FOR THIS SURVEY IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (GEOID12A).
3. SURVEYED IN THE FIELD ON 12/12/2014.
4. BEARINGS AND DISTANCE SHOWN ARE MEASURED IN THE FIELD UNLESS OTHERWISE NOTED.
5. ALL MEASURED DISTANCES SHOWN ARE GRID USING A COMBINED SCALE FACTOR 0.99965634.

**SURVEYOR'S CERTIFICATE**

I, MARSHALL LINDEEN, A PROFESSIONAL LAND SURVEYOR IN THE STATE OF NEW MEXICO, DO 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.



**LEGEND**

FOUND MONUMENT O

PROPOSED SURFACE HOLE LOCATION ●

PROPOSED BOTTOM HOLE LOCATION X

	NMWS NAD83	NAD83	TIES
PROPOSED SURFACE HOLE LOCATION (SHL)	N (Y) = 2,037,753.04 E (X) = 2,636,051.46	LAT. = 38 59 07.5412" N LON. = 108 12 28 00.57" W	FSL = 1007' FEL = 1128'
PROPOSED ENTRY POINT (EP)	N (Y) = 2,038,702.20 E (X) = 2,636,314.69	LAT. = 38 60 23.4989" N LON. = 108 13 28 07.74" W	FSL = 1951' FEL = 1896'
PROPOSED BOTTOM HOLE LOCATION (BHL)	N (Y) = 2,041,289.76 E (X) = 2,630,582.12	LAT. = 38 60 39.0081" N LON. = 108 14 05 32.47" W	FNL = 783' FEL = 1321'

DRAWN BY RLM	CHECKED BY M.W.L.	SCALE 1"=1000'	DATE 03/02/2015	SHEET 1 OF 1	REVISION 1
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**BP AMERICA**  
PRODUCTION COMPANY  
US LOWER 48 ONSHORE

**WELL LOCATION PLAT**

GALLEGOS CANYON UNIT 247E COM #2H

PART OF  
SECTION 5 AND 6, TOWNSHIP 27N, RANGE 12W,  
N.M.P.M.  
SAN JUAN COUNTY, NEW MEXICO

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 #2H  
Mancos Horizontal Development Well  
Surface Location: 1007' FSL & 1128' FEL  
Section 5, T27N, R12W  
Ungraded GL Elev = 5702.2'  
Lat. = 36.59975412° N  
Long. = 108.12986057° W  
NAD83  
San Juan County, New Mexico

Proposed Bottom Hole Location: 783' FNL – 1321' FEL  
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'**

<u>Formation Tops</u>	<u>Surface (TVD)</u>	<u>Thickness</u>	<u>BHP psi/ft</u>
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	32	0.324

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

## Drilling Plan

Drill 12 1/4" 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 550' MD and build 2 degrees per 100' to 10.56 degrees and 348.54 azimuth. Hold inclination and azimuth to 3995.6' MD. Then drop 2 degrees per 100' to vertical point at 4523.82' MD and hold vertical to 4673.82' MD. Trip out of hole and pick up 8 3/4" kick off assembly. KOP #2 is 4673.82' MD and build 9 degrees per 100' to 7" casing point at 90.45 degrees and 298.48 azimuth, 5738.81' MD/5285' TVD.

The 7" casing will be drilled out with a 6 1/8" drilling assembly holding angle to 90.45 degrees inclination and 298.48 degree azimuth. Drill to a total depth at 11123.15' MD / 5243' TVD. Adjustments may be made to the directional program based on geology.

The Bottom hole location will be in a legal location at 11123.15' MD/5243' TVD at 783' FNL & 1321' FEL of section 6. A total of 5384.19' 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.**

<u>Formation Tops</u>	<u>Surface (TVD)</u>	<u>Thickness</u>	<u>Contents</u>
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	32	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 Sandstone at 5285' 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 5285' 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 nipped-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 5738.81' MD = 7" Casing point @ 90.45 degrees  
 6-1/8" Lateral = 5738.81' MD to 11123.15' 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' – 5738.81' MD	New Casing. Foam Cement in one stage to surface
4-1/2" (6-1/8")	11.6 ppf	P-110	LT&C	5588.81' – 11123.15' 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 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> 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 (collapse & burst), 100k overpull (tension)

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

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	
Tension	340	Mud Wt 9 BF 0.8626	Air Wt 12,240	Bouy Wt 10,558	BW +100k 110,558	4.42	100k over pull BF= 1- (MW)/65.5

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

Intermediate Interval 1	Top Interval	Btm Interval	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
	0	5660	7	23	K55	LTC	3,270 1.125	4,360 1.000	341,000 1.200	

Collapse Interval 1	Top Interval	Btm Interval	Depth TVD	MW in	MW out	Pres in	Pres out	SF - 1.125
23	0 K55	5660	5200	0	9	0	2434	1.34

Burst Interval 1	Top Interval	Btm Interval	Depth TVD	MW in	MW out	Pres in	Pres out	SF - 1.0	Frac Pres
23	0 K55	5660	5200	9	0	2434 2434	0	1.79	0

Tension Interval 1	Top Interval	Btm Interval	Depth TVD	Mud Wt	Air Wt	Bouy Wt	BW +100k	SF - 1.2	
23	0 K55	5660	5200	9 BF 0.8626	119,600	103,166	203,166	1.68	BF= 1- (MW)/65.5

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

Liner Interval 1	Size	Weight	Grade	Conn	Collapse	Burst	Tension	Notes
	4.5	11.6	P-110	LTC	7,560 1.125	10,690 1.000	279,000 1.200	TD 10962', TVD 5200'

Collapse	Casing Depth (TVD)	MW in	MW out	Pres in	Pres out	SF
	5200	0.00	9.00	0	2434	3.11

Burst	Casing Depth (TVD)	MW in	MW out	Pres in	Pres out	SF	
	5200	9.00	0.00	2434 8934	0	1.20	6500 Burst pressure = Hyd + frac pressure

Tension	Casing Depth (TVD)	Mud Wt	Air Wt	Bouy Wt	BW +100k	SF	
	5200	8.80 BF 0.8656	60,320	52,216	152,216	1.83	100k over pull BF= 1- (MW)/65.5

**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 (0.3132ft<sup>3</sup>/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 ft<sup>3</sup>/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) - (0-5660'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' – 5127'): 600 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: 202.3 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 - (5127'-5660') - 533': 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% BWOW

Yield – 1.174 ft3/sx

Water requirement – 5.15 gal/sx.

Compressive strength: 24 hr – 2000 psi+

**Total sacks of cement pumped = 850**

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 :	22533.7 scf
Annulus Back Pressure :	100 psig	Additional Gas :	40000 scf
Bottom Hole Circulating Temp :	105degF	Total Gas :	62533.7 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	Extend aCem	0	13		10.83	10.83
3	Extend aSeal	7.7	10		11.11	13.55
3	Extend aSeal	144.9	10		30.63	32.06

**Production Casing (Liner) – Foam Cement ( Constant Density) - (5510'MD - 10962'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 - (5156' – 5510'): 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 - (5510' – 10962'): 255 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: 86.9 bbls

Foamed Weight - 10 ppg (Constant Density Method)

Average Foam Yield – 1.901ft3/sx

Foamed Volume: 86.9 bbls

Compressive strength: 24 hr – 1000 psi+

**Tail #1 - (10962'-9828') - 1133': 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 = 390**

**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 :	17493.9 scf
Annulus Back Pressure :	100 psig	Additional Gas :	40000 scf
Bottom Hole Circulating Temp :	145degF	Total Gas :	57493.9 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		227.66	228.96
3	Extend aSeal	62.2	10		230.79	231.9

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'-4591'	Vertical to KOP	8-3/4"	Flex Firm KA	8.4-9.5	38-42	6	14	12	11.0
4674'-5739'	Curve	8-3/4"	Flex Firm KA	9.0-9.5	38-42	6	14	12	11.0
5739'- 11123'	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:

$$\text{Sacks of Barite per 100 bbl of mud} = 1470 \times (W2 - W1) \div (35 - W2)$$

Where; W1 = current mud weight

W2 = new mud weight

$$\text{Sacks} = 1470 \times (10.5 - 8.4) \div (35 - 10.5) = 126 \text{ sx} \times 5 \text{ (500bbbls minimum)} = 630\text{sx}$$

Pason Pit Volume Totalizer (PVT) equipment (or equivalent) 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 5739'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 in surface use plan 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:**

Intermediate Hole Section (Mancos Shale to Landing Point)

Proposed Open Hole Logs (If hole conditions allow): (1) Triple combo, (2) Dipole sonic & FMI and (3) Rotary sidewall cores

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 @ +/- 2,000' 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 pressure 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 @ 5285' TVD: ~164° 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 5739'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<sub>2</sub>S 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 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. If a 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 19.15.17.13NMAC.



Company: B.P.  
 Project: San Juan County, NM NAD83  
 Site: Gallegos Canyon Unit  
 Well: GCU 247E Com #2H  
 Wellbore: OH  
 Design: Plan #3

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



Azimuths to Grid North  
 True North: 0.18°  
 Magnetic North: 9.86°  
 Magnetic Field  
 Strength: 50153.3anT  
 Dip Angle: 63.20°  
 Date: 2/2/2015  
 Model: BGGM2014

WELL DETAILS: GCU 247E Com #2H

Plan: Plan #3 (GCU 247E Com #2H/OH)

Created By: Janie Collins Date: 10:16, March 10 2015

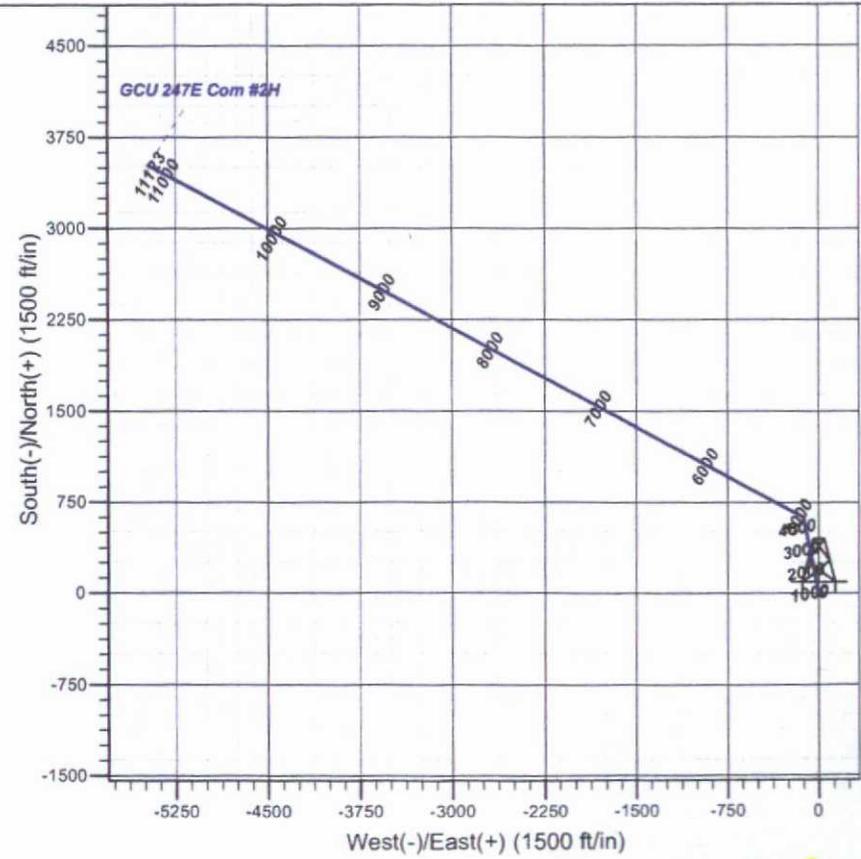
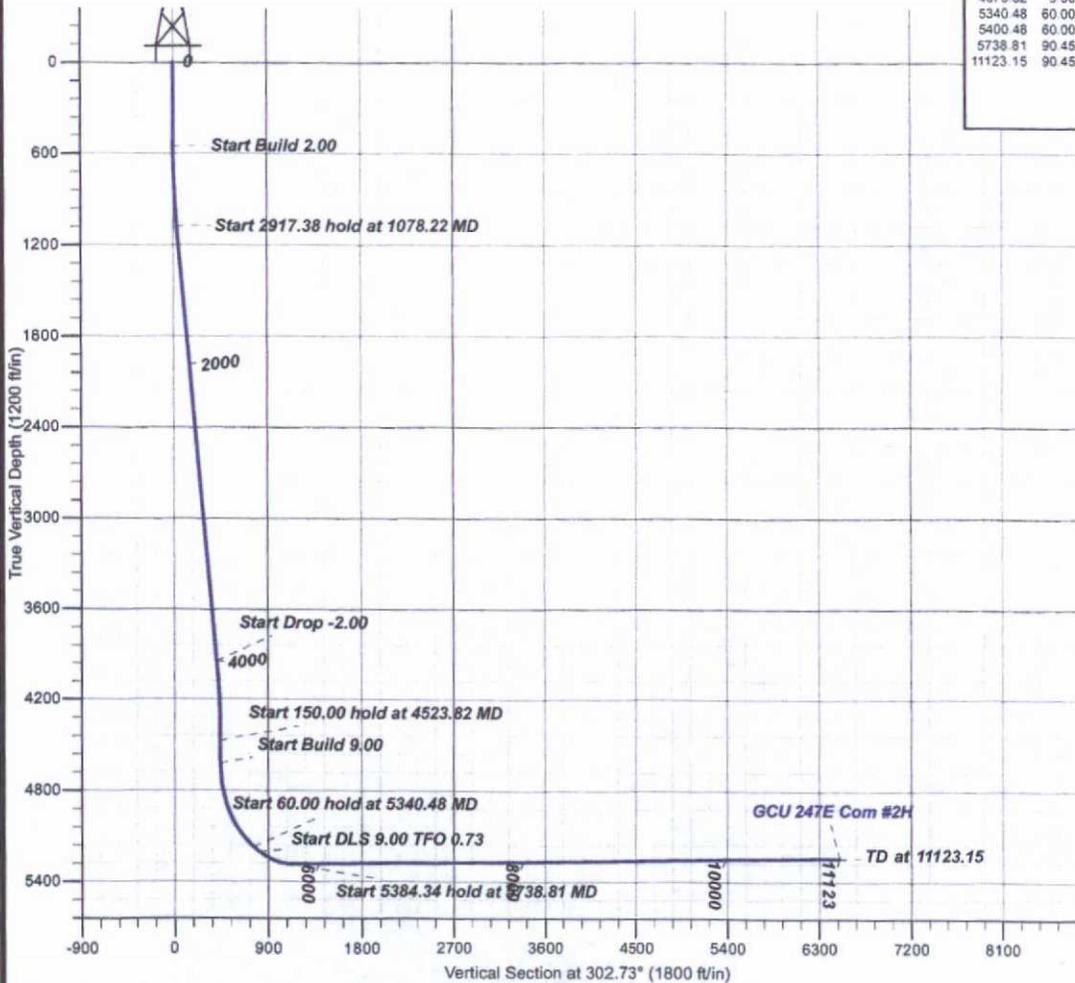
GL 5702.2' & RKB 17' @ 5719.20ft  
 +N/-S +E/-W Northing Easting Latitude Longitude  
 0.00 0.00 2037755.04 2636051.46 36.5997541 -108.1298606

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
GCU 247E Com #2H PBHL	5243.00	3514.73	-5469.35	2041269.76	2630582.12	36.6093608	-108.1485325
GCU 247E Com #2H LP	5285.00	947.16	-736.81	2038702.20	2635314.65	36.6023496	-108.1323807

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		
550.00	0.00	0.00	550.00	0.00	0.00	0.00	0.00	0.00		Start Build 2.00
1078.22	10.56	348.54	1075.23	47.59	-9.65	2.00	348.54	33.85		Start 2917.38 hold at 1078.22 MD
3995.60	10.56	348.54	3943.16	571.80	-115.93	0.00	0.00	406.65		Start Drop -2.00
4523.82	0.00	0.00	4468.39	619.39	-125.58	2.00	180.00	440.50		Start 150.00 hold at 4523.82 MD
4673.82	0.00	0.00	4618.39	619.39	-125.58	0.00	0.00	440.50		Start Build 9.00
5340.48	60.00	298.11	5169.72	769.37	-405.34	9.00	298.11	757.78		Start 60.00 hold at 5340.48 MD
5400.48	60.00	298.11	5199.72	793.85	-452.18	0.00	0.00	809.57		Start DLS 9.00 TFO 0.73
5738.81	90.45	298.48	5285.00	947.16	-736.81	9.00	0.73	1131.91		Start 5384.34 hold at 5738.81 MD
11123.15	90.45	298.48	5243.00	3514.73	-5469.35	0.00	0.00	6501.32	GCU 247E Com #2H PBHL	TD at 11123.15





**B.P.**

**San Juan County, NM NAD83  
Gallegos Canyon Unit  
GCU 247E Com #2H**

**OH**

**Plan: Plan #3**

## **Standard Planning Report**

**10 March, 2015**



[www.scientificdrilling.com](http://www.scientificdrilling.com)



<b>Database:</b>	Grand Junction District	<b>Local Co-ordinate Reference:</b>	Well GCU 247E Com #2H
<b>Company:</b>	B.P.	<b>TVD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Project:</b>	San Juan County, NM NAD83	<b>MD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Site:</b>	Gallegos Canyon Unit	<b>North Reference:</b>	Grid
<b>Well:</b>	GCU 247E Com #2H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #3		

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

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

<b>Well</b>	GCU 247E Com #2H					
<b>Well Position</b>	<b>+N/-S</b>	-32.50 ft	<b>Northing:</b>	2,037,755.03 usft	<b>Latitude:</b>	36.5997541
	<b>+E/-W</b>	-34.19 ft	<b>Easting:</b>	2,636,051.46 usft	<b>Longitude:</b>	-108.1298606
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	0.00 ft	<b>Ground Level:</b>	5,702.20 ft

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

<b>Design</b>	Plan #3				
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<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00	
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.00	0.00	0.00	302.73	

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	
550.00	0.00	0.00	550.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,078.22	10.56	348.54	1,075.23	47.59	-9.65	2.00	2.00	0.00	348.54	
3,995.60	10.56	348.54	3,943.16	571.80	-115.93	0.00	0.00	0.00	0.00	
4,523.82	0.00	0.00	4,468.39	619.39	-125.58	2.00	-2.00	0.00	180.00	
4,673.82	0.00	0.00	4,618.39	619.39	-125.58	0.00	0.00	0.00	0.00	
5,340.48	60.00	298.11	5,169.72	769.37	-406.34	9.00	9.00	0.00	298.11	
5,400.48	60.00	298.11	5,199.72	793.85	-452.18	0.00	0.00	0.00	0.00	
5,738.81	90.45	298.48	5,285.00	947.16	-736.81	9.00	9.00	0.11	0.73	
11,123.15	90.45	298.48	5,243.00	3,514.73	-5,469.35	0.00	0.00	0.00	0.00	GCU 247E Com #2H



<b>Database:</b>	Grand Junction District	<b>Local Co-ordinate Reference:</b>	Well GCU 247E Com #2H
<b>Company:</b>	B.P.	<b>TVD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Project:</b>	San Juan County, NM NAD83	<b>MD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Site:</b>	Gallegos Canyon Unit	<b>North Reference:</b>	Grid
<b>Well:</b>	GCU 247E Com #2H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #3		

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
550.00	0.00	0.00	550.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Start Build 2.00</b>									
600.00	1.00	348.54	600.00	0.43	-0.09	0.30	2.00	2.00	0.00
700.00	3.00	348.54	699.93	3.85	-0.78	2.74	2.00	2.00	0.00
800.00	5.00	348.54	799.68	10.68	-2.17	7.60	2.00	2.00	0.00
900.00	7.00	348.54	899.13	20.93	-4.24	14.88	2.00	2.00	0.00
1,000.00	9.00	348.54	998.15	34.57	-7.01	24.58	2.00	2.00	0.00
1,078.22	10.56	348.54	1,075.23	47.59	-9.65	33.85	2.00	2.00	0.00
<b>Start 2917.38 hold at 1078.22 MD</b>									
1,100.00	10.56	348.54	1,096.64	51.50	-10.44	36.63	0.00	0.00	0.00
1,200.00	10.56	348.54	1,194.95	69.47	-14.09	49.41	0.00	0.00	0.00
1,300.00	10.56	348.54	1,293.25	87.44	-17.73	62.19	0.00	0.00	0.00
1,400.00	10.56	348.54	1,391.56	105.41	-21.37	74.97	0.00	0.00	0.00
1,500.00	10.56	348.54	1,489.86	123.38	-25.01	87.74	0.00	0.00	0.00
1,600.00	10.56	348.54	1,588.17	141.35	-28.66	100.52	0.00	0.00	0.00
1,700.00	10.56	348.54	1,686.47	159.32	-32.30	113.30	0.00	0.00	0.00
1,800.00	10.56	348.54	1,784.78	177.28	-35.94	126.08	0.00	0.00	0.00
1,900.00	10.56	348.54	1,883.08	195.25	-39.59	138.86	0.00	0.00	0.00
2,000.00	10.56	348.54	1,981.39	213.22	-43.23	151.64	0.00	0.00	0.00
2,100.00	10.56	348.54	2,079.69	231.19	-46.87	164.42	0.00	0.00	0.00
2,200.00	10.56	348.54	2,178.00	249.16	-50.52	177.20	0.00	0.00	0.00
2,300.00	10.56	348.54	2,276.30	267.13	-54.16	189.98	0.00	0.00	0.00
2,400.00	10.56	348.54	2,374.61	285.09	-57.80	202.75	0.00	0.00	0.00
2,500.00	10.56	348.54	2,472.91	303.06	-61.45	215.53	0.00	0.00	0.00
2,600.00	10.56	348.54	2,571.22	321.03	-65.09	228.31	0.00	0.00	0.00
2,700.00	10.56	348.54	2,669.52	339.00	-68.73	241.09	0.00	0.00	0.00
2,800.00	10.56	348.54	2,767.83	356.97	-72.37	253.87	0.00	0.00	0.00
2,900.00	10.56	348.54	2,866.13	374.94	-76.02	266.65	0.00	0.00	0.00
3,000.00	10.56	348.54	2,964.44	392.91	-79.66	279.43	0.00	0.00	0.00
3,100.00	10.56	348.54	3,062.74	410.87	-83.30	292.21	0.00	0.00	0.00
3,200.00	10.56	348.54	3,161.05	428.84	-86.95	304.99	0.00	0.00	0.00
3,300.00	10.56	348.54	3,259.35	446.81	-90.59	317.76	0.00	0.00	0.00
3,400.00	10.56	348.54	3,357.66	464.78	-94.23	330.54	0.00	0.00	0.00
3,500.00	10.56	348.54	3,455.96	482.75	-97.88	343.32	0.00	0.00	0.00
3,600.00	10.56	348.54	3,554.27	500.72	-101.52	356.10	0.00	0.00	0.00
3,700.00	10.56	348.54	3,652.57	518.68	-105.16	368.88	0.00	0.00	0.00
3,800.00	10.56	348.54	3,750.88	536.65	-108.81	381.66	0.00	0.00	0.00
3,900.00	10.56	348.54	3,849.18	554.62	-112.45	394.44	0.00	0.00	0.00
3,995.60	10.56	348.54	3,943.16	571.80	-115.93	406.65	0.00	0.00	0.00
<b>Start Drop -2.00</b>									
4,000.00	10.48	348.54	3,947.49	572.59	-116.09	407.21	2.00	-2.00	0.00
4,100.00	8.48	348.54	4,046.12	588.72	-119.36	418.69	2.00	-2.00	0.00
4,200.00	6.48	348.54	4,145.26	601.47	-121.95	427.76	2.00	-2.00	0.00
4,300.00	4.48	348.54	4,244.80	610.83	-123.84	434.41	2.00	-2.00	0.00
4,400.00	2.48	348.54	4,344.61	616.77	-125.05	438.64	2.00	-2.00	0.00
4,500.00	0.48	348.54	4,444.57	619.29	-125.56	440.43	2.00	-2.00	0.00
4,523.82	0.00	0.00	4,468.39	619.39	-125.58	440.50	2.00	-2.00	0.00
<b>Start 150.00 hold at 4523.82 MD</b>									



<b>Database:</b>	Grand Junction District	<b>Local Co-ordinate Reference:</b>	Well GCU 247E Com #2H
<b>Company:</b>	B.P.	<b>TVD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Project:</b>	San Juan County, NM NAD83	<b>MD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Site:</b>	Gallegos Canyon Unit	<b>North Reference:</b>	Grid
<b>Well:</b>	GCU 247E Com #2H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #3		

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)
4,600.00	0.00	0.00	4,544.57	619.39	-125.58	440.50	0.00	0.00	0.00
4,673.82	0.00	0.00	4,618.39	619.39	-125.58	440.50	0.00	0.00	0.00
<b>Start Build 9.00</b>									
4,700.00	2.36	298.11	4,644.57	619.64	-126.05	441.04	9.00	9.00	0.00
4,800.00	11.36	298.11	4,743.75	625.26	-136.57	452.92	9.00	9.00	0.00
4,900.00	20.36	298.11	4,839.84	638.12	-160.65	480.13	9.00	9.00	0.00
5,000.00	29.36	298.11	4,930.49	657.91	-197.69	521.99	9.00	9.00	0.00
5,100.00	38.36	298.11	5,013.45	684.13	-246.78	577.46	9.00	9.00	0.00
5,200.00	47.36	298.11	5,086.68	716.14	-306.71	645.19	9.00	9.00	0.00
5,300.00	56.36	298.11	5,148.38	753.16	-376.01	723.50	9.00	9.00	0.00
5,340.48	60.00	298.11	5,169.72	769.37	-406.34	757.78	9.00	9.00	0.00
<b>Start 60.00 hold at 5340.48 MD</b>									
5,400.00	60.00	298.11	5,199.48	793.65	-451.81	809.15	0.00	0.00	0.00
5,400.48	60.00	298.11	5,199.72	793.85	-452.18	809.57	0.00	0.00	0.00
<b>Start DLS 9.00 TFO 0.73</b>									
5,500.00	68.96	298.23	5,242.55	836.21	-531.26	899.00	9.00	9.00	0.12
5,600.00	77.96	298.34	5,271.00	881.59	-615.59	994.48	9.00	9.00	0.11
5,700.00	86.95	298.44	5,284.12	928.68	-702.71	1,093.23	9.00	9.00	0.10
5,738.81	90.45	298.48	5,285.00	947.17	-736.81	1,131.91	9.00	9.00	0.10
<b>Start 5384.34 hold at 5738.81 MD - GCU 247E Com #2H LP</b>									
5,800.00	90.45	298.48	5,284.52	976.35	-790.59	1,192.93	0.00	0.00	0.00
5,900.00	90.45	298.48	5,283.74	1,024.03	-878.49	1,292.65	0.00	0.00	0.00
6,000.00	90.45	298.48	5,282.96	1,071.72	-966.38	1,392.38	0.00	0.00	0.00
6,100.00	90.45	298.48	5,282.18	1,119.40	-1,054.28	1,492.10	0.00	0.00	0.00
6,200.00	90.45	298.48	5,281.40	1,167.09	-1,142.17	1,591.82	0.00	0.00	0.00
6,300.00	90.45	298.48	5,280.62	1,214.77	-1,230.07	1,691.55	0.00	0.00	0.00
6,400.00	90.45	298.48	5,279.84	1,262.46	-1,317.96	1,791.27	0.00	0.00	0.00
6,500.00	90.45	298.48	5,279.06	1,310.15	-1,405.86	1,890.99	0.00	0.00	0.00
6,600.00	90.45	298.48	5,278.28	1,357.83	-1,493.75	1,990.71	0.00	0.00	0.00
6,700.00	90.45	298.48	5,277.50	1,405.52	-1,581.65	2,090.44	0.00	0.00	0.00
6,800.00	90.45	298.48	5,276.72	1,453.20	-1,669.54	2,190.16	0.00	0.00	0.00
6,900.00	90.45	298.48	5,275.94	1,500.89	-1,757.43	2,289.88	0.00	0.00	0.00
7,000.00	90.45	298.48	5,275.16	1,548.58	-1,845.33	2,389.60	0.00	0.00	0.00
7,100.00	90.45	298.48	5,274.38	1,596.26	-1,933.22	2,489.33	0.00	0.00	0.00
7,200.00	90.45	298.48	5,273.60	1,643.95	-2,021.12	2,589.05	0.00	0.00	0.00
7,300.00	90.45	298.48	5,272.82	1,691.63	-2,109.01	2,688.77	0.00	0.00	0.00
7,400.00	90.45	298.48	5,272.04	1,739.32	-2,196.91	2,788.50	0.00	0.00	0.00
7,500.00	90.45	298.48	5,271.26	1,787.00	-2,284.80	2,888.22	0.00	0.00	0.00
7,600.00	90.45	298.48	5,270.48	1,834.69	-2,372.70	2,987.94	0.00	0.00	0.00
7,700.00	90.45	298.48	5,269.70	1,882.38	-2,460.59	3,087.66	0.00	0.00	0.00
7,800.00	90.45	298.48	5,268.92	1,930.06	-2,548.49	3,187.39	0.00	0.00	0.00
7,900.00	90.45	298.48	5,268.14	1,977.75	-2,636.38	3,287.11	0.00	0.00	0.00
8,000.00	90.45	298.48	5,267.36	2,025.43	-2,724.28	3,386.83	0.00	0.00	0.00
8,100.00	90.45	298.48	5,266.58	2,073.12	-2,812.17	3,486.55	0.00	0.00	0.00
8,200.00	90.45	298.48	5,265.80	2,120.80	-2,900.06	3,586.28	0.00	0.00	0.00
8,300.00	90.45	298.48	5,265.02	2,168.49	-2,987.96	3,686.00	0.00	0.00	0.00
8,400.00	90.45	298.48	5,264.24	2,216.18	-3,075.85	3,785.72	0.00	0.00	0.00
8,500.00	90.45	298.48	5,263.46	2,263.86	-3,163.75	3,885.45	0.00	0.00	0.00
8,600.00	90.45	298.48	5,262.68	2,311.55	-3,251.64	3,985.17	0.00	0.00	0.00
8,700.00	90.45	298.48	5,261.90	2,359.23	-3,339.54	4,084.89	0.00	0.00	0.00
8,800.00	90.45	298.48	5,261.12	2,406.92	-3,427.43	4,184.61	0.00	0.00	0.00
8,900.00	90.45	298.48	5,260.34	2,454.61	-3,515.33	4,284.34	0.00	0.00	0.00
9,000.00	90.45	298.48	5,259.56	2,502.29	-3,603.22	4,384.06	0.00	0.00	0.00



<b>Database:</b>	Grand Junction District	<b>Local Co-ordinate Reference:</b>	Well GCU 247E Com #2H
<b>Company:</b>	B.P.	<b>TVD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Project:</b>	San Juan County, NM NAD83	<b>MD Reference:</b>	GL 5702.2' & RKB 17' @ 5719.20ft
<b>Site:</b>	Gallegos Canyon Unit	<b>North Reference:</b>	Grid
<b>Well:</b>	GCU 247E Com #2H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #3		

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)	
9,100.00	90.45	298.48	5,258.78	2,549.98	-3,691.12	4,483.78	0.00	0.00	0.00	
9,200.00	90.45	298.48	5,258.00	2,597.66	-3,779.01	4,583.50	0.00	0.00	0.00	
9,300.00	90.45	298.48	5,257.22	2,645.35	-3,866.90	4,683.23	0.00	0.00	0.00	
9,400.00	90.45	298.48	5,256.44	2,693.03	-3,954.80	4,782.95	0.00	0.00	0.00	
9,500.00	90.45	298.48	5,255.66	2,740.72	-4,042.69	4,882.67	0.00	0.00	0.00	
9,600.00	90.45	298.48	5,254.88	2,788.41	-4,130.59	4,982.40	0.00	0.00	0.00	
9,700.00	90.45	298.48	5,254.10	2,836.09	-4,218.48	5,082.12	0.00	0.00	0.00	
9,800.00	90.45	298.48	5,253.32	2,883.78	-4,306.38	5,181.84	0.00	0.00	0.00	
9,900.00	90.45	298.48	5,252.54	2,931.46	-4,394.27	5,281.56	0.00	0.00	0.00	
10,000.00	90.45	298.48	5,251.76	2,979.15	-4,482.17	5,381.29	0.00	0.00	0.00	
10,100.00	90.45	298.48	5,250.98	3,026.83	-4,570.06	5,481.01	0.00	0.00	0.00	
10,200.00	90.45	298.48	5,250.20	3,074.52	-4,657.96	5,580.73	0.00	0.00	0.00	
10,300.00	90.45	298.48	5,249.42	3,122.21	-4,745.85	5,680.45	0.00	0.00	0.00	
10,400.00	90.45	298.48	5,248.64	3,169.89	-4,833.75	5,780.18	0.00	0.00	0.00	
10,500.00	90.45	298.48	5,247.86	3,217.58	-4,921.64	5,879.90	0.00	0.00	0.00	
10,600.00	90.45	298.48	5,247.08	3,265.26	-5,009.53	5,979.62	0.00	0.00	0.00	
10,700.00	90.45	298.48	5,246.30	3,312.95	-5,097.43	6,079.34	0.00	0.00	0.00	
10,800.00	90.45	298.48	5,245.52	3,360.63	-5,185.32	6,179.07	0.00	0.00	0.00	
10,900.00	90.45	298.48	5,244.74	3,408.32	-5,273.22	6,278.79	0.00	0.00	0.00	
11,000.00	90.45	298.48	5,243.96	3,456.01	-5,361.11	6,378.51	0.00	0.00	0.00	
11,100.00	90.45	298.48	5,243.18	3,503.69	-5,449.01	6,478.24	0.00	0.00	0.00	
11,123.15	90.45	298.48	5,243.00	3,514.73	-5,469.35	6,501.32	0.00	0.00	0.00	

TD at 11123.15 - GCU 247E Com #2H PBHL

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
GCU 247E Com #2H PE - hit/miss target - Shape - Point	0.00	360.00	5,243.00	3,514.73	-5,469.35	2,041,269.76	2,630,582.12	36.6093608	-108.1485325	
GCU 247E Com #2H LP - plan hits target center by 0.01ft at 5738.81ft MD (5285.00 TVD, 947.17 N, -736.81 E) - Point	0.00	360.00	5,285.00	947.16	-736.81	2,038,702.20	2,635,314.65	36.6023496	-108.1323808	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
550.00	550.00	0.00	0.00	Start Build 2.00	
1,078.22	1,075.23	47.59	-9.65	Start 2917.38 hold at 1078.22 MD	
3,995.60	3,943.16	571.80	-115.93	Start Drop -2.00	
4,523.82	4,468.39	619.39	-125.58	Start 150.00 hold at 4523.82 MD	
4,673.82	4,618.39	619.39	-125.58	Start Build 9.00	
5,340.48	5,169.72	769.37	-406.34	Start 60.00 hold at 5340.48 MD	
5,400.48	5,199.72	793.85	-452.18	Start DLS 9.00 TFO 0.73	
5,738.81	5,285.00	947.16	-736.81	Start 5384.34 hold at 5738.81 MD	
11,123.15	5,243.00	3,514.73	-5,469.35	TD at 11123.15	

### *Introduction*

The following surface use plan of operations (SUPO) will be followed and carried out once the APD is approved by the BLM Farmington Field Office and the Navajo Nation. No other disturbance will be created other than what was submitted in this surface use plan. If any other surface disturbance is needed after the APD is approved, a BLM approved sundry notice or right of way application will be acquired prior to any new surface disturbance.

Before any surface disturbance is created, stakes or flagging will be installed to mark boundaries of permitted areas of disturbance, including soil storage areas. As necessary, slope, grade, and other construction control stakes will be placed to ensure construction in accordance with the surface use plan. All boundary markers will be maintained in place until final construction cleanup is completed. If disturbance boundary markers are disturbed or knocked down, they will be replaced before construction proceeds.

## **A. Existing Roads**

1. The proposed location is on an active well pad. Access to the location will utilize existing roads as shown on Plate 1. Improvements to the existing roads are discussed in Section B. The Road Maintenance Plan is located in Appendix A.
2. Location Access: from Bloomfield, NM, travel south on Highway 550 for 8.4 miles. Turn west on County Road 7010. Continue on County Road 7010 for approximately 6.4 miles. Turn south on an unnamed road. Continue for another 2.0 miles. The location access road will be on the west side of the road. Travel around the crop circle for 0.65 miles. The location will be west of the crop circle.
3. The operator will improve or maintain existing roads in a condition the same as or better than before as per NAPI standards before operations begin. The operator will repair pot holes, diversion trenches, and road crowns. All existing structures on the entire access route such as cattleguards, other range improvement projects, culverts, etc. will be properly repaired or replaced if they are damaged or have deteriorated beyond practical use.
4. The operator will prevent and abate fugitive dust as needed, whether created by vehicular traffic, equipment operations, or wind events. NAPI written approval will be acquired before application of surfactants, binding agents, or other dust suppression chemicals on roadways. Water application will be used for default dust control.

## **B. New or Reconstructed Roads**

Improvements to existing access roads are necessary to allow for safe entry/exit to the location. All improvements to roads shall meet NAPI standards. Reconstruction of the existing roads is discussed below. Plate 2 shows the location of access roads relative to the well pad.

1. The maximum driving width of reconstructed roads will be 14 feet. The maximum width of surface disturbance when reconstructing the existing roads will not exceed 30 feet. All areas outside of the driving surface will be revegetated.
2. The northern access road is 4,141 feet in length. The southern access road is 3,158 feet in length.
3. The maximum grade for the road improvements will not exceed 8 percent.
4. No turnouts will be constructed on existing access roads.
5. No cattle guards will be installed on existing access roads.
6. The existing access roads will be improved with 6 inches of compacted road base.
7. No additional right-of-way grant is needed for road reconstruction.
8. No culverts are necessary for road improvements.
9. No low water crossings will be installed during road reconstruction.



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 3<sup>rd</sup> 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 Mexico

Date: August 24, 2004

By: John Thompson (Wolch E&P)

