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State of New Mexico
Energy Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-101
Revised July 18, 2013

☐ AMENDED REPORT

OIL CONS. DIV DIST. 3
DEC 22 2015

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

1. Operator Name and Address	2. OGRID Number
BP America Production Company **737 North Eldridge Parkway** **Houston, TX 77079**	**000778**
	3. API Number 30-045-35746

4. Property Code	5. Property Name	6. Well No.
19081	**Federal 32 6 9**	**2H**

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
A (Lot 1)	**09**	**32N**	**06W**		**478**	**North**	**231**	**East**	**San Juan**

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
O	**09**	**32N**	**06W**		**710**	**South**	**1977**	**East**	**San Juan**

KP

9. Pool Information

Pool Name	Pool Code
Basin Fruitland Coal	**71629**

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
New Drill	**Gas**	**Rotary**	**Private**	**6105'**
16. Multiple	17. Proposed Depth	18. Formation	19. Contractor	20. Spud Date
N	**8200**	**Fruitland Coal**		February 1, 2016

Depth to Ground water	Distance from nearest fresh water well	Distance to nearest surface water
225'	**4502'**	**275'**

☒ **We will be using a closed-loop system in lieu of lined pits**

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surface	**12 ¼"**	**8 5/8"**	**24**	**300**	**127**	**Surface**
Production	**7 7/8"**	**5 ½"**	**15.5**	**2900**	**304**	**Surface**
Lateral 1	**4 ¾"**	**2 7/8"**	**6.5**	**6032**	**Un-cemented Liner**	
Lateral 2	**4 ¾"**	**2 7/8"**	**5.5**	**5945**	**Un-cemented Liner**	

Casing/Cement Program: Additional Comments

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Annular/Blind Ram	**3000**	**2000**	**Townsend**

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. **I further certify that I have complied with 19.15.14.9 (A) NMAC ☒ and/or 19.15.14.9 (B) NMAC ☐, if applicable.**	OIL CONSERVATION DIVISION
Signature: Toya Colvin	Approved By: Charlie Perrin
Printed name: **Toya Colvin**	Title: SUPERVISOR DISTRICT #3
Title: **Regulatory Analyst**	Approved Date: 1-18-2016 Expiration Date: JAN 18 2018
E-mail Address: **Toya.Colvin@bp.com**	
Date: **12/18/2015** Phone: **281-366-7148**	Conditions of Approval Attached

N

KC

28

OIL CONS. DIV DIST. 3

DEC 22 2015

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Form C-102
Revised August 1, 2011
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-045-35746	71629	Basin Fruitland Coal

[4] Property Code	[5] Property Name	[6] Well Number
019081	Federal 32-6-9	2H Pilot

[7] OGRID No.	[8] Operator Name	[9] Elevation
000778	BP America Production Company	6105

[10] Surface Location

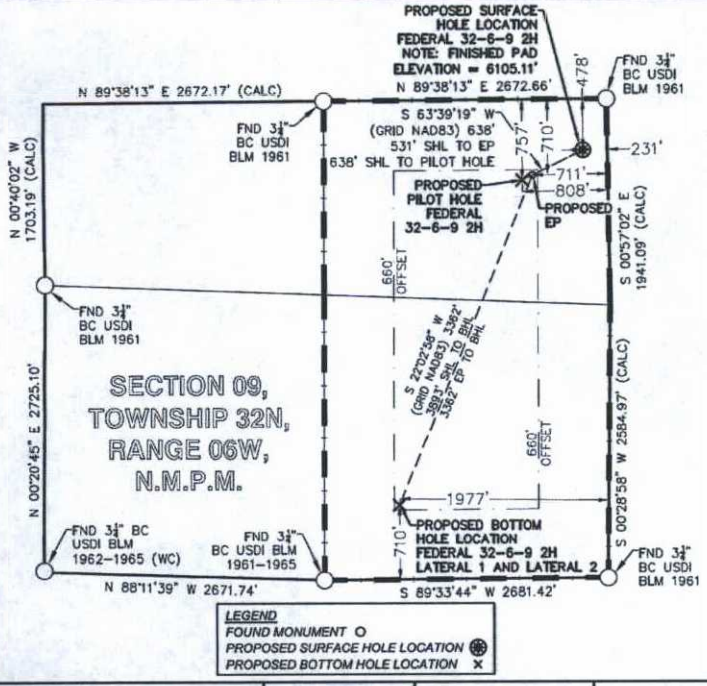
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A (Lot 1)	09	32N	06W		478	North	231	East	San Juan

[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
H	09	32N	06W		757	North	808	East	San Juan

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
279.4			

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.



FEDERAL 32-6-9 2H	NMWZ NAD'83	NAD'83	TIES
PROPOSED SURFACE HOLE LOCATION (SHL)	N (Y) = 2,183,142.74' E (X) = 2,833,532.48'	LAT. = 36.99887524°N LON.= 107.45512823°W	FNL = 478' FEL = 231'
PROPOSED ENTRY POINT (EP) PILOT, LAT 1, & LAT 2	N (Y) = 2,182,907.26' E (X) = 2,833,056.96'	LAT. = 36.99823362°N LON.= 107.45675980°W	FNL = 710' FEL = 711'
PROPOSED PILOT HOLE	N (Y) = 2,182,859.49' E (X) = 2,832,960.49'	LAT. = 36.99810346°N LON.= 107.45709080°W	FNL = 757' FEL = 808'
PROPOSED BOTTOM HOLE LOCATION (BHL) LAT 1	N (Y) = 2,179,790.95' E (X) = 2,831,794.76'	LAT. = 36.98968776°N LON.= 107.46112381°W	FSL = 710' FEL = 1977'
PROPOSED BOTTOM HOLE LOCATION (BHL) LAT 2	N (Y) = 2,179,790.95' E (X) = 2,831,794.76'	LAT. = 36.98968776°N LON.= 107.46112381°W	FSL = 710' FEL = 1977'

[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 12/15/15
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.

12-15-15
Date of Survey

Signature and Seal of Professional Surveyor:

MARSHALL W. LINDEEN NEW MEXICO 17078 12-15-15 PROFESSIONAL SURVEYOR

17078
Certificate Number

Cris Sendor states the lease and operating agreement indicate the same ownership from surface to BHL

OIL CONS. DIV DIST. 3

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Revised August 1, 2011
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-045-35746	71629	Basin Fruitland Coal

[4] Property Code	[5] Property Name	[6] Well Number
019081	Federal 32-6-9	2H Lat 1

[7] OGRID No.	[8] Operator Name	[9] Elevation
000778	BP America Production Company	6105

[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
A (Lot 1)	09	32N	06W		478	North	231	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
O	09	32N	06W		710	South	1977	East	San Juan

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
279.4			

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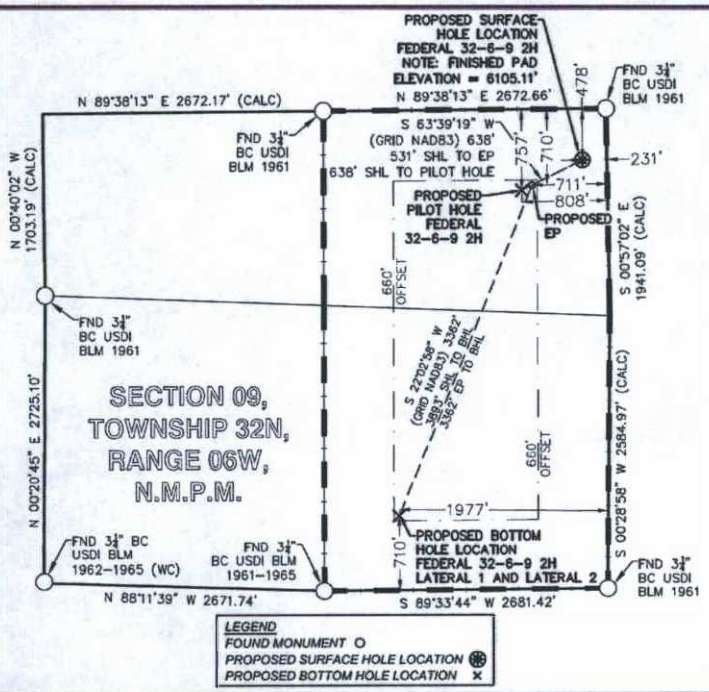

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Toya Colvin 12/15/15
Signature Date

Toya Colvin
Printed Name

Toya.Colvin@bp.com
E-mail Address

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12-15-15
Date of Survey

Signature and Seal of Professional Surveyor:

MARSHALL W. LINDEEN · NEW MEXICO · 17078 · 12-15-15 · PROFESSIONAL SURVEYOR

17078
Certificate Number

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000778	BP America Production Company	6105

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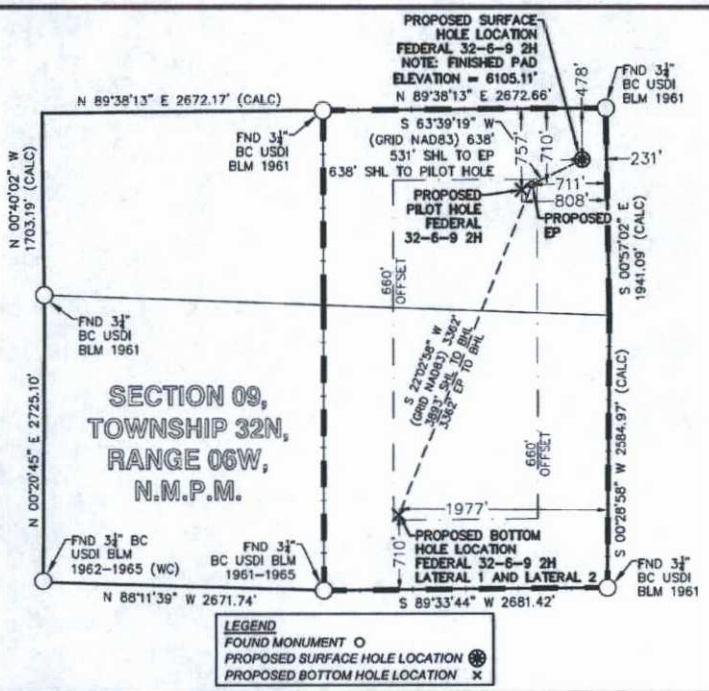

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Date of Survey

Signature and Seal of Professional Surveyor:

MARSHALL W. LINDEEN
NEW MEXICO
17078
12-15-15
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

Federal Unit 32-6-9 2H

Stacked Multi-lateral Fruitland Coal Well
Surface Location: 478' FNL & 231' FEL
Section 9, T32N, R06W
GL Elev = 6105.11'
Lat. = 36.99887524° N
Long. = 107.45512823° W
NAD83
San Juan County, New Mexico

Proposed Entry Point: 710' FNL – 711' FEL
Pilot Proposed Bottom Hole Location: 757' FNL - 808' FEL
LAT 1 Proposed Bottom Hole Location: 710' FSL – 1977' FEL
LAT 2 Proposed Bottom Hole Location: 710' FSL – 1977' FEL
Section 9, T32N, R06W
San Juan County, New Mexico

1. Geology:

Depths referenced to GL of 6105.11' & RKB 11' @ 6116.11'

Marker	Sub Sea	TVD	Thickness	MD	
Animas	6,105'	11'	1,624'	11'	Water - usable
Lwr. Animas	4,481'	1,635'	259'	1,671'	Water - usable
Kirtland Sh	4,222'	1,894'	136'	1,940'	Water
Farmington SS	4,086'	2,030'	333'	2,081'	Gas & Water
Lwr. Kirtland Sh	3,753'	2,363'	151'	2,427'	Gas & Water
Fruitland Coal	3,602'	2,514'	10'	2,583'	Gas, Water & Coal
Lemon Coal Seam*	3,592'	2,524'	2'	2,594'	Gas, Water & Coal
Lwr Lemon Coal Seam*	3,554'	2,562'	19'	2,633'	Gas, Water & Coal
Ignacio U Coal Seam*	3,448'	2,628'	6'	2,702'	Gas, Water & Coal
Ignacio L Coal Seam*	3,435'	2,681'	10'	2,756'	Gas, Water & Coal
Pictured Cliffs SS	3,416'	2,700'	200'	2,776'	Gas & Water
TOTAL DEPTH:	3,216'	2,900'		2,984'	

2. Purpose:

It is proposed, based on strong offset production, to drill 2 stacked laterals from, targeting the Lwr. Lemon and Lwr. Ignacio Coal seams, and a new pilot hole. The additional rathole (through the Pictured Cliffs formation) will allow setting the pump below the deepest coal seam (Lwr. Ignacio) and provide room for coal fines. The Pictured Cliffs formation will be isolated by the cemented 5-1/2" production casing and will not be completed in this well.

3. Basic Drilling & Horizontal Re-entry Procedure:

- Drill 12-1/4" vertical surface hole to 300' MD.
- Run 8-5/8" surface casing and cement to surface. (NOTE: Surface casing may be pre-set prior to mobilizing the drilling rig on location)
- Drill slightly deviated 7-7/8" pilot hole to TD @ 2,984' MD / 2900' TVD.
- Run 5-1/2" production casing and cement to surface.
- Pilot hole will be perforated and hydraulically stimulated in the Fruitland Coal.
- Move in and rig up drilling rig on completed pilot hole
- Run gyro survey, orient and set whipstock for casing exit #1 @ +/-2589' MD
- Mill window and TOOH for curve BHA.
- Planned KOP for LAT 1 (Targeting the Ignacio L Coal Seam) @ 2589' MD / 2519' TVD.
- Drill 4-3/4" curve from 2589' MD / 2519' TVD to landing point @ 2880' MD / 2686' TVD at 90.18°.
- TOOH and PU lateral BHA.
- Drill from 2880' MD / 2686' TVD to 6032' MD / 2676' TVD (3775ft of Vertical Section)
- TOOH and run 2-7/8" pre-perforated liner from 2594' MD to TD @ 6032' MD.
- Run gyro survey, orient and set whipstock for casing exit #2 @ +/-2480' MD
- Mill window and TOOH for curve BHA.
- Planned KOP for LAT 2 (Targeting the Lwr. Lemon Coal Seam) @ 2480' MD / 2414' TVD.
- Drill 4-3/4" curve from 2480' MD / 2414' TVD to landing point @ 2768' MD / 2581' TVD at 89.33°.
- TOOH and PU lateral BHA.
- Drill from 2786' MD / 2581' TVD to 5945' MD / 2618' TVD (3775ft of Vertical Section)
- TOOH and run 2-7/8" pre-perforated liner from 2485' MD to TD @ 5945' MD.
- TOOH and retrieve whip stocks.
- Secure well, rig down and move off location.

The entry point into the Fruitland Coal formation will be a in a legal location at 2,583' MD / 2,514' TVD at 710' FNL & 711' FEL. The 5-1/2" production casing bottom hole location will be in a legal location at TD 2,984' MD / 2,900' TVD at 757' FNL & 808' FEL of Section 9, T32N, R06W. The bottom hole location for LAT 1 will be in a legal location at TD 6,032' MD / 2676' TVD (3,775ft of vertical section) at 710' FSL and 1977' FEL of Section 9, T32N, R06W. The bottom hole location for LAT 2 will be in a legal location at TD 5,945' MD / 2618' TVD (3,775ft of vertical section) at 710' FSL and 1977' FEL of Section 9, T32N, R06W. A total of 7,550' of horizontal hole will be drilled.

4. BOP Specifications:

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 = 2900' TVD x 0.44 psi/ft = 1276 psi, which is less than 2000 psi working pressure. Therefore, a Class 2 (2000 psi) BOPE system meets the requirements that consist of the following:

- 2 preventers with either double ram (blind and pipe) or annular preventer and blind rams.
- Kill line (2" minimum)
- 1 Kill line valve (2" minimum)
- 1 choke line valve
- 2 chokes (refer to diagram in Attachment 1)
- Upper Kelly cock valve with handle available
- Safety valve and subs to fit all drill strings in use
- Pressure gauge on choke manifold
- 2" minimum choke manifold
- Fill-up line above the uppermost preventer

See the attached diagram for the proposed BOP systems. Stack #1 will be nippled-up on the 11" 3,000 psi top flange of the wellhead A section for the slightly deviated pilot hole. Stack #2 will be nippled-up on the 7-1/16" 5,000 psi B section for the dual lateral re-entry. The BOP will be hydraulically operated.

All ram preventers and related equipment will be tested to 2,000 psi for 10 minutes. Annular preventers will be tested to 70% of rated working pressure for 10 minutes. Surface casing will be tested to 1500 psi. All preventers and surface casing will be tested before drilling out of surface casing. BOP equipment will be tested when initially installed, whenever any seal subject to test pressure is broken, following related repairs and at least once every 30 days. Annular preventers will be functionally operated at least once per week. Rams preventers will be activated each trip, not to exceed once per day.

5. Casing Program:

Casing & Hole Size	Hole Section	Weight	Grade	Coupling	Setting Depth (MD)	Comments
8-5/8" (12-1/4")	SURFACE	24 ppf	J55	ST&C	300' MD	Cemented to surface
5-1/2" (7-7/8")	PRODUCTION	15.5 ppf	J55	LT&C	2,984' MD / 2,900' TVD	Cemented to surface
2-7/8" (4-3/4")	LAT 1	6.5 ppf	J55	EUE	2,594' MD - 6,032' MD	Pre-perforated / Un-cemented Casing Dropped off in open hole section..
2-7/8" (4-3/4")	LAT 2	5.5 ppf	J55	EUE	2,485' MD - 5,945' MD	Pre-perforated / Un-cemented Casing Dropped off in open hole section.

Conductor: No conductor casing is necessary

Surface Casing: Protection of shallow fresh water shall be accomplished by setting surface casing 50' below known fresh water sources and cemented to surface with 8 5/8" surface casing.

Possible Aquifers: Animas, 225' TVD (5880' SSTVD)

Oil & Gas: Primary objective is gas in the Fruitland Coal formation (Lwr. Lemon Coal Seam at 2,562' TVD and the Ignacio L Coal Seam at 2,681' TVD).

Production Casing: Protection for all other formations will be accomplished by setting 5-1/2" casing and cementing to surface. The 5-1/2" production casing will be fracture stimulated prior to re-entry for the laterals open hole sections.

Production Liners: Will be pre-perforated, un-cemented, unstimulated liners to maintain hole stability.

6. Cement Program:

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. The 8-5/8" surface casing shall be cemented back to surface. Top plugs shall be used to reduce contamination of cement by displacement fluid. A fluid spacer will be pumped to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry. The 5-1/2" production casing will be cemented to surface. Tail cement for the 5-1/2" production casing cement job is designed to cover 400' TVD above the Fruitland Coal formation top, lead cement is designed to be circulate to surface. Planned excess is 30% in the open hole, excess volume approximately 25 bbls. Actual volumes will be calculated and determined by conditions onsite. Slurries used will be the slurries listed below or equivalent slurries depending on service provider selected. Cement yields may change depending on selected slurries.

Interval (MD)	Hole Section	Hole Size	Type	Cement Yield (ft3/sx)	Cement Weight (ppg)	Top of Cement (MD)	Notes
0-300'	SURFACE	12-1/4"	VARICEM	LEAD = 2.393 TAIL = 1.837	LEAD = 12.3 TAIL = 13.5	SURFACE	27sx Lead 100sx Tail 127sx Total
0-2,984'	PRODUCTION	7-7/8"	VARICEM	LEAD #1 = 2.395 LEAD #2 = 2.401	LEAD = 12.3 TAIL = 13.5	SURFACE	156sx Lead #1 40sx Lead #2

				TAIL = 1.844			108sx Tail 304sx Total
2,594'-6,032'	LAT 1	4-3/4"	N/A	N/A	N/A	N/A	Un-cemented liner
2,485'-5,945'	LAT 2	4-3/4"	N/A	N/A	N/A	N/A	Un-cemented liner

The 8-5/8" surface and 5-1/2" production casing strings will be tested to .22 psi per foot of the casing string length or 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield. The 2-7/8" pre-perforated production casing liners will be uncemented, unstimulated and not tested. The purpose of the 2-7/8" liner is to maintain hole stability and prevent coal fines production and wellbore collapse. The liners are not pressure containing strings. Isolation for the 4-3/4" laterals will be maintained by the cased and cemented pilot hole with 5-1/2" casing and cement to surface.

7. Mud Program:

Interval (MD)	Hole Section	Hole Size	Type	MW (ppg)	VIS (s/qt)	FL (mL/30 min)	PV (cP)	YP ($lbs/100ft^2$)	Max Salinity (mg/L)	pH
0-300'	SURFACE	12-1/4"	Spud	8.4-9.0	40-60	NC	16-22	18-24	2500	8-8.9
0-2,984'	PRODUCTION	7-7/8"	LSND	8.4-9.4	35-40	<10	6-21	4-27	5,000	8-9.5
2,594'-6,032'	LAT 1	4-3/4"	Brine	9.0-9.5	28-34	NC	1	4	300,000	8-9.1
2,485'-5,945'	LAT 2	4-3/4"	Brine	9.0-9.5	28-34	NC	1	4	300,000	8-9.1

Pit Volume Totalizer (PVT) equipment (or equivalent) will be on each pit to monitor pit levels. A trip tank equipped with a PVT sensor will be used to monitor trip volumes. Possible lost circulation in the Fruitland Coal and Pictured Cliffs Sand. Lost circulation has been successfully mitigated with lost circulation materials.

There will not be a reserve pit for this well. A closed-loop system will be used to recover drilling fluid and dry cuttings during both the pilot hole and laterals hole sections of the well. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. Frac tanks will be on location to store fresh water, produced water, drilling mud and brine.

8. Logging Program:

Testing: None planned.

Logging: MWD/LWD (Gamma ray) for both lateral hole sections (from casing exit to TD).

Mud Logging: Geologist & a manned mud-logging unit will be operational for both lateral hole sections. Gas detection equipment will be utilized in the mud return system and visual mud monitoring equipment will be in place to detect volume changes, indicating loss or gain of the circulating fluid volume.

Coring: None.

Cement Bond Log: Will be run inside the 5-1/2" casing to determine the casing window exit points and top of cement.

9. Additional Information:

Directional Plans: Directional plans attached. Depths and directional plans are based on estimated formation tops. Corrections for KOP's and landing points will be made based on actual formation tops & cement bond from logs.

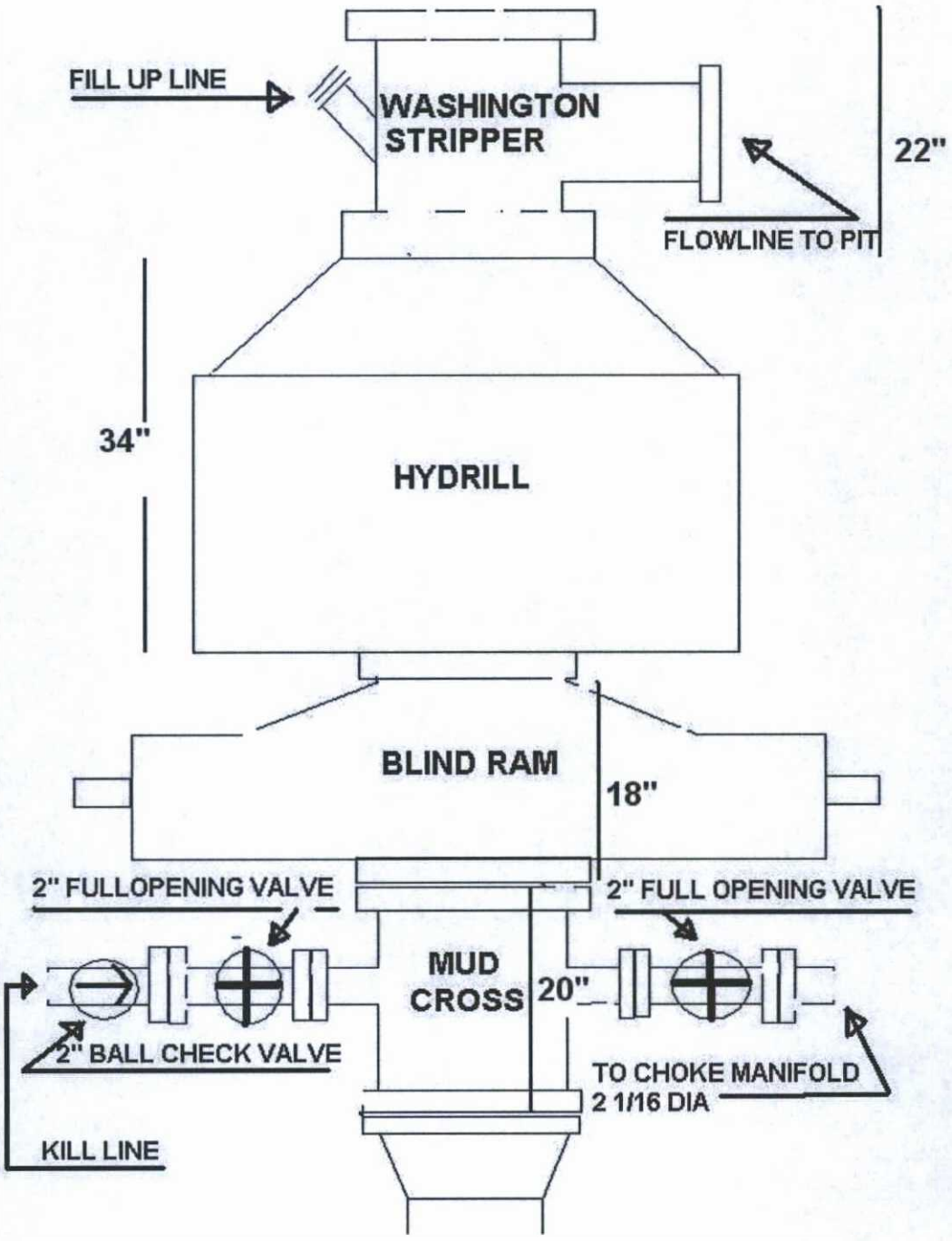
Completion: The deviated pilot hole well will be fracture stimulated to the economic coal seams, identified by cased hole logs, within the Fruitland coal interval estimated from 2514'-2691' TVD. It will be cased and cemented with 5-1/2" production casing and fracture stimulated with approximately 5,000# of sand per net foot of pay in 2-3 stages using x-linked gel pumped at 25-30 BPM. The laterals

will be cased with 2-7/8" pre-perforated uncemented tubing to maintain hole stability for natural open hole completion. The general make-up of the frac fluid that will be used is fresh water.

✓ **Cuttings Disposal:** BP will utilize a closed-loop system for cuttings collection and disposal. No reserve pit required. 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.

92" overall height



Proposed Class 2 BOP Stack - STACK #1 (PILOT HOLE)

Company: B.P.
Project: San Juan County, NM NAD83
Site: Federal Pad
Well: Federal 32-6-9 2H

Scientific Drilling

Well Details: Federal 32-6-9 2H

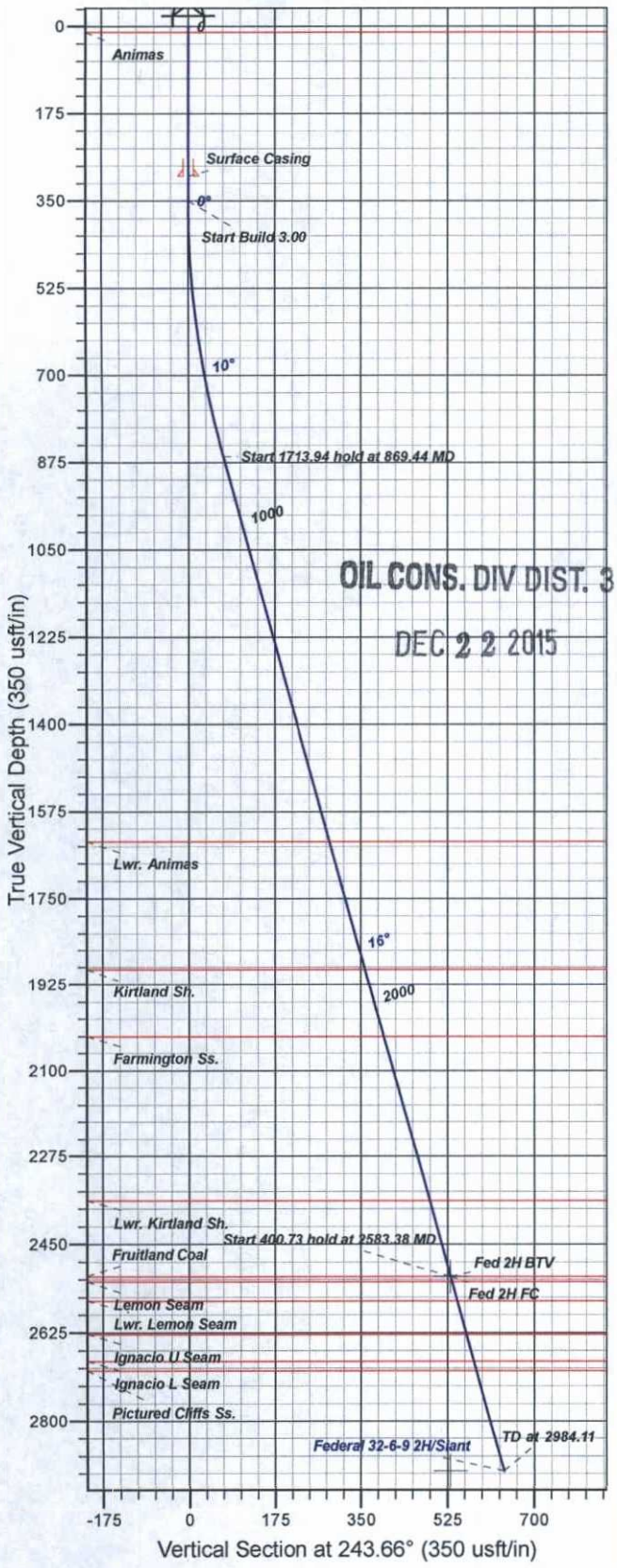
GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)

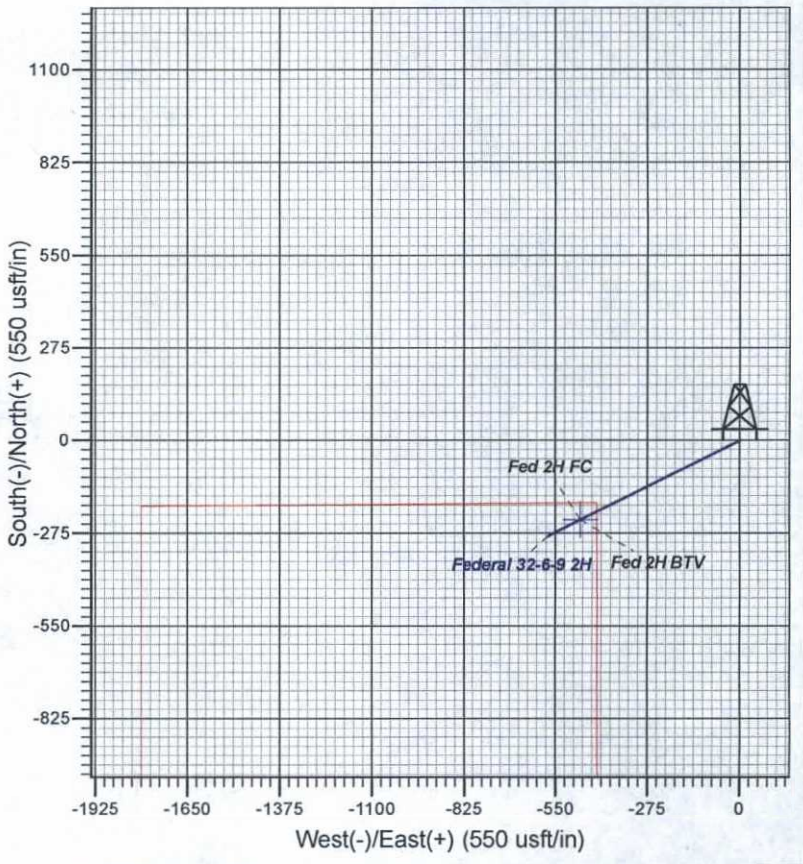
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	2183142.74	2833532.48	36.9988752	-107.4551282	

T G M

Azimuths to Grid North
True North: -0.23°
Magnetic North: 9.02°

Magnetic Field
Strength: 50251.2snT
Dip Angle: 63.62°
Date: 12/10/2015
Model: HDGM





FORMATION TOP DETAILS

TVDPath	MDPath	Formation
11.00	11.00	Animas
1635.00	1670.84	Lwr. Animas
1894.00	1939.72	Kirtland Sh.
2030.00	2080.91	Farmington Ss.
2363.00	2426.62	Lwr. Kirtland Sh.
2514.00	2583.38	Fruitland Coal
2524.00	2593.76	Lemon Seam
2562.00	2633.21	Lwr. Lemon Seam
2628.00	2701.73	Ignacio U Seam
2681.00	2756.76	Ignacio L Seam
2700.00	2776.48	Pictured Cliffs Ss.

Plan: Slant

15:50, December 17 2015
Created By: Janie Collins

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

CASING DETAILS

TVD	MD	Name	Size
300.00	300.00	Surface Casing	8.62

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	350.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	0.00	
3	869.44	15.58	243.66	863.06	-31.15	-62.91	3.00	243.66	70.20	
4	2583.38	15.58	243.66	2514.00	-235.48	-475.52	0.00	0.00	530.63	Fed 2H FC
5	2984.11	15.58	243.66	2900.00	-283.25	-571.99	0.00	0.00	638.28	

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Fed 2H BTV	2514.00	-235.48	-475.52	2182907.26	2833056.96	36.9982336	-107.4567598	Point
- plan hits target center								
Fed 2H FC	2514.00	-235.48	-475.52	2182907.26	2833056.96	36.9982336	-107.4567598	Point
- plan hits target center								
Fed 2H PBHL	2900.00	-235.48	-475.52	2182907.26	2833056.96	36.9982336	-107.4567598	Point
- plan misses target center by 103.69usft at 2955.19usft MD (2872.14 TVD, -279.81 N, -565.03 E)								

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Slant		

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	Federal Pad				
Site Position:		**Northing:**	2,183,108.94 usft	**Latitude:**	36.9987821
From:	Map	**Easting:**	2,833,558.13 usft	**Longitude:**	-107.4550409
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.20 in	**Grid Convergence:**	0.23 °

Well	Federal 32-6-9 2H					
Well Position	**+N/-S**	33.80 usft	**Northing:**	2,183,142.74 usft	**Latitude:**	36.9988752
	+E/-W	-25.65 usft	**Easting:**	2,833,532.48 usft	**Longitude:**	-107.4551283
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	6,105.11 usft

Wellbore	Pilot			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM	12/10/2015	9.25	63.62	50,251

Design	Slant				
Audit Notes:					
Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	243.66	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
350.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	0.00	0.00	
869.44	15.58	243.66	863.06	-31.15	-62.91	3.00	3.00	0.00	243.66	
2,583.38	15.58	243.66	2,514.00	-235.48	-475.52	0.00	0.00	0.00	0.00	Fed 2H FC
2,984.11	15.58	243.66	2,900.00	-283.25	-571.99	0.00	0.00	0.00	0.00	

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Slant		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00	0.00	0.00
Animas									
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
Surface Casing									
350.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	1.50	243.66	399.99	-0.29	-0.59	0.65	3.00	3.00	0.00
500.00	4.50	243.66	499.85	-2.61	-5.28	5.89	3.00	3.00	0.00
600.00	7.50	243.66	599.29	-7.25	-14.64	16.34	3.00	3.00	0.00
700.00	10.50	243.66	698.04	-14.19	-28.66	31.98	3.00	3.00	0.00
800.00	13.50	243.66	795.85	-23.42	-47.29	52.77	3.00	3.00	0.00
869.44	15.58	243.66	863.06	-31.15	-62.91	70.20	3.00	3.00	0.00
900.00	15.58	243.66	892.50	-34.80	-70.27	78.41	0.00	0.00	0.00
1,000.00	15.58	243.66	988.82	-46.72	-94.34	105.28	0.00	0.00	0.00
1,100.00	15.58	243.66	1,085.14	-58.64	-118.42	132.14	0.00	0.00	0.00
1,200.00	15.58	243.66	1,181.47	-70.56	-142.49	159.00	0.00	0.00	0.00
1,300.00	15.58	243.66	1,277.79	-82.48	-166.56	185.87	0.00	0.00	0.00
1,400.00	15.58	243.66	1,374.12	-94.40	-190.64	212.73	0.00	0.00	0.00
1,500.00	15.58	243.66	1,470.44	-106.33	-214.71	239.60	0.00	0.00	0.00
1,600.00	15.58	243.66	1,566.77	-118.25	-238.78	266.46	0.00	0.00	0.00
1,670.84	15.58	243.66	1,635.00	-126.69	-255.84	285.49	0.00	0.00	0.00
Lwr. Animas									
1,700.00	15.58	243.66	1,663.09	-130.17	-262.86	293.32	0.00	0.00	0.00
1,800.00	15.58	243.66	1,759.41	-142.09	-286.93	320.19	0.00	0.00	0.00
1,900.00	15.58	243.66	1,855.74	-154.01	-311.01	347.05	0.00	0.00	0.00
1,939.72	15.58	243.66	1,894.00	-158.75	-320.57	357.72	0.00	0.00	0.00
Kirtland Sh.									
2,000.00	15.58	243.66	1,952.06	-165.93	-335.08	373.91	0.00	0.00	0.00
2,080.91	15.58	243.66	2,030.00	-175.58	-354.56	395.65	0.00	0.00	0.00
Farmington Ss.									
2,100.00	15.58	243.66	2,048.39	-177.85	-359.15	400.78	0.00	0.00	0.00
2,200.00	15.58	243.66	2,144.71	-189.78	-383.23	427.64	0.00	0.00	0.00
2,300.00	15.58	243.66	2,241.03	-201.70	-407.30	454.50	0.00	0.00	0.00
2,400.00	15.58	243.66	2,337.36	-213.62	-431.37	481.37	0.00	0.00	0.00
2,426.62	15.58	243.66	2,363.00	-216.79	-437.78	488.52	0.00	0.00	0.00
Lwr. Kirtland Sh.									
2,500.00	15.58	243.66	2,433.68	-225.54	-455.45	508.23	0.00	0.00	0.00
2,583.38	15.58	243.66	2,514.00	-235.48	-475.52	530.63	0.00	0.00	0.00
Fruitland Coal - Fed 2H BTV - Fed 2H FC									
2,593.76	15.58	243.66	2,524.00	-236.72	-478.02	533.42	0.00	0.00	0.00
Lemon Seam									
2,600.00	15.58	243.66	2,530.01	-237.46	-479.52	535.10	0.00	0.00	0.00
2,633.21	15.58	243.66	2,562.00	-241.42	-487.52	544.02	0.00	0.00	0.00
Lwr. Lemon Seam									
2,700.00	15.58	243.66	2,626.33	-249.38	-503.59	561.96	0.00	0.00	0.00
2,701.73	15.58	243.66	2,628.00	-249.59	-504.01	562.43	0.00	0.00	0.00
Ignacio U Seam									
2,756.76	15.58	243.66	2,681.00	-256.15	-517.26	577.21	0.00	0.00	0.00
Ignacio L Seam									

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Slant		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,776.48	15.58	243.66	2,700.00	-258.50	-522.01	582.51	0.00	0.00	0.00
Pictured Cliffs Ss.									
2,800.00	15.58	243.66	2,722.66	-261.30	-527.67	588.82	0.00	0.00	0.00
2,900.00	15.58	243.66	2,818.98	-273.23	-551.74	615.69	0.00	0.00	0.00
2,955.19	15.58	243.66	2,872.14	-279.81	-565.03	630.51	0.00	0.00	0.00
Fed 2H PBHL									
2,984.11	15.58	243.66	2,900.00	-283.25	-571.99	638.28	0.00	0.00	0.00

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Fed 2H BTV - plan hits target center - Point	0.00	0.00	2,514.00	-235.48	-475.52	2,182,907.26	2,833,056.96	36.9982336	-107.4567598
Fed 2H FC - plan hits target center - Point	0.00	0.00	2,514.00	-235.48	-475.52	2,182,907.26	2,833,056.96	36.9982336	-107.4567598
Fed 2H PBHL - plan misses target center by 103.69usft at 2955.19usft MD (2872.14 TVD, -279.81 N, -565.03 E) - Point	0.00	0.00	2,900.00	-235.48	-475.52	2,182,907.26	2,833,056.96	36.9982336	-107.4567598

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)
300.00	300.00	Surface Casing	8.62	12.25

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
11.00	822.39	Animas		0.00	0.00
1,670.84	2,446.39	Lwr. Animas		0.00	0.00
1,939.72	2,705.39	Kirtland Sh.		0.00	0.00
2,080.91	2,841.39	Farmington Ss.		0.00	0.00
2,426.62	3,174.39	Lwr. Kirtland Sh.		0.00	0.00
2,583.38	3,325.39	Fruitland Coal		0.00	0.00
2,593.76	3,335.39	Lemon Seam		0.00	0.00
2,633.21	3,373.39	Lwr. Lemon Seam		0.00	0.00
2,701.73	3,439.39	Ignacio U Seam		0.00	0.00
2,756.76	3,492.39	Ignacio L Seam		0.00	0.00
2,776.48	3,511.39	Pictured Cliffs Ss.		0.00	0.00

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Pilot		
Design:	Slant		

Company: B.P.
Project: San Juan County, NM NAD83
Site: Federal Pad
Well: Federal 32-6-9 2H
Wellbore: Lateral 1
Design: Slant Plan

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: -0.23°
Magnetic North: 9.02°

Magnetic Field
Strength: 50251.2snT
Dip Angle: 63.62°
Date: 12/10/2015
Model: HDGM

WELL DETAILS: Federal 32-6-9 2H

GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	2183142.74	2833532.48	36.9988752	-107.4551282

Plan: Slant Plan (Federal 32-6-9 2H/Lateral 1)

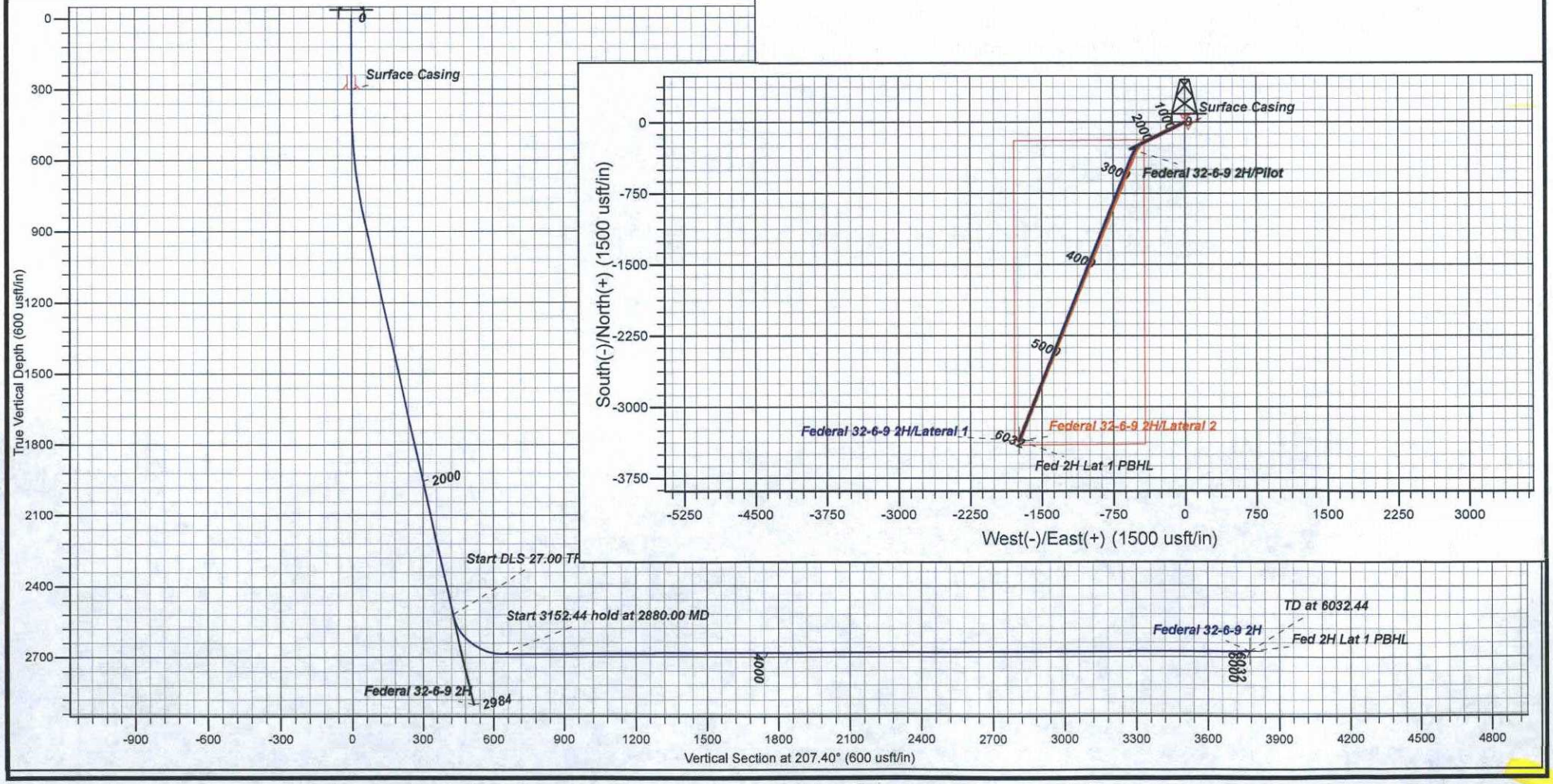
Created By: Janie Collins Date: 11:31, December 14 2015

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Fed 2H Lat 1 PBHL	2676.00	-3351.79	-1737.72	2179790.95	2831794.76	36.9896878	-107.4611238

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSect	Target	Annotation
2588.55	15.58	243.66	2518.98	-236.10	-476.76	0.00	0.00	429.04		
2880.00	90.18	201.50	2686.00	-418.70	-582.40	27.00	-43.19	639.78		
6032.44	90.18	201.50	2676.00	-3351.79	-1737.72	0.00	0.00	3775.47	Fed 2H Lat 1 PBHL	



B.P.

San Juan County, NM NAD83
Federal Pad
Federal 32-6-9 2H

Lateral 1

Plan: Slant Plan

Standard Planning Report

14 December, 2015

Scientific Drilling

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral 1		
Design:	Slant Plan		

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	Federal Pad				
Site Position:		**Northing:**	2,183,108.94 usft	**Latitude:**	36.9987821
From:	Map	**Easting:**	2,833,558.13 usft	**Longitude:**	-107.4550409
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.20 in	**Grid Convergence:**	0.23 °

Well	Federal 32-6-9 2H					
Well Position	**+N/-S**	33.80 usft	**Northing:**	2,183,142.74 usft	**Latitude:**	36.9988752
	+E/-W	-25.65 usft	**Easting:**	2,833,532.48 usft	**Longitude:**	-107.4551283
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	6,105.11 usft

Wellbore	Lateral 1			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM	12/10/2015	9.25	63.62	50,251

Design	Slant Plan				
Audit Notes:					
Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	2,588.55
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	207.40	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
2,588.55	15.58	243.66	2,518.98	-236.10	-476.76	0.00	0.00	0.00	0.00	
2,880.00	90.18	201.50	2,686.00	-418.70	-582.40	27.00	25.60	-14.46	-43.19	
6,032.44	90.18	201.50	2,676.00	-3,351.79	-1,737.72	0.00	0.00	0.00	0.00	Fed 2H Lat 1 PBHL

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral 1		
Design:	Slant Plan		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,588.55	15.58	243.66	2,518.98	-236.10	-476.76	429.04	0.00	0.00	0.00
2,599.99	17.96	236.78	2,529.94	-237.75	-479.62	431.82	27.00	20.75	-60.05
2,699.99	42.67	213.24	2,615.86	-275.23	-511.69	479.86	27.00	24.71	-23.54
2,799.99	68.97	205.66	2,671.60	-346.98	-551.21	561.74	27.00	26.29	-7.58
2,880.00	90.18	201.50	2,686.00	-418.70	-582.40	639.78	27.00	26.52	-5.20
2,899.99	90.18	201.50	2,685.94	-437.31	-589.73	659.67	0.00	0.00	0.00
2,999.99	90.18	201.50	2,685.62	-530.35	-626.38	759.13	0.00	0.00	0.00
3,099.99	90.18	201.50	2,685.31	-623.39	-663.03	858.60	0.00	0.00	0.00
3,199.99	90.18	201.50	2,684.99	-716.43	-699.68	958.07	0.00	0.00	0.00
3,299.99	90.18	201.50	2,684.67	-809.47	-736.32	1,057.54	0.00	0.00	0.00
3,399.99	90.18	201.50	2,684.35	-902.51	-772.97	1,157.01	0.00	0.00	0.00
3,499.99	90.18	201.50	2,684.04	-995.56	-809.62	1,256.48	0.00	0.00	0.00
3,599.99	90.18	201.50	2,683.72	-1,088.60	-846.27	1,355.95	0.00	0.00	0.00
3,699.99	90.18	201.50	2,683.40	-1,181.64	-882.92	1,455.41	0.00	0.00	0.00
3,799.99	90.18	201.50	2,683.08	-1,274.68	-919.57	1,554.88	0.00	0.00	0.00
3,899.99	90.18	201.50	2,682.77	-1,367.72	-956.21	1,654.35	0.00	0.00	0.00
3,999.99	90.18	201.50	2,682.45	-1,460.76	-992.86	1,753.82	0.00	0.00	0.00
4,099.99	90.18	201.50	2,682.13	-1,553.81	-1,029.51	1,853.29	0.00	0.00	0.00
4,199.99	90.18	201.50	2,681.81	-1,646.85	-1,066.16	1,952.76	0.00	0.00	0.00
4,299.99	90.18	201.50	2,681.50	-1,739.89	-1,102.81	2,052.23	0.00	0.00	0.00
4,399.99	90.18	201.50	2,681.18	-1,832.93	-1,139.46	2,151.69	0.00	0.00	0.00
4,499.99	90.18	201.50	2,680.86	-1,925.97	-1,176.10	2,251.16	0.00	0.00	0.00
4,599.99	90.18	201.50	2,680.55	-2,019.02	-1,212.75	2,350.63	0.00	0.00	0.00
4,699.99	90.18	201.50	2,680.23	-2,112.06	-1,249.40	2,450.10	0.00	0.00	0.00
4,799.99	90.18	201.50	2,679.91	-2,205.10	-1,286.05	2,549.57	0.00	0.00	0.00
4,899.99	90.18	201.50	2,679.59	-2,298.14	-1,322.70	2,649.04	0.00	0.00	0.00
4,999.99	90.18	201.50	2,679.28	-2,391.18	-1,359.35	2,748.51	0.00	0.00	0.00
5,099.99	90.18	201.50	2,678.96	-2,484.22	-1,395.99	2,847.98	0.00	0.00	0.00
5,199.99	90.18	201.50	2,678.64	-2,577.27	-1,432.64	2,947.44	0.00	0.00	0.00
5,299.99	90.18	201.50	2,678.32	-2,670.31	-1,469.29	3,046.91	0.00	0.00	0.00
5,399.99	90.18	201.50	2,678.01	-2,763.35	-1,505.94	3,146.38	0.00	0.00	0.00
5,499.99	90.18	201.50	2,677.69	-2,856.39	-1,542.59	3,245.85	0.00	0.00	0.00
5,599.99	90.18	201.50	2,677.37	-2,949.43	-1,579.24	3,345.32	0.00	0.00	0.00
5,699.99	90.18	201.50	2,677.06	-3,042.47	-1,615.88	3,444.79	0.00	0.00	0.00
5,799.99	90.18	201.50	2,676.74	-3,135.52	-1,652.53	3,544.26	0.00	0.00	0.00
5,899.99	90.18	201.50	2,676.42	-3,228.56	-1,689.18	3,643.72	0.00	0.00	0.00
5,999.99	90.18	201.50	2,676.10	-3,321.60	-1,725.83	3,743.19	0.00	0.00	0.00
6,032.44	90.18	201.50	2,676.00	-3,351.79	-1,737.72	3,775.47	0.00	0.00	0.00
Fed 2H Lat 1 PBHL									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Fed 2H Lat 1 PBHL - plan hits target center - Point	0.00	0.00	2,676.00	-3,351.79	-1,737.72	2,179,790.95	2,831,794.76	36.9896877	-107.4611239

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral 1		
Design:	Slant Plan		

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)
300.00	300.00	Surface Casing	8.62	12.25

Company: B.P.
Project: San Juan County, NM NAD83
Site: Federal Pad
Well: Federal 32-6-9 2H
Wellbore: Lateral 2
Design: Slant

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

Plan: Slant (Federal 32-6-9 2H/Lateral 2)

Created By: Janie Collins Date: 11:39, December 14 2015

Azimuths to Grid North
True North: -0.23°
Magnetic North: 9.02°

Magnetic Field
Strength: 50250.8nT
Dip Angle: 63.62°
Date: 12/11/2015
Model: HDGM

WELL DETAILS: Federal 32-6-9 2H

GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)

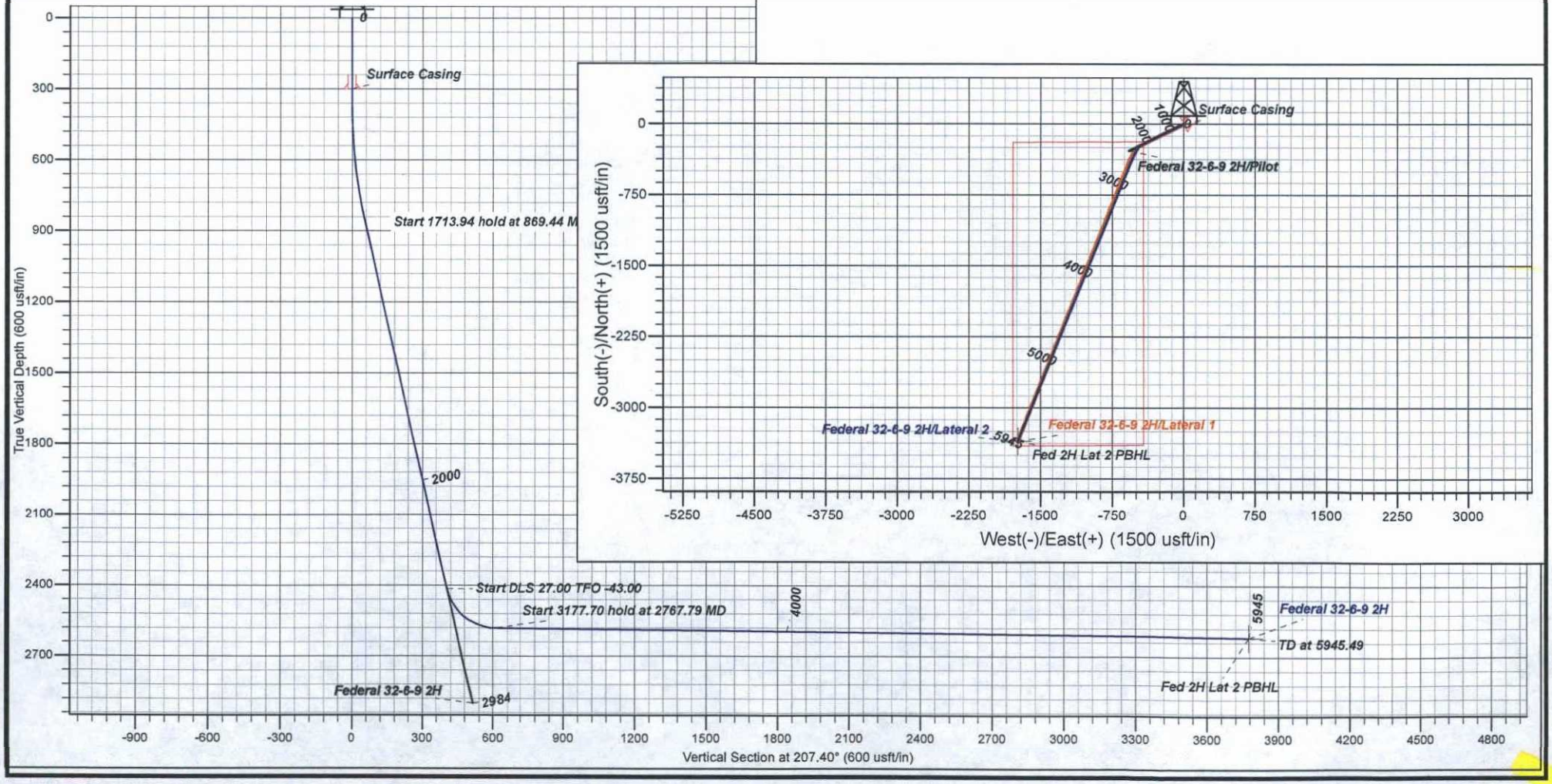
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	2183142.74	2833532.48	36.9988752	-107.4551282

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Fed 2H Lat 2 PBHL	2618.00	-3351.79	-1737.72	2179790.95	2831794.76	36.9896878	-107.4611238

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSect	Target	Annotation
2479.66	15.58	243.66	2414.09	-223.11	-450.55	0.00	0.00	405.45		
2767.79	89.33	201.84	2581.00	-402.43	-555.47	27.00	-43.00	612.93		
5945.49	89.33	201.84	2618.00	-3351.79	-1737.72	0.00	0.00	3775.47	Fed 2H Lat 2 PBHL	



B.P.

San Juan County, NM NAD83
Federal Pad
Federal 32-6-9 2H

Lateral 2

Plan: Slant

Standard Planning Report

14 December, 2015

Scientific Drilling

www.scientificdrilling.com

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral 2		
Design:	Slant		

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	Federal Pad				
Site Position:		**Northing:**	2,183,108.94 usft	**Latitude:**	36.9987821
From:	Map	**Easting:**	2,833,558.13 usft	**Longitude:**	-107.4550409
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.20 in	**Grid Convergence:**	0.23 °

Well	Federal 32-6-9 2H					
Well Position	**+N/-S**	33.80 usft	**Northing:**	2,183,142.74 usft	**Latitude:**	36.9988752
	+E/-W	-25.65 usft	**Easting:**	2,833,532.48 usft	**Longitude:**	-107.4551283
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	6,105.11 usft

Wellbore	Lateral 2			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	HDGM	12/11/2015	9.25	63.62	50,251

Design	Slant			
Audit Notes:				
Version:	**Phase:**	PROTOTYPE	**Tie On Depth:**	2,479.66

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.00	0.00	0.00	207.40

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
2,479.66	15.58	243.66	2,414.09	-223.11	-450.55	0.00	0.00	0.00	0.00	
2,767.79	89.33	201.84	2,581.00	-402.43	-555.47	27.00	25.60	-14.51	-43.00	
5,945.49	89.33	201.84	2,618.00	-3,351.79	-1,737.72	0.00	0.00	0.00	0.00	Fed 2H Lat 2 PBHL

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral 2		
Design:	Slant		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,479.66	15.58	243.66	2,414.09	-223.11	-450.55	405.45	0.00	0.00	0.00
2,500.00	19.94	232.63	2,433.46	-226.43	-455.76	410.79	27.00	21.45	-54.24
2,599.99	45.01	212.46	2,517.36	-267.39	-488.90	462.41	27.00	25.07	-20.17
2,699.99	71.35	205.33	2,569.67	-341.42	-528.89	546.54	27.00	26.34	-7.13
2,767.79	89.33	201.84	2,581.00	-402.43	-555.47	612.93	27.00	26.53	-5.14
2,799.99	89.33	201.84	2,581.38	-432.33	-567.45	644.99	0.00	0.00	0.00
2,899.99	89.33	201.84	2,582.54	-525.14	-604.65	744.51	0.00	0.00	0.00
2,999.99	89.33	201.84	2,583.70	-617.96	-641.86	844.03	0.00	0.00	0.00
3,099.99	89.33	201.84	2,584.87	-710.77	-679.06	943.56	0.00	0.00	0.00
3,199.99	89.33	201.84	2,586.03	-803.58	-716.27	1,043.08	0.00	0.00	0.00
3,299.99	89.33	201.84	2,587.20	-896.40	-753.47	1,142.60	0.00	0.00	0.00
3,399.99	89.33	201.84	2,588.36	-989.21	-790.68	1,242.12	0.00	0.00	0.00
3,499.99	89.33	201.84	2,589.53	-1,082.02	-827.88	1,341.65	0.00	0.00	0.00
3,599.99	89.33	201.84	2,590.69	-1,174.84	-865.09	1,441.17	0.00	0.00	0.00
3,699.99	89.33	201.84	2,591.86	-1,267.65	-902.29	1,540.69	0.00	0.00	0.00
3,799.99	89.33	201.84	2,593.02	-1,360.47	-939.49	1,640.21	0.00	0.00	0.00
3,899.99	89.33	201.84	2,594.18	-1,453.28	-976.70	1,739.74	0.00	0.00	0.00
3,999.99	89.33	201.84	2,595.35	-1,546.09	-1,013.90	1,839.26	0.00	0.00	0.00
4,099.99	89.33	201.84	2,596.51	-1,638.91	-1,051.11	1,938.78	0.00	0.00	0.00
4,199.99	89.33	201.84	2,597.68	-1,731.72	-1,088.31	2,038.30	0.00	0.00	0.00
4,299.99	89.33	201.84	2,598.84	-1,824.54	-1,125.52	2,137.83	0.00	0.00	0.00
4,399.99	89.33	201.84	2,600.01	-1,917.35	-1,162.72	2,237.35	0.00	0.00	0.00
4,499.99	89.33	201.84	2,601.17	-2,010.16	-1,199.93	2,336.87	0.00	0.00	0.00
4,599.99	89.33	201.84	2,602.33	-2,102.98	-1,237.13	2,436.39	0.00	0.00	0.00
4,699.99	89.33	201.84	2,603.50	-2,195.79	-1,274.34	2,535.92	0.00	0.00	0.00
4,799.99	89.33	201.84	2,604.66	-2,288.61	-1,311.54	2,635.44	0.00	0.00	0.00
4,899.99	89.33	201.84	2,605.83	-2,381.42	-1,348.75	2,734.96	0.00	0.00	0.00
4,999.99	89.33	201.84	2,606.99	-2,474.23	-1,385.95	2,834.48	0.00	0.00	0.00
5,099.99	89.33	201.84	2,608.16	-2,567.05	-1,423.15	2,934.01	0.00	0.00	0.00
5,199.99	89.33	201.84	2,609.32	-2,659.86	-1,460.36	3,033.53	0.00	0.00	0.00
5,299.99	89.33	201.84	2,610.48	-2,752.68	-1,497.56	3,133.05	0.00	0.00	0.00
5,399.99	89.33	201.84	2,611.65	-2,845.49	-1,534.77	3,232.57	0.00	0.00	0.00
5,499.99	89.33	201.84	2,612.81	-2,938.30	-1,571.97	3,332.10	0.00	0.00	0.00
5,599.99	89.33	201.84	2,613.98	-3,031.12	-1,609.18	3,431.62	0.00	0.00	0.00
5,699.99	89.33	201.84	2,615.14	-3,123.93	-1,646.38	3,531.14	0.00	0.00	0.00
5,799.99	89.33	201.84	2,616.31	-3,216.74	-1,683.59	3,630.66	0.00	0.00	0.00
5,899.99	89.33	201.84	2,617.47	-3,309.56	-1,720.79	3,730.19	0.00	0.00	0.00
5,945.49	89.33	201.84	2,618.00	-3,351.79	-1,737.72	3,775.47	0.00	0.00	0.00
Fed 2H Lat 2 PBHL									

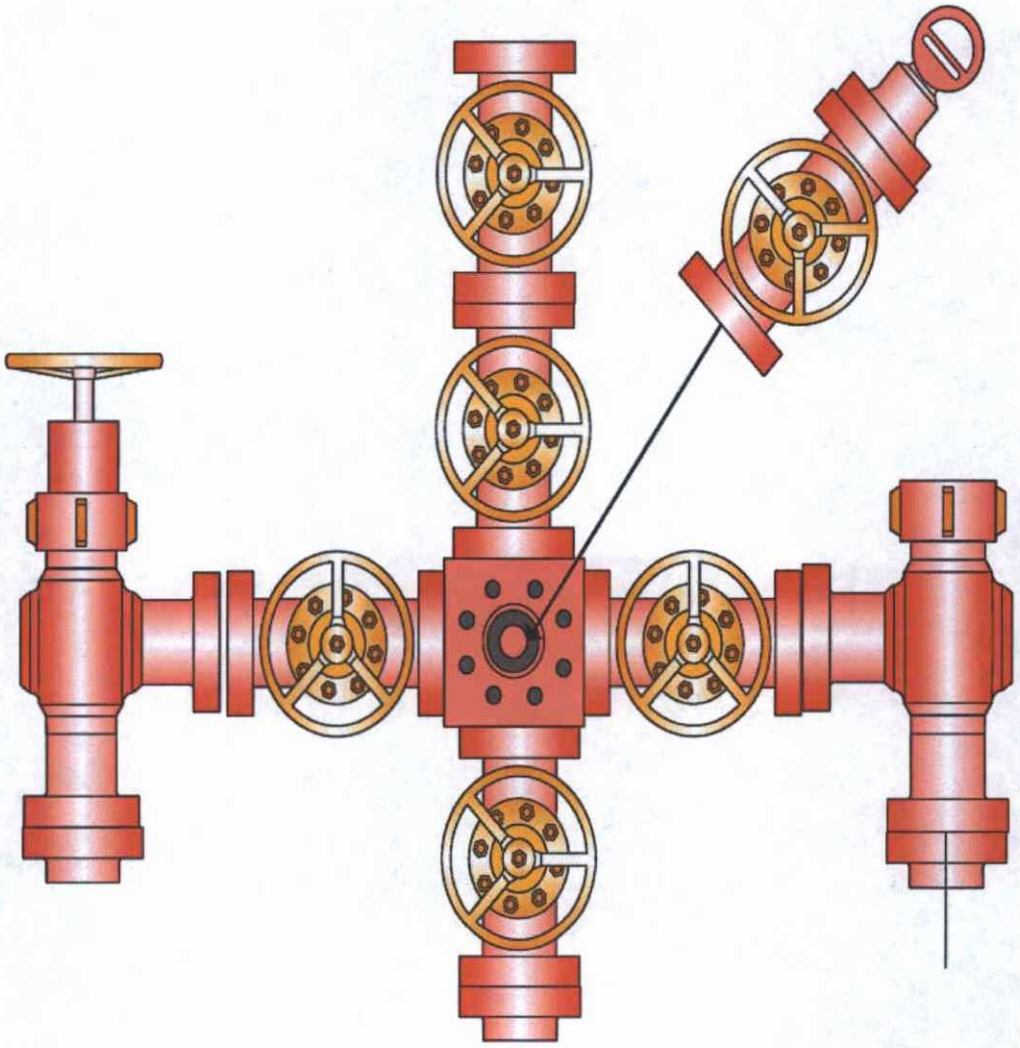
Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Fed 2H Lat 2 PBHL - plan hits target center - Point	0.00	0.00	2,618.00	-3,351.79	-1,737.72	2,179,790.95	2,831,794.76	36.9896877	-107.4611239

Database:	Grand Junction District	**Local Co-ordinate Reference:**	Well Federal 32-6-9 2H
Company:	B.P.	**TVD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Project:	San Juan County, NM NAD83	**MD Reference:**	GL 6105.11' & RKB 11' @ 6116.11usft (Aztec 507)
Site:	Federal Pad	**North Reference:**	Grid
Well:	Federal 32-6-9 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral 2		
Design:	Slant		

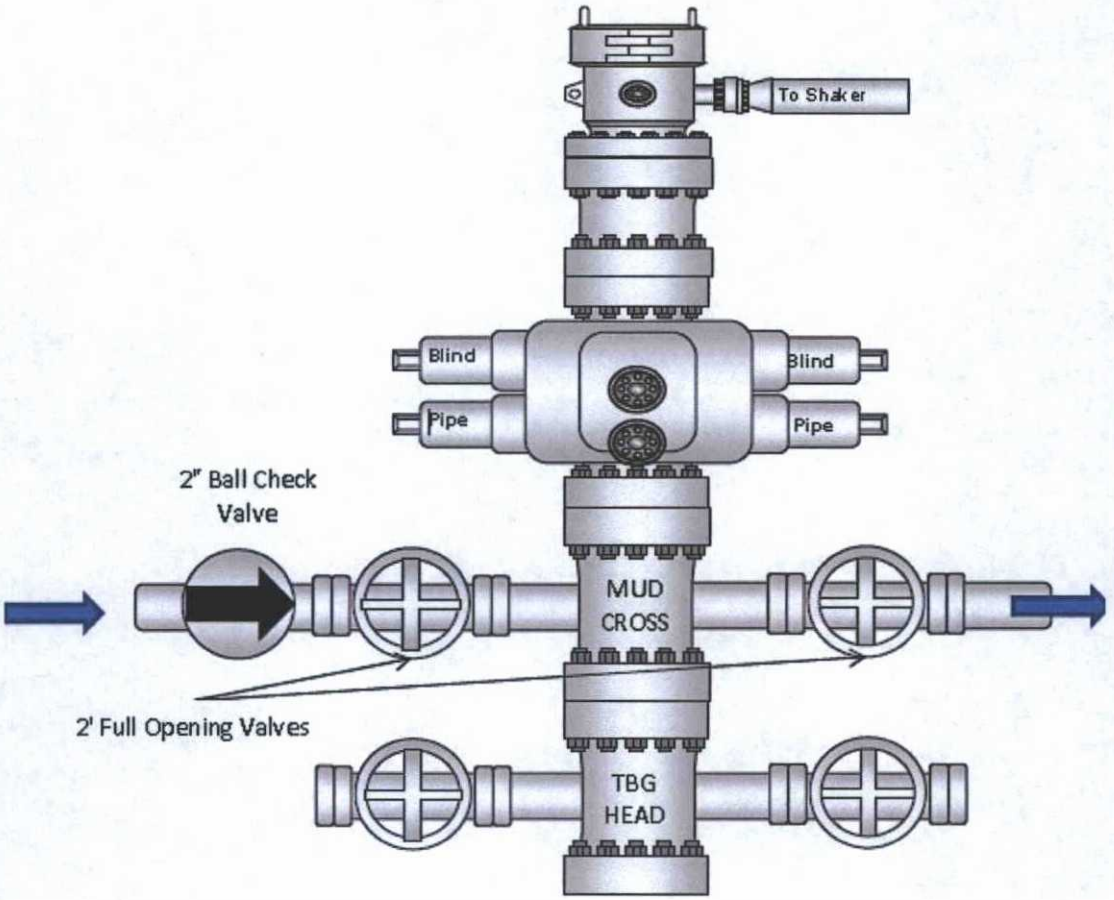
Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)
300.00	300.00	Surface Casing	8.62	12.25



(Minimum 2")

Proposed 2,000 psi Choke Manifold Stack



Proposed Class 2 BOP Stack - STACK #2 (LATERAL RE-ENTRY)

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

David R. Catanach
Division Director
Oil Conservation Division

New Mexico Oil Conservation Division Conditions of Approval (C-101 Application for permit to drill)

- 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
- o 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
- ✓ 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.