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

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

RECEIVED
FEB 05 2015
NMOCD
DISTRICT III

Form C-101
Revised July 18, 2013

☐ AMENDED REPORT

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

1. Operator Name and Address	2. OGRID Number
Energen Resources 2010 Afton Place Farmington, NM 87401	162928
	3. API Number 30-045-35041

4. Property Code	5. Property Name	6. Well No.
314190	CROW MESA 24-08 2	4H

KP

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
I	2	24N	8W		1370'	SOUTH	507'	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
M	2	24N	8W		380'	SOUTH	380'	WEST	SAN JUAN

9. Pool Information

Pool Name	Pool Code
DUFFERS POINT	19859

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
N	O	R	State ~~R~~	7318'
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
NO	6320' TVD 11343' MD	MANCOS	TO BE DETERMINED	7/30/15

Depth to Ground water UNKNOWN	Distance from nearest fresh water well ~5280'	Distance to nearest surface water ~5280'

☒ **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	12-1/4"	9-5/8"	36#	500'	270 SKS	SURFACE
INTERMEDIATE	8-3/4"	7"	26#	6925'	857 SKS	SURFACE
PRODUCTION	6-1/4"	4-1/2"	11.6#	11343'	500 SKS	~6725'

Casing/Cement Program: Additional Comments

SEE ATTACHED NMOCD CONDITIONS OF APPROVAL

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
DOUBLE RAM	3000#	2550#	TO BE DETERMINED

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.** Signature: Anna Stotts	OIL CONSERVATION DIVISION
Printed name: Anna Stotts	Approved By: Charlie Perrin 2-12-2015
Title: Regulatory Analyst	Title: SUPERVISOR DISTRICT #3
E-mail Address: astott@energen.com	Approved Date: FEB 12 2015 Expiration Date: FEB 12 2017
Date: 2/4/15 Phone: (505) 324-4154	Conditions of Approval Attached

KC

13.

RECEIVED
FEB 06 2015
NMOCD
DISTRICT III

DISTRICT I
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State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
30-045-35241	19859	Duffers Point

4 Property Code	5 Property Name	6 Well Number
314190	CROW MESA 24-08 2	4H

7 OGRID No.	8 Operator Name	9 Elevation
162928	ENERGEN RESOURCES CORPORATION	7318'

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
I	2	24N	8W		1370'	SOUTH	507'	EAST	SAN JUAN

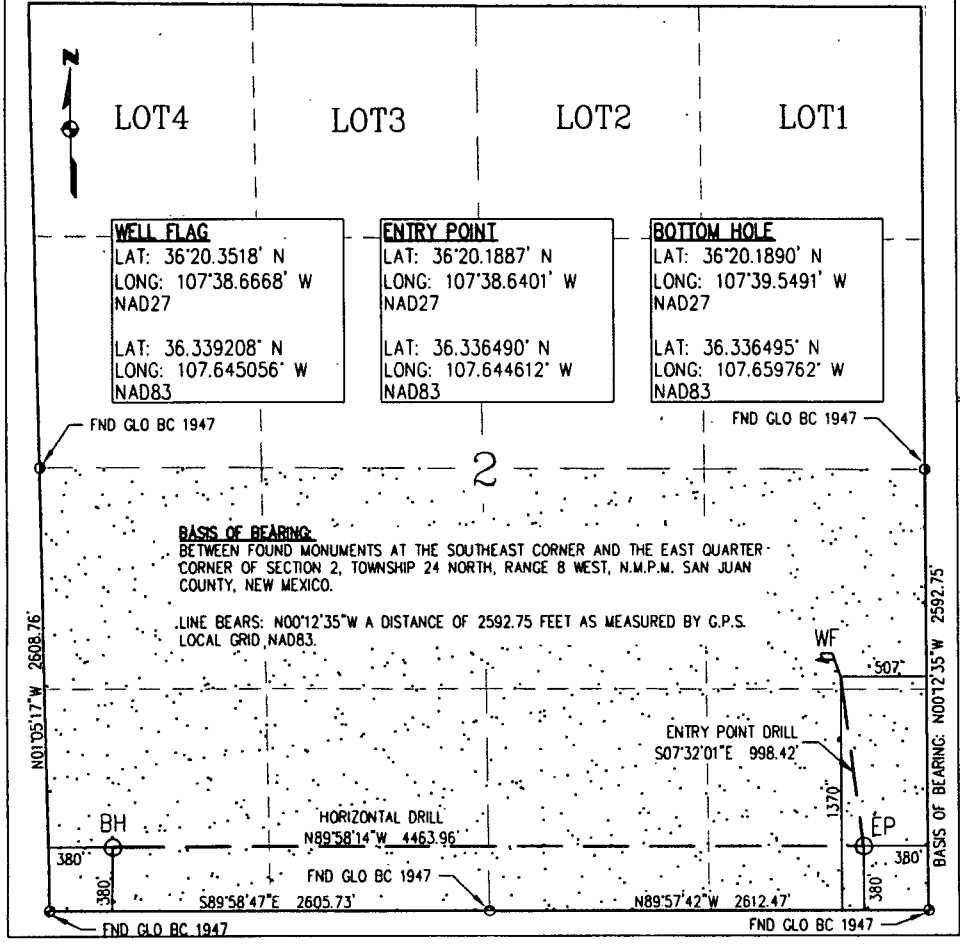
11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	2	24N	8W		380'	SOUTH	380'	WEST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
PROJECT AREA S/2 SEC 2 320 ACRES			

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

16



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.

Anna Stotts 2/6/15
Signature Date

ANNA STOTTS
Printed Name

astotts@energen.com
E-mail Address

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.

2-6-15
Date of Survey

Signature and Seal of Professional Surveyor:

GLEN W. RUSSELL NEW MEXICO 15703 LICENSED PROFESSIONAL SURVEYOR

GLEN W. RUSSELL
Certificate Number 15703

Drilling Plan
Energen Resources Corporation

Crow Mesa 24-08 2 #4H
Surface Location: 1370 FSL, 507 FEL
Legal Description: Sec 2, T24N, R8W (36.339208° N, 107.645056° W – NAD83)
Bottom Hole Location: 380 FSL, 380 FWL
Legal Description: Sec 2, T24N, R8W (36.336495° N, 107.659762° W – NAD83)
San Juan County, NM

1. The elevation of the unprepared ground is 7,318 feet above sea level.
2. The geological name of the surface formation is the Nacimiento.
3. A rotary rig will be used to drill the well to a Proposed Total Depth of 6,320' TVD/11,343' MD.
4. Estimated top of important geological markers:

Formation	Depth (TVD)(ft)	Depth (MD)(ft)
Nacimiento	Surface	Surface
Ojo Alamo	1,932	1,932
Kirtland	2,122	2,122
Fruitland	2,243	2,243
Pictured Cliffs	2,659	2,679
Huerfantio Bentonite	2,991	3,028
Chacra	3,461	3,523
Cliff House	4,232	4,335
Menefee	4,260	4,364
Point Lookout	4,980	5.122
Mancos	5,281	5,439
Mancos/Niobrara "C"	6,320	6,879

5. Estimated depth at which anticipated water, oil, gas or other mineral bearing formations are expected to be encountered:

Formation	Depth (TVD)(ft)	Water/HydroCarbon
Fruitland	2,243	Water/Gas
Pictured Cliffs	2,659	Gas
Cliffhouse	4,232	Gas
Point Lookout	4,980	Gas
Mancos	5,281	Oil/Gas

6. All proposed casing is new and the program is as follows:

Casing	Size	Depth		Grade	Weight	Connection	PSI		x1000 lbs
		MD	TVD				Burst	Collapse	Tension
Surface	9-5/8""	0-500'	0-500'	J-55	36.00	STC	3520	2020	394
Intermediate	7"	0-6,925'	0-6,320'	J-55	26.00	LTC	4980	4320	367
Production	4-1/2"	6,775'-11,343'	6,320'-6,183'	L-80	11.60	LTC	7780	6350	212

7. Cementing Program:

   a. 12-1/4" hole x 9-5/8" casing at 500' will have cement circulated to surface with 270 sks (100% excess true hole) Class H Cement with 1.0 % $CaCl_2$, ½ #/sk Poly-E-Flake15.8 ppg, 1.17 ft^3/sk. Note: CEMENT MUST BE CIRCULATED TO SURFACE. STANDARD BOW SPRING CENTRALIZERS SHALL BE PLACED ON THE FIRST 3 (BOTTOM 3) JOINTS OF CASING (1 PER JOINT) AND 1 EVERY 3RD JOINT TO SURFACE. 20 BBLS OF WATER FOLLOWED BY 20 BBLS OF MUDFLUSH AHEAD OF CEMENT AS SPACER

   b. 8-3/4" hole x 7" casing at 6,925'. Cement will be circulated to surface with 742 sks (50% excess true hole) of HLC with 1.0 % $CaCl_2$. ¼ #/sk Poly-E-Flake, 5 #/sk Kol-Seal (Gilsonite) – 12.3 ppg, 1.95 ft^3/sk followed by 115 sks (100% excess true hole) 50/50 Glass H/Poz with 0.15% Versaset, 0.30% HALAD-9, ¼ #/sk Poly-E-Flake, 5 #/sk Kol-Seal – 13.5 ppg, 1.31 ft^3/sk. ONE CENTRALIZER PER JOINT FOR THE FIRST 3 JOINTS, THEN EVERY 3RD JOINT TO SURFACE. 10 BBLS OF WATER FOLLOWED BY 30 BBLS OF MUDFLUSH AHEAD OF CEMENT AS SPACER. Test Intermediate Casing to 1500 psi. Cement Additives Subject to Change Based on Wellbore Conditions and Cement Design Criteria

   c. 6-1/4" hole x 4-1/2" liner at 11,343'. A fluid caliper will be run to determine base slurry cement to have TOC at 6,725'. Base slurry to consist of 450 sks 50/50 Class H/Poz with 0.10% Versaset, 1.5 gal/sk CHEM-FOAMER 760, 0.10% sa-1015, 0.20% HALAD-766 – 13.5 ppg, 1.27 ft^3/sk, Foamed density 10.5 ppg. 50 sks of base slurry to be used as tail cement less foaming agent. CENTRALIZERS TO BE USED AT DISCRETION IN LATERAL TO ACHIEVE 70% STAND OFF. CENTRALIZERS TO BE USED TO TIE BACK DEPTH OF 6150' TO ACHIEVE 70% STAND OFF. PACKOFF SEAL ASSEMBLY TO BE USED FOR LINER TOP ISOLATION. Cement Additives Subject to Change Based on Wellbore Conditions and Cement Design Criteria. Liner to be Pressure Tested During Completion Operations.

8. Pressure Control Equipment

   a. BOPE to be installed prior to Surface Casing drillout.
   b. Pressure control equipment will be used to meet 2,000 (2M) psi specifications.
   c. BOPE working pressure of 3,000 psi.
   d. Function test and visual inspection to be done at each casing size change prior to drill out.
   e. BOP annular to be tested to 85% of working pressure.
   f. All BOP and related equipment will be tested in accordance with the requirements outlined in Onshore Order No. 2 and Notice to Operators dated May 27, 2005.
   g. BOP remote controls to be located on rig floor and readily accessible, master control on ground at accumulator will be able to function all preventors.
   h. Kill line will be 2 in min and have two kill line valves, one being a check valve.
   i. Choke line will be 2 in min and have two choke line valves, choke manifold with have two adjustable chokes, one manual and one remote. All choke lines will be as straight as possible. Any turns will be properly targeted using block and/or running tees. Choke line and manifold to be pressure tested to 1,500 psi.
   j. Float sub and TIW valve will be on the rig floor at all times.
   k. If high pressure co-flex hoses are used, they will be run as straight as possible and anchored to prevent whip.
   l. The main discharge line (panic line) will be at least 100' from the choke manifold and discharged into an appropriately sized discharge facility.

9. Mud Program:

0' - 500'	Fresh water/Spud Mud. Paper for losses and seepage. 8.5 to 9.0 ppg, 32 to 75 vis, PV 3 to 5, YP 5 to 7, WL NC
500' – 6,925'	Fresh water/LSND. As needed LCM for losses and seepage. 8.5 to 9.5 ppg, pH 10, 28 to 60 vis, PV 1, YP 1, WL 8-15
6,925' – 11,343'	WBM with shale and clay stabilizers. As needed LCM for losses and seepage. 8.3 to 9.3 ppg, 15 to 35 vis, PV 4-6, YP 4-6, WL < 20

****During drilling operations, all necessary products will be sufficiently stored on location for abnormal situations. The characteristics, use, testing of drilling mud and the implementation of related drilling procedures shall be designed to prevent the loss of well control. Sufficient quantities of mud materials shall be maintained or readily accessible for the purpose of assuring well control.**
****A pH of 10 or above in the fresh water base mud system shall be maintained to control the effects corrosion has on metallurgy of equipment used.**

Operating and Maintenance

Energen Resources Corporation will be using all above ground steel pits for fluid and cuttings while drilling. If any tank develops a leak we will have immediate visual discovery, we would then transfer the fluid to another tank then remove any contaminated soil and dispose of it in the cuttings bins for transportation. Any leaks, spills or other undesirable events will be reported in accordance with BLM NTL 3A. Rig crews will monitor the tanks at all times. A trip/surge tank will be used to monitor returns for any "kicks" of formation fluids.

Equipment:

2-Mongoose Shale Shakers

2-3400 High Speed Centrifuges with stands and pumps

2-Roll off bins with Tracks

2-200 bbl Open top Frac tanks

1-Mud/Gas Separator and Degasser

1-Trip/Surge Tank

Electronic or Visual monitoring system to indicate lost returns

10. Testing, Logging and Coring Program:

    a. Testing Program: No drillstem tests are anticipated
    b. Electric Logging Program: TBD
    c. LWD Program: TBD
    d. Coring Program: None.
    e. CBL's and/or Temperature Surveys Will Be Performed as Needed or Required.

11. Bottom Hole Pressure expected to be 2,500 +/- psi
12. Bottom Hole Temperature expected to be 160 deg F.

Energen Resources

Crow Mesa
Crow Mesa 24-08 2 #4H
Preliminary Design
Design #1

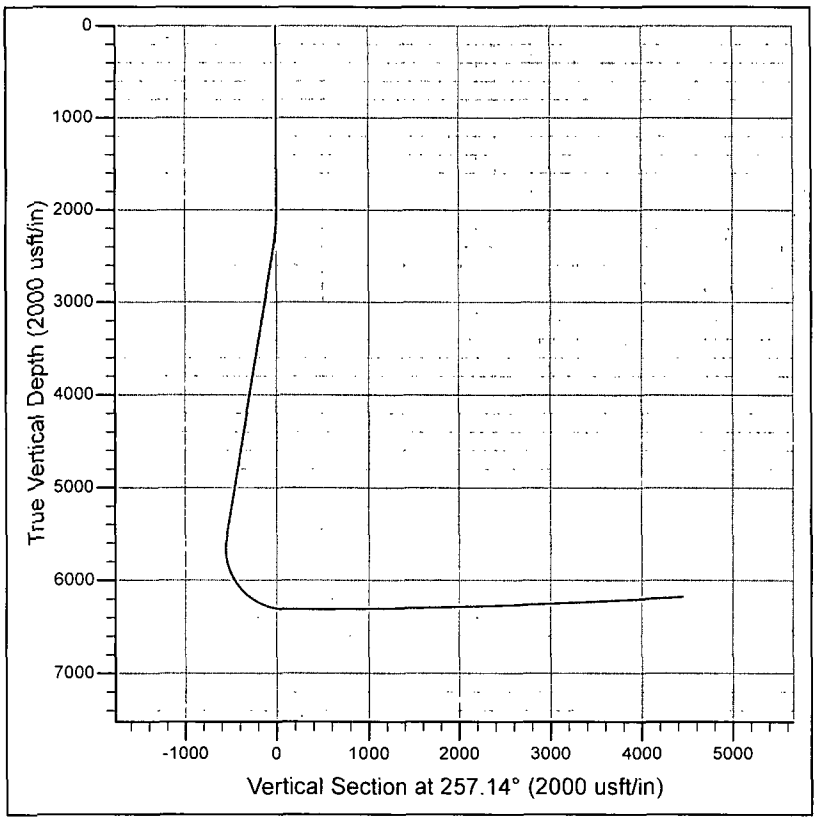
Plan: APD Plan

Preliminary Design

03 February, 2015

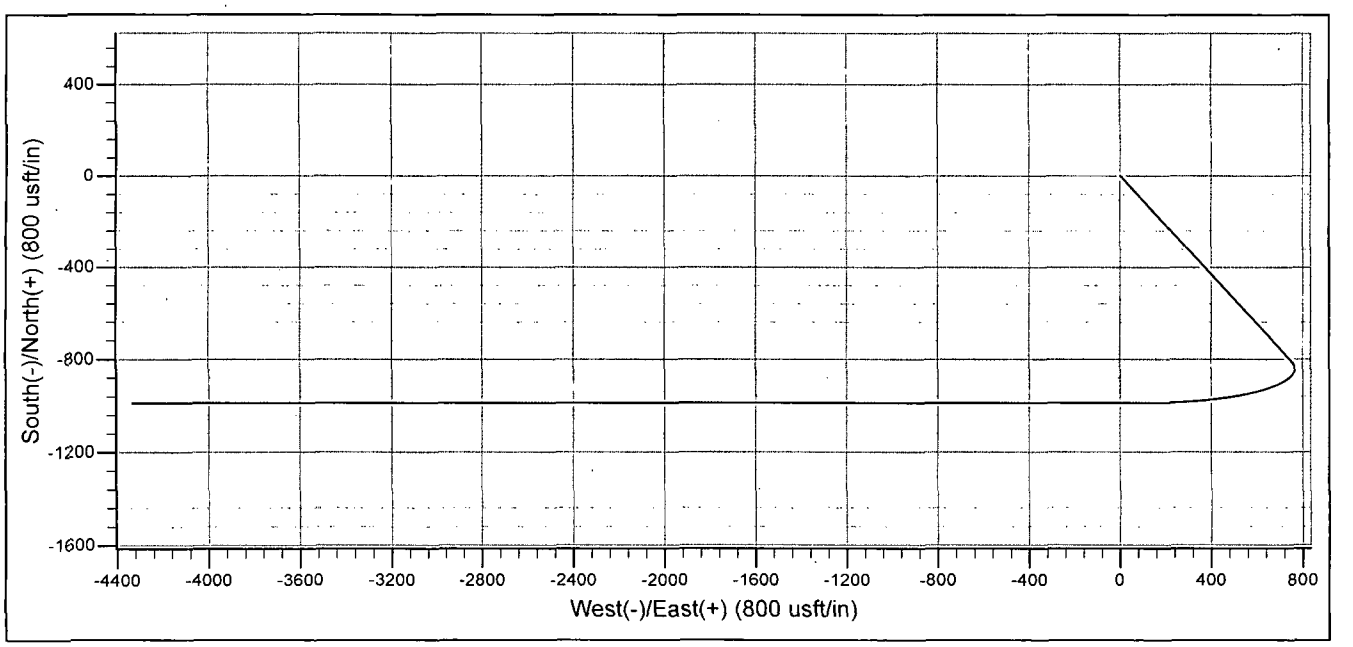
Company Name: Energen Resources

Project: Crow Mesa
Site: Crow Mesa 24-08 2 #4H
Well: Preliminary Design
Wellbore: Design #1
Design: APD Plan



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	2000.0	0.00	0.00	2000.0	0.0	0.0	0.00	0.00	0.0
3	2403.1	18.14	137.22	2396.4	-46.5	43.0	4.50	137.22	-31.6
4	5742.8	18.14	137.22	5570.1	-809.7	749.2	0.00	0.00	-550.2
5	6878.5	90.00	270.00	6320.0	-990.0	127.0	9.00	131.33	96.6
6	11343.5	93.50	270.00	6183.7	-990.0	-4335.2	0.08	0.00	4446.8



Energen

Preliminary Design

Company:	Energen Resources	**Local Co-ordinate Reference:**	Site Crow Mesa 24-08 2 #4H
Project:	Crow Mesa	**TVD Reference:**	WELL @ 0.0usft (Original Well Elev)
Site:	Crow Mesa 24-08 2 #4H	**MD Reference:**	WELL @ 0.0usft (Original Well Elev)
Well:	Preliminary Design	**North Reference:**	Grid
Wellbore:	Design #1	**Survey Calculation Method:**	Minimum Curvature
Design:	APD Plan	**Database:**	EDM 5000.1 Single User Db

Project Crow Mesa

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Central Zone		

Site Crow Mesa 24-08 2 #4H

Site Position:		**Northing:**	1,945,704.48 usft	**Latitude:**	36° 20' 21.149 N
From:	Lat/Long	**Easting:**	1,229,545.71 usft	**Longitude:**	107° 38' 42.202 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	-0.83 °

Well Preliminary Design

Well Position	**+N/-S**	0.0 usft	**Northing:**	1,945,704.48 usft	**Latitude:**	36° 20' 21.149 N
	+E/-W	0.0 usft	**Easting:**	1,229,545.71 usft	**Longitude:**	107° 38' 42.202 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	0.0 usft

Wellbore Design #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	9.96	63.19	50,745

Design APD Plan

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	257.14

Survey Tool Program **Date** 2/3/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	11,343.5	APD Plan (Design #1)	MWD	MWD - Standard

Planned Survey

TVD (usft)	MD (usft)	Inc (°)	Azi (azimuth) (°)	N/S (usft)	E/W (usft)	Build (°/100usft)	V. Sec (usft)
0.0	0.0	0.00	0.00	0.0	0.0	0.00	0.0
100.0	100.0	0.00	0.00	0.0	0.0	0.00	0.0
200.0	200.0	0.00	0.00	0.0	0.0	0.00	0.0
300.0	300.0	0.00	0.00	0.0	0.0	0.00	0.0
400.0	400.0	0.00	0.00	0.0	0.0	0.00	0.0
500.0	500.0	0.00	0.00	0.0	0.0	0.00	0.0
Surface Casing							
600.0	600.0	0.00	0.00	0.0	0.0	0.00	0.0
700.0	700.0	0.00	0.00	0.0	0.0	0.00	0.0
800.0	800.0	0.00	0.00	0.0	0.0	0.00	0.0
900.0	900.0	0.00	0.00	0.0	0.0	0.00	0.0
1,000.0	1,000.0	0.00	0.00	0.0	0.0	0.00	0.0

Energen

Preliminary Design

Company:	Energen Resources	**Local Co-ordinate Reference:**	Site Crow Mesa 24-08 2 #4H
Project:	Crow Mesa	**TVD Reference:**	WELL @ 0.0usft (Original Well Elev)
Site:	Crow Mesa 24-08 2 #4H	**MD Reference:**	WELL @ 0.0usft (Original Well Elev)
Well:	Preliminary Design	**North Reference:**	Grid
Wellbore:	Design #1	**Survey Calculation Method:**	Minimum Curvature
Design:	APD Plan	**Database:**	EDM 5000.1 Single User Db

Planned Survey

TVD (usft)	MD (usft)	Inc (°)	Azi (azimuth) (°)	N/S (usft)	E/W (usft)	Build (°/100usft)	V. Sec (usft)
1,100.0	1,100.0	0.00	0.00	0.0	0.0	0.00	0.0
1,200.0	1,200.0	0.00	0.00	0.0	0.0	0.00	0.0
1,300.0	1,300.0	0.00	0.00	0.0	0.0	0.00	0.0
1,400.0	1,400.0	0.00	0.00	0.0	0.0	0.00	0.0
1,500.0	1,500.0	0.00	0.00	0.0	0.0	0.00	0.0
1,600.0	1,600.0	0.00	0.00	0.0	0.0	0.00	0.0
1,700.0	1,700.0	0.00	0.00	0.0	0.0	0.00	0.0
1,800.0	1,800.0	0.00	0.00	0.0	0.0	0.00	0.0
1,900.0	1,900.0	0.00	0.00	0.0	0.0	0.00	0.0
2,000.0	2,000.0	0.00	0.00	0.0	0.0	0.00	0.0
2,099.9	2,100.0	4.50	137.22	-2.9	2.7	4.50	-2.0
2,199.2	2,200.0	9.00	137.22	-11.5	10.6	4.50	-7.8
2,297.2	2,300.0	13.50	137.22	-25.8	23.9	4.50	-17.5
2,396.4	2,403.1	18.14	137.22	-46.5	43.0	4.50	-31.6
2,488.5	2,500.0	18.14	137.22	-68.6	63.5	0.00	-46.6
2,583.5	2,600.0	18.14	137.22	-91.4	84.6	0.00	-62.1
2,678.5	2,700.0	18.14	137.22	-114.3	105.8	0.00	-77.7
2,773.6	2,800.0	18.14	137.22	-137.1	126.9	0.00	-93.2
2,868.6	2,900.0	18.14	137.22	-160.0	148.1	0.00	-108.7
2,963.6	3,000.0	18.14	137.22	-182.9	169.2	0.00	-124.2
3,058.7	3,100.0	18.14	137.22	-205.7	190.3	0.00	-139.8
3,153.7	3,200.0	18.14	137.22	-228.6	211.5	0.00	-155.3
3,248.7	3,300.0	18.14	137.22	-251.4	232.6	0.00	-170.8
3,343.7	3,400.0	18.14	137.22	-274.3	253.8	0.00	-186.4
3,438.8	3,500.0	18.14	137.22	-297.1	274.9	0.00	-201.9
3,533.8	3,600.0	18.14	137.22	-320.0	296.1	0.00	-217.4
3,628.8	3,700.0	18.14	137.22	-342.8	317.2	0.00	-232.9
3,723.9	3,800.0	18.14	137.22	-365.7	338.4	0.00	-248.5
3,818.9	3,900.0	18.14	137.22	-388.5	359.5	0.00	-264.0
3,913.9	4,000.0	18.14	137.22	-411.4	380.7	0.00	-279.5
4,009.0	4,100.0	18.14	137.22	-434.2	401.8	0.00	-295.1
4,104.0	4,200.0	18.14	137.22	-457.1	423.0	0.00	-310.6
4,199.0	4,300.0	18.14	137.22	-479.9	444.1	0.00	-326.1
4,294.0	4,400.0	18.14	137.22	-502.8	465.3	0.00	-341.6
4,389.1	4,500.0	18.14	137.22	-525.6	486.4	0.00	-357.2
4,484.1	4,600.0	18.14	137.22	-548.5	507.5	0.00	-372.7
4,579.1	4,700.0	18.14	137.22	-571.4	528.7	0.00	-388.2
4,674.2	4,800.0	18.14	137.22	-594.2	549.8	0.00	-403.8
4,769.2	4,900.0	18.14	137.22	-617.1	571.0	0.00	-419.3
4,864.2	5,000.0	18.14	137.22	-639.9	592.1	0.00	-434.8
4,959.2	5,100.0	18.14	137.22	-662.8	613.3	0.00	-450.3
5,054.3	5,200.0	18.14	137.22	-685.6	634.4	0.00	-465.9
5,149.3	5,300.0	18.14	137.22	-708.5	655.6	0.00	-481.4
5,244.3	5,400.0	18.14	137.22	-731.3	676.7	0.00	-496.9

Energen

Preliminary Design

Company:	Energen Resources	**Local Co-ordinate Reference:**	Site Crow Mesa 24-08 2 #4H
Project:	Crow Mesa	**TVD Reference:**	WELL @ 0.0usft (Original Well Elev)
Site:	Crow Mesa 24-08 2 #4H	**MD Reference:**	WELL @ 0.0usft (Original Well Elev)
Well:	Preliminary Design	**North Reference:**	Grid
Wellbore:	Design #1	**Survey Calculation Method:**	Minimum Curvature
Design:	APD Plan	**Database:**	EDM 5000.1 Single User Db

Planned Survey

TVD (usft)	MD (usft)	Inc (°)	Azi (azimuth) (°)	N/S (usft)	E/W (usft)	Build (°/100usft)	V. Sec (usft)
5,339.4	5,500.0	18.14	137.22	-754.2	697.9	0.00	-512.5
5,434.4	5,600.0	18.14	137.22	-777.0	719.0	0.00	-528.0
5,529.4	5,700.0	18.14	137.22	-799.9	740.2	0.00	-543.5
5,570.1	5,742.8	18.14	137.22	-809.7	749.2	0.00	-550.2
5,576.9	5,750.0	17.72	138.81	-811.3	750.7	-5.85	-551.2
5,624.9	5,800.0	15.23	152.08	-822.8	758.8	-4.99	-556.6
5,673.3	5,850.0	13.76	169.16	-834.5	763.0	-2.93	-558.1
5,721.9	5,900.0	13.66	188.23	-846.2	763.3	-0.20	-555.7
5,770.4	5,950.0	14.95	205.75	-857.8	759.6	2.58	-549.6
5,818.5	6,000.0	17.33	219.57	-869.4	752.1	4.75	-539.6
5,865.8	6,050.0	20.41	229.74	-880.8	740.7	6.17	-526.0
5,912.1	6,100.0	23.93	237.19	-891.9	725.5	7.04	-508.7
5,957.1	6,150.0	27.73	242.77	-902.7	706.6	7.58	-487.9
6,000.5	6,200.0	31.69	247.07	-913.2	684.1	7.93	-463.7
6,042.1	6,250.0	35.77	250.50	-923.2	658.3	8.16	-436.2
6,081.6	6,300.0	39.93	253.30	-932.7	629.1	8.32	-405.7
6,118.7	6,350.0	44.15	255.65	-941.6	596.8	8.43	-372.2
6,153.2	6,400.0	48.40	257.67	-949.9	561.7	8.51	-336.1
6,185.0	6,450.0	52.69	259.44	-957.5	523.9	8.58	-297.5
6,213.8	6,500.0	57.00	261.02	-964.5	483.6	8.62	-256.7
6,239.4	6,550.0	61.33	262.44	-970.6	441.1	8.66	-213.9
6,261.7	6,600.0	65.68	263.76	-976.0	396.7	8.69	-169.5
6,280.6	6,650.0	70.03	264.99	-980.5	350.6	8.71	-123.5
6,295.8	6,700.0	74.39	266.15	-984.2	303.2	8.72	-76.4
6,307.4	6,750.0	78.76	267.26	-987.0	254.6	8.74	-28.5
6,315.3	6,800.0	83.13	268.34	-988.9	205.3	8.74	20.0
6,319.4	6,850.0	87.51	269.40	-989.9	155.5	8.75	68.8
6,320.0	6,878.5	90.00	270.00	-990.0	127.0	8.75	96.6
6,320.0	6,900.0	90.02	270.00	-990.0	105.5	0.08	117.6
6,320.0	6,925.0	90.04	270.00	-990.0	80.5	0.08	141.9
Intermediate Casing							
6,319.9	7,000.0	90.10	270.00	-990.0	5.5	0.08	215.1
6,319.7	7,100.0	90.17	270.00	-990.0	-94.5	0.08	312.5
6,319.3	7,200.0	90.25	270.00	-990.0	-194.5	0.08	410.0
6,318.8	7,300.0	90.33	270.00	-990.0	-294.5	0.08	507.5
6,318.1	7,400.0	90.41	270.00	-990.0	-394.5	0.08	605.0
6,317.4	7,500.0	90.49	270.00	-990.0	-494.5	0.08	702.5
6,316.4	7,600.0	90.57	270.00	-990.0	-594.5	0.08	800.0
6,315.4	7,700.0	90.64	270.00	-990.0	-694.5	0.08	897.5
6,314.2	7,800.0	90.72	270.00	-990.0	-794.5	0.08	994.9
6,312.9	7,900.0	90.80	270.00	-990.0	-894.5	0.08	1,092.4
6,311.4	8,000.0	90.88	270.00	-990.0	-994.5	0.08	1,189.9
6,309.8	8,100.0	90.96	270.00	-990.0	-1,094.5	0.08	1,287.4
6,308.1	8,200.0	91.04	270.00	-990.0	-1,194.4	0.08	1,384.9
6,306.2	8,300.0	91.11	270.00	-990.0	-1,294.4	0.08	1,482.3

Energen

Preliminary Design

Company:	Energen Resources	**Local Co-ordinate Reference:**	Site Crow Mesa 24-08 2 #4H
Project:	Crow Mesa	**TVD Reference:**	WELL @ 0.0usft (Original Well Elev)
Site:	Crow Mesa 24-08 2 #4H	**MD Reference:**	WELL @ 0.0usft (Original Well Elev)
Well:	Preliminary Design	**North Reference:**	Grid
Wellbore:	Design #1	**Survey Calculation Method:**	Minimum Curvature
Design:	APD Plan	**Database:**	EDM 5000.1 Single User Db

Planned Survey

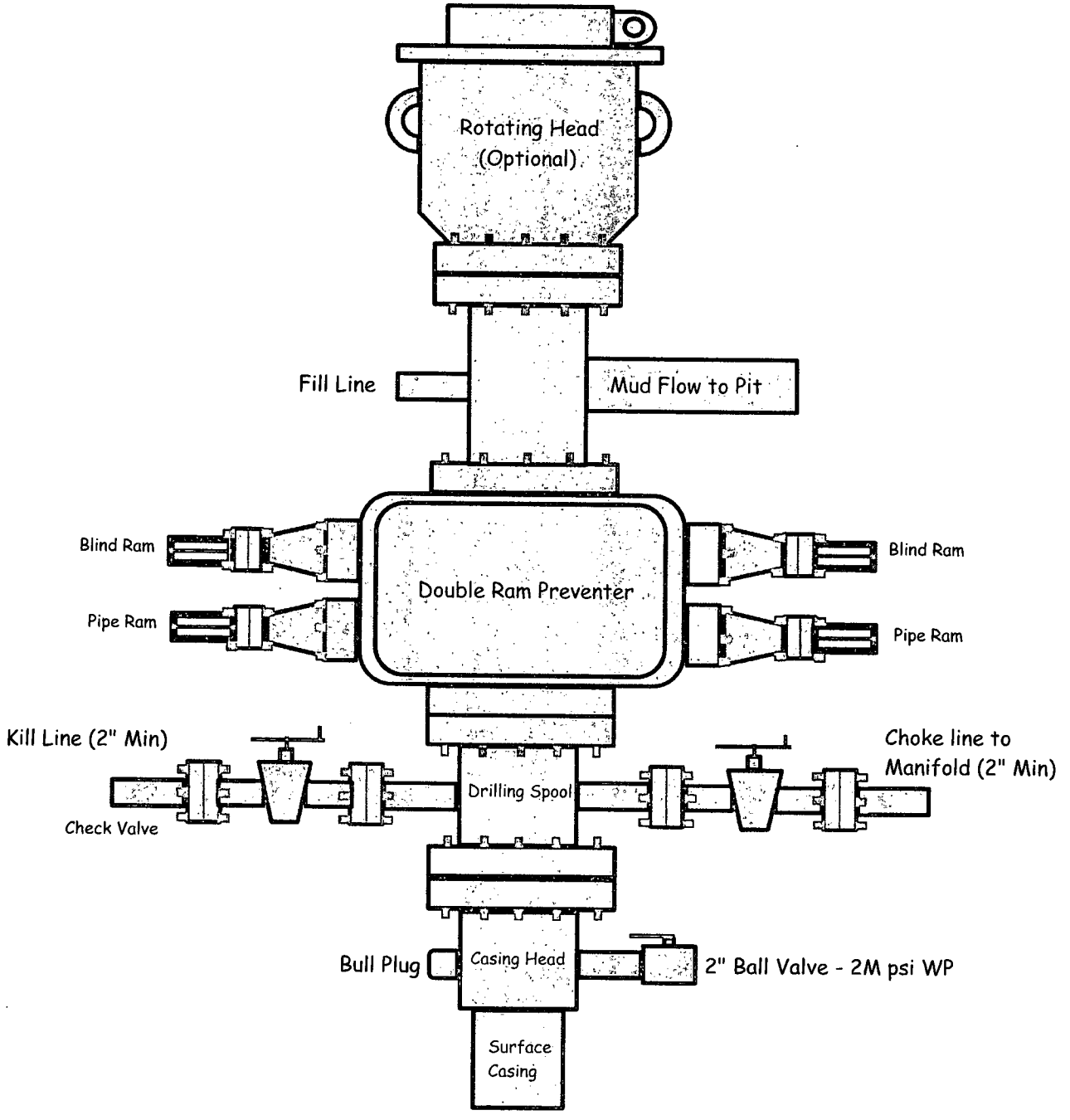
TVD (usft)	MD (usft)	Inc (°)	Azi (azimuth) (°)	N/S (usft)	E/W (usft)	Build (°/100usft)	V. Sec (usft)
6,304.2	8,400.0	91.19	270.00	-990.0	-1,394.4	0.08	1,579.8
6,302.0	8,500.0	91.27	270.00	-990.0	-1,494.4	0.08	1,677.3
6,299.7	8,600.0	91.35	270.00	-990.0	-1,594.3	0.08	1,774.7
6,297.3	8,700.0	91.43	270.00	-990.0	-1,694.3	0.08	1,872.2
6,294.7	8,800.0	91.51	270.00	-990.0	-1,794.3	0.08	1,969.7
6,292.0	8,900.0	91.58	270.00	-990.0	-1,894.3	0.08	2,067.1
6,289.2	9,000.0	91.66	270.00	-990.0	-1,994.2	0.08	2,164.6
6,286.2	9,100.0	91.74	270.00	-990.0	-2,094.2	0.08	2,262.0
6,283.1	9,200.0	91.82	270.00	-990.0	-2,194.1	0.08	2,359.5
6,279.9	9,300.0	91.90	270.00	-990.0	-2,294.1	0.08	2,456.9
6,276.5	9,400.0	91.98	270.00	-990.0	-2,394.0	0.08	2,554.3
6,273.0	9,500.0	92.05	270.00	-990.0	-2,493.9	0.08	2,651.8
6,269.3	9,600.0	92.13	270.00	-990.0	-2,593.9	0.08	2,749.2
6,265.5	9,700.0	92.21	270.00	-990.0	-2,693.8	0.08	2,846.6
6,261.6	9,800.0	92.29	270.00	-990.0	-2,793.7	0.08	2,944.0
6,257.6	9,900.0	92.37	270.00	-990.0	-2,893.6	0.08	3,041.4
6,253.4	10,000.0	92.45	270.00	-990.0	-2,993.6	0.08	3,138.8
6,249.0	10,100.0	92.53	270.00	-990.0	-3,093.5	0.08	3,236.2
6,244.5	10,200.0	92.60	270.00	-990.0	-3,193.4	0.08	3,333.6
6,239.9	10,300.0	92.68	270.00	-990.0	-3,293.3	0.08	3,431.0
6,235.2	10,400.0	92.76	270.00	-990.0	-3,393.1	0.08	3,528.4
6,230.3	10,500.0	92.84	270.00	-990.0	-3,493.0	0.08	3,625.8
6,225.3	10,600.0	92.92	270.00	-990.0	-3,592.9	0.08	3,723.1
6,220.1	10,700.0	93.00	270.00	-990.0	-3,692.8	0.08	3,820.5
6,214.8	10,800.0	93.07	270.00	-990.0	-3,792.6	0.08	3,917.8
6,209.4	10,900.0	93.15	270.00	-990.0	-3,892.5	0.08	4,015.2
6,203.8	11,000.0	93.23	270.00	-990.0	-3,992.3	0.08	4,112.5
6,198.1	11,100.0	93.31	270.00	-990.0	-4,092.2	0.08	4,209.9
6,192.3	11,200.0	93.39	270.00	-990.0	-4,192.0	0.08	4,307.2
6,186.3	11,300.0	93.47	270.00	-990.0	-4,291.8	0.08	4,404.5
6,183.7	11,343.0	93.50	270.00	-990.0	-4,334.7	0.08	4,446.3
Production Liner							
6,183.7	11,343.5	93.50	270.00	-990.0	-4,335.2	0.08	4,446.8

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
500.0	500.0	Surface Casing	9-5/8	12-1/4
6,925.0	6,320.0	Intermediate Casing	7	8-3/4
11,343.0	6,183.7	Production Liner	4-1/2	6-1/4

Checked By: _____ Approved By: _____ Date: _____

Typical BOP Schematic - 3M psi System



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.