

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB No. 1004-0135  
Expires: January 31, 2004

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.*

**SUBMIT IN TRIPLICATE - Other Instructions on reverse side**

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other

2. Name of Operator

Black Hills Gas Resources, Inc. Contact: Lynn H. Benally

3a. Address

3200 N 1st Street PO Box 249 Bloomfield, NM 87413

3b. Phone No. (include area code)

505-634-1111 ext 27

4. Location of Well (Footage, Sec., T. R., M., or Survey Description)

Surface: 1,645' FSL 1,210' FWL NW/SW Sec. 9 T29N R3W Unit L

Bottom Hole: 1,645' FSL 660' FEL NE/SE Sec 9 T29N R3W Unit I

5. Lease Serial No.

Contract 451

6. If Indian, Allottee or Tribe Name

Jicarilla Apache

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

8. Well Name and No.

Jicarilla 451-09 #31

9. API Well No.

30-039-29444

10. Field and Pool, or Exploratory Area

E. Blanco / Pictured Cliffs

11. County or Parish, State

Rio Arriba, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

TYPE OF ACTION

☒ Notice of Intent

☐ Subsequent Report

☐ Final Abandonment Notice

☐ Acidize

☐ Alter Casing

☐ Casing Repair

☐ Change Plans

☐ Convert to Injection

☐ Deepen

☐ Fracture Treat

☐ New Construction

☐ Plug and Abandon

☐ Plug Back

☐ Production (Start/Resume)

☐ Reclamation

☐ Recomplete

☐ Temporarily Abandon

☐ Water Disposal

☐ Water Shut-Off

☐ Well Integrity

☒ Other Convert Vertical well to Horizontal well

3. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

The initial APD to drill a Pictured Cliff (PC) well was approved on July 12, 2005. The well was given API number 30-039-29444. After evaluation of data from recently drilled wells in the immediate area, it was determined that the PC formation is best developed in this area, using Horizontal Drilling Technology. Black Hills Gas Resources is submitting an updated drilling plan, a new C-102, and a revised NM State Form C-101, to change the well from a vertical well to a horizontal well. Black Hills Gas Resources also request that if tests of the tertiary and PC formations are favorable that we will also complete these formations and submit comingle applications if needed.

The surface location of the well remains the same but the new bottom hole will be 1,645' FSL 660' FEL.

Surface disturbance will not change from the initial APD, therefore the Surface Use Plan will not be updated or modified.

HOLD C104 FOR

*Directional Survey*  
C102 for Cabrete Canyon Testing is added

CONDITIONS OF APPROVAL  
Add to previously issued stipulations.

14. I hereby certify that the foregoing is true and correct  
Name (Printed/Typed)

Lynn H. Benally

Title Regulatory Compliance Coordinator

Signature

Date

Name

(Printed/Typed)

Title

Date

Approved by (Signature)

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

Office

NMOCDB

DISTRICT I  
1625 N. French Dr., Hobbs, N.M. 88240

DISTRICT II  
1301 W. Grand Ave., Artesia, N.M. 88210

DISTRICT III  
1000 Rio Brazos Rd., Aztec, N.M. 87410

DISTRICT IV  
1220 South St. Francis Dr., Santa Fe, NM 87505

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 October 12, 2005  
Submit to Appropriate District Office  
State Lease - 4 Copies  
Fee Lease - 3 Copies

☐ AMENDED REPORT

**WELL LOCATION AND ACREAGE DEDICATION PLAT**

<sup>1</sup> API Number 30-039-29444	<sup>2</sup> Pool Code 72400	<sup>3</sup> Pool Name EAST BLANCO / PICTURED CLIFFS
<sup>4</sup> Property Code 34110	<sup>5</sup> Property Name JICARILLA 451-09	<sup>6</sup> Well Number 31
<sup>7</sup> OGRID No. 013925	<sup>8</sup> Operator Name BLACK HILLS GAS RESOURCES	<sup>9</sup> Elevation 7063'

<sup>10</sup> Surface Location

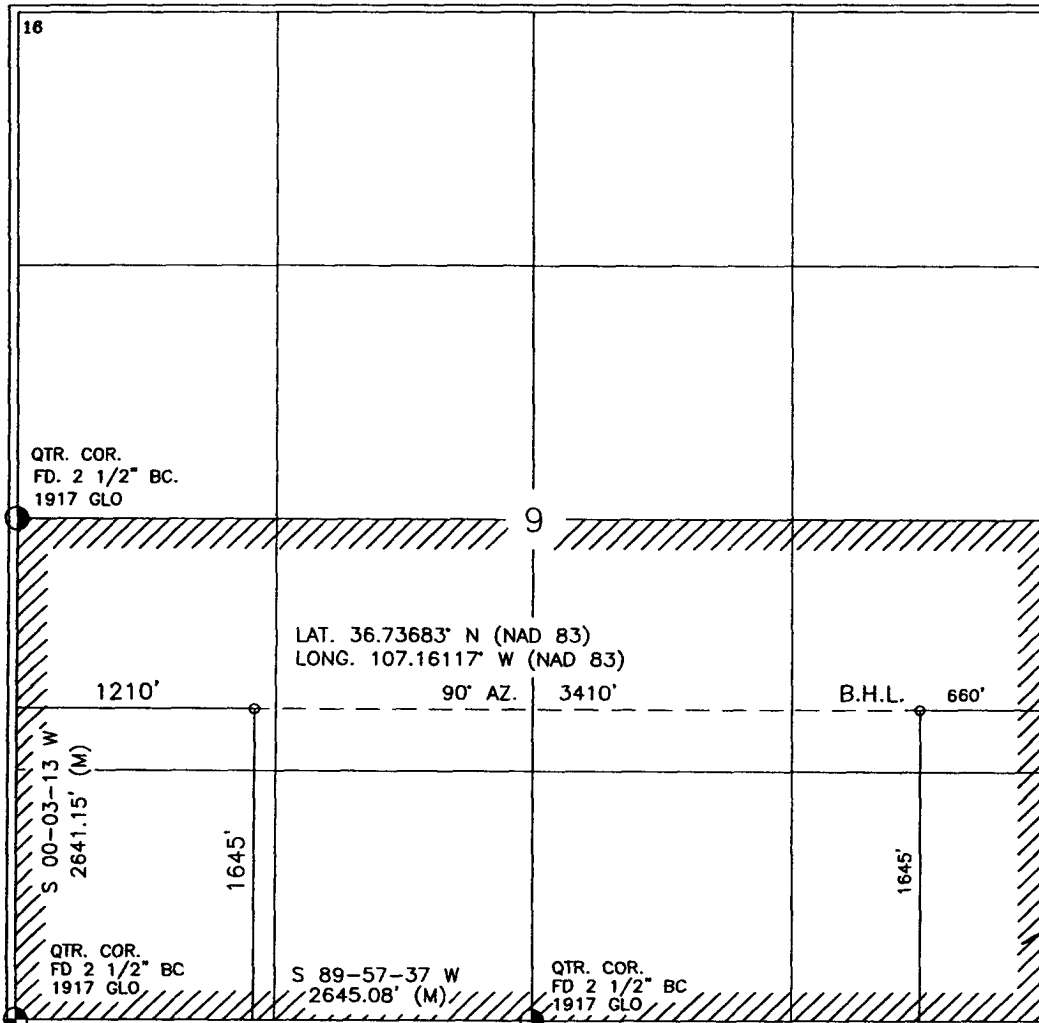
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	9	29-N	3-W		1645	SOUTH	1210	WEST	RIO ARRIBA

<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
I	9	29-N	3-W		1645	SOUTH	660	EAST	RIO ARRIBA

<sup>12</sup> Dedicated Acres 320 - S/2	<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



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.

*Daniel Manus* 8/24/06  
Signature Date  
Daniel Manus  
Printed Name

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.

SEP 18 2004  
Date of Survey  
Signature and Seal of Registered Professional Surveyor  
14831  
Certificate Number

Black Hills Gas Resources (BHGR)  
**Jicarilla 451-09 #31**  
Surface Location: 1645' FSL 1210' FWL (NW/SW)  
Bottom Hole Location: 1645' FSL 660' FEL (NE/SE)  
Sec.9 T29N R3W  
Rio Arriba County, New Mexico  
Lease: Contract 451

**DRILLING PROGRAM**  
(Per Rule 320)

This Application for Permit to Drill (APD) was initiated under the NOS process as stated in Onshore Order No. 1 and supporting Bureau of Land Management (BLM) documents. This APD process includes an onsite meeting which was held on July 12, 2005 as determined by Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA) and Jicarilla Oil & Gas Administration (JOGA), and at which time the specific concerns of Black Hills Gas Resources (BHGR) were discussed.

This well was originally permitted and approved as a vertical PC well. This new drilling plan addresses changing the un-drilled well to a horizontal PC well.

SURFACE FORMATION – San Jose

GROUND ELEVATION – 7,063'

ESTIMATED FORMATION TOPS - (Water, oil, gas and/or other mineral-bearing formations)

San Jose	Surface	Sandstone, shales & siltstones
Nacimiento	1,977'	Sandstone, shales & siltstones
Ojo Alamo	3,185'	Sandstone, shales & siltstones
Fruitland	3,611'	Sandstone, shales & siltstones
Pictured Cliffs	3,700'	Sandstone, shales & siltstones
Lewis	3,808'	Sandstone, shales & siltstones

<b>TOTAL DEPTH</b>	<del>4,000'</del>	<del>TVD</del>	<i>TD must be M.D.</i> <b>Vertical Length of Bore</b>
	4,085'		

Estimated depths of anticipated fresh water, oil, or gas:

**Tertiary**

San Jose	surface	Gas
Ojo Alamo	1,977'	Gas
Ojo Alamo	3,185'	Gas
Fruitland	3,611'	Gas
Pictured Cliffs	3,700'	Gas

**HORIZONTAL DRILLING PROGRAM**

Kick Off Point is estimated to be  $\pm 3691'$  TVD

**CASING PROGRAM**

Depth	Hole Diameter	Casing Diameter	Casing Weight and Grade	Cement
0-250' TVD	12-1/4"	8 5/8"	J-55 24# ST&C New	To surface ( $\pm 175$ sxs Standard cement containing 2% $\text{CaCl}_2$ and 0.25lb/sx LCM) **
0-4000' TVD	7-7/8"	5 1/2 "	J-55 15.5# LT&C New	TD to surface (Lead: $\pm 300$ sxs lite standard cement. Tail: 400 sxs 50:50 poz containing 0.25 lb/sx LCM) * **
3691' TVD (KOP) End of Lateral Bore	4-3/4"	2-7/8"	PH-6 Liner	None

\* Actual cement volume to be determined by caliper log.

\*\* Cement will be circulated to surface

**Yields:**

Surface: Standard cement yield =  $1.2 \text{ ft}^3/\text{sx}$  (mixed at 15.6 lb/gal)

Production: Lite Standard Cement yield: =  $1.59 \text{ ft}^3/\text{sx}$  (mixed at 13.4 lb/gal)

50:50 poz yield =  $1.27 \text{ ft}^3/\text{sx}$  (mixed at 14.15 lb/gal)

All fresh water and prospectively valuable minerals encountered during drilling will be recorded by depth and protected.

**PRESSURE CONTROL**

BOPs and choke manifold will be installed and pressure tested before drilling out under surface casing (subsequent pressure test will be performed whenever pressure seals are broken), and then will be checked daily as to mechanical operating conditions. BOP's will be pressure tested at least once every 30 days. Ram type preventors and related pressure control equipment will be pressure tested to 1,000 psi. Annular type preventor will be pressure tested to 50% of the rated working pressure, not to exceed 1,000 psi. All casing strings will be pressure tested to 0.22 psi/ft. or 1,000 psi, whichever is greater, not to exceed 70% of internal yield.

BOP to be either double gate rams or an annular preventor as per Onshore Order No. 2.

**Statement on Accumulator System and Location of Hydraulic Controls**

The drilling rig has not yet been selected for this well. Selection will take place after approval of this application. Manual and/or hydraulic controls will be in compliance with Onshore Order No. 2 for 2M systems.

A remote accumulator will be used. Pressures, capacities, location of remote hydraulic and manual controls will be identified at the time of the BLM supervised BOP test.

MUD PROGRAM

0'	-	300'	Fresh water – M.W. 8.5 ppg, Vis 30-33
300'	-	TD'	Clean Faze - Low solids non-dispersed
			M.W. 8.5 – 9.2 ppg
			Vis – 28 – 50 sec
			W.L. 15cc or less

Sufficient mud materials to maintain mud properties, control lost circulation and to contain “kick” will be available at well site.

AUXILIARY EQUIPMENT

- A) A Kelly cock will be kept in the drill string at all times
- B) Inside BOP or stab-in valve (available on rig floor)
- C) Mud monitoring will be visually observed

LOGGING, CORING, TESTING PROGRAM

- A) Logging: DIL- CNL-FDC-GR - TD - BSC (GR to surface)  
Sonic (BSC to TD)
- B) Coring: None
- C) Testing: Possible DST – None anticipated. Drill stem tests may be run on shows of interest

ABNORMAL CONDITIONS

- A) Pressures: No abnormal conditions are anticipated  
Bottom hole pressure gradient – 0.31 psi/ft
- B) Temperatures: No abnormal conditions are anticipated
- C) H<sub>2</sub>S: See attached H<sub>2</sub>S plan in event H<sub>2</sub>S is encountered.
- D) Estimated bottomhole pressure: 1,240 psi

ANTICIPATED START DATE

October 1, 2006

COMPLETION

The location pad will be of sufficient size to accommodate all completion activities and equipment. A string of 2-7/8” PH-6 tubing will be run for a flowing string. A Sundry Notice will be submitted with a revised completion program if warranted.



1724-B Townhurst Dr, Houston, Tx 77043  
(713) 827-8302  
www.nevisenergy.com

Job Number: 61xxx  
Company: Black Hills E&P  
Lease/Well: Jicarilla 451-09 #31  
Location: Rio Arriba Co., NM  
Rig Name: ☐  
RKB: ☐  
G.L. or M.S.L.: ☐

State/Country: NM/USA  
Declination: ☐  
Grid: ☐  
File name: C:\BHEP\451-09~1\45109#31.SVY  
Date/Time: 26-Jul-06 / 19:00  
Curve Name: 451-09- #31 Plan 7-26-06

WINSERVE PROPOSAL REPORT  
Minimum Curvature Method  
Vertical Section Plane 90.00  
Vertical Section Referenced to Wellhead  
Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
<b>KOP- 5' Below Top PCCF - 3691 TVD Begin Build @ 60.94°/ 100'</b>									
3691.00	.00	90.00	3691.00	.00	.00	.00	.00	.00	.00
3701.00	6.10	90.00	3700.98	.53	.00	.53	.53	90.00	60.95
3711.00	12.19	90.00	3710.85	2.12	.00	2.12	2.12	90.00	60.95
3721.00	18.29	90.00	3720.49	4.75	.00	4.75	4.75	90.00	60.95
3731.00	24.38	90.00	3729.80	8.38	.00	8.38	8.38	90.00	60.95
3741.00	30.48	90.00	3738.68	12.99	.00	12.99	12.99	90.00	60.95
3751.00	36.57	90.00	3747.01	18.51	.00	18.51	18.51	90.00	60.95
3761.00	42.67	90.00	3754.71	24.88	.00	24.88	24.88	90.00	60.95
3771.00	48.76	90.00	3761.69	32.04	.00	32.04	32.04	90.00	60.95
3781.00	54.86	90.00	3767.87	39.89	.00	39.89	39.89	90.00	60.95
3791.00	60.95	90.00	3773.18	48.36	.00	48.36	48.36	90.00	60.95
3801.00	67.05	90.00	3777.56	57.34	.00	57.34	57.34	90.00	60.95
3811.00	73.14	90.00	3780.96	66.74	.00	66.74	66.74	90.00	60.95
3821.00	79.24	90.00	3783.35	76.45	.00	76.45	76.45	90.00	60.95
3831.00	85.33	90.00	3784.69	86.35	.00	86.35	86.35	90.00	60.95
3838.63	89.99	90.00	3785.00	93.98	.00	93.98	93.98	90.00	60.95
<b>4' Above Lewis - Begin Build @ 10.00°/ 100'</b>									
3838.66	90.00	90.00	3785.00	94.00	.00	94.00	94.00	90.00	60.94
3848.66	91.00	90.00	3784.91	104.00	.00	104.00	104.00	90.00	10.00
3858.66	92.00	90.00	3784.65	114.00	.00	114.00	114.00	90.00	10.00
3868.66	93.00	90.00	3784.22	123.99	.00	123.99	123.99	90.00	10.00
3878.66	94.00	90.00	3783.61	133.97	.00	133.97	133.97	90.00	10.00

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
3888.66	95.00	90.00	3782.82	143.94	.00	143.94	143.94	90.00	10.00
3898.66	96.00	90.00	3781.86	153.89	.00	153.89	153.89	90.00	10.00
3908.66	97.00	90.00	3780.73	163.83	.00	163.83	163.83	90.00	10.00
3918.66	98.00	90.00	3779.42	173.74	.00	173.74	173.74	90.00	10.00
3928.66	99.00	90.00	3777.95	183.63	.00	183.63	183.63	90.00	10.00

**Begin Hold @ 100.00°, 90.00° Azm**

3938.66	100.00	90.00	3776.30	193.49	.00	193.49	193.49	90.00	10.00
4038.66	100.00	90.00	3758.93	291.97	.00	291.97	291.97	90.00	.00
4138.66	100.00	90.00	3741.57	390.46	.00	390.46	390.46	90.00	.00
4238.66	100.00	90.00	3724.20	488.94	.00	488.94	488.94	90.00	.00

**Begin Drop @ -10.00°/ 100'**

4270.66	100.00	90.00	3718.64	520.45	.00	520.45	520.45	90.00	.00
4280.66	99.00	90.00	3716.99	530.32	.00	530.32	530.32	90.00	10.00
4290.66	98.00	90.00	3715.52	540.21	.00	540.21	540.21	90.00	10.00
4300.66	97.00	90.00	3714.21	550.12	.00	550.12	550.12	90.00	10.00
4310.66	96.00	90.00	3713.08	560.06	.00	560.06	560.06	90.00	10.00
4320.66	95.00	90.00	3712.12	570.01	.00	570.01	570.01	90.00	10.00
4330.66	94.00	90.00	3711.34	579.98	.00	579.98	579.98	90.00	10.00
4340.66	93.00	90.00	3710.73	589.96	.00	589.96	589.96	90.00	10.00
4350.66	92.00	90.00	3710.29	599.95	.00	599.95	599.95	90.00	10.00
4360.66	91.00	90.00	3710.03	609.95	.00	609.95	609.95	90.00	10.00

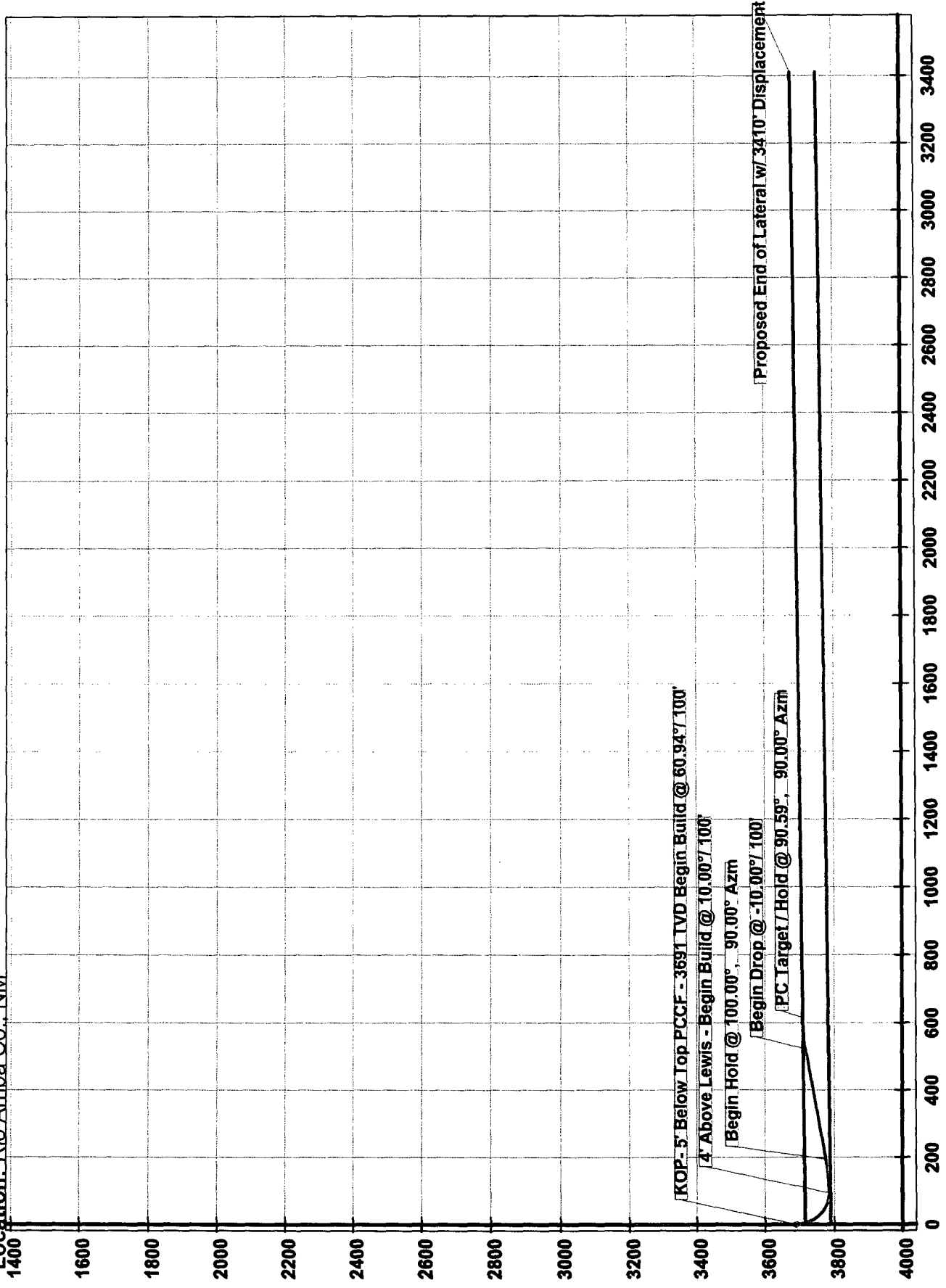
**PC Target / Hold @ 90.59°, 90.00° Azm**

4364.72	90.59	90.00	3709.97	614.00	.00	614.00	614.00	90.00	10.00
4400.00	90.59	90.00	3709.61	649.28	.00	649.28	649.28	90.00	.00
4500.00	90.59	90.00	3708.58	749.28	.00	749.28	749.28	90.00	.00
4600.00	90.59	90.00	3707.55	849.27	.00	849.27	849.27	90.00	.00
4700.00	90.59	90.00	3706.52	949.26	.00	949.26	949.26	90.00	.00
4800.00	90.59	90.00	3705.49	1049.26	.00	1049.26	1049.26	90.00	.00
4900.00	90.59	90.00	3704.46	1149.25	.00	1149.25	1149.25	90.00	.00
5000.00	90.59	90.00	3703.43	1249.25	.00	1249.25	1249.25	90.00	.00
5100.00	90.59	90.00	3702.40	1349.24	.00	1349.24	1349.24	90.00	.00
5200.00	90.59	90.00	3701.37	1449.24	.00	1449.24	1449.24	90.00	.00
5300.00	90.59	90.00	3700.34	1549.23	.00	1549.23	1549.23	90.00	.00
5400.00	90.59	90.00	3699.31	1649.23	.00	1649.23	1649.23	90.00	.00
5500.00	90.59	90.00	3698.28	1749.22	.00	1749.22	1749.22	90.00	.00
5600.00	90.59	90.00	3697.25	1849.22	.00	1849.22	1849.22	90.00	.00
5700.00	90.59	90.00	3696.23	1949.21	.00	1949.21	1949.21	90.00	.00
5800.00	90.59	90.00	3695.20	2049.21	.00	2049.21	2049.21	90.00	.00
5900.00	90.59	90.00	3694.17	2149.20	.00	2149.20	2149.20	90.00	.00
6000.00	90.59	90.00	3693.14	2249.20	.00	2249.20	2249.20	90.00	.00
6100.00	90.59	90.00	3692.11	2349.19	.00	2349.19	2349.19	90.00	.00
6200.00	90.59	90.00	3691.08	2449.19	.00	2449.19	2449.19	90.00	.00
6300.00	90.59	90.00	3690.05	2549.18	.00	2549.18	2549.18	90.00	.00

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
6400.00	90.59	90.00	3689.02	2649.17	.00	2649.17	2649.17	90.00	.00
6500.00	90.59	90.00	3687.99	2749.17	.00	2749.17	2749.17	90.00	.00
6600.00	90.59	90.00	3686.96	2849.16	.00	2849.16	2849.16	90.00	.00
6700.00	90.59	90.00	3685.93	2949.16	.00	2949.16	2949.16	90.00	.00
6800.00	90.59	90.00	3684.90	3049.15	.00	3049.15	3049.15	90.00	.00
6900.00	90.59	90.00	3683.87	3149.15	.00	3149.15	3149.15	90.00	.00
7000.00	90.59	90.00	3682.84	3249.14	.00	3249.14	3249.14	90.00	.00
7100.00	90.59	90.00	3681.81	3349.14	.00	3349.14	3349.14	90.00	.00
Proposed End of Lateral w/ 3410' Displacement									
7160.87	90.59	90.00	3681.18	3410.00	.00	3410.00	3410.00	90.00	.00



Job Number: 61xxx  
 Company: Black Hills E&P  
 Lease/Well: Jicarilla 451-09 #31  
 Location: Rio Arriba Co., NM



VERTICAL SECTION ( Ft ) @ 90.00°

Jicarilla 451-09 #31  
 1,645' FSL 1,210' FWL, ( NW /4 SW /4)  
 Sec. 9 T 29 R 3W  
 Rio Arriba County, New Mexico  
 Contract 451

### SURFACE CASING AND CENTRALIZER DESIGN

Proposed Total Depth: 4,000 '  
 Proposed Depth of Surface Casing: 250 '  
 Estimated Pressure Gradient: 0.31 psi/ft  
 Bottom Hole Pressure at 4,000 '  
     0.31 psi/ft x 4,000 ' = 1,240 psi  
 Hydrostatic Head of gas/oil mud: 0.22 psi/ft  
     0.22 psi/ft x 4,000 ' = 880 psi

#### Maximum Design Surface Pressure

Bottom Hole Pressure	-	Hydrostatic Head	=	
( 0.31 psi/ft x 4,000 ' )	-	( 0.22 psi/ft x 4,000 ' )	=	
1,240 psi	-	880 psi	=	360 psi

#### Casing Strengths

8 5/8 J-55 24# ST&C

Wt.	Tension (lbs)	Burst (psi)	Collapse (psi)
24 #	244,000	2,950	1,370
32 #	372,000	3,930	2,530

#### Safety Factors

Tension (Dry):	1.8	Burst:	1.0	Collapse:	1.125
Tension (Dry):	24 # / ft x	250 ' =	6,000 #		
Safety Factor =	244,000	=	40.67		ok
	6,000				
Burst:	Safety Factor =	2,950 psi	=	8.19	ok
		360 psi			
Collapse:	Hydrostatic =	0.052 x 9.0 ppg x	250 ' =	117 psi	
Safety Factor =	1,370 psi	=	11.71		ok
	117 psi				

Use 250 ' 8 5/8 J-55 24# ST&C

Use 2,000 psi minimum casinghead and BOP's but will test to 1,000 psi

#### Centralizers

5 Total  
 1 near surface at 40'  
 2 -1 each at middle of bottom joint, second joint  
 2 -1 each at every other joint 40' spacing  
 Total centralized ± 200 ' ( 50 ' - 250 ' )

Note that field experience indicates that additional centralizers greatly increase the chance of "sticking" the surface casing prior to reaching surface casing total depth.