

RECEIVED
AUG 20 2008
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Office of Land Management
Farmington Field Office

FORM APPROVED
OMB No. 1004-0137
Expires: March 31, 2007

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

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 Location: 550'FSL 610' FWL Unit N SE/SW Sec 19 T30N R03W
Bottom Hole: ± 50'FNL ± 700' FEL Unit A NW/NW Sec 19 T30N R03W

5. Lease Serial No.
Contract 459

6. If Indian, Allottee, or Tribe Name
Jicarilla Apache Nation

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

8. Well Name and No.
Jicarilla 459-19 #141

9. API Well No.
30-039-29879

10. Field and Pool, or Exploratory Area
East Blanco Pictured Cliffs

11. County or Parish, State
Rio Arriba, New Mexico

CHECK APPROPRIATE BOX(S) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

☒ Notice of Intent

☐ Subsequent Report

☐ Final Abandonment Notice

TYPE OF ACTION

☐ Acidize ☐ Deepen ☐ Production (Start/ Resume) ☐ Water Shut-off

☐ Altering Casing ☐ Fracture Treat ☐ Reclamation ☐ Well Integrity

☐ Casing Repair ☐ New Construction ☐ Recomplete ☒ Other Drilling

☐ Change Plans ☐ Plug and abandon ☐ Temporarily Abandon plan change

☐ Convert to Injection ☐ Plug back ☐ Water Disposal

13. 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 recomplete horizontally, give subsurface locations and measured and true vertical depths or pertinent markers and sands. Attach the Bond under which the work will performed or provide the Bond No. on file with the 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 recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notice 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.)

June 23, 2008
The initial APD to drill a Pictured Cliff (PC) well was approved on ~~August 17, 2007~~. The well was given API number 30-039-29879. Black Hills Gas Resources (BHGR) is submitting this updated drilling plan to change the un-drilled vertical well to a horizontal well. BHGR also requests 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 new bottom hole is estimated at ±50'FNL ± 700' FEL Unit A ~~NW/NW~~ Sec 19 T30N R03W

NENE

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

RCVD AUG 29 '08

OIL CONS. DIV.
DIST. 3

*HOLD C104 FOR Hearing for NSP rescinding
R-8774 Tract 5*

14. I hereby certify that the foregoing is true and correct.

Name (Printed/ Typed)

Lynn H. Benally

Title

Regulatory Specialist

Signature

Date

8/21/2008

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Date

[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.

Petr. Eng

8/27/08

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

(Instructions on page 2)

NMOCDD

GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations, and reports of such operations when completed, as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this

form and the number of copies to be submitted, particularly with regard to local area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from the local Federal office.

SPECIFIC INSTRUCTIONS

Item 4 - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

Item 13 - Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or

present productive zones, or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to top of any left in the hole; method of closing top of well and date well site conditioned for final inspection looking to approval of the abandonment.

NOTICE

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3, and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c); and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.

ROUTINE USES: Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.

EFFECT OF NOT PROVIDING THE INFORMATION: Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3 - 2, 3162.3 - 3, 3162.3 - 4.

The Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) requires us to inform you that:

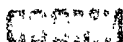
This information is being collected to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.

Response to this request is mandatory.

BLM would like you to know that you do not have to respond to this or any other Federal agency -sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT

Public reporting burden for this form is estimated to average 25 minutes per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau information Collection Clearance Officer, (WO-630), Mail Stop 401 LS, 1849 C St., N.W., Washington D.C. 20240





Black Hills Gas Resources

Jicarilla 459-19 #141

Surface Location: 550' FSL 610' FWL (SE/SW) Unit N - Lot 4

Sec.19 T30N R03W

Bottom Hole Location: $\pm 50'$ FNL $\pm 700'$ FEL (NW/NW) Unit A

Sec.19 T30N RW

Rio Arriba County, New Mexico

Lease: Contract 459

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 March 29, 2006 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 new drilling plan will modify the drilling program to include the parasite string technique for this un-drilled horizontal well. It will still be drilled into the pictured cliffs formation. Attached is the horizontal drilling plan.

SURFACE FORMATION – San Jose

GROUND ELEVATION – 7,280'

ESTIMATED FORMATION TOPS - (mineral-bearing formations)

| | | | |
|-----------------|---------|---------|--------------------------------|
| San Jose | Surface | Surface | Sandstone, shales & siltstones |
| Nacimiento | 2119'M | 2,119'V | Sandstone, shales & siltstones |
| Ojo Alamo | 3397'M | 3,382'V | Sandstone, shales & siltstones |
| Kirtland | 3662'M | 3,601'V | Sandstone, shales & siltstones |
| Fruitland Coal | 4149'M | 3,866'V | Sandstone, shales & siltstones |
| Pictured Cliffs | 4409'M | 3,379'V | Sandstone, shales & siltstones |

TOTAL DEPTH 8932' TMD 3885' TVD

ESTIMATED DEPTHS OF ANTICIPATED FRESH WATER, OIL, OR GAS:

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

| | | |
|-----------------|-------|------------------|
| Nacimiento | 2119' | Gas, water, sand |
| Ojo Alamo | 3397' | Gas, water, sand |
| Kirtland | 3662' | Gas, water, sand |
| Fruitland Coal | 4149' | Gas, water, sand |
| Pictured Cliffs | 4409' | Gas, water, sand |

HORIZONTAL DRILLING PROGRAMKick Off Point is estimated to be \pm 2953' TVD**CASING PROGRAM**

| Depth | Hole Diameter | Casing Diameter | Casing Weight and Grade | Cement |
|---------------|---------------|-----------------|-------------------------|---|
| 250' | 17-1/2" | 13-3/8" | J-55 61# | To Surface (\pm 340 sxs premium cement containing 2% CaCl ² and 1/4#/sx Poly-E-Flake) |
| 250' – 2953' | 12-1/4" | 7" csg + | J-55 23# | TD to surface (Lead \pm 665 sxs lite standard cement, 3% Econolite, 10 #/sk Gilsonite, 1/4#/sk Poly-E-Flake. Tail \pm 210 sxs 50/50 poz containing, 5#/sk Gilsonite, 1/8#/sk Poly-E-Flake & .4% Halad (R)-344 |
| 250' - 2953' | | 1.9" tbg | J-55 2.76# | |
| 2953' – 4569' | 8-3/4" | 7" csg | J-55 23# | |
| 4569' – 8932' | 6-1/8" | Open hole** | Open hole | |

* Actual cement volume to be determined by caliper log.

** If hole instability is encountered, a 4 1/2", 10.5#, J-55 uncemented liner may be run in the 6 1/8" open hole section.

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

PARASITE STRING

The general procedure to be utilized by Black Hills Gas Resources (BHGR) is; to run a 1-1/2" parasite string on the 7" casing production string.

The main objective of the parasite string on this well is to reduce the equivalent circulating density (ECD) of the drilling fluid system while drilling horizontally in the Pictured Cliffs Formation. It has been BHGR experience, that severe lost circulation in the Pictured Cliffs has been both costly and damaging to the productivity of these horizontal wells.

It may be argued that conventional air equipment could be utilized, but it has been BHGR experience that conventional air pumped down the drill pipe results in oxygen contamination via fracture within the Pictured Cliffs on offset wells. This result requires either the shutting in or chemical treating of offset wells.

Procedure

1. A 17-1/2" hole will be drilled to 250 ft. Then a 13-3/8" casing will be run and cemented to surface.
2. Out from underneath surface casing a 12-1/4" hole will be drilled to KOP (\pm 2953') at that point we will TOH for tools, TIH, and an MWD-GR will be used to begin drilling a 8-3/4" hole directionally at a build rate of 6°/100 to TD @ 4569' MD, The directional tools will be laid down, and 7", 23# ft J-55 LT&C casing will be run in the hole setting @ 85°.
3. At approximately 2953, an Xtech Industries Air Injection collar (AIC) will be placed in the 7" casing string. This collar will be tack welded on both top and bottom.

4. Due to severe lost circulation below 3921' TVD, a 1.5" ID, 1.9" OD parasite string will be utilized on the 7" intermediate casing. This string will allow the injection of compressed air into the wellbore at a depth of \pm 2953'MD. Once the AIC is made up, the parasite string will be screwed into the AIC, and the parasite string will be banded to the 7" casing with metal strips which are welded onto the 7" casing. There will be two (2) bands per joint used to hold the parasite string in place.
5. Once the 7" casing is landed, the 7" casing will be cemented as in "normal" cementing operations. Upon bumping the plug, a 20 bbl sugar water plug (1 lb/bbl of sugar) will be pumped down the parasite string to insure that any cement in the AIC is cleaned out. The sugar water will act as a retarder, and not allow the cement to set up.
6. Once the sugar water is pumped. The parasite string is cut at surface, and a tee is welded onto the stub. This is then piped to conventional air compression equipment.
7. During drilling of the production hole (6-1/8" hole size), this will effectively reduce the equivalent circulating density from 9.1 ppg to \pm 6.0 ppg while drilling the production portion of the well. BOPs will then nipped up, and a 6-1/8" PDC bit and 4-3/4" directional assembly are tripped in the hole. Float equipment is drilled out and once drilling in the Pictured Cliffs begins air injection down the parasite string is began.
8. Initial air rates are 700 to 1,200 scf/min, and as drilling continues will be increased to 2,000 to 2,500 scf/min. Based on air drilling models we are expecting a reduction of 3.0 ppg in our ECD. This will hopefully allow us to minimize our lost circulation during the lateral section (losses have been as high as 10,000 bbls per well).
9. Additional advantages of the parasite string are hoped to be increased penetration rate and better indications of gas productive intervals to aid in geo-steering the lateral section of this well.
10. Also, a rotating head and gas buster will be utilized at surface while drilling the lateral section of this wellbore.

Upon reaching TD, an RBP will be place in the 7" casing below the AIC. This will eliminate any concerns of Pictured Cliffs gas being at the surface during rig down of the drilling rig.

| Interval | Weight | Grade | Cplng O.D. | Nom. O.D. | I.D. | Drift | Connection |
|-------------|-----------|-------|------------|-----------|--------|--------|----------------------|
| 0' to 2,953 | 2.76 #/ft | J-55 | 2.115" | 1.900" | 1.610" | 1.516" | 10 Rd Integral Joint |

API RATING / SAFETY FACTOR

| Interval | Description | Collapse (psi) ^a | Burst (psi) ^b | Tension Body (M Lbs) ^c | Tension Cplng (M Lbs) ^c |
|--------------|-----------------------------|-----------------------------|--------------------------|-----------------------------------|------------------------------------|
| 0' to 2,953' | 1-1/2", 2.76 #/ft, J-55, IJ | 7,750. / 6.13 | 7,350. / 2.66 | 55 / 1.70 | 55 / 1.70 |

- a) Based on full parasite string evacuation with 9.0 ppg formation gradient on backside
- b) Based on 9.0 ppg gradient to surface, with no fluid on backside (backside evacuated) and 1,500 psi applied surface pressure
- c) Based on tubing string weight in air (7,452 lbs) with 25,000 lbs of over-pull applied. Buoyed weight of parasite string in 9.0 ppg mud = 6,412. lbs

Yields:

Surface: Standard cement yield = 1.2 ft³/sx (mixed at 15.6 lb/gal)

Production: Lite Standard Cement yield: = 2.90 ft³/sx (mixed at 11.4 lb/gal)

50:50 poz yield = 1.41 ft³/sx (mixed at 13.1 lb/gal)

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 condition. 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' | - | 250' | Fresh water – M.W. 8.5 ppg, Vis 30-33 |
| 250' | - | TD' | Potassium Formate- Inhibitive low solids non-dispersed M.W. 6.0 – 9.2 ppg Vis – 45 – 60 sec W.L. 8cc or less |

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

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: GR/SP/CAL – Resistivity/Conductivity – Neutron/Density – Bulk Density/RWA
From TD to SC
- 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) H₂S: See attached H₂S plan in event H₂S is encountered.
- D) Estimated bottomhole pressure: 1,145 psi

ANTICIPATED START DATE: September 29, 2008

COMPLETION

The location pad will be of sufficient size to accommodate all completion activities and equipment. A string of 2-3/8", 4.7#, J-55 tubing will be run for a flowing string. A Sundry Notice will be submitted with a revised completion program if warranted.

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, 2006

Submit to Appropriate District Office

State Lease - 4 Copies

Fee Lease - 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

| | | |
|---|---|---|
| ¹ API Number 30-039-29879 | ² Pool Code 72460 | ³ Pool Name EAST BLANCO PICTURED CLIFFS |
| ⁴ Property Code 22210 | ⁶ Property Name JICARILLA 459-19 | ⁵ Well Number 141 |
| ⁷ GRID No. 013925 | ⁸ Operator Name BLACK HILLS GAS RESOURCES | ⁹ Elevation 7280 |

¹⁰ Surface Location

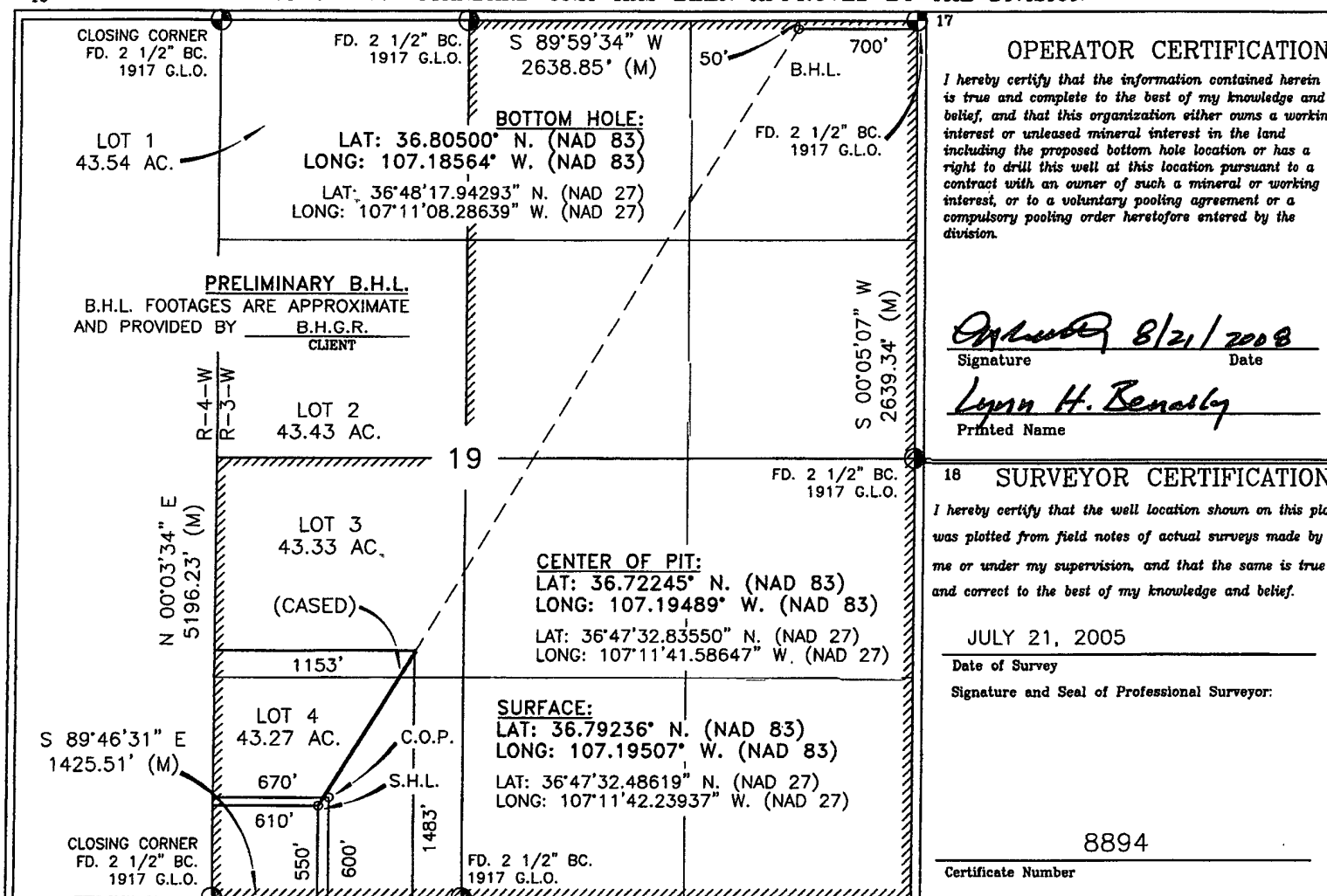
| | | | | | | | | | |
|--------------------|---------------|------------------|--------------|--------------|----------------------|---------------------------|----------------------|------------------------|----------------------|
| UL or lot no. N | Section 19 | Township 30-N | Range 3-W | Lot Idn 4 | Feet from the 550 | North/South line SOUTH | Feet from the 610 | East/West line WEST | County RIO ARRIBA |
|--------------------|---------------|------------------|--------------|--------------|----------------------|---------------------------|----------------------|------------------------|----------------------|

¹¹ Bottom Hole Location If Different From Surface

| | | | | | | | | | |
|--------------------|---------------|------------------|--------------|---------|---------------------|---------------------------|----------------------|------------------------|----------------------|
| UL or lot no. A | Section 19 | Township 30-N | Range 3-W | Lot Idn | Feet from the 50 | North/South line NORTH | Feet from the 700 | East/West line EAST | County RIO ARRIBA |
|--------------------|---------------|------------------|--------------|---------|---------------------|---------------------------|----------------------|------------------------|----------------------|

| | | | |
|---|-------------------------------|----------------------------------|-------------------------|
| ¹² Dedicated Acres 406.60 | ¹³ Joint or Infill | ¹⁴ Consolidation Code | ¹⁵ Order No. |
|---|-------------------------------|----------------------------------|-------------------------|

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





Job Number: 81xxxx
Company: Black Hills Gas Resources
Lease/Well: Jicarilla 459-19 #141
Location: Rio Arriba County, NM
Rig Name: Patterson 741
RKB: 15'
G.L. or M.S.L.: 7280'

State/Country: NM
Declination: □
Grid: □
File name: Z:\BLACKH-1\NEWWEL~1\459-19~1\45919141.SVY
Date/Time: 15-Aug-08 / 12:33
Curve Name: Jicarilla 459-19 #141 plan 8-15-08

Jicarilla 459-19 #141 plan 8-15-08

WINSERVE PROPOSAL REPORT
 Minimum Curvature Method
 Vertical Section Plane 30.47
 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 |
|---|----------------------|---------------------------|---------------------------|---------------------------|-----------|-----------|---------------------------|------------------|-------------------------------|
| KOP-> 2953 TVD Begin Build @ 6.00% 100' | | | | | | | | | |
| 2953.00 | .00 | 30.47 | 2953.00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 2983.00 | 1.80 | 30.47 | 2983.00 | .47 | .41 | .24 | .47 | 30.47 | 6.00 |
| 3013.00 | 3.60 | 30.47 | 3012.96 | 1.88 | 1.62 | .96 | 1.88 | 30.47 | 6.00 |
| 3043.00 | 5.40 | 30.47 | 3042.87 | 4.24 | 3.65 | 2.15 | 4.24 | 30.47 | 6.00 |
| 3073.00 | 7.20 | 30.47 | 3072.68 | 7.53 | 6.49 | 3.82 | 7.53 | 30.47 | 6.00 |
| 3103.00 | 9.00 | 30.47 | 3102.38 | 11.76 | 10.14 | 5.96 | 11.76 | 30.47 | 6.00 |
| 3133.00 | 10.80 | 30.47 | 3131.94 | 16.92 | 14.58 | 8.58 | 16.92 | 30.47 | 6.00 |
| 3163.00 | 12.60 | 30.47 | 3161.31 | 23.00 | 19.83 | 11.67 | 23.00 | 30.47 | 6.00 |
| 3193.00 | 14.40 | 30.47 | 3190.48 | 30.01 | 25.87 | 15.22 | 30.01 | 30.47 | 6.00 |
| 3223.00 | 16.21 | 30.47 | 3219.41 | 37.93 | 32.69 | 19.23 | 37.93 | 30.47 | 6.00 |
| 3253.00 | 18.01 | 30.47 | 3248.09 | 46.75 | 40.30 | 23.71 | 46.75 | 30.47 | 6.00 |
| 3283.00 | 19.81 | 30.47 | 3276.47 | 56.47 | 48.67 | 28.64 | 56.47 | 30.47 | 6.00 |
| 3313.00 | 21.61 | 30.47 | 3304.53 | 67.08 | 57.81 | 34.01 | 67.08 | 30.47 | 6.00 |
| 3343.00 | 23.41 | 30.47 | 3332.24 | 78.56 | 67.71 | 39.84 | 78.56 | 30.47 | 6.00 |
| 3373.00 | 25.21 | 30.47 | 3359.58 | 90.91 | 78.36 | 46.10 | 90.91 | 30.47 | 6.00 |
| 3403.00 | 27.01 | 30.47 | 3386.52 | 104.11 | 89.73 | 52.79 | 104.11 | 30.47 | 6.00 |
| 3433.00 | 28.81 | 30.47 | 3413.03 | 118.15 | 101.84 | 59.91 | 118.15 | 30.47 | 6.00 |
| 3463.00 | 30.61 | 30.47 | 3439.08 | 133.02 | 114.65 | 67.45 | 133.02 | 30.47 | 6.00 |
| 3493.00 | 32.41 | 30.47 | 3464.66 | 148.70 | 128.16 | 75.40 | 148.70 | 30.47 | 6.00 |
| 3523.00 | 34.21 | 30.47 | 3489.73 | 165.17 | 142.36 | 83.76 | 165.17 | 30.47 | 6.00 |
| 3553.00 | 36.01 | 30.47 | 3514.27 | 182.43 | 157.23 | 92.51 | 182.43 | 30.47 | 6.00 |
| 3583.00 | 37.81 | 30.47 | 3538.26 | 200.45 | 172.76 | 101.64 | 200.45 | 30.47 | 6.00 |
| 3613.00 | 39.61 | 30.47 | 3561.66 | 219.21 | 188.93 | 111.16 | 219.21 | 30.47 | 6.00 |

| 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 | |
| 3643.00 | 41.41 | 30.47 | 3584.47 | 238.69 | 205.73 | 121.04 | 238.69 | 30.47 | 6.00 |
| 3673.00 | 43.21 | 30.47 | 3606.65 | 258.89 | 223.13 | 131.28 | 258.89 | 30.47 | 6.00 |
| 3703.00 | 45.01 | 30.47 | 3628.19 | 279.77 | 241.13 | 141.87 | 279.77 | 30.47 | 6.00 |
| 3733.00 | 46.81 | 30.47 | 3649.06 | 301.32 | 259.70 | 152.79 | 301.32 | 30.47 | 6.00 |
| 3763.00 | 48.62 | 30.47 | 3669.25 | 323.51 | 278.83 | 164.05 | 323.51 | 30.47 | 6.00 |
| | | | | | | | | | |
| 3793.00 | 50.42 | 30.47 | 3688.72 | 346.33 | 298.50 | 175.62 | 346.33 | 30.47 | 6.00 |
| 3823.00 | 52.22 | 30.47 | 3707.47 | 369.75 | 318.68 | 187.49 | 369.75 | 30.47 | 6.00 |
| 3853.00 | 54.02 | 30.47 | 3725.48 | 393.74 | 339.36 | 199.66 | 393.74 | 30.47 | 6.00 |
| 3883.00 | 55.82 | 30.47 | 3742.72 | 418.29 | 360.52 | 212.11 | 418.29 | 30.47 | 6.00 |
| 3913.00 | 57.62 | 30.47 | 3759.18 | 443.37 | 382.14 | 224.83 | 443.37 | 30.47 | 6.00 |
| | | | | | | | | | |
| 3943.00 | 59.42 | 30.47 | 3774.85 | 468.95 | 404.19 | 237.80 | 468.95 | 30.47 | 6.00 |
| 3973.00 | 61.22 | 30.47 | 3789.70 | 495.01 | 426.65 | 251.01 | 495.01 | 30.47 | 6.00 |
| 4003.00 | 63.02 | 30.47 | 3803.73 | 521.53 | 449.50 | 264.46 | 521.53 | 30.47 | 6.00 |
| 4033.00 | 64.82 | 30.47 | 3816.92 | 548.47 | 472.73 | 278.12 | 548.47 | 30.47 | 6.00 |
| 4063.00 | 66.62 | 30.47 | 3829.26 | 575.82 | 496.30 | 291.99 | 575.82 | 30.47 | 6.00 |
| | | | | | | | | | |
| 4093.00 | 68.42 | 30.47 | 3840.73 | 603.54 | 520.19 | 306.05 | 603.54 | 30.47 | 6.00 |
| 4123.00 | 70.22 | 30.47 | 3851.32 | 631.60 | 544.38 | 320.28 | 631.60 | 30.47 | 6.00 |
| 4153.00 | 72.02 | 30.47 | 3861.02 | 659.99 | 568.84 | 334.67 | 659.99 | 30.47 | 6.00 |
| 4183.00 | 73.82 | 30.47 | 3869.83 | 688.67 | 593.56 | 349.21 | 688.67 | 30.47 | 6.00 |
| 4213.00 | 75.62 | 30.47 | 3877.74 | 717.60 | 618.50 | 363.89 | 717.60 | 30.47 | 6.00 |
| | | | | | | | | | |
| 4243.00 | 77.42 | 30.47 | 3884.73 | 746.78 | 643.64 | 378.68 | 746.78 | 30.47 | 6.00 |
| 4273.00 | 79.22 | 30.47 | 3890.80 | 776.16 | 668.96 | 393.58 | 776.16 | 30.47 | 6.00 |
| 4303.00 | 81.03 | 30.47 | 3895.95 | 805.71 | 694.44 | 408.57 | 805.71 | 30.47 | 6.00 |
| 4333.00 | 82.83 | 30.47 | 3900.16 | 835.41 | 720.04 | 423.63 | 835.41 | 30.47 | 6.00 |
| 4363.00 | 84.63 | 30.47 | 3903.44 | 865.23 | 745.74 | 438.75 | 865.23 | 30.47 | 6.00 |
| | | | | | | | | | |
| Begin Hold @ 85.00° for 200' | | | | | | | | | |
| 4369.23 | 85.00 | 30.47 | 3904.00 | 871.43 | 751.08 | 441.89 | 871.43 | 30.47 | 6.00 |
| 4469.23 | 85.00 | 30.47 | 3912.72 | 971.05 | 836.94 | 492.41 | 971.05 | 30.47 | .00 |
| 5' into PC / casing pt | | | | | | | | | |
| 4569.23 | 85.00 | 30.47 | 3921.43 | 1070.67 | 922.80 | 542.92 | 1070.67 | 30.47 | .00 |
| | | | | | | | | | |
| Begin Build @ 7.94° 100' | | | | | | | | | |
| 4669.23 | 85.00 | 30.47 | 3930.15 | 1170.29 | 1008.67 | 593.44 | 1170.29 | 30.47 | .00 |
| 4699.23 | 87.38 | 30.47 | 3932.14 | 1200.22 | 1034.46 | 608.62 | 1200.22 | 30.47 | 7.94 |
| 4729.23 | 89.76 | 30.47 | 3932.89 | 1230.21 | 1060.31 | 623.82 | 1230.21 | 30.47 | 7.94 |
| | | | | | | | | | |
| Target / Hold @ 90.65°, 30.47° Azm | | | | | | | | | |
| 4740.47 | 90.65 | 30.47 | 3932.85 | 1241.45 | 1070.00 | 629.52 | 1241.45 | 30.47 | 7.94 |
| 4840.47 | 90.65 | 30.47 | 3931.71 | 1341.44 | 1156.18 | 680.23 | 1341.44 | 30.47 | .00 |
| 4940.47 | 90.65 | 30.47 | 3930.57 | 1441.44 | 1242.37 | 730.93 | 1441.44 | 30.47 | .00 |
| 5040.47 | 90.65 | 30.47 | 3929.43 | 1541.43 | 1328.55 | 781.64 | 1541.43 | 30.47 | .00 |
| 5140.47 | 90.65 | 30.47 | 3928.29 | 1641.42 | 1414.73 | 832.34 | 1641.42 | 30.47 | .00 |
| | | | | | | | | | |
| 5240.47 | 90.65 | 30.47 | 3927.15 | 1741.42 | 1500.92 | 883.05 | 1741.42 | 30.47 | .00 |
| 5340.47 | 90.65 | 30.47 | 3926.01 | 1841.41 | 1587.10 | 933.76 | 1841.41 | 30.47 | .00 |
| 5440.47 | 90.65 | 30.47 | 3924.87 | 1941.40 | 1673.29 | 984.46 | 1941.40 | 30.47 | .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 | |
| 5540.47 | 90.65 | 30.47 | 3923.73 | 2041.40 | 1759.47 | 1035.17 | 2041.40 | 30.47 | .00 |
| 5640.47 | 90.65 | 30.47 | 3922.59 | 2141.39 | 1845.65 | 1085.87 | 2141.39 | 30.47 | .00 |
| 5740.47 | 90.65 | 30.47 | 3921.45 | 2241.38 | 1931.84 | 1136.58 | 2241.38 | 30.47 | .00 |
| 5840.47 | 90.65 | 30.47 | 3920.31 | 2341.38 | 2018.02 | 1187.28 | 2341.38 | 30.47 | .00 |
| 5940.47 | 90.65 | 30.47 | 3919.17 | 2441.37 | 2104.21 | 1237.99 | 2441.37 | 30.47 | .00 |
| 6040.47 | 90.65 | 30.47 | 3918.03 | 2541.37 | 2190.39 | 1288.69 | 2541.37 | 30.47 | .00 |
| 6140.47 | 90.65 | 30.47 | 3916.89 | 2641.36 | 2276.57 | 1339.40 | 2641.36 | 30.47 | .00 |
| 6240.47 | 90.65 | 30.47 | 3915.75 | 2741.35 | 2362.76 | 1390.10 | 2741.35 | 30.47 | .00 |
| 6340.47 | 90.65 | 30.47 | 3914.61 | 2841.35 | 2448.94 | 1440.81 | 2841.35 | 30.47 | .00 |
| 6440.47 | 90.65 | 30.47 | 3913.47 | 2941.34 | 2535.13 | 1491.52 | 2941.34 | 30.47 | .00 |
| 6540.47 | 90.65 | 30.47 | 3912.33 | 3041.33 | 2621.31 | 1542.22 | 3041.33 | 30.47 | .00 |
| 6640.47 | 90.65 | 30.47 | 3911.19 | 3141.33 | 2707.49 | 1592.93 | 3141.33 | 30.47 | .00 |
| 6740.47 | 90.65 | 30.47 | 3910.05 | 3241.32 | 2793.68 | 1643.63 | 3241.32 | 30.47 | .00 |
| 6840.47 | 90.65 | 30.47 | 3908.91 | 3341.31 | 2879.86 | 1694.34 | 3341.31 | 30.47 | .00 |
| 6940.47 | 90.65 | 30.47 | 3907.77 | 3441.31 | 2966.04 | 1745.04 | 3441.31 | 30.47 | .00 |
| 7040.47 | 90.65 | 30.47 | 3906.63 | 3541.30 | 3052.23 | 1795.75 | 3541.30 | 30.47 | .00 |
| 7140.47 | 90.65 | 30.47 | 3905.49 | 3641.29 | 3138.41 | 1846.45 | 3641.29 | 30.47 | .00 |
| 7240.47 | 90.65 | 30.47 | 3904.36 | 3741.29 | 3224.60 | 1897.16 | 3741.29 | 30.47 | .00 |
| 7340.47 | 90.65 | 30.47 | 3903.22 | 3841.28 | 3310.78 | 1947.86 | 3841.28 | 30.47 | .00 |
| 7440.47 | 90.65 | 30.47 | 3902.08 | 3941.27 | 3396.96 | 1998.57 | 3941.27 | 30.47 | .00 |
| 7540.47 | 90.65 | 30.47 | 3900.94 | 4041.27 | 3483.15 | 2049.27 | 4041.27 | 30.47 | .00 |
| 7640.47 | 90.65 | 30.47 | 3899.80 | 4141.26 | 3569.33 | 2099.98 | 4141.26 | 30.47 | .00 |
| 7740.47 | 90.65 | 30.47 | 3898.66 | 4241.25 | 3655.52 | 2150.69 | 4241.25 | 30.47 | .00 |
| 7840.47 | 90.65 | 30.47 | 3897.52 | 4341.25 | 3741.70 | 2201.39 | 4341.25 | 30.47 | .00 |
| 7940.47 | 90.65 | 30.47 | 3896.38 | 4441.24 | 3827.88 | 2252.10 | 4441.24 | 30.47 | .00 |
| 8040.47 | 90.65 | 30.47 | 3895.24 | 4541.24 | 3914.07 | 2302.80 | 4541.24 | 30.47 | .00 |
| 8140.47 | 90.65 | 30.47 | 3894.10 | 4641.23 | 4000.25 | 2353.51 | 4641.23 | 30.47 | .00 |
| 8240.47 | 90.65 | 30.47 | 3892.96 | 4741.22 | 4086.43 | 2404.21 | 4741.22 | 30.47 | .00 |
| 8340.47 | 90.65 | 30.47 | 3891.82 | 4841.22 | 4172.62 | 2454.92 | 4841.22 | 30.47 | .00 |
| 8440.47 | 90.65 | 30.47 | 3890.68 | 4941.21 | 4258.80 | 2505.62 | 4941.21 | 30.47 | .00 |
| 8540.47 | 90.65 | 30.47 | 3889.54 | 5041.20 | 4344.99 | 2556.33 | 5041.20 | 30.47 | .00 |
| 8640.47 | 90.65 | 30.47 | 3888.40 | 5141.20 | 4431.17 | 2607.03 | 5141.20 | 30.47 | .00 |
| 8740.47 | 90.65 | 30.47 | 3887.26 | 5241.19 | 4517.35 | 2657.74 | 5241.19 | 30.47 | .00 |
| 8840.47 | 90.65 | 30.47 | 3886.12 | 5341.18 | 4603.54 | 2708.45 | 5341.18 | 30.47 | .00 |
| Proposed End of Lateral | | | | | | | | | |
| 8931.51 | 90.65 | 30.47 | 3885.08 | 5432.22 | 4682.00 | 2754.61 | 5432.22 | 30.47 | .00 |

Job Number: 81xxxx
Company: Black Hills Gas Resources
Lease/Well: Jicarilla 459-19 #141
Location: Rio Arriba County, NM

