

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0136
Expires January 31, 2004

5. Lease Serial No. Jicarilla 457
6. If Indian, Allottee or Tribe Name Jicarilla Apache Nation
7. If Unit or CA Agreement, Name and No. NA
8. Lease Name and Well No. Jicarilla 457-10 #8D
9. API Well No. 30-039-29869
10. Field and Pool, or Exploratory East Blanco Dakota
11. Sec., T., R., M., or Blk. and Survey or Area Sec. 10 T30N R3W
12. County or Parish Rio Arriba
13. State NM

la. Type of Work: ☒ DRILL ☐ REENTER
1b. Type of Well: ☐ Oil Well ☒ Gas Well ☐ Other ☐ Single Zone ☒ Multiple Zone

2. Name of Operator

Black Hills Gas Resources

3a. Address

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

3b. Phone No. (include area code)

505-634-1111 ext 27

4. Location of Well (Report location clearly and in accordance with any State requirements. *)

At surface 2385' FSL 1545' FWL NE/SW

At proposed prod. zone 2385' FSL 1545' FWL NE/SW

14. Distance in miles and direction from nearest town or post office*

20 miles Southwest of Dulce, New Mexico

15. Distance from proposed*

location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) Approx. 3300 feet

16. No. of Acres in lease

Approx. 2532 acres

17. Spacing Unit dedicated to this well

313.24 ~~100-acre~~ W/2

18. Distance from proposed location*

to nearest well, drilling, completed, applied for, on this lease, ft. 50 feet (Twin loc)

19. Proposed Depth

8523 feet bgs

20. BLM/BIA Bond No. on file

NMB000230

21. Elevations (Show whether DF, KDB, RT, GL, etc.)

7121' GR

22. Approximate date work will start*

6/1/2006

23. Estimated duration

45-60 days drig & compl

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, shall be attached to this form:

1. Well plat certified by a registered surveyor.

2. A Drilling Plan.

3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office).

4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).

5. Operator certification.

6. Such other site specific information and/or plans as may be required by the authorized officer.

25. Signature

Name (Printed/Typed)

Lynn H. Benally

Date

4/3/06

Title

Regulatory Specialist/Black Hills Gas Resources

Approved by (Signature)

Original Signed: Stephen Mason

Name (Printed/Typed)

Date

JUN 2 2006

Title

Office

Application approval 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.

Conditions of approval, if any, are attached.

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

*(Instructions on reverse)

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

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

NMOC

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

¹ API Number 30-039-29809	² Pool Code 71599	³ Pool Name BASIN DAKOTA
⁴ Property Code 22860	⁵ Property Name JICARILLA 457-10	⁶ Well Number 8D
⁷ OGRID No. 013925	⁸ Operator Name BLACK HILLS GAS RESOURCES	⁹ Elevation 7198'

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
K	10	30-N	3-W		2410	SOUTH	1515	WEST	RIO ARriba

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
¹² Dedicated Acres 160 W2 320									
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

¹⁶ CALC'D. CORNER			
LOT 4 36.76	LOT 3 36.48	LOT 2 36.30	LOT 1 36.16
N 00-00-05 E 5145.4' (C)			
1515'	10		
	LAT. 36.82652° N (NAD 83) LONG. 107.14181° W (NAD 83)		
	2410'		
SEC. CORNER	S 89-59-44 E 2641.2' (C)	QTR. CORNER	

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.

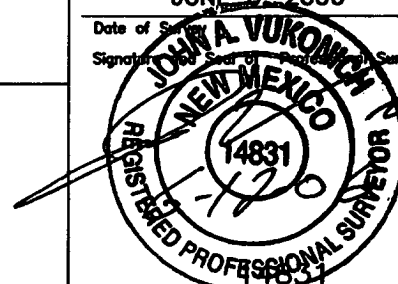
Daniel Manus 6-14-06
Signature Date
Printed Name

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.

JUNE 6, 2006

Date of Survey
Signature of Registered Professional Surveyor



Certificate Number

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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, Inc.

3a. Address
P.O. Box 249 / 3200 N 1st Street Bloomfield, NM 87413

3b. Phone No. (include area code)
505 634-1111

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

**At surface 2,410' FSL 1,515 FWL NE/4 SW/4 Unit K
At proposed prod. zone 2,410' FSL 1,515 FWL NE/4 SW/4 Unit K**

5. Lease Serial No.
Jicarilla 457

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

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

8. Well Name and No.
Jicarilla 457-10 #8D

9. API Well No.
3003929869

10. Field and Pool, or Exploratory Area
Basin Dakota

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			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> 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 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.)

On June 7, 2006, the Jicarilla 457-10 #8D was on-sited with Jicarilla Oil and Gas, BIA and Black Hills Gas Resources. Base on the on-site, the initial footage of 2,385' FSL and 1,545' FWL were change to 2,410' FSL and 1,515' FWL.

Please find attachments of revised plats.



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

Daniel R. Manus

Title **Regulatory Technician**

Signature

[Handwritten Signature]

Date

6-14-06

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by **Original Signed: Stephen Mason**

Title

Date

JUN 22 2006

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

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

(Instructions on page 2)

NMOCED

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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-144
June 1, 2004

For drilling and production facilities, submit to appropriate NMOCD District Office.
For downstream facilities, submit to Santa Fe office

Pit or Below-Grade Tank Registration or Closure

Is pit or below-grade tank covered by a "general plan"? Yes ☒ No ☐

Type of action: Registration of a pit or below-grade tank ☒ Closure of a pit or below-grade tank ☐

Operator: Black Hills Gas Resources Telephone: (505) 634-1111 ext 27 e-mail address: lbenally@bhgp.com		
Address: 3200 N 1st Street PO Box 249 Bloomfield, NM 87413		
Facility or well name: Jicarilla 457-10 #8D API #: NA U/L or Qtr/Qtr NE/SW Sec 10 T 30N R 3W		
County: Rio Arriba	Latitude _____ Longitude _____	NAD: 1927 <input type="checkbox"/> 1983 <input checked="" type="checkbox"/>
Surface Owner: Federal <input type="checkbox"/> State <input type="checkbox"/> Private <input type="checkbox"/> Indian <input checked="" type="checkbox"/>		
Pit Type: Drilling <input checked="" type="checkbox"/> Production <input type="checkbox"/> Disposal <input type="checkbox"/> Workover <input type="checkbox"/> Emergency <input type="checkbox"/> Lined <input checked="" type="checkbox"/> Unlined <input type="checkbox"/> Liner type: Synthetic <input checked="" type="checkbox"/> Thickness 15 mil Clay <input type="checkbox"/> Pit Volume 5,000 bbl	Below-grade tank Volume: _____ bbl Type of fluid: _____ Construction material: _____ Double-walled, with leak detection? Yes <input type="checkbox"/> If not, explain why not: _____	
Depth to ground water (vertical distance from bottom of pit to seasonal high water elevation of ground water.)	Less than 50 feet 50 feet or more, but less than 100 feet 100 feet or more	(20 points) (10 points) (0 points)
Wellhead protection area: (Less than 200 feet from a private domestic water source, or less than 1000 feet from all other water sources.)	Yes No	(20 points) (0 points)
Distance to surface water: (horizontal distance to all wetlands, playas, irrigation canals, ditches, and perennial and ephemeral watercourses.)	Less than 200 feet 200 feet or more, but less than 1000 feet 1000 feet or more	(20 points) (10 points) (0 points)
Ranking Score (Total Points)		20 points

If this is a pit closure: (1) Attach a diagram of the facility showing the pit's relationship to other equipment and tanks. (2) Indicate disposal location: (check the onsite box if you are burying in place) onsite ☐ offsite ☐ If offsite, name of facility: _____. (3) Attach a general description of remedial action taken including remediation start date and end date. (4) Groundwater encountered: No ☐ Yes ☐ If yes, show depth below ground surface _____ ft. and attach sample results. (5) Attach soil sample results and a diagram of sample locations and excavations.

Additional Comments:

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that the above-described pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☒, a general permit ☐, or an (attached) alternative OCD-approved plan ☐.

Date: **4/10/06**

Printed Name/Title **Lyn H. Benally / Regulatory Specialist** Signature 

Your certification and NMOCD approval of this application/closure does not relieve the operator of liability should the contents of the pit or tank contaminate ground water or otherwise endanger public health or the environment. Nor does it relieve the operator of its responsibility for compliance with any other federal, state, or local laws and/or regulations.

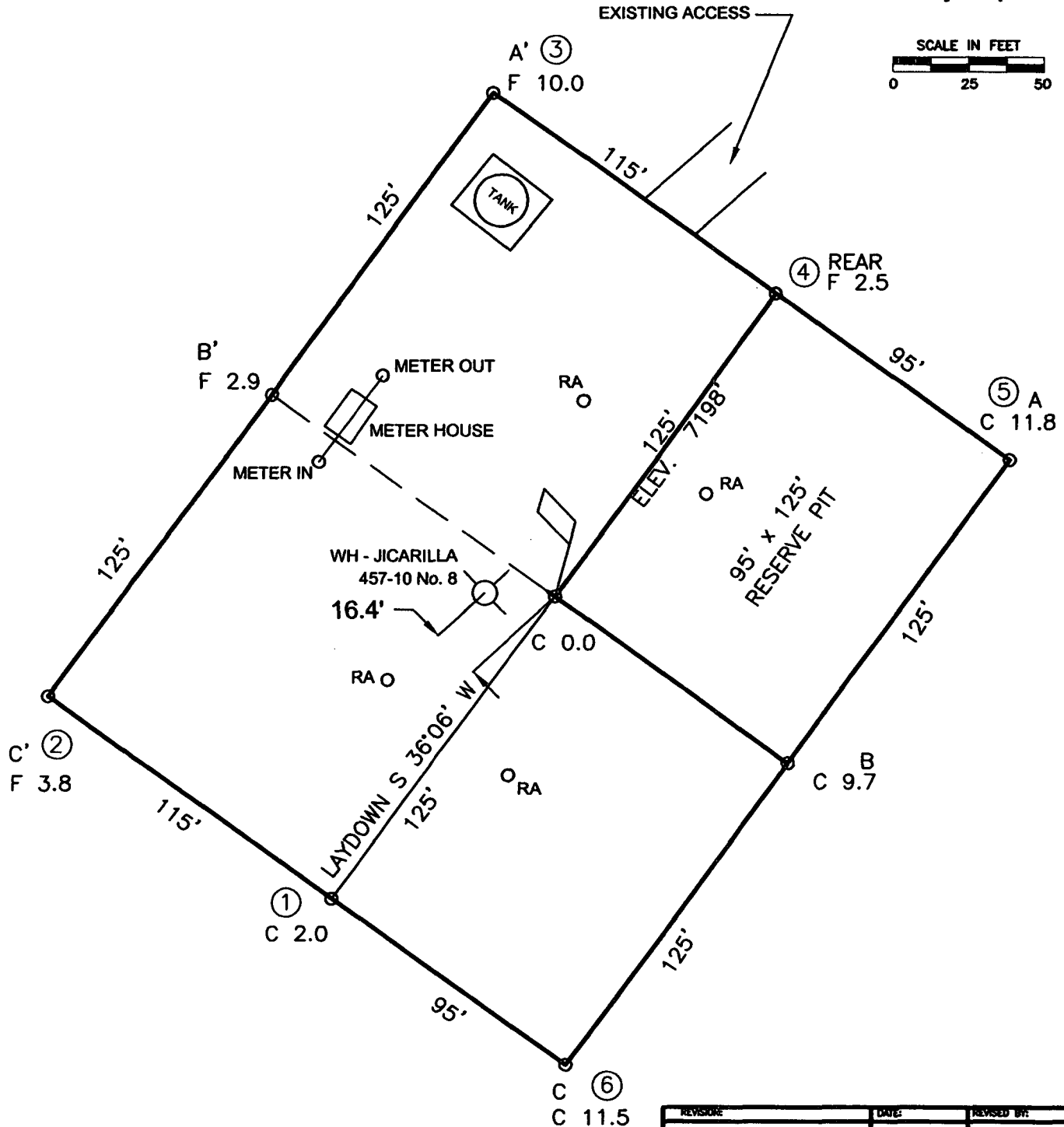
Approval: **DEPUTY OIL & GAS INSPECTOR, DIST. 8** Signature  Date: **JUN 22 2006**

WELL PAD DIAGRAM

COMPANY: BLACK HILLS GAS RESOURCES
 LEASE: JICARILLA 457-10 No. 8D
 FOOTAGE: 2410 FSL 1515 FWL
 SEC.: 10, TWN: 30-N, RNG: 3-W, NMPM
 ELEVATION: 7198'




SCALE IN FEET
 0 25 50



NOTE:

DAGGETT ENTERPRISES, INC. IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES. NEW MEXICO ONE CALL TO BE NOTIFIED 48 HOURS PRIOR TO EXCAVATION OR CONSTRUCTION.

REVISION	DATE	REVISOR
 Daggett Enterprises, Inc. Surveying and Oil Field Services P. O. Box 15068 • Farmington, NM 87401 Phone (505) 326-1772 • Fax (505) 326-6019 NEW MEXICO L.S. 14831		
DRAWN BY: A.G.	CADD: MN488PLB	
ROW: MN488	DATE: 06/07/06	

WELL PAD CROSS-SECTIONAL DIAGRAM

COMPANY: BLACK HILLS GAS RESOURCES

LEASE: JICARILLA 457-10 No. 8D

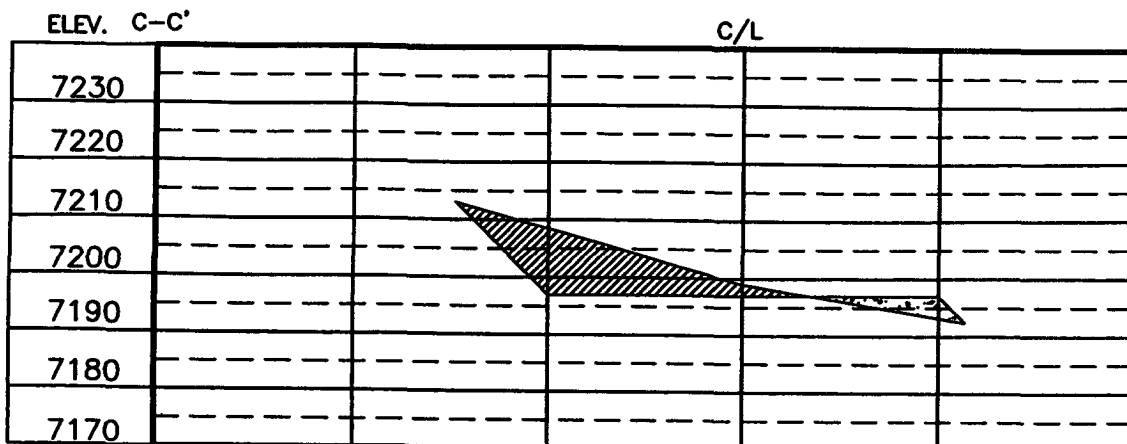
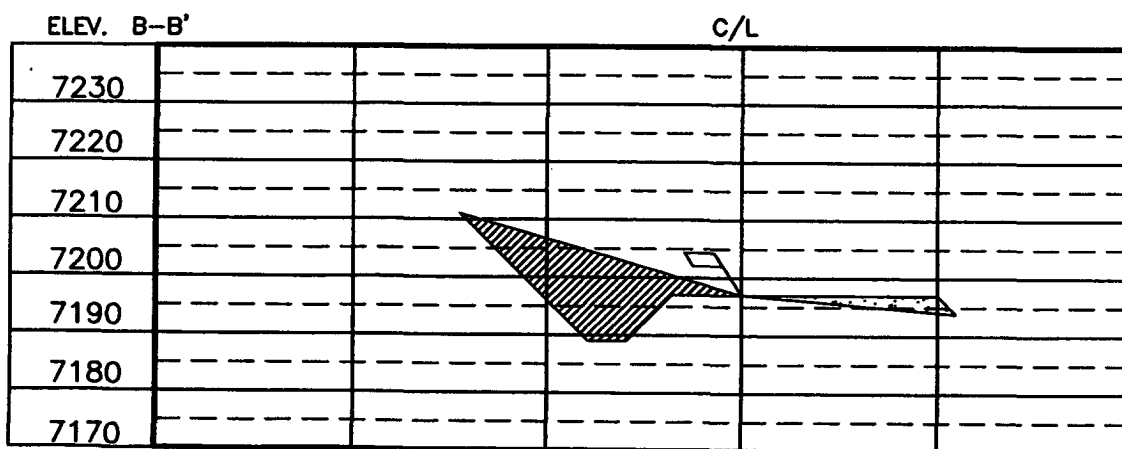
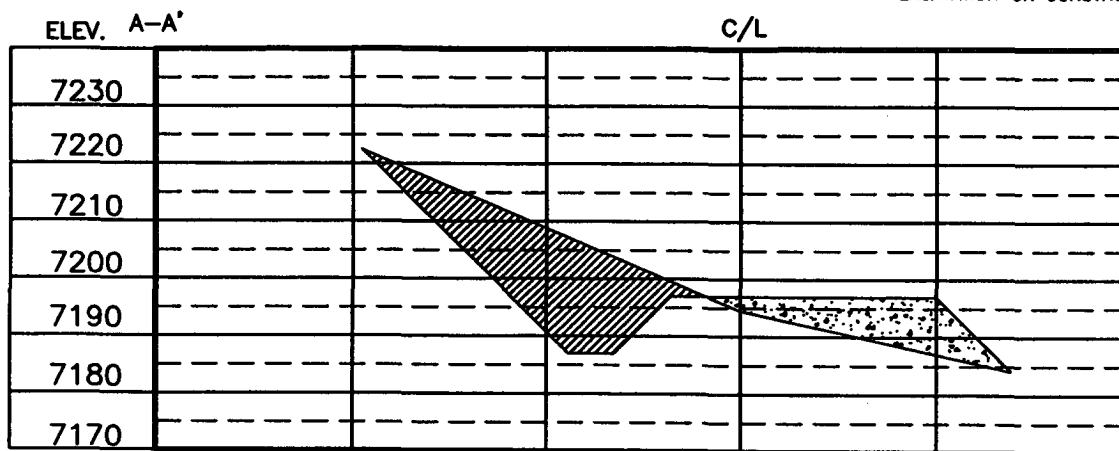
FOOTAGE: 2410 FSL, 1515 FWL

SEC.: 10, TWN: 30-N, RNG: 3-W, NMPM

ELEVATION: 7198'

NOTE:

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REF. DWG. MN498PLB WELL PAD DIAGRAM

REVISION DATE REVISION DATE

Daggett Enterprises, Inc.
Surveying and Oil Field Services
P. O. Box 15068 • Farmington, NM 87401
Phone (505) 326-1772 • Fax (505) 326-6019



NEW MEXICO L.S. 14831
DWG. BY: A.G. CHECKED BY: MN498PLB
DATE: 06/07/06



Black Hills Gas Resources

Hydrogen Sulfide Drilling Operations Plan

I. Hydrogen Sulfide Training

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards and characteristics of hydrogen sulfide (H_2S).
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of H_2S on metal components. If high tensile tubular are to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H_2S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H_2S zone (within 3 days or 500 feet) and weekly H_2S and well control drills for all personnel in each crew. The initial training sessions shall include a review of the site specific H_2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will required to carry documentation that they have received the proper training.

II. H_2S safety equipment and Systems

Note: All H_2S safety equipment and systems (if necessary) will be in stalled, tested, and operational when drilling reaches a depth of 500 feet above the three days prior to penetrating the first zone containing or reason ably expected to contain H_2S .

A. Well control equipment:

1. Choke manifold with a minimum of one remote choke.
2. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.

B. Protective equipment for essential personnel

1. Mark II Surniveair 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.
- C. H₂S detection and monitoring equipment:
1. Two portable H₂S monitors positioned on location for best coverage and response. These units have warning lights and aquilbesirens when H₂S levels of 10ppm.
- D. Visual warning systems:
1. Wind direction indicators as shown on well site diagram.
 2. Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used when appropriate. See example attached.
- E. Mud program:
1. The mud programs has been designed to minimize the volume of H₂S circulated to the surface. Proper mud weight, safe drilling practices and the use of H₂S scavengers will minimize hazards when penetrating H₂S bearing zones.
- F. Metallurgy:
1. All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H₂S service.
 2. All elastomers used for packing and seals shall be H₂S trim.
- G. Communication:
1. Cellular telephone communications in company vehicles.
- H. Well testing:
1. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill stem testing operations conducted in an H₂S environment will use the closed chamber method of testing.



Black Hills Gas Resources

Jicarilla 457-10 #8D
2385' FSL 1545' FWL (NE/SW)
Sec.10 T30N R3W
Rio Arriba County, New Mexico
Lease: Contract 457

CONFIDENTIAL

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 NOS process includes an onsite meeting which was held on August 15, 1990 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 Mallon Oil Company (Mallon) the predecessor of BHGR, included in the meeting were BLM, BIA and JOGA.

BHGR RESPECTFULLY REQUESTS THAT ALL INFORMATION REGARDING THIS WELL BE KEPT CONFIDENTIAL.

SURFACE FORMATION – San Jose

GROUND ELEVATION – 7,197'

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

San Jose	Surface	Sandstone, shales & siltstones
Ojo Alamo	3,173'	Sandstone, shales & siltstones
Pictured Cliffs	3,682'	Sandstone, shales & siltstones
Lewis	3,804'	Sandstone, shales & siltstones
Cliffhouse	5,655'	Sandstone, shales & siltstones
Point Lookout	6,088'	Sandstone, shales & siltstones
Mancos	6,553'	Sandstone, shales & siltstones
Gallup	7,398'	Sandstone, shales & siltstones
Dakota	8,296'	Sandstone
Morrison	8,523'	Sandstone

TOTAL DEPTH 8,723'

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

Ojo Alamo	3,281'	Gas, water, sand
Pictured Cliffs	3,826'	Gas, water, sand
Lewis	3,911'	Gas, water, sand, shale
Cliffhouse	5,797'	Gas, water, sand, shale
Point Lookout	6,184'	Gas, water, sand, shale
Mancos	6,658'	Gas, water, sand, shale
Gallup	7,463'	Gas, oil, water, sand, shale
Dakota	8,357'	Gas, water, sand, shale
Morrison	8,582'	

CASING PROGRAM

Depth	Hole Diameter	Casing Diameter	Casing Weight and Grade	Cement
0-300'	12-1/4"	9 5/8"	J-55 36# ST&C	+/- 305 sxs Class B
0-3908	8-3/4"	7"	N_80 23# LT&C	+/- 792 sxs lite or 65:35 poz and +/- 166 sxs 50:50 poz
3908-TD	6-1/8"	4-1/2"	L-80 11.6# LT&C	+/- 656 sxs lite or 65:35 poz and +/- 206 sxs 50:50 poz

* Actual cement volume to be determined by caliper log.

Yields: Class B yield = 1.18 ft³/sx
 65:35 Poz yield = 1.62 ft³/sx
 50:50 Poz yield = 1.26 ft³/sx

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 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' -	3908'	Fresh water - Low solids non-dispersed
		M.W. 8.5 - 9.2 ppg
		Vis - 28 - 50 sec
		W.L. 15cc or less
3908' -	8,723'	Air - Deliver ± 2400 SCFM (Air) @ 1700 psi & 35 gpm fluid.

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: 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) H₂S: See attached H₂S plan in event H₂S is encountered.
- D) Estimated bottomhole pressure: 2720 psi

ANTICIPATED START DATE

June 1, 2006

COMPLETION

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

Jicarilla 457-10 #8D
 2,385' FWL 1,545' FEL, (NE 1/4 SW 1/4)
 Sec. 10 T. 30N R. 3W
 Rio Arriba County, New Mexico
 Contract 457

SURFACE CASING AND CENTRALIZER DESIGN

Proposed Total Depth: 8,723 '
 Proposed Depth of Surface Casing: 275 '
 Estimated Pressure Gradient: 0.31 psi/ft
 Bottom Hole Pressure at
 $0.31 \text{ psi/ft} \times 4,000' = \text{psi}$
 Hydrostatic Head of gas/oil mud:
 $0.22 \text{ psi/ft} \times 4,000' = \text{psi}$

Maximum Design Surface Pressure

Bottom Hole Pressure — Hydrostatic Head =
 $(0.31 \text{ psi/ft} \times 8,723') - (0.22 \text{ psi/ft} \times 8,723') =$
 $2,704 \text{ psi} - 1,919 \text{ psi} = 785 \text{ psi}$

Casing Strengths

9 5/8 J-55 24# ST&C

Wt.	Tension (lbs)	Burst (psi)	Collapse (psi)
36 #	394,000	3,520	2,020
40 #	452,000	2,950	2,570

Safety Factors

Tension (Dry): 1.8 Burst: 1.0 Collapse: 1.125
 Tension (Dry): $36 \text{ # / ft} \times 275' = 9,900 \text{ #}$
 Safety Factor = $\frac{394,000}{9,900} = 39.80$ ok
 Burst: Safety Factor = $\frac{3,520 \text{ psi}}{785 \text{ psi}} = 4.48$ ok
 Collapse: Hydrostatic = $0.052 \times 9.0 \text{ ppg} \times 275' = 129 \text{ psi}$
 Safety Factor = $\frac{2,020 \text{ psi}}{129 \text{ psi}} = 15.70$ ok

Use 275' 9.625 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 $\pm 200' (75' - 275')$

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

2-M SYSTEM

Black Hills Gas Resources, Inc.

ANNULAR PREVENTOR MAY BE SUBSTITUTED FOR DOUBLE GATE PREVENTORS
BOP PRESSURE TEST TO 1,000 PSI

