Form 3160-5
(September 2001)

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.

2006 NOV 16 PM 5 11

SUBMIT IN TRIPLICATE - Other instructions on reverse side

RECEIVED
070 FARMINGTON

5. Lease Serial No.
Contract 460

6. If Indian, Allottee or Tribe Name
Jicarilla Apache

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

1. Type of Well
☐ Oil Well ☑ Gas Well ☐ Other

8. Well Name and No.
Jicarilla 460-21 #1

2. Name of Operator
Black Hills Gas Resources, Inc. Contact: Lynn H. Benally

9. API Well No.
30-039-25866

3a. Address
3200 N 1st Street PO Box 249 Bloomfield, NM 87413

3b. Phone No. *(include area code)*
505-634-1111 ext 27

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

4. Location of Well *(Footage, Sec., T, R., M., or Survey Description)*
Surface: 1,456' FNL 1,476' FEL SE/NW Unit F Sec. 21 T30N R3W
Bottom Hole: 1,980' FNL 684' FEL SE/SE Unit H Sec. 21 T30N R3W

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	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other Convert Vertical well to Horizontal well
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

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 recomplete 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 recompletion 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 May 14, 1998. The well was given API number 30-039-25866. 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 and a new C-102, to change the well from a verical 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 1,980' FNL 684' FEL SE/SE UnitH Sec.21 T30N R3W

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

Cancel previous intent to PoA

RCVD NOV21'06
OIL CONS. DIV.
DIST. 3

HOLD C104 FOR Directional survey

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

Title Regulatory Compliance Coordinator

Signature

Date 11/16/2006

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by *(Signature)* Original Signed: Stephen Mason

Name *(Printed/Typed)*

Title

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

Date NOV 20 2006

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.

(Continued on next page)

NMOCD

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

RECEIVED
NOV 16 2006
BY:

RECEIVED
2006 NOV 16 PM 5 11

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	[2] Pool Code	[3] Pool Name
30-039-25866-00-00	72400	EAST BLANCO / PICTURE CLIFF

[4] Property Code	[5] Property Name	[6] Well Number
23336	JICARILLA 460-21	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
13925	BLACK HILLS GAS RESOURCES	7269'

[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
F	21	30-N	3-W		1456	NORTH	1476	WEST	RIO ARRIBA

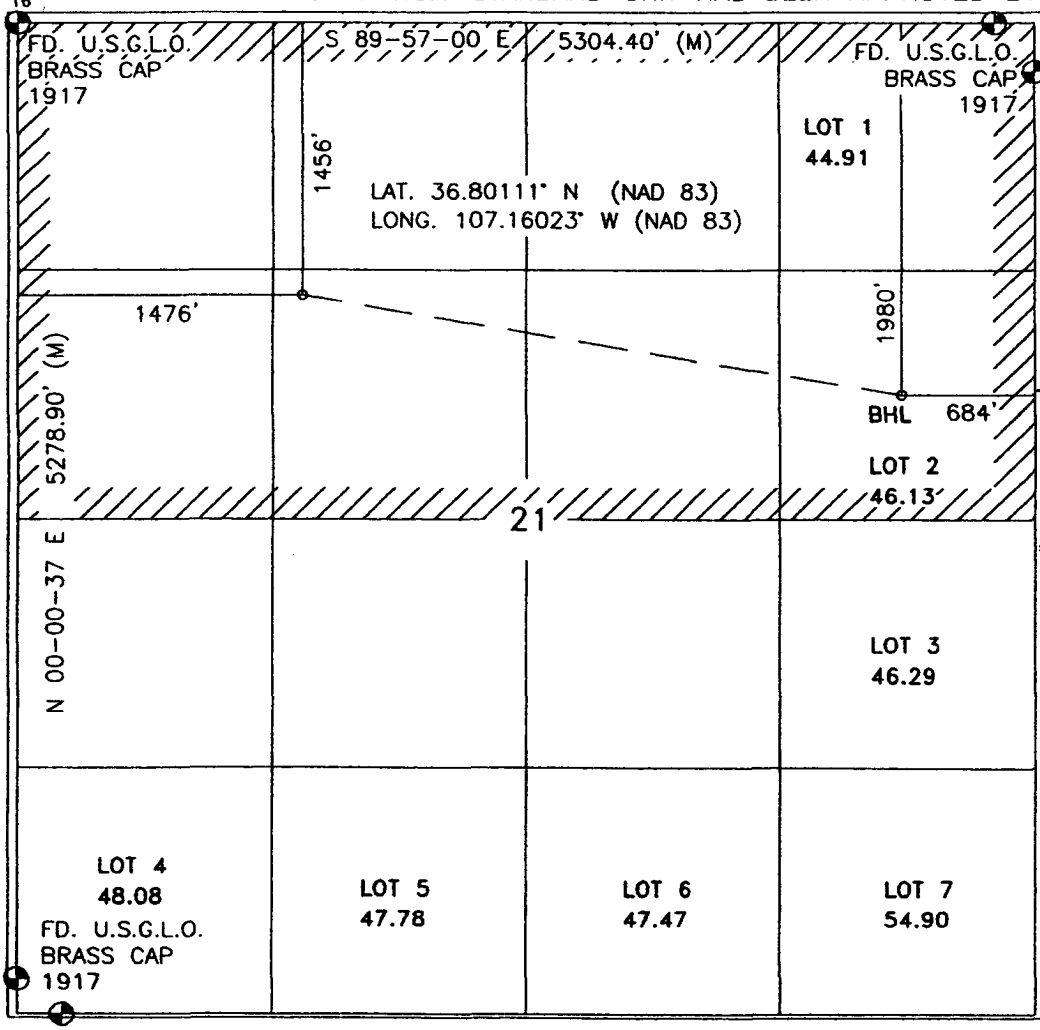
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	21	30-N	3-W		1980	NORTH	684	EAST	RIO ARRIBA

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
N/2-320			

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.

Daniel Manus 12/6/06
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.

MARCH 31, 1998
Date of Survey

Signature and Seal of Professional Surveyor:

NEW MEXICO 8894 REGISTERED PROFESSIONAL LAND SURVEYOR

12-06

8894
Certificate Number

WELL PAD CROSS-SECTIONAL DIAGRAM

COMPANY: BLACK HILLS GAS RESOURCES

LEASE: JICARILLA 460-21 No. 1

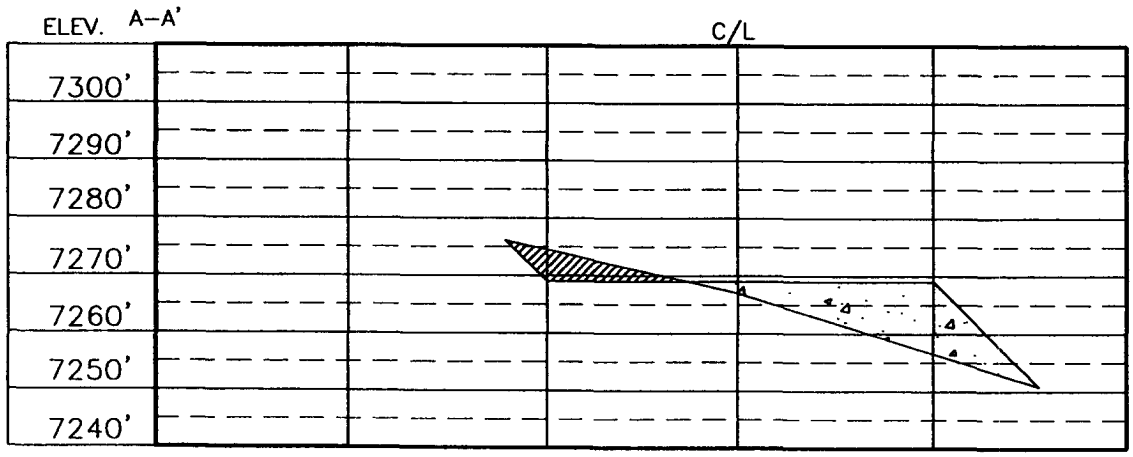
FOOTAGE: 1456' FNL 1476' FWL

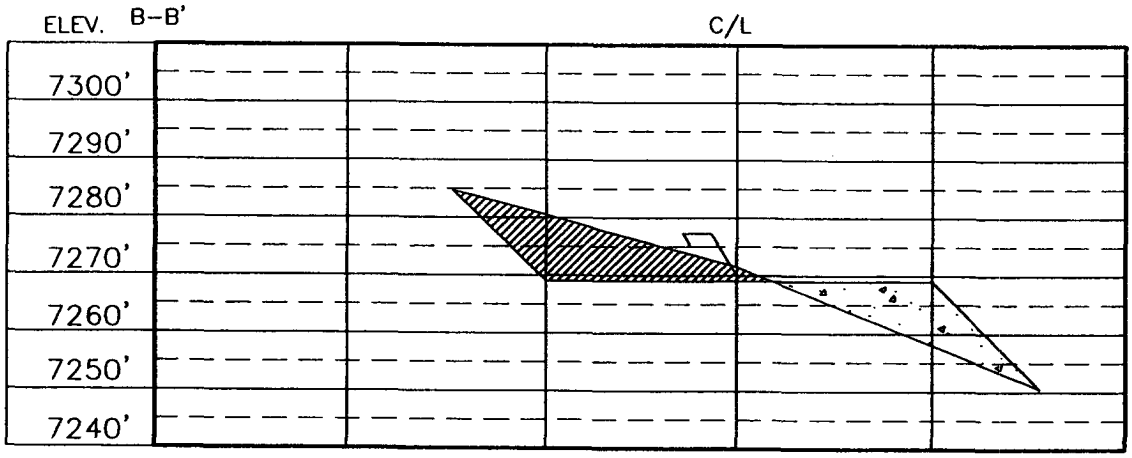
SEC.: 21, TWN: 30-N, RNG: 3-W, NMPM

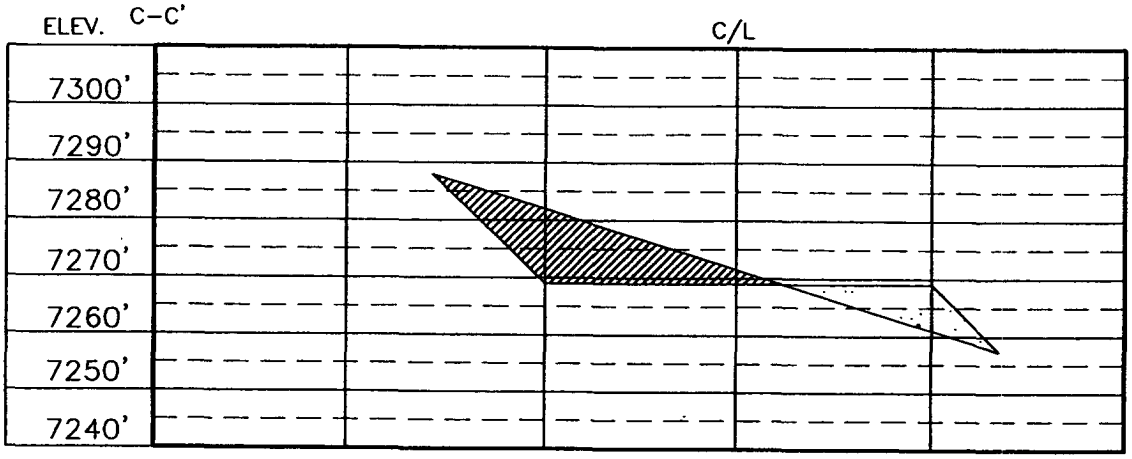
ELEVATION: 7269'

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.







REF. DWG. MN041PL8 WELL PAD DIAGRAM

REVISION:	DATE:	REVISED BY:
UPDATE PLAT FORMAT	11/13/06	A.G.

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. 8894

DRAWN BY: B.L. | CADFILE: MN041CF8 | DATE: 03/27/98

Rev#: MN041

WELL PAD DIAGRAM

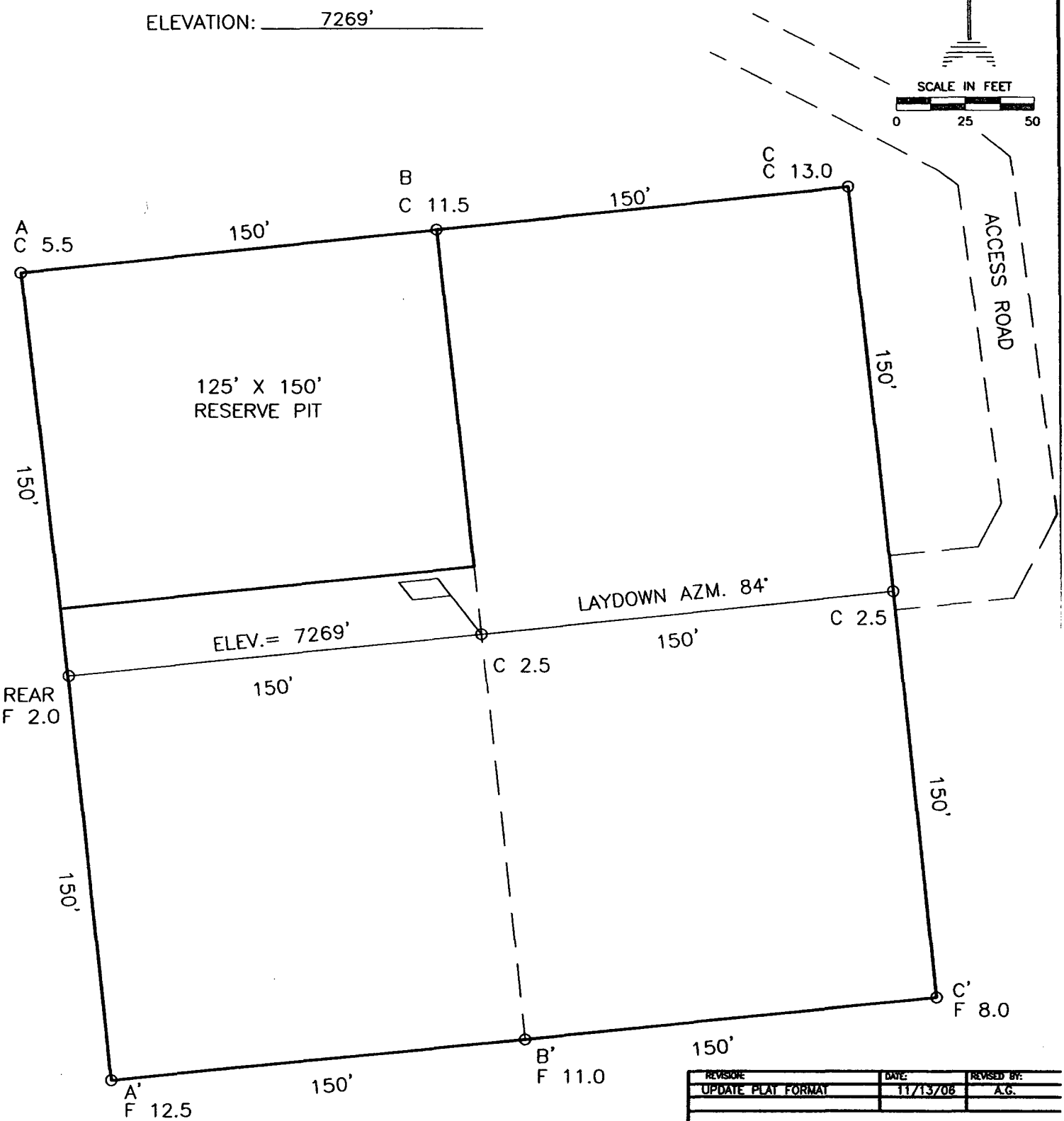
COMPANY: BLACK HILLS GAS RESOURCES

LEASE: JICARILLA 460-21 No. 1

FOOTAGE: 1456' FNL 1476' FWL

SEC.: 21 TWN: 30-N RNG: 3-W NMPM

ELEVATION: 7269'



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:	REVISED BY:
UPDATE PLAT FORMAT	11/13/08	A.G.

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. 8894

DRAWN BY: A.G.	CADFILE: MN041PL8
ROW#: MN041	DATE: 03/27/98


BLACK HILLS GAS RESOURCES
JICARILLA 460-21 No. 1
1456 FNL 1476 FWL
SEC. 21, T30N, R3W, N.M.P.M.
RIO ARRIBA COUNTY, NEW MEXICO
Bancos Lake
J I C A R I L L A
A P A C H E
I N D I A N
EAST BLANCO FACILITY
AMINE PLANT SITE
JIC.458-5 #2
JIC.458-5 #3
JIC. 457-4 #2
JIC. 457-4 #732
JIC. 457-3 #3
JIC.458-8 #6
JIC. 458-08 #13
JIC. 457-9 #2
JIC. 457-9 #2SJ
JIC.457-10 #11
JIC.458-8 #15
JIC.458-8 #9
JIC.458-8 #10
JIC.458-8 SJ #10
JIC. 457 #1
JIC.457-10 #8
JIC.457-9 #1
JIC.459 #8
459-18 #15
JIC.459-17 #9
JIC. 459-17 #24
JIC.460-16 #721
JIC.460-16 #1SJ
JIC. 460-16 #1
JIC. 460-16 #6
JIC. 460-15 #2
JIC. 460-15 #13
JIC. 460-15 #3
JIC.459 #1
Vaqueros
834
836
JIC. 460-15 #32
JIC.459-17 #743
JIC. 459-17 #11
JIC. 460-16 #741
JIC. 460-16 #4
JIC. 460-16 #5
JIC.459-17 #741
JIC.459-17 #10
837
JIC.459-20 #7
JIC.459 #2
JIC.460-21 #722
JIC.460-21 #2
JIC.460-21 #1
JIC. 462-22 #3
JIC.459-20 #8
JIC. 459-20 #34
JIC.462-22 #22
JIC.459-20 #12SJ
JIC.459-20 #12
JIC. 459-20 #17
JIC.460 #2
JIC. 462-22 #44
JIC.464-29 #16
JIC.464-29 #16RD
JIC.464-29 #14
JIC. 460-21 #44
JIC.462 #1
JIC.464 #7
JIC. 30-03-28 #14
JIC. 30-3-28 #2
JIC. 30-3-27 #4
JIC. 464-29 #9
832
JIC. 30-3-27 #21
16
20
21
22
8
10
15

Black Hills Gas Resources (BHGR)
Jicarilla 460-21 #1
Surface Location: 1,456' FNL 1,476' FWL (SE/NW)
Bottom Hole Location: 1,980' FNL 684' FEL (SE/SE)
Sec.21 T30N R3W
Rio Arriba County, New Mexico
Lease: Contract 460

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 April 6, 1998 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 – 7,268'

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

San Jose	Surface	Sandstone, shales & siltstones
Ojo Alamo	3,268'	Sandstone, shales & siltstones
Kirtland	3,493'	Sandstone, shales & siltstones
Fruitland	3,667'	Sandstone, shales & siltstones
Pictured Cliffs	3,784'	Sandstone, shales & siltstones
TOTAL DEPTH	**3,868'**	**TVD**

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

San Jose	surface	Fresh Water
Ojo Alamo	3,268'	Gas
Fruitland	3,667'	Gas
Pictured Cliffs	3,784'	Gas

HORIZONTAL DRILLING PROGRAM
Kick Off Point is estimated to be ± 3789' 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 (± 175 sxs Standard cement containing 2% $CaCl_2$ and 0.25lb/sx LCM) **
0-4000' TVD	7-7/8"	5 ½ "	J-55 15.5# LT&C New	TD to surface (Lead: ± 300 sxs lite standard cement. Tail: 400 sxs 50:50 poz containing 0.25 lb/sx LCM) * **
3789' 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 ft^3/sx (mixed at 15.6 lb/gal)

Production: Lite Standard Cement yield: = 1.59 ft^3/sx (mixed at 13.4 lb/gal)
50:50 poz yield = 1.27 ft^3/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_2S:	See attached H_2S plan in event H_2S is encountered.
D)	Estimated bottomhole pressure:	1,240 psi

ANTICIPATED START DATE

December 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
Lease/Well: Jicarilla 460-21 #1
Location: Rio Arriba Co., NM
Rig Name:
RKB:
G.L. or M.S.L.:

State/Country: NM/USA
Declination:
Grid:
File name: N:\BLACKH~1\2006\JIC460~1\46021122.SVY
Date/Time: 31-Oct-06 / 08:56
Curve Name: Jicarilla 460-21 #122 Plan 10-31-06

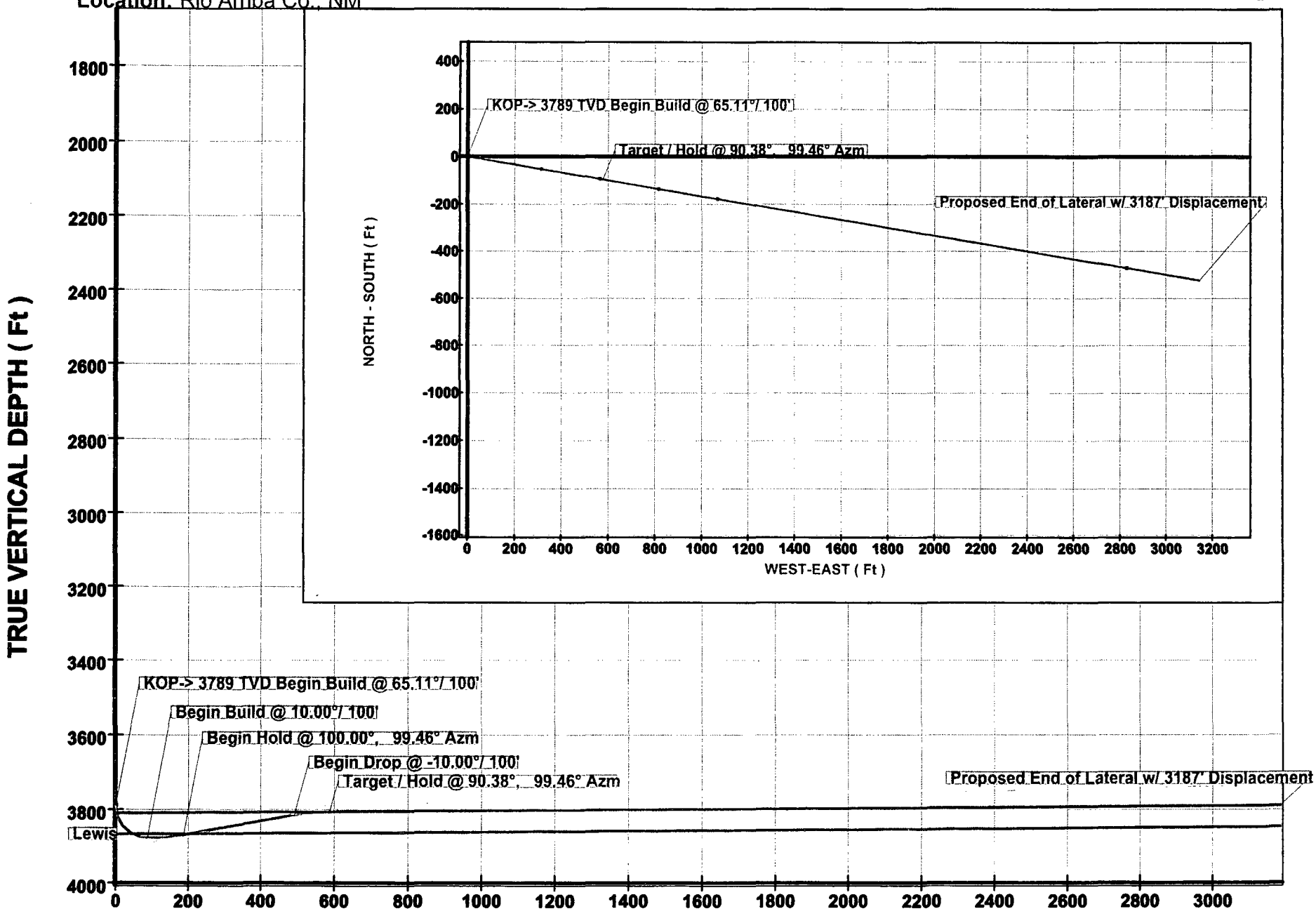
WINSERVE PROPOSAL REPORT

Minimum Curvature Method
Vertical Section Plane 99.46
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	CLOSURE Direction Deg	Dogleg Severity Deg/100
KOP-> 3789 TVD Begin Build @ 65.11°/ 100'									
3789.00	.00	99.46	3789.00	.00	.00	.00	.00	.00	.00
3819.00	19.53	99.46	3818.42	5.06	-.83	5.00	5.06	99.46	65.11
3849.00	39.07	99.46	3844.46	19.67	-3.23	19.41	19.67	99.46	65.11
3879.00	58.60	99.46	3864.11	42.15	-6.93	41.58	42.15	99.46	65.11
3909.00	78.13	99.46	3875.12	69.90	-11.49	68.95	69.90	99.46	65.11
10' Into Lewis - Begin Build @ 10.00°/ 100'									
3927.23	90.00	99.46	3877.00	88.00	-14.47	86.80	88.00	99.46	65.11
3957.23	93.00	99.46	3876.21	117.99	-19.40	116.38	117.99	99.46	10.00
3987.23	96.00	99.46	3873.86	147.89	-24.31	145.88	147.89	99.46	10.00
4017.23	99.00	99.46	3869.94	177.63	-29.20	175.21	177.63	99.46	10.00
Begin Hold @ 100.00°, 99.46° Azm									
4027.17	100.00	99.46	3868.30	187.43	-30.81	184.88	187.43	99.46	10.00
4127.18	100.00	99.46	3850.94	285.93	-47.01	282.03	285.93	99.46	.00
4227.18	100.00	99.46	3833.57	384.41	-63.20	379.18	384.41	99.46	.00
4327.18	100.00	99.46	3816.21	482.89	-79.39	476.32	482.89	99.46	.00
Begin Drop @ -10.00°/ 100'									
4335.18	100.00	99.46	3814.82	490.77	-80.68	484.09	490.77	99.46	.00
4365.18	97.00	99.46	3810.39	520.43	-85.56	513.35	520.43	99.46	10.00
4395.18	94.00	99.46	3807.51	550.29	-90.47	542.80	550.29	99.46	10.00
4425.18	91.00	99.46	3806.21	580.26	-95.39	572.36	580.26	99.46	10.00
Target / Hold @ 90.38°, 99.46° Azm									
4431.39	90.38	99.46	3806.13	586.47	-96.41	578.49	586.47	99.46	10.00
4431.40	90.38	99.46	3806.13	586.47	-96.42	578.49	586.47	99.46	4.27

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Vertical Section FT	N-S FT	E-W FT	CLOSURE Distance FT	CLOSURE Direction Deg	Dogleg Severity Deg/100
4531.40	90.38	99.46	3805.47	686.47	-112.86	677.13	686.47	99.46	.00
4631.40	90.38	99.46	3804.81	786.47	-129.29	775.77	786.47	99.46	.00
4731.40	90.38	99.46	3804.15	886.47	-145.73	874.41	886.47	99.46	.00
4831.40	90.38	99.46	3803.49	986.47	-162.17	973.04	986.47	99.46	.00
4931.40	90.38	99.46	3802.84	1086.46	-178.61	1071.68	1086.46	99.46	.00
5031.40	90.38	99.46	3802.18	1186.46	-195.05	1170.32	1186.46	99.46	.00
5131.40	90.38	99.46	3801.52	1286.46	-211.49	1268.96	1286.46	99.46	.00
5231.40	90.38	99.46	3800.86	1386.46	-227.93	1367.59	1386.46	99.46	.00
5331.40	90.38	99.46	3800.20	1486.45	-244.37	1466.23	1486.45	99.46	.00
5431.40	90.38	99.46	3799.54	1586.45	-260.81	1564.87	1586.45	99.46	.00
5531.40	90.38	99.46	3798.88	1686.45	-277.25	1663.50	1686.45	99.46	.00
5631.40	90.38	99.46	3798.22	1786.45	-293.69	1762.14	1786.45	99.46	.00
5731.40	90.38	99.46	3797.56	1886.45	-310.13	1860.78	1886.45	99.46	.00
5831.40	90.38	99.46	3796.90	1986.44	-326.57	1959.42	1986.44	99.46	.00
5931.40	90.38	99.46	3796.25	2086.44	-343.01	2058.05	2086.44	99.46	.00
6031.40	90.38	99.46	3795.59	2186.44	-359.45	2156.69	2186.44	99.46	.00
6131.40	90.38	99.46	3794.93	2286.44	-375.89	2255.33	2286.44	99.46	.00
6231.40	90.38	99.46	3794.27	2386.44	-392.33	2353.97	2386.44	99.46	.00
6331.40	90.38	99.46	3793.61	2486.43	-408.77	2452.60	2486.43	99.46	.00
6431.40	90.38	99.46	3792.95	2586.43	-425.21	2551.24	2586.43	99.46	.00
6531.40	90.38	99.46	3792.29	2686.43	-441.65	2649.88	2686.43	99.46	.00
6631.40	90.38	99.46	3791.63	2786.43	-458.08	2748.51	2786.43	99.46	.00
6731.40	90.38	99.46	3790.97	2886.42	-474.52	2847.15	2886.42	99.46	.00
6831.40	90.38	99.46	3790.31	2986.42	-490.96	2945.79	2986.42	99.46	.00
6931.40	90.38	99.46	3789.66	3086.42	-507.40	3044.43	3086.42	99.46	.00
7031.40	90.38	99.46	3789.00	3186.42	-523.84	3143.06	3186.42	99.46	.00
Proposed End of Lateral w/ 3187' Displacement									
7032.35	90.38	99.46	3788.99	3187.37	-524.00	3144.00	3187.37	99.46	.03

Job Number: 61xxx
Company: Black Hills
Lease/Well: Jicarilla 460-21 #1
Location: Rio Arriba Co., NM



Jicarilla 460-21 #1
1456' FNL 1476' FWL, (SE /4 NW /4)
Sec. 21 T 30 R 3W
Rio Arriba County, New Mexico
Contract 460

SURFACE CASING AND CENTRALIZER DESIGN

Proposed Total Depth:		3,868 '	
Proposed Depth of Surface Casing:		250 '	
Estimated Pressure Gradient:		0.31	psi/ft
Bottom Hole Pressure at		3,868 '	
0.31 psi/ft x 3,868 '	=	1,199	psi
Hydrostatic Head of gas/oil mud:		0.22	psi/ft
0.22 psi/ft x 3,868 '	=	851	psi

Maximum Design Surface Pressure

Bottom Hole Pressure	–	Hydrostatic Head	=
(0.31 psi/ft x 3,868 ')	–	(0.22 psi/ft x 3,868 ')	=
1,199 psi	–	851 psi	= 348 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 / 6,000 = 40.67 ok

Burst: Safety Factor = 2,950 psi / 348 psi = 8.47 ok

Collapse: Hydrostatic = 0.052 x 9.0 ppg x 250 ' = 117 psi

Safety Factor = 1,370 psi / 117 psi = 11.71 ok

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.