

For temporary pits, closed-loop systems, and below-grade tanks, submit to the appropriate NMOCD District Office.
For permanent pits and exceptions submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

Pit, Closed-Loop System, Below-Grade Tank, or
Proposed Alternative Method Permit or Closure Plan Application

Type of action: ☒ Permit of a pit, closed-loop system, below-grade tank, or proposed alternative method
☐ Closure of a pit, closed-loop system, below-grade tank, or proposed alternative method
☐ Modification to an existing permit
☐ Closure plan only submitted for an existing permitted or non-permitted pit, closed-loop system, below-grade tank, or proposed alternative method

Instructions: Please submit one application (Form C-144) per individual pit, closed-loop system, below-grade tank or alternative request

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1. Operator: Black Hills Gas Resources OGRID #: 013925
Address: 3200 North 1st Street
Facility or well name: Jicarilla 29-02-23 #121
API Number: 30-039-30747 OCD Permit Number: _____
U/L or Qtr/Qtr Unit E SW/NW Section 23 Township 29 N Range 02W County: Rio Arriba
Center of Proposed Design: Latitude 36.712873° N Longitude 107.018193° W NAD: ☐ 1927 ☒ 1983
Surface Owner: ☐ Federal ☐ State ☐ Private ☒ Tribal Trust or Indian Allotment

2. ☒ **Pit:** Subsection F or G of 19.15.17.11 NMAC

Temporary: ☒ Drilling ☐ Workover

☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A

☒ Lined ☐ Unlined Liner type: Thickness 20 mil ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other _____

☐ String-Reinforced

Liner Seams: ☐ Welded ☒ Factory ☐ Other _____ Volume: 22,000 bbl Dimensions: L 120' x W 95' x D 10'

3. ☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC

Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Applies to activities which require prior approval of a permit or notice of intent)

☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other _____

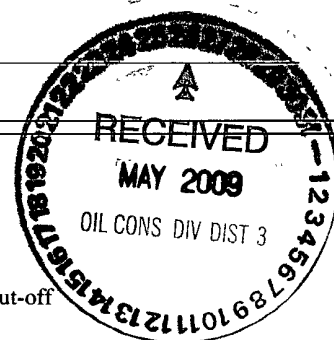
☐ Lined ☐ Unlined Liner type: Thickness _____ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other _____

Liner Seams: ☐ Welded ☐ Factory ☐ Other _____

4. ☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC
Volume: _____ bbl Type of fluid: _____
Tank Construction material: _____
☐ Secondary containment with leak detection ☐ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☐ Other _____
Liner type: Thickness _____ mil ☐ HDPE ☐ PVC ☐ Other _____

5. ☐ **Alternative Method:**

Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.



6.

Fencing: Subsection D of 19.15.17.11 NMAC (*Applies to permanent pits, temporary pits, and below-grade tanks*)

- ☐ Chain link, six feet in height, two strands of barbed wire at top (*Required if located within 1000 feet of a permanent residence, school, hospital, institution or church*)
- ☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet
- ☒ Alternate. Please specify Hog wire with one strand of barbed wire on the top

7.

Netting: Subsection E of 19.15.17.11 NMAC (*Applies to permanent pits and permanent open top tanks*)

- ☐ Screen ☐ Netting ☐ Other _____
- ☐ Monthly inspections (If netting or screening is not physically feasible)

8.

Signs: Subsection C of 19.15.17.11 NMAC

- ☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers
- ☒ Signed in compliance with 19.15.3.103 NMAC

9.

Administrative Approvals and Exceptions:

Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance.

Please check a box if one or more of the following is requested, if not leave blank:

- ☒ Administrative approval(s): Requests must be submitted to the appropriate division district or the Santa Fe Environmental Bureau office for consideration of approval.
- ☐ Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

Instructions: The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Applicant must attach justification for request. Please refer to 19.15.17.10 NMAC for guidance. Siting criteria does not apply to drying pads or above-grade tanks associated with a closed-loop system.

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to temporary, emergency, or cavitation pits and below-grade tanks) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☒ No ☐ NA
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to permanent pits) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☐ No ☒ NA
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	☐ Yes ☒ No
Within a 100-year floodplain. - FEMA map	☐ Yes ☒ No

11.

Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
- ☒ Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC
- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☒ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____ or Permit Number: _____

12.

Closed-loop Systems Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Geologic and Hydrogeologic Data (only for on-site closure) - based upon the requirements of Paragraph (3) of Subsection B of 19.15.17.9
- ☐ Siting Criteria Compliance Demonstrations (only for on-site closure) - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____

☐ Previously Approved Operating and Maintenance Plan API Number: _____ (Applies only to closed-loop system that use above ground steel tanks or haul-off bins and propose to implement waste removal for closure)

13.

Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Climatological Factors Assessment
- ☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Quality Control/Quality Assurance Construction and Installation Plan
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Nuisance or Hazardous Odors, including H₂S, Prevention Plan
- ☐ Emergency Response Plan
- ☐ Oil Field Waste Stream Characterization
- ☐ Monitoring and Inspection Plan
- ☐ Erosion Control Plan
- ☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

14.

Proposed Closure: 19.15.17.13 NMAC**Instructions:** Please complete the applicable boxes, Boxes 14 through 18, in regards to the proposed closure plan.

Type: ☒ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Closed-loop System

☐ Alternative

Proposed Closure Method: ☐ Waste Excavation and Removal

☐ Waste Removal (Closed-loop systems only)

☒ On-site Closure Method (Only for temporary pits and closed-loop systems)

☒ In-place Burial ☐ On-site Trench Burial

☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

15.

Waste Excavation and Removal Closure Plan Checklist: (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
- ☐ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings)
- ☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
- ☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

16.

Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only: (19.15.17.13.D NMAC)

Instructions: Please identify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please provide the information below) ☐ No

Required for impacted areas which will not be used for future service and operations:

☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.

Siting Criteria (regarding on-site closure methods only): 19.15.17.10 NMAC

Instructions: Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17.10 NMAC for guidance.

Ground water is less than 50 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Ground water is between 50 and 100 feet below the bottom of the buried waste - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Ground water is more than 100 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☒ Yes ☐ No ☐ NA
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	☐ Yes ☒ No
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	☐ Yes ☒ No
Within a 100-year floodplain. - FEMA map	☐ Yes ☒ No

18.

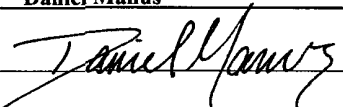
On-Site Closure Plan Checklist: (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
- ☐ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☐ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
- ☒ Waste Material Sampling Plan - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
- ☐ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)
- ☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
- ☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

19.

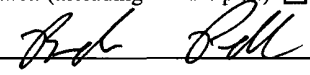
Operator Application Certification:

I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name (Print): Daniel ManusTitle: Regulatory TechnicianSignature: Date: May 21, 2009e-mail address: daniel.manus@blackhillscorp.comTelephone: (505) 634-1111 extension 28

20.

OCD Approval: ☒ Permit Application (including closure plan) ☐ Closure Plan (only) ☐ OCD Conditions (see attachment)

OCD Representative Signature: Approval Date: 6-23-09Title: Enviro/spec

OCD Permit Number: _____

21.

Closure Report (required within 60 days of closure completion): Subsection K of 19.15.17.13 NMAC

Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☐ Closure Completion Date: _____

22.

Closure Method:

☐ Waste Excavation and Removal ☐ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)
☐ If different from approved plan, please explain.

23.

Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:

Instructions: Please identify the facility or facilities for where the liquids, drilling fluids and drill cuttings were disposed. Use attachment if more than two facilities were utilized.

Disposal Facility Name: _____

Disposal Facility Permit Number: _____

Disposal Facility Name: _____

Disposal Facility Permit Number: _____

Were the closed-loop system operations and associated activities performed on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please demonstrate compliance to the items below) ☐ No

Required for impacted areas which will not be used for future service and operations:

- ☐ Site Reclamation (Photo Documentation)
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique

24.

Closure Report Attachment Checklist: *Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.*

- ☐ Proof of Closure Notice (surface owner and division)
☐ Proof of Deed Notice (required for on-site closure)
☐ Plot Plan (for on-site closures and temporary pits)
☐ Confirmation Sampling Analytical Results (if applicable)
☐ Waste Material Sampling Analytical Results (required for on-site closure)
☐ Disposal Facility Name and Permit Number
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique
☐ Site Reclamation (Photo Documentation)

On-site Closure Location: Latitude _____

Longitude _____

NAD: ☐ 1927 ☐ 1983

25.

Operator Closure Certification:

I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): _____

Title: _____

Signature: _____

Date: _____

e-mail address: _____

Telephone: _____



Black Hills Gas Resources

Jicarilla 29-02-23 #121

Surface Location: 1,775' FNL 950' FWL (SW/NW) Unit E

Sec.23 T29N R2W

Rio Arriba County, New Mexico

Lease: Contract MDA 701-98-0013, Tract 4

Hydro-geologic data for Jicarilla 29-02-23 #121

- Directions to location: From Bloomfield, New Mexico, travel approximately 55 miles east on US Highway 64 to the intersection of US Highway 64 and NM 537. Turn right (south) on NM 537 and travel south for approximately 7.5 miles. Turn right (west) on unnamed existing road and travel approximately 700 feet. Turn right (north) on unnamed road and travel 0.75 miles to the well-pad located west of HWY 537.
- The Project Area is roughly 25 miles southeast of Navajo Reservoir, and roughly 14 miles southwest of the town of Dulce, New Mexico. The well site is located in the northeastern portion of the San Juan Basin, completely within Rio Arriba County and within the boundaries of the Jicarilla Apache Reservation. Additionally for reference, the well locations can be found on the Bixler Ranch, N.M. (1963) and Cement Lake, N.M. (1963) U.S. Geological Survey (USGS) 7.5' topographic quadrangle maps (Geo Community 2007). The well is located on the south side of U.S. Highway 64 and would be accessed from existing roads branching from Jicarilla Road J-40.
- The lithology of the San Juan Basin includes mainly shales and sandstones of varying grain size but also includes coals, some carbonates, and igneous rocks. Sedimentary rocks display an aggregate thickness of over 14,000 feet near the Colorado-New Mexico state line. The elevation of the top of the Precambrian basement rocks is more than 7,500 feet below sea level at the deepest part of the Basin. Formations representing the Permian period through the Pennsylvanian period consist mainly of shales and sandstones. The Cretaceous-age rocks represent 6,000 feet of sandstones, siltstones, shales, and coals (Landes 1970). The predominant hydrocarbon-producing reservoirs are the Cretaceous Pictured Cliffs, Mesaverde Group, and Dakota Formations. They contain both source rocks and natural reservoirs for oil and gas (*see attached Generalized Hydrogeologic Cross Section of San Juan Basin*).
 - Depth to nearest groundwater in the following Townships and Ranges (*Information provided by Jicarilla Apache Natural Resources Division, Department of Water Resources water well information*):
 - Township 30 Range 3 West ranges from 402-600 feet below ground surface (bgs);
 - Township 29 Range 2 West ranges from 235-475 feet bgs;
 - North half of Township 29 Range 3 West ranges from 315-350 feet bgs;
 - North half of Township 28 Range 2 West is 252 feet bgs.

Hydro-geologic Data for Jicarilla 29-02-15 #24

References

Bureau of Indian Affairs (BIA), Jicarilla Agency 1994, *Programmatic Environmental Assessment for leasing, Exploration and Development of Oil and Gas Resources on the Jicarilla Apache Reservation*.

Landes, Kenneth K. 1970. *Petroleum Geology of the United States*. Wiley-Interscience, John Wiley & Sons. New York, New York.

Manley, K., G.R. Scott, and R.A. Wobus, 1987. Geologic map of the Aztec 1 x 2 degree quadrangle, northwestern New Mexico and Southern Colorado: *U.S. Geological Survey Miscellaneous Investigations Series Map I-1730* (1:250,000).

Natural Resources Conservation Service. 2006. Web Soil Survey of Jicarilla Apache Nation, Parts of Rio Arriba and Sandoval Counties, New Mexico. Available online at <http://websoilsurvey.nrcs.usda.gov/app/>.

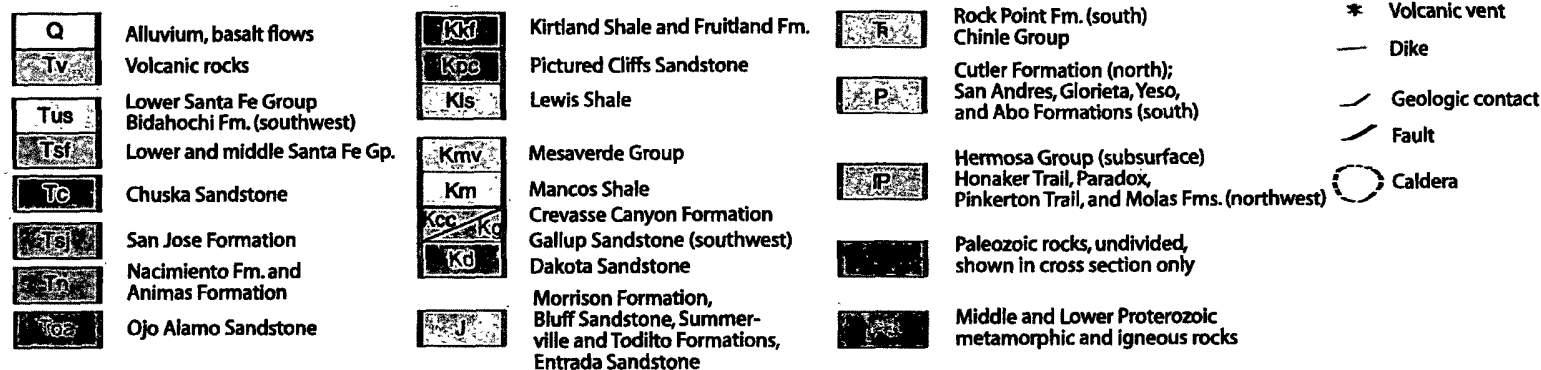


FIGURE 5—Generalized geologic map of the San Juan Basin (Beaumont, 1982; Green et al., 1991).

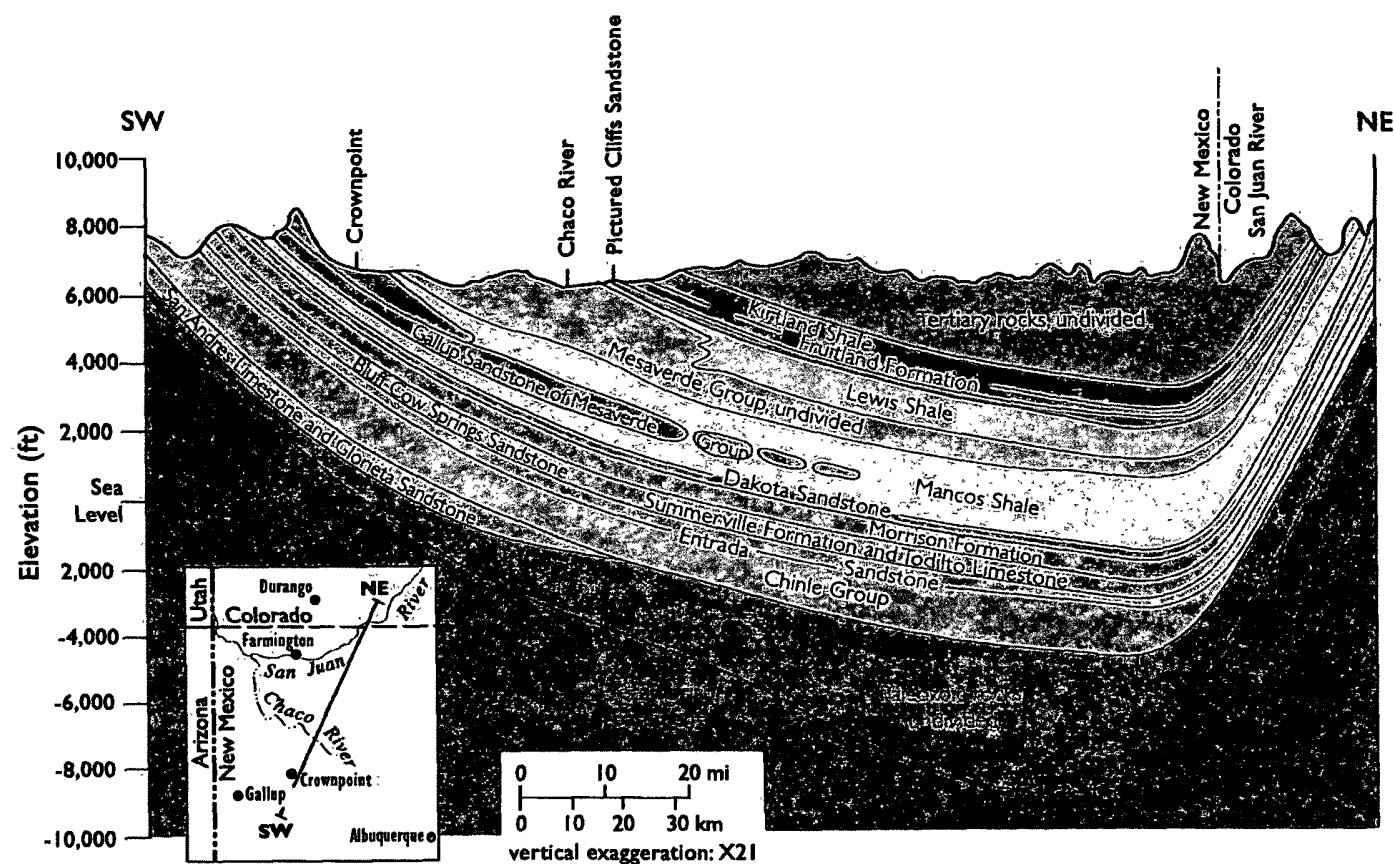
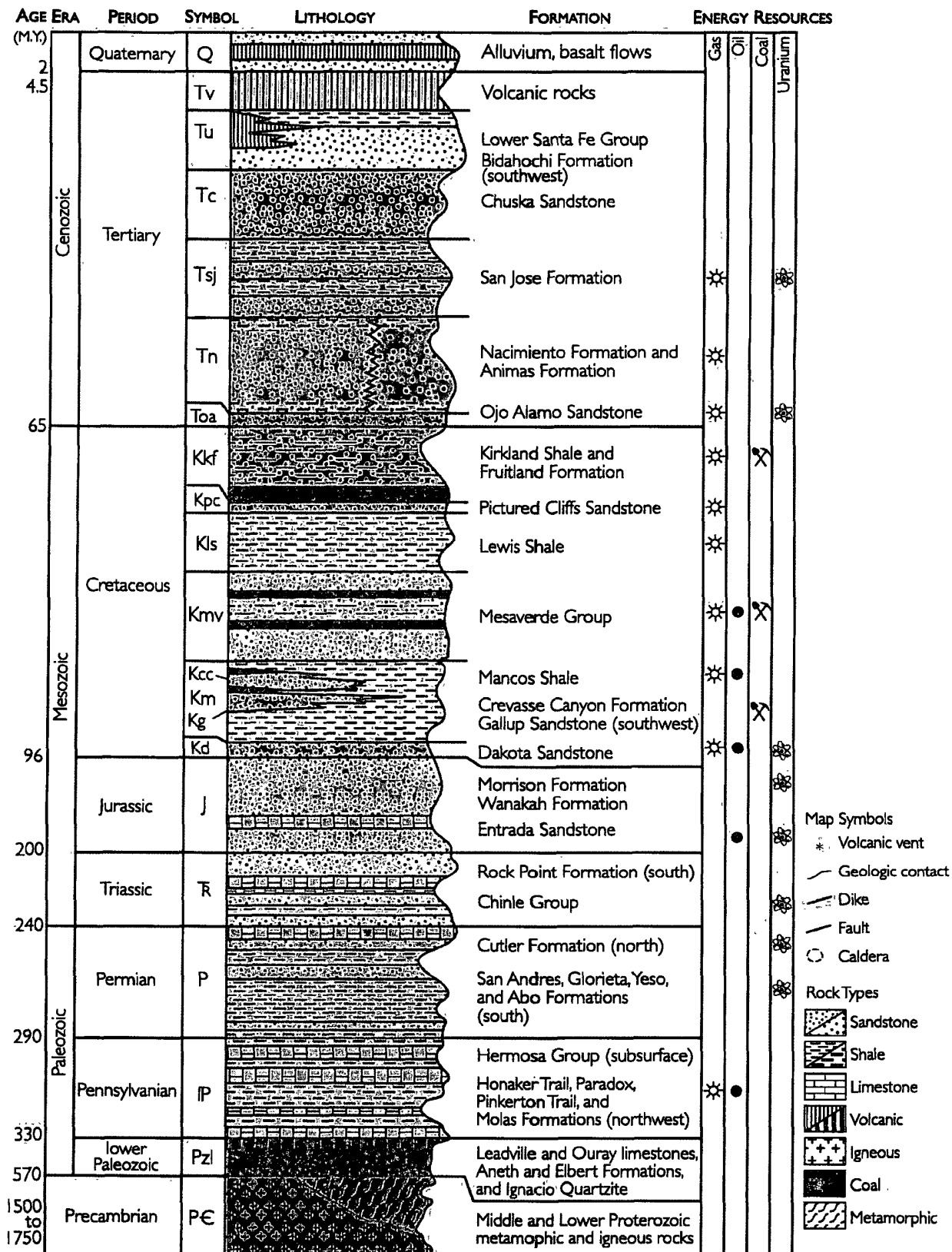
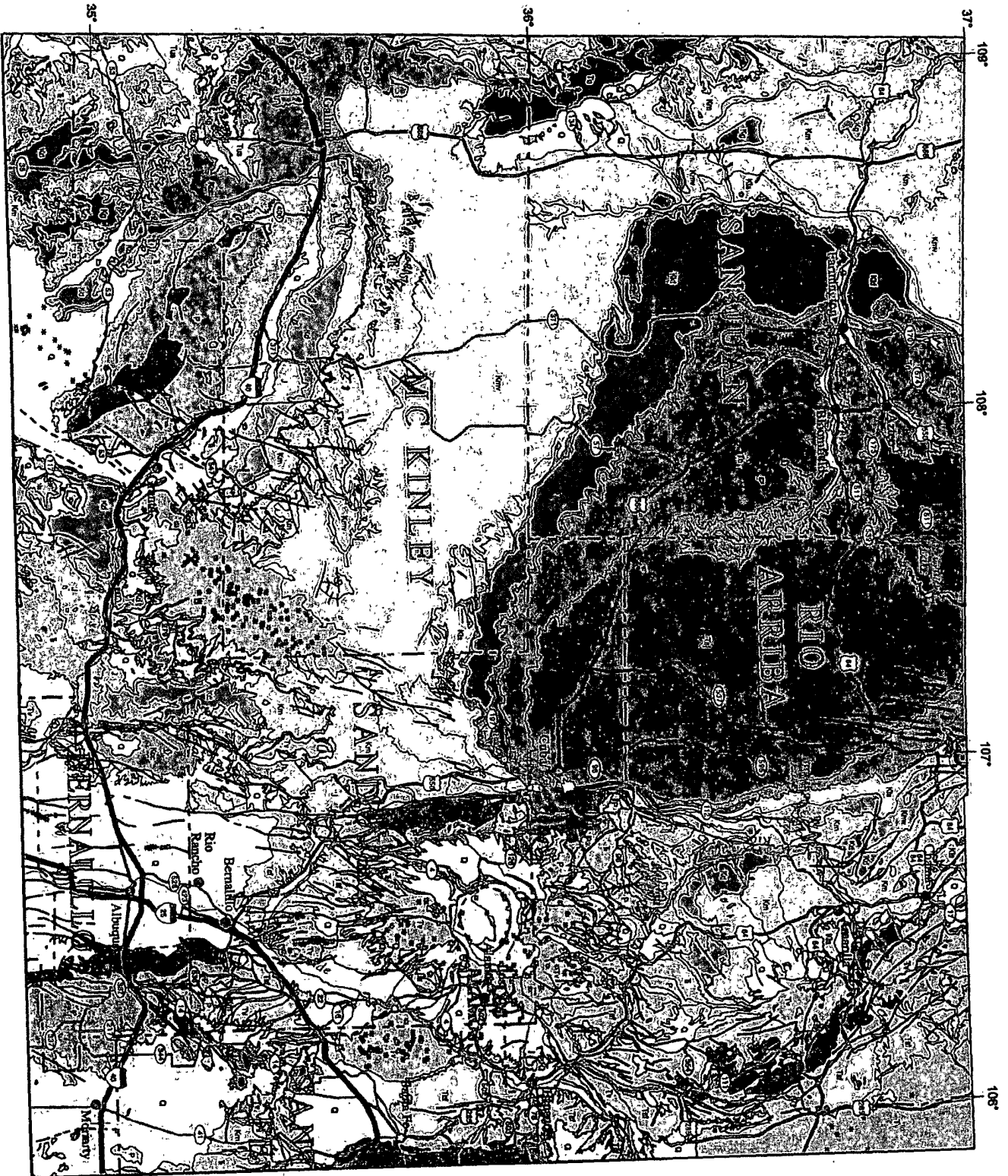


FIGURE 6—Generalized geologic cross section of the San Juan Basin (modified from Stone et al., 1983).







Black Hills Gas Resources

Jicarilla 29-02-23 #121

Surface Location: 1,775' FNL 950' FWL (SW/NW) Unit E

Sec.23 T29N R2W

Rio Arriba County, New Mexico

Lease: Contract MDA 701-98-0013, Tract 4

Siting Criteria Compliance Demonstrations

- **Depth to groundwater**

Jicarilla 29-02-23 #121

Section 23; Township 29 North; Range 2 West

Depth to nearest ground water over 185 feet below pit bottom.

Depth to nearest groundwater in the following Townships and Ranges (*Information provided by Jicarilla Apache Natural Resources Division, Department of Water Resources water well information*):

- Township 30 Range 3 West ranges from 402-600 feet below ground surface (bgs);
- Township 29 Range 2 West ranges from 235-475 feet bgs;
- North half of Township 29 Range 3 West ranges from 315-350 feet bgs;
- North half of Township 28 Range 2 West is 252 feet bgs.

- **Distance to water course**

- The pit is not located within 300 feet of a continuous watercourse, see attached topo map.
- The pit is located over 0.4 miles southeast of the dry La Jara Canyon Wash. See attached topo and aerial photo.

- **Distance to permanent residence**

- The pit is not located within 300 feet of a permanent residence, school, hospital, or institution, see attached aerial image generated from the Natural Resources Conservation Service website, <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>.

- **Distance to water well/Within incorporated municipal boundary**

- The pit is not located within 500 feet of a private domestic water source or 1000 feet from any other fresh water well or spring. There are no identified water wells or stock water wells within a radius of 500 feet.
- The pit is not located within any incorporated municipal water boundary; location is on the Jicarilla Apache Reservation with Dulce, NM being the closest city, which is over 18 miles northeast.



Black Hills Gas Resources

- **Distance to wetland**
 - The pit is not within 500 feet of a wetland. The Environmental Assessment for the area did not identify wetlands within a 500-foot radius of the location. In addition, there is no digital information for this area from the US Fish and Wildlife resources, see attached map generated from the US Fish and Wildlife website. <http://wetlandsfws.er.usgs.gov/wtlnds/launch.html>
- **Distance to subsurface mine**
 - The pit does not overlie any subsurface mine, see attached map generated by the Mines, Mills, and Quarries in New Mexico 2001.
- **Within an unstable area**
 - The pit is not located in an unstable area, see attached map generated by Decision-makers Field Guide 2002.
- **FEMA Map (100 Year Floodplain)**
 - The FEMA Map for the Jicarilla 29-02-23 #121 is unavailable due to its location on the Jicarilla Apache Reservation. FEMA does not provide information for Indian Reservations, Forest Service Lands, and Military Installations.

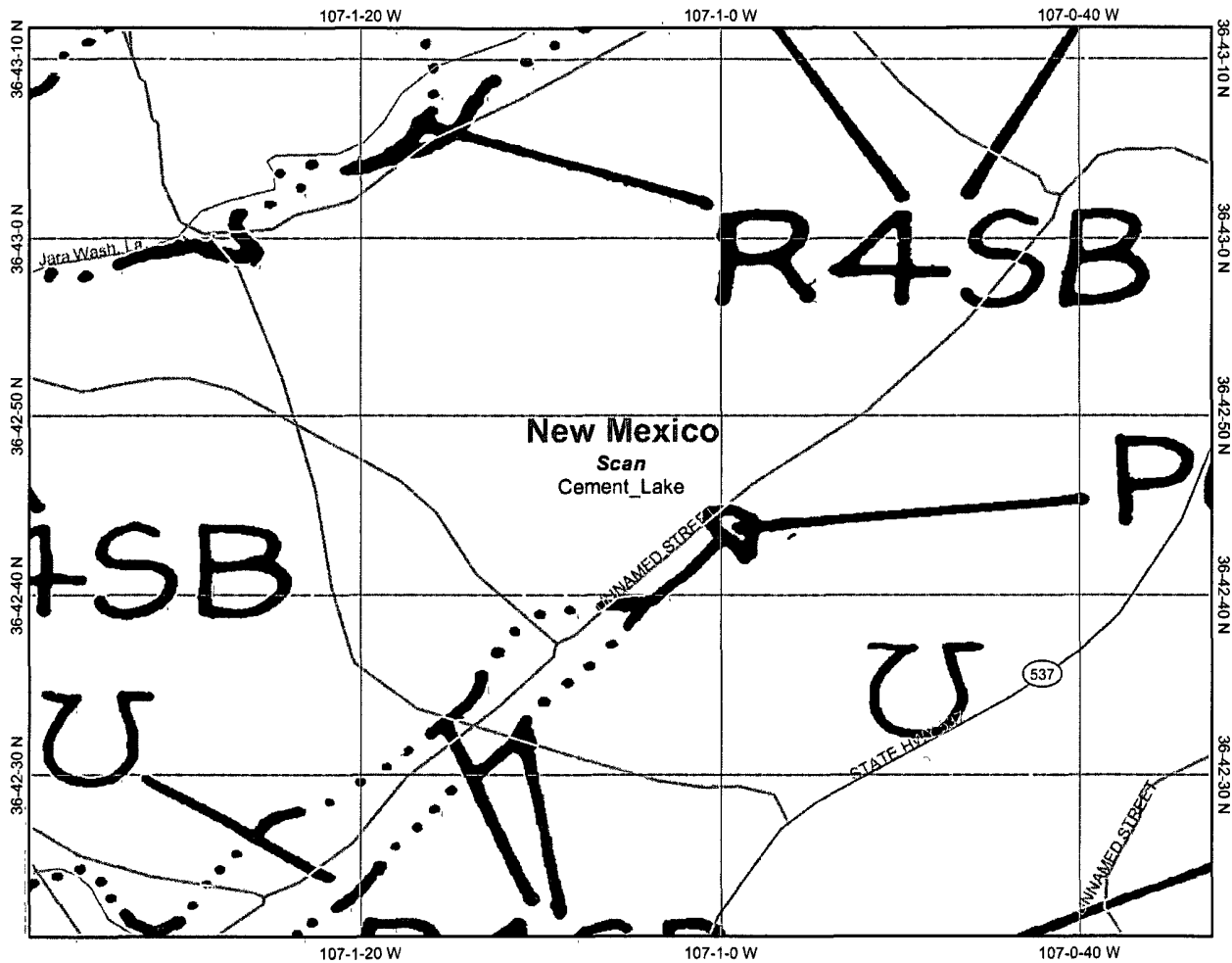


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Shopping Cart (Free)



Jicarilla 29-02-23 #121



Map center: 36° 42' 46" N, 107° 1' 5" W

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Notes Center of Map is Center of Pit



Legend

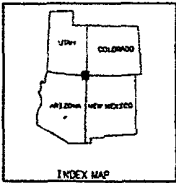
Ohio_wet_scan

- 0
- 1
- Out of range
- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- Cities
- USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Streams
- Counties 100K
- States 100K
- South America
- North America



Scale: 1:10,988

SAN JUAN RIVER BASIN



LEGEND

SAN JUAN RIVER

TRIBUTARIES

TOWNS

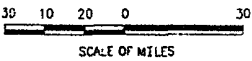
IMPORTANT GAUGING STATIONS

BLUFF

FOUR CORNERS

SHIPROCK

FARMINGTON



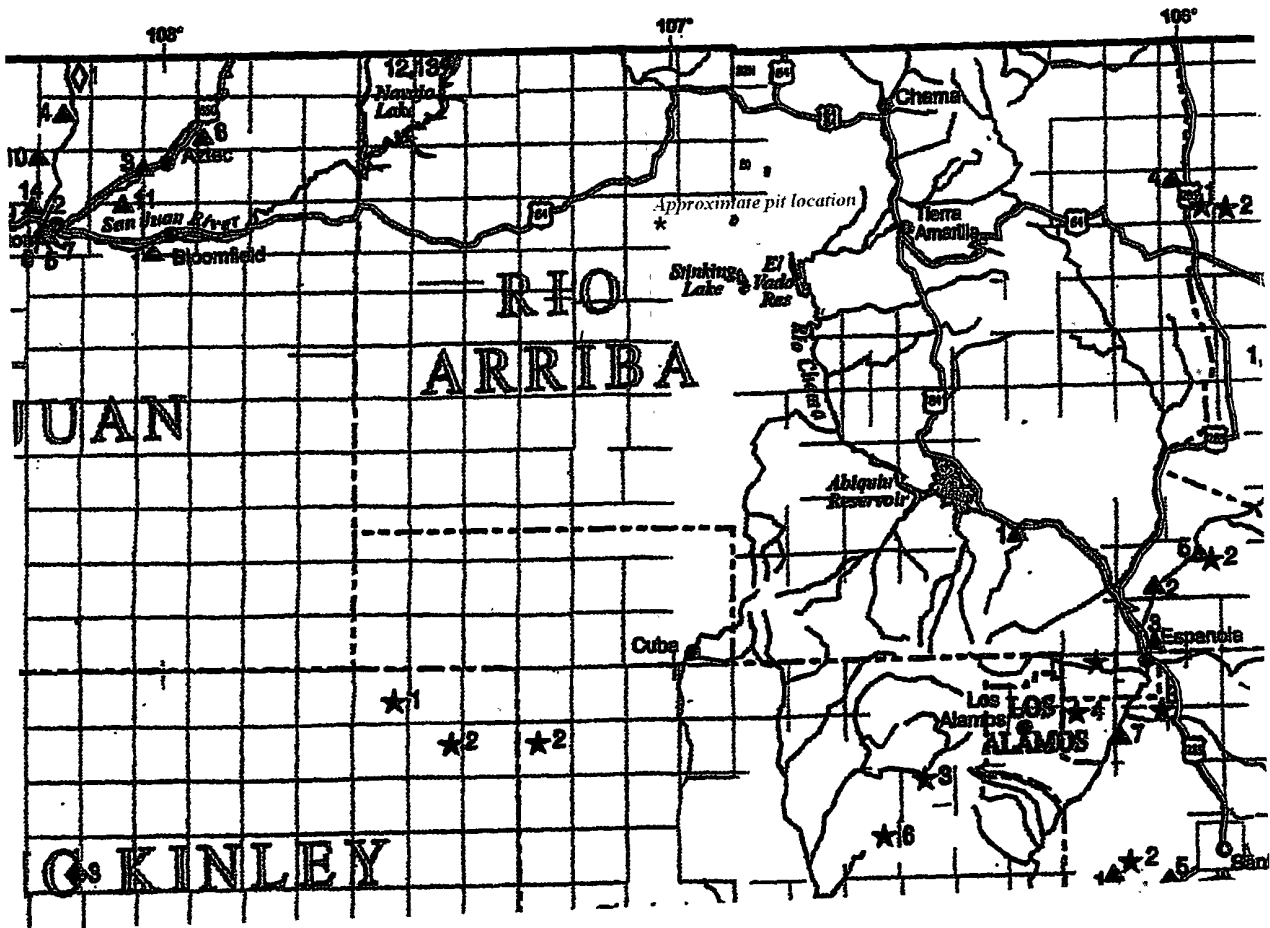
Approximate pit location for Jicarilla 29-02-23 #121

Mines, Mills, and Quarries in New Mexico

Spring 2001

Mining and Minerals Division New Mexico Energy

Jicarilla 29-02-23 #121



PO Box 395, Logan, NM 88426
Surface Estate: Same

RICHARDSON PIT ▲2
Aggregate/Sand & Gravel

Corn Construction Co.
PO Box 92797, Albuquerque, NM 87199
(505) 822-1776
Type of Operation: Surface Mine
Status: Active Mining
Location: Sec 12 T13N R36E
USGS Quad: Martin Draw
Mineral Estate: Private Land; Tom Mitchell c/o Jim Richardson; Rte. 1, Box 26, Bard, NM 88411
Surface Estate: Same

Rio Arriba County

ABIQUIU SAND & GRAVEL PIT ▲1
Sand & Gravel

Abiquiu Sand & Gravel
PO Box 406, Abiquiu, NM 87510
(505) 685-4666
Type of Operation: Surface Mine
Status: Under Development
Location: Sec 19 T23N R6E
USGS Quad: Abiquiu
Mineral Estate: Private Land; Bob A. Trujillo; PO Box 406, Abiquiu, NM 87510
Surface Estate: Same

EL GUIQUE PIT ▲2
Sand & Gravel

Espanola Transit Mix Co.
PO Box 38, Espanola, NM 87532
(505) 753-2176
Type of Operation: Surface Mine
Status: Active Mining
MSHA Number: 2901712
Location: Sec 26 T22N R8E
USGS Quad: San Juan Pueblo
Mineral Estate: Private Land; Piedra Inc.; PO Box 38, Espanola, NM 87532
Surface Estate: Same

LOWDERMILK ▲3
Sand & Gravel

Espanola Transit Mix Co.
PO Box 38, Espanola, NM 87532
(505) 753-2176
Type of Operation: Mill
Status: Active Mining
MSHA Number: 2901990
Location: NW Sec 26 T21N R8E
USGS Quad: San Juan Pueblo
Mineral Estate: Indian Land; San Juan Pueblo
Surface Estate: Espanola Transit Mix; PO Box 38, Espanola, NM 87532

RED HILL MINE (PORTABLE CRUSHER NO. 1) ▲4
Scoria

Mountain West-Colorado Aggregate of NM
2255 Lava Lane, Alamosa, CO 81101

(719) 589-4925
Type of Operation: Surface Mine
Status: Active Mining
MSHA Number: 2902158
Location: SW/SW Sec 5 T29N R9E
USGS Quad: San Antonio Mountain
Mineral Estate: Federal; BLM - Taos Resource Area; 224 Montevideo Plaza, Cruz Alts, Taos, NM 87571
Surface Estate: Joseph Garcia; PO Box 127, El Rito, NM 87530

VELARDE PIT ▲5
Sand & Gravel

Espanola Transit Mix Co.
PO Box 38, Espanola, NM 87532
(505) 753-2176
Type of Operation: Surface Mine
Status: Active Mining
MSHA Number: 2901712
Location: Sec 3 T22N R9E
USGS Quad: Velarde
Mineral Estate: Private Land; Cook Brothers; PO Box 38, Espanola, NM 87532
Surface Estate: Same

Roosevelt County

NUNN PIT ▲1
Crushed Rock/Caliche/Base Course

K. Barnett And Sons, Inc.
PO Box 960, Clovis, NM 88102-0960
(505) 762-4407
Type of Operation: Surface Mine
Status: Active Mining
MSHA Number: 2901543
Location: Sec 22 T2S R33E
USGS Quad: Delphos
Mineral Estate: Private Land; Mrs. Mary Lynch; South Floyd Hwy, Portales, NM 88130
Surface Estate: Same

VALLEY TOLAR PIT # 1 ▲2
Base Course/Fill Dirt/Sand & Gravel/Crushed Rock/Other

Valley Inc.
PO Box 344, Portales, NM 88130
(505) 355-7587
Type of Operation: Other
Status: Active Mining
MSHA Number: 2901797
Location: NE Sec 13 T3N R29E
USGS Quad: Krider
Mineral Estate: Private Land; Forrest Atchley; PO Box 272, Clayton, NM 88415
Surface Estate: Same

San Juan County

3 HATS ▲1
Sand & Gravel/Aggregate

LaFarge/4 Corners Division
PO Box 160, Aztec, NM 87410
(505) 334-1400



Black Hills Gas Resources

Jicarilla 29-02-23 #121

Surface Location: 1,775' FNL 950' FWL (SW/NW) Unit E

Sec.23 T29N R2W

Rio Arriba County, New Mexico

Lease: Contract MDA 701-98-0013, Tract 4

Design and Construction Plan for Drilling Pit Jicarilla 29-02-23 #121

In accordance with Rule 19.15.17 NMAC the following information describes the design and construction of temporary pits for Black Hills Gas Resources (BHGR). The following describes BHGR standard procedures for temporary pits, a separate plan will be submitted for any temporary pit which does not conform to this plan

BHGR design and construction activities will use the following methods;

- BHGR will operate and maintain its temporary pits to contain drilling liquids and solids, in a manner to prevent contamination of fresh water and protection of the environment.
- Prior to constructing the pit, topsoil will be stockpiled on the well pad for later use in restoration/reclamation. The stockpile will not be within 300 feet of a continuous watercourse.
- BHGR will post a well sign, not less than 12" by 24", on the well site prior to construction of the temporary pit. The sign will include;
 - the operator,
 - the location of the well site by Unit letter, section, township range,
 - and emergency telephone numbers
- BHGR will construct all new fences using 48" steel mesh field-fence (hog wire) on the bottom with a single strand of barbed wire on top T-posts will be installed every 10 feet and corners shall be anchored using metal H bracing. Temporary pits will be fenced at all times excluding drilling or work-over, when the front side of the fence will be temporarily removed for drilling or work-over.
- BHGR shall construct the temporary pit so that the foundation and interior slopes are firm and free of rocks, debris, sharp edges or irregularities in order to prevent liner failure.
 - Geo-textile will be installed beneath the liner when rocks, debris, sharp edges or irregularities cannot be avoided
- BHGR will construct the pit so that the slopes are no steeper than two horizontal feet to 1 vertical foot.
 - Pit walls will be walked down by a crawler type tractor following construction.
 - All liners will be anchored in the bottom of a compacted earth-filled trench at least 18 Inches deep.
 - BHGR will minimize liner seams and orient them up and down, not across a slope. Factory seams will be used whenever possible; BHGR will ensure all field seams are welded by qualified personnel. Field seams will be overlapped four to six Inches and will be oriented parallel to the line of maximum slope. BHGR will minimize the number of field seams in corners and irregularly shaped areas.
 - The volume of the pit shall not exceed 10 acre-feet, including 2 ft of freeboard

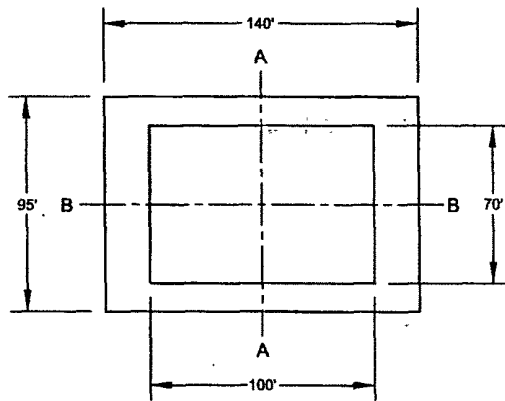
Pit Design and Construction Plan for Jicarilla 29-02-23 #121



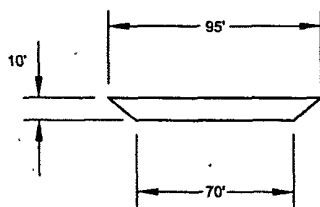
Black Hills Gas Resources

- All temporary pits will be lined with a minimum 20-mil, string reinforced, Linear Low Density Polyethylene (LLDPE) liner, complying with EPA SW-846 method 9090A requirements.
- The liner shall be protected from any fluid force or mechanical damage through the use of mud pit slides, or a manifold system.
 - The pit shall be protected from run-off by constructing and maintaining diversion ditches around the location or around the perimeter of the pit, if necessary.
- BHGR shall install, or maintain on site, an oil absorbent boom or other device to contain and remove oil from a pit's surface until the pit is closed.

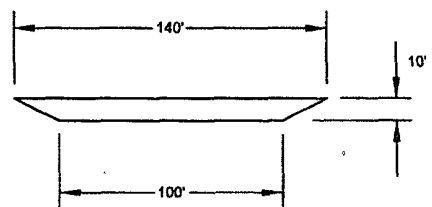
BLACK HILLS GAS RESOURCES
TYPICAL DRILLING PIT



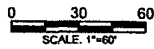
PLAN VIEW



VIEW A-A



VIEW B-B



NOTE:

PIT VOLUME APPROXIMATELY 22,000 BARRELS $\approx$ 3.3. ACRE FEET OF WATER



Black Hills Gas Resources

Jicarilla 29-02-23 #121

Surface Location: 1,775' FNL 950' FWL (SW/NW) Unit E

Sec.23 T29N R2W

Rio Arriba County, New Mexico

Lease: Contract MDA 701-98-0013, Tract 4

Operation and Maintenance Plan for Drilling Pit Jicarilla 29-02-23 #121

In accordance with Rule 19.15.17 NMAC the following Information describes the operation and maintenance (O&M) of temporary pits for Black Hills Gas Resources (BHGR). The following describes BHGR standard procedures for temporary pits, a separate plan will be submitted for any temporary pit which does not conform to this plan

BHGR O&M activities will use the following methods;

- BHGR will operate and maintain its temporary pits to contain drilling liquids and solids, in a manner to prevent contamination of fresh water and protection of the environment. BHGR will recycle drilling liquids by transferring drilling liquids to pits ahead of the drilling rig.
- BHGR will not discharge into or store any hazardous waste in the temporary pit.
- After the pit is installed it will be marked to gauge liquid elevation in the pit, beginning from the bottom as zero and continuing to the top measuring feet of liquid.
 - BHGR will maintain at least two feet of freeboard for a temporary pit, BHGR shall remove all free liquids from a temporary pit within 30 days from the release the drilling or work-over rig
- The pit will be monitored on a daily basis for the following:
 - Overall physical condition
 - Rips, cuts, or tears
 - If any physical damage is discovered NMOCD will be contacted, If any pit liner's integrity is compromised, or if any penetration of the liner occurs above the liquid's surface, then BHGR shall notify the Aztec Division office by phone or email within 48 hours of the discovery and repair the damage or replace the liner
 - If a leak develops below the liquid's level, BHGR shall remove all liquids above the damaged liner within 48 hours and repair the damage or replace the liner, BHGR shall notify the Aztec Division office by phone or email within 48 hours of the discovery for leaks less than 25 barrels BR shall notify the Aztec Division office as required pursuant to Subsection S of 19.15.3.116 NMAC shall be reported within twenty-four (24) hours of discovery of leaks greater than 25 barrels.
 - In addition, immediate verbal notification pursuant to Subsection B, Paragraph (1), and Subparagraph (d) of 19.15.3.116 NMAC shall be reported to the division's Environmental Bureau Chief.
- The liner shall be protected from any fluid force or mechanical damage through the use



Black Hills Gas Resources

of mud pit slides or a manifold system. The pit shall be protected from run-off by constructing and maintaining diversion ditches around the location or around the perimeter of the pit.

- Proceeding drilling or work-over, oil from the pits surface will be skimmed from the surface and excess liquid will be removed from the pit and the remaining solids will be addressed using BHGR closure plan. Only fluids generated during drilling or work-over may be discharged into the temporary pit, BHGR will maintain the temporary pit free of miscellaneous solid waste or debris
- During drilling or work-over, BHGR will inspect the temporary pit daily to ensure compliance with this plan. Inspections will be logged into the daily drilling reports; this information will be provided to the Aztec Division office upon closure of the pit.
- After drilling or work-over, BHGR will inspect the temporary pit weekly as long as liquids remain in the temporary pit. A log of the inspections will be stored at BHGR office electronically and will be filed with the Aztec Division office upon closure of the pit.
- The drilling pit volume will be less than 10 acre feet.



Black Hills Gas Resources

Jicarilla 29-02-23 #121

Surface Location: 1,775' FNL 950' FWL (SW/NW) Unit E

Sec.23 T29N R2W

Rio Arriba County, New Mexico

Lease: Contract MDA 701-98-0013, Tract 4

Pit closure plan for Jicarilla 29-02-23 #121

In accordance with Rule 19.15.17.13 NMAC this is a new pit which will follow Rule 19.15.17.12 NMAC for closure. The following describes Black Hills Gas Resources (BHGR) standard procedures for temporary pit closures

BHGR closure activities will close temporary pits in place using the following methods;

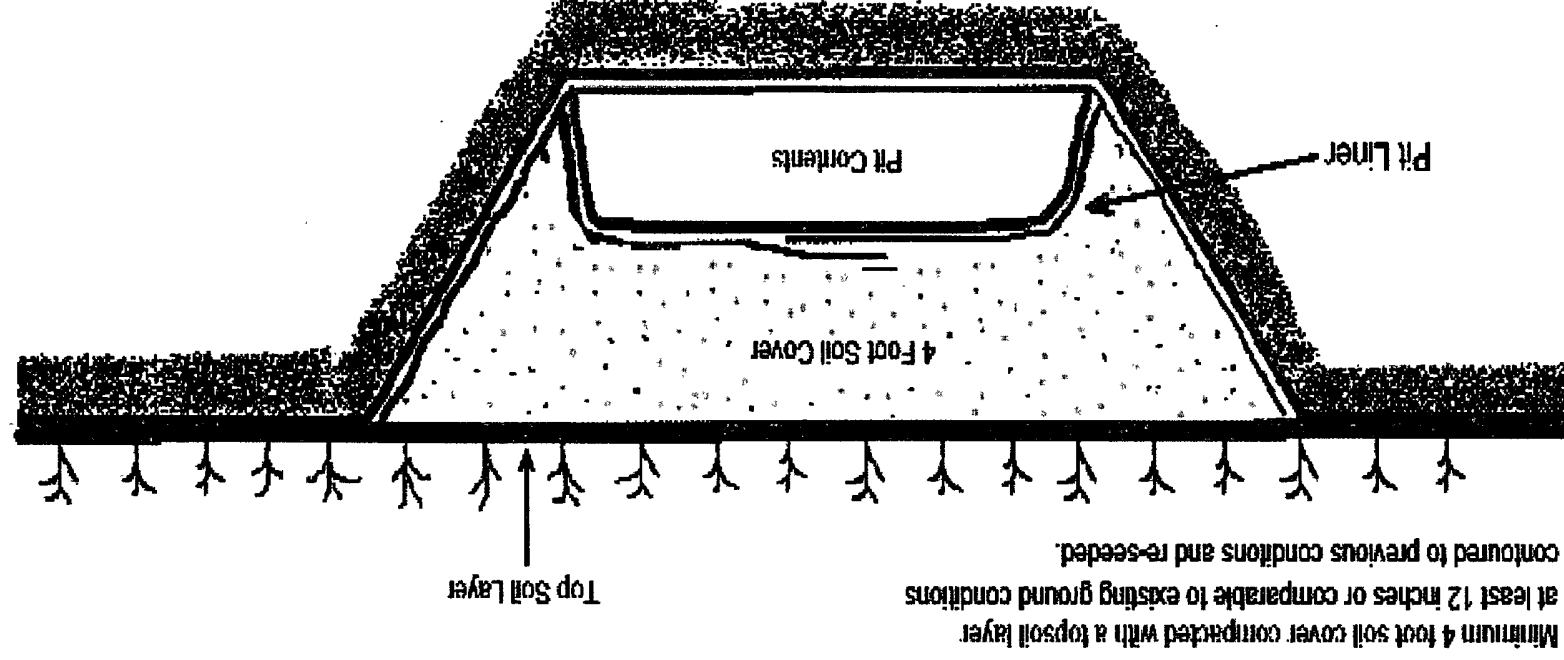
- The preferred method of closure for all temporary pits will be on-site burial, assuming that all the criteria listed in sub-section (B) of 19.15.17.13 are met.
- BHGR will submit to NMOCD within 60 days of pit closure using C-144 a pit closure report to include;
 - Details on the soil cover and capping, where applicable
 - A plot plan
 - Inspection Reports
 - Sampling Results
 - C-105
 - A copy of Deed Notice, where applicable. Location is on Jicarilla Apache Tribal Lands.
- Any hydrocarbon products floating on top of the pit will be recovered and any free water or other liquids will be removed at the start of the pit closure process and disposed of in a division-approved facility or recycle, reuse or reclaim the liquids in a manner that the appropriate division district office approves, the pit must be completely dewatered before stirring or otherwise disturbing the bottom of the pit.
 - Excess water removed from the pit will be filtered and pumped out and taken either to BHGR Water Station 5 located approximately 3.5 miles west of the location, section 19 T29N R2W on the Jicarilla Apache Reservation, or used for the next drilling location.
 - Excess sludge's or other solid materials will not included in the in place burial will be transported to the TNT Evaporation Pond/Land-farm located in sections 5, 7 and 8 T25N R3W, HRC 74 Box 113, Lindrith, NM 87029, NM1-8.
- Where applicable the surface owner shall be notified of BHGR proposed closure plan using a means that provides proof of notice (i.e. certified mail, return receipt requested, approved APD).
- Within 6 months of the Rig Off status occurring BHGR will ensure that temporary pits are closed, re-contoured, and reseeded.
- Notice of Closure will be given to the Aztec Division office between 72 hours and one week of closure via email, or verbally. The notification of closure will include the following:
 - Operator's name, Location by Unit Letter, Section, Township, and Range. Well name and API number.
- Pit contents will be sampled and analyzed for BTEX, DRO, GRO and Chloride to determine existing concentrations. Closure standards will be dependent upon vertical distance to groundwater from the bottom of the pit. A five point composite sample will be taken of the pit contents, samples will be tested per Subsection B of 19.15.17.13(B)(1)(b).

- Benzene analyzed using EPA SW-846 method 8021B/8260B, *with a detection limit of 0.2 mg/kg*
- BTEX analyzed using EPA SW-846 method 8021B/8260B, *with a detection limit of 50 mg/kg*
- TPH analyzed using EPA SW-846 method 418.1, *with a detection limit of 2500 mg/kg*
- GRO/DRO analyzed using EPA SW-846 method 8015M, *with a detection limit of 500 mg/kg*
- Chlorides analyzed using EPA 300.1, *with a detection limit of 500 mg/kg or 1000 mg/kg*

In the event that the criteria are not met, all contents will be handled per Subparagraph (a) of Paragraph (1) of Subsection B of 19.15.17.13 i.e., Dig and haul

- The remaining cuttings will be covered in place using native soils and the temporary berm material, the surface is graded to prevent water accumulation, for pit material with constituent concentrations slightly higher than those allowed for pit burial, the pit material may be blended with clean, local soil to dilute and reduce the high concentrations to acceptable levels before the waste/soil mix is buried. If pit material is above closure standard a secondary test will be taken to determine concentrations after soil blending. The mixing ratio shall not exceed 3 parts clean soil to 1 part pit contents
- The liner will be cut free from its anchor points and rolled into itself on all four sides. Removal of liner will consist of manually or mechanically cutting liner and removing all remaining liner. Care will be taken to remove "All" of the liner i.e., edges of liner entrenched or buried. All excessive liner will be disposed of at a licensed disposal facility
- A minimum of four feet of soil cover will be applied over the remaining pit contents and compacted. Stockpiled topsoil shall be applied last. The soil should be mounded and shaped to ensure runoff without erosion and diversion terraces constructed, if necessary. The cover shall include one foot of suitable material to establish vegetation at the site, or to the background thickness of topsoil, whichever is greater. Re-contouring of location will match fit, shape, line, form and texture of the surrounding area.
- The area is re-vegetated with native species to reduce the potential for erosion and promote full recovery of the area's ecosystem. BHGR shall seed the disturbed areas the first growing season after pit closure. Seeding will be accomplished using drilling on the contour whenever practical or by other division-approved methods, BIA stipulated seed mixes will be used. Vegetative cover will equal 70% of the native perennial vegetative cover (un-impacted) consisting of at least three native plant species, including at least one grass and maintain that cover through two successive growing seasons. Re-seeding or planting will be continued until successful vegetative growth occurs.
- The temporary pit will be located with a steel marker, no less than four inches in diameter, cemented in a hole three feet deep in the center. The marker will include welded or stamped, the Operator's Name, Lease Name, Well Name and number, Unit Number, Section, Township, Range and an Indicator that the marker is an onsite burial location.
 - During the production life of the well, a steel plate measuring no less than 12 inches by 12 inches will be used as a surface completion to indicate the pit location. The plate will include welded or stamped the date of closure and indicate an "in place burial" for the former pit.
- Attached is the Siting Criteria information
- Attached is the Black Hills Gas Resources Typical Drilling Pit Design
- Attached is a location map
- Attached is the BHGR pit closure diagram

Black Hills Gas Resources Pit Closure Diagram



Pit Notification

In ordinance with 19.17.15.13 New Mexico Administrative Code (NMAC)

Operator/Pit Information:

Operator: Black Hills Gas Resources Telephone: (505) 634-1111 ext 27 e-mail address: dmanus@bhgp.com

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

Facility or well name: Jicarilla 29-02-23 #121 API #: 30-039-3747 Lease Name: Contract MDA 701-98-0013, Tract 4

Footage:

U/L or Qtr/Qtr Unit E SW/NW Sec 23 T 29 N R 02 W County: Rio Arriba

Pit Coordinates:

Latitude 36.712873° N Longitude 107.018193° W NAD: 1927 ☐ 1983 ☒

Pit

Type: Drilling ☒ Production ☐ Disposal ☐ Workover ☐ Emergency ☐

Lined ☒ Unlined ☐

Liner type: Synthetic ☒ Thickness 20 mil Clay ☐

Pit Volume 22,000 bbl

Date:

May 21, 2009

Printed Name/Title Daniel Manus / Regulatory Technician

Signature

[Signature]

Received by:

Printed Name/Title MARLENIA REVAL, REALTY ASSISTANT

Signature

[Signature]

Date:

05/21/2009