



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
Las Cruces District Office
1800 Marquess Street
Las Cruces, New Mexico 88005
www.blm.gov/nm

In Reply Refer To:
NM71526
3100 (NM-03100)

June 25, 2012

Dear Interested Party:

The Bureau of Land Management (BLM), Las Cruces District Office, has completed a preliminary Environmental Assessment (EA) evaluating the Application for Permit to Drill (APD) submitted by the Harvey E. Yates Company (HEYCO). The proposed project is located in an area of south-central New Mexico known as Otero Mesa.

A copy of the EA, DOI-BLM-NM-030-2006-161 is enclosed for your review. The EA analyzes the potential environmental impacts that could result from the Proposed Action. The purpose of this letter is to inform the public of the project and provide the opportunity for interested parties to participate in the EA process. Additional information regarding the HEYCO APD is available at the Las Cruces District Office.

Comments on this proposal must be received by July 16, 2012. Comments may be submitted using any of the following methods:

- EMAIL: BLM_NM_LCDO_Comments@blm.gov
Please include "Bennett Ranch Unit #6" in the subject line of your email message.
- MAIL: Edward Seum, BLM Las Cruces District Office, 1800 Marquess Street, Las Cruces, NM 88005

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

We look forward to your comments. If you need additional information, or if you have questions concerning the project, please contact Edward Seum at the above address, or at (575) 525-4313.

Sincerely,

/s/Bill Childress

Bill Childress
District Manager

1 Enclosure

ENVIRONMENTAL ASSESSMENT (EA)
FOR
BENNETT RANCH UNIT #6 APD
DOI-BLM-NM-030-2006-161

JUNE 2012



**United States Department of the Interior
Bureau of Land Management
Las Cruces District Office
1800 Marquess Street
Las Cruces, NM 88005**

ENVIRONMENTAL ASSESSMENT

DOI-BLM-NM-030-2006-161

For The

Bennett Ranch Unit #6 APD

T. 26 S., R. 12 E., Section 24

2130' FSL & 660' FWL

Otero County, New Mexico, NPM

Prepared by: /s/Edward Seum 6/21/12
Supervisor, Lands and Minerals Date

Approved by: /s/David L. Wallace 6/22/12
Assistant District Manager, Multi-Resources Date

1.0 INTRODUCTION

The proposed project is located in an area of south-central New Mexico known as Otero Mesa, part of a large expanse of northern Chihuahuan Desert grassland (see Map 1). Oil and gas exploration began in the area in 1925, when the first well was drilled. Since that time 67 wells have been drilled in Otero County with “shows” of oil or gas (a term indicating the detection of hydrocarbons) reported for some of the wells.

From April 1, 1988 through September 1, 1995, the BLM authorized a number of oil and gas leases on Otero Mesa currently controlled by Harvey E. Yates Company (HEYCO). The leases were consolidated into one unit, the Bennett Ranch Unit (BRU), covering 10,637 acres. HEYCO drilled two wells in the leased area encountering gas finds in 1997 in the #1-Y well, and again in early 2001 in the #25-1 well.

The wells are currently “shut-in” (capped but not plugged) pending further drilling to determine the extent of the reservoirs, and if there are sufficient reserves to justify construction of a pipeline. HEYCO has submitted an Application for Permit to Drill (APD) an additional well within the BRU to further determine the extent of the reservoirs and reserves which might exist.

1.1 PURPOSE AND NEED

The purpose of the proposal is to determine whether to allow further exploration and development by HEYCO consistent with the existing land use plan and with the Federal oil and gas mineral leases issued to HEYCO by the BLM. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, as amended [30 USC 181 et seq.] and the Federal Land Policy and Management Act of 1976, as amended; to respond to a request for an APD to drill a well on a Federal oil and gas lease.

1.2 DECISION TO BE MADE

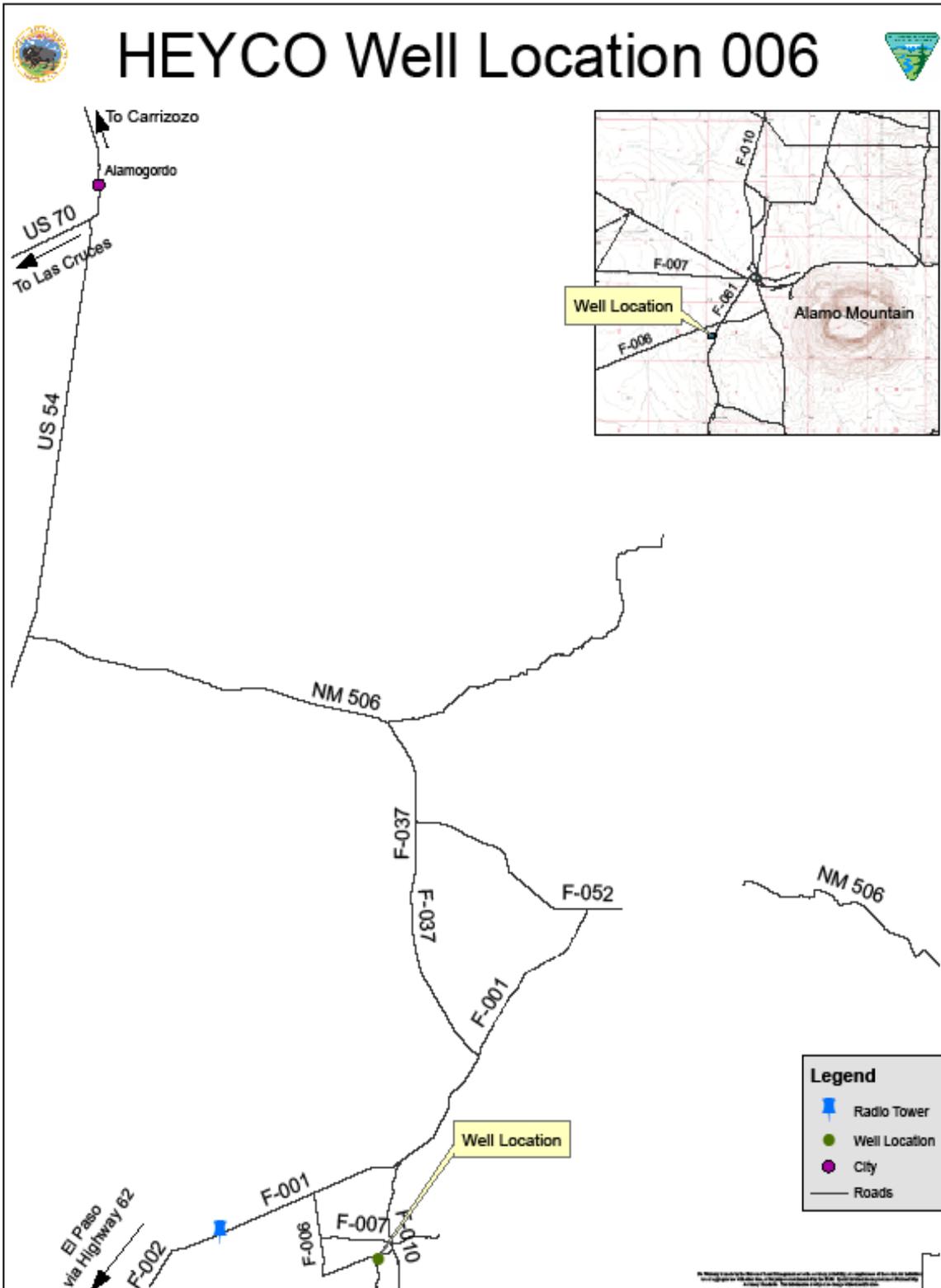
The BLM will decide whether or not to approve the APD, and if so, under what terms and conditions.

1.3 CONFORMANCE WITH APPLICABLE LAND USE PLAN AND OTHER ENVIRONMENTAL ASSESSMENTS

The proposed project would not conflict with any local, county, or State plans. The proposed well is in conformance with the White Sands Resource Area Resource Management Plan (RMP) and Record of Decision (ROD) signed September 1986. It is located in an area identified in that document as open to oil and gas leasing and is within a previously issued Federal lease.

1.4 FEDERAL, STATE OR LOCAL PERMITS, LICENSES OR OTHER CONSULTATION REQUIREMENTS

Section 402 of the Clean Water Act (as amended), required the U.S. Environmental Protection Agency (EPA), to develop a phased approach to regulate storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. Industrial activities disturbing land may require permit coverage through a NPDES storm water discharge permit. Depending on the acreage disturbed, either a Phase I industrial activity (5 or more acres disturbance) or a Phase II small construction activities (between 1 and 5 acres disturbance) permit may be required. A Section 404 Permit from the U.S. Army Corps of Engineers for the discharge of dredge and fill materials may also be required. Operators are required to obtain all necessary permits and approvals prior to any surface disturbing activities.



MAP 1- LOCATION OF THE BENNETT RANCH UNIT #6 IN SOUTHERN NEW MEXICO

Section 106 responsibilities of the National Historic Preservation Act are adhered to by following the BLM – New Mexico State Historic Preservation Officer protocol agreement, which is authorized by the National Programmatic Agreement between the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, and other applicable BLM handbooks.

Additionally, the Operator is required to:

- Use a steel tank closed loop circulation system per State of New Mexico regulation NMAC 19.15.1.21(B) (Rule 21) by the New Mexico Oil Conservation Division. This order has not been adopted by the Federal Authorized Officer as a directive under the Mineral Leasing Act and 43 CFR 3162.1. Therefore this EA will analyze an alternative that allows HEYCO to use a lined earthen reserve pit.
- Comply with all applicable Federal, State and local laws and regulations.
- Obtain necessary permits for drilling, completion and production of the well including water rights appropriations, installation of water management facilities, water discharge permits, and relevant air quality permits.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 ALTERNATIVE A - NO ACTION

The BLM NEPA Handbook (H-1790-1), NEPA and associated Code of Federal Regulations, states that for EAs on externally initiated proposed actions, the No Action Alternative means that the proposed activity would not take place. Current land and resource uses would continue to occur in the proposed project area. No mitigation measures would be required.

2.2 ALTERNATIVE B - PROPOSED ACTION

HEYCO submitted an APD for an exploratory gas well and associated infrastructure. *Proposed Well Information:*

Well Name	Number	Township	Range	Section	Lease Number	Date Lease Issued
BENNETT RANCH UNIT	#6	T 26 S	R 12 E	24	NM71526	03/24/1988

County: Otero

Applicant: Harvey E. Yates Company

Surface Owners: Bureau of Land Management

Detailed descriptions of design features and construction practices associated with the Proposed Action are contained in the APD and available for review in the Las Cruces District Office. The Proposed Action involves the development of the project, including the following:

- Construction of a 3.7-acre pad
- Drilling a gas well to a depth of 6,100 feet.
- Construction of a lined earthen reserve pit 170 feet by 100 feet in size.
- No new access roads are required.
- In the event a producing well is drilled a tank battery may be constructed on the location and a buried gas line, approximately 300 feet in length, may be constructed beneath the pad to connect the well to a proposed gathering system.
- If the well is dry, it will be plugged and abandoned, the surface re-contoured and vegetation re-established.

The Proposed Action includes the use of compressed air and foam as an alternative to conventional drilling fluids where possible. When drilling fluids are required an underbalanced fresh water based drilling mud would be used.

2.3 ALTERNATIVE C

Alternative C would be identical to the Proposed Action with the exception that the operator would be required to use a closed loop system of steel tanks to contain fluids used or generated during drilling.

2.4 ALTERNATIVE D

Alternative D would require directionally drilling the proposed well to the intended target from an existing well pad, specifically the BRU #1-Y or the BRU #25-1 pad. The BRU #1-Y pad is located approximately 1.5 miles to the north of the proposed location for the BRU #6, and the pad for the BRU #25-1 is located approximately 0.9 miles to the southeast. This alternative would include the use of either a lined reserve pit or a closed loop steel tank system.

3.0 **DESCRIPTION OF AFFECTED ENVIRONMENT**

This section describes the environment affected by implementation of the alternatives described in Section 2, focusing on relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. Only those environmental components that may be impacted are described below. This site-specific analysis tiers to and incorporates by reference the information and analysis contained in the White Sands RMP/Final Environmental Impact Statement (FEIS) (September 1986).

3.1 AIR RESOURCES (AIR QUALITY AND CLIMATE)

Air quality and climate are components of air resources which may be affected by BLM applications, activities, and resource management. Therefore, the BLM must consider and analyze the potential effects of BLM and BLM-authorized activities on air resources as part of the planning and decision making process. Much of the information referenced in this section is incorporated from the *Air Quality Technical Report for BLM Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas* (herein referred to as Air Quality Technical Report). This document summarizes the technical information related to air resources and climate change associated with oil and gas development.

3.1.1 Air Quality

The proposed well is located in a remote area of Otero County, New Mexico. Air quality in this region is generally good, and the area is not designated by the EPA as a “non-attainment area” for any listed

pollutants regulated by the Clean Air Act. The region is designated as a Class II air quality area which allows for moderate amounts of air quality degradation. The area is also in attainment for all state air quality standards (NMAQS). The primary source of air degradation is PM₁₀ (dust) generated off-site during high wind events which are fairly common in southern New Mexico, especially during the spring months. In addition, the Air Quality Technical Report describes the types of data used for description of the existing conditions of criteria pollutants, how the criteria pollutants are related to activities involved in oil and gas development, and provides a table of current National and state standards.

3.1.2 Climate

The project area is located in an arid to semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the 90s to low 100s (Fahrenheit) and winter minimum temperatures are generally in the 20s or 30s. Temperatures have reached above 100° F in every month from May to September and have occasionally dipped below zero in December, January and February. Precipitation is divided between summer thunderstorms associated with the Southwest Monsoon and winter rain and snowfall as Pacific weather systems drop south into New Mexico. Table 3.1 shows climate normals for the 30 year period from 1981-2010 for Orogrande, New Mexico which is the closest observation site to the proposed project for which normals are available.

Table 1 Climate Normals 1981 – 2010 (NOAA 2011)

TABLE 1 CLIMATE NORMALS 1981 – 2010 (NOAA, 2011)												
Orogrande	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temp. (°F)	43.1	48.3	54.1	62.1	70.8	79.3	80.7	78.6	73.6	63.2	51.1	43.0
Avg. Min. Temp. (°F)	28.5	33.2	37.7	45.2	53.9	62.4	66.0	64.4	59.3	47.9	36.0	28.6
Avg. Max. Temp. (°F)	57.8	63.3	70.6	79.0	87.7	96.1	95.4	92.9	88.0	78.5	66.3	57.3
Avg. Precip. (inches)	0.48	0.41	0.23	0.24	0.63	1.17	2.09	2.60	1.70	1.33	0.56	1.06

3.2 AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACECS)

The Proposed Action and alternatives would not be located within any ACEC designated by the RMP. However the proposed site is located approximately one mile west of the Alamo Mountain ACEC. The Alamo Mountain ACEC contains an estimated 20,000 petroglyphs or images pecked into rock from the Archaic, Jornada Mogollon, Apache, and historic periods.

3.3 CULTURAL RESOURCES

A cultural resources inventory was conducted for the area of potential effect for this project as proposed. This is documented in the report entitled *Archaeological Inventory of 8.26 Acres near Alamo Mountain, Otero County, New Mexico, for the Bennett Ranch Unit #6 Well pad*. No historic properties were identified directly within the area of potential effect.

Six recent cultural resources inventories have been undertaken in the lease area. These were comprised of linear surveys and small block surveys associated with oil and gas exploration and drilling. No historic properties were identified within the areas of potential effect for these projects.

One historic property, the Butterfield Trail (Laboratory of Anthropology Site Number (LA) 131080) is located to the north of the project area. The Butterfield Trail was operative from 1858 to 1861 and is significant because it was the first regular transport route for mail, passengers, and cargo from the United States through its southwestern territories to California. The remains of the Alamo Spring Stage Station, one of many stations to support the Trail, are located approximately 2 miles northeast of the proposed Bennett Ranch Unit #6 well pad and are a contributing element to the Butterfield Trail.

Decision C-6, page 46, White Sands Resource Area RMP states in part that:

"No surface disturbing activities will be allowed in an area 1/4-mile from each side of well-preserved segments of the Butterfield Trail on public land (2,220 acres) (Map 2-4)."

The Trail trends southwest from the Alamo Springs Stage Station and terminates at County Road F010 to the northeast of the project area. It registers on-the-ground as an observable trace or swale at this location. The White Sands RMP (1986) provided a 1/4-mile buffer of the Trail at this location ending at County Road F010. The Trail then proceeds west as isolated segments immediately south and adjacent to a bladed road. Blading of the road has obliterated much of the Trail; segments remain, but are difficult to discern on-the-ground. This latter section of the Butterfield Trail is directly north of the proposed Bennett Ranch Unit #6 well pad.

Although no other prehistoric or historic sites have been recorded within the subject area, it abuts the Alamo Mountain ACEC. The Alamo Mountain ACEC contains an estimated 20,000 petroglyphs or images pecked into rock from the Archaic, Jornada Mogollon, Apache, and historic periods.

3.3.1 Native American Religious Concerns

A traditional cultural property (TCP) as defined in National Register Bulletin 38:

"...can be defined generally as one that is eligible for the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community."

A sacred site as defined by Executive Order No. 13007:

"...means any specific, discrete, narrowly delineated location of Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

In order for the BLM to determine the potential effects of the Proposed Action on traditional cultural properties or sacred sites, the specific locations of these resources as well as information about their relationship to practices or beliefs of a living community must be identified. The BLM must also have the specific, delineated location of a sacred site to avoid adversely affecting the physical integrity of a sacred site at the location specified.

Interested Native American entities were informed of the proposed drilling project by mail on December 13, 2006 as part of the scoping process. Comments received are incorporated in Section 5 of this document. Formal consultation was initiated by certified mail on September 17, 2007. Further scoping will be conducted and comments addressed upon completion of the EA.

Should specific locations and knowledge regarding TCP sacred sites be forthcoming, BLM would keep such information confidential where it is appropriate and has been requested to do so by the Native American entity. Where specific sacred site locations and their associations are identified, BLM would, in consultation with the interested Native American entity, work to make the changes necessary to accommodate access and ceremonial use of the location and make the changes necessary to avoid adverse effect to the physical integrity of the sacred site location. Where information has been provided concerning a TCP, BLM would evaluate or cause to have evaluated the information provided to determine if it is an historic property and eligible for inclusion on the National Register of Historic Places.

3.4 INVASIVE, NON-NATIVE SPECIES

No known populations of noxious weeds occur within the proposed development site. However, populations of African Rue (*Peganum harmala*) occur on the adjacent grazing allotment within 10 miles of the proposed development site. These populations exist primarily along the shoulders of county-maintained roads which are the main access routes into the proposed development site. African rue, a perennial species identified by its bushy growth habit, fleshy stems and leaves, and a five-petal white flower, is spread by seed, roots, and root fragments. Two African Rue plants were found on the HEYCO #1-Y pad; steps were taken to eliminate the plants and monitoring of the site continues.

3.5 WASTES, HAZARDOUS OR SOLID

There are no known hazardous or solid waste issues in the area of the proposed well.

3.6 WATER QUALITY

3.6.1 Surface Water

Surface water is affected by geology, precipitation, and water erosion. No perennial surface water is found in the area. Surface water occurs primarily as sheet flow during localized storm events. Percolation of surface water into the water table is restricted by a continuous caliche layer that exists at shallow depth below the surface. Ephemeral surface water within the area may occur within tributaries, playas, and stock tanks.

3.6.2 Ground Water

Ground water occurs in basin-fill deposits and consolidated rock. Basin-fill aquifers consist mainly of unconsolidated to semi-indurated sedimentary deposits. The material is generally of Quaternary and Tertiary ages ranging from poorly-sorted to moderately-sorted mixtures of gravel, sand, silt, and clay derived from consolidated rock in the nearby mountain ranges. Evaporite deposits, limestone, conglomerate, and volcanic rocks are present in places. Ground water in the basins is primarily recharged by ephemeral streams draining the surrounding mountains and discharging across the permeable alluvial fans at the mouths of the steep canyons or by underflow in these canyons, which enters the alluvial fan directly. Discharge can occur by evapotranspiration, movement to rivers and streams or groundwater withdrawals. Most of the ground water is currently used for rural domestic and livestock purposes.

The proposed well is located on the geomorphic feature of Otero Mesa which is the western edge of the Salt Basin, part of the Basin and Range Province. The area is also part of the Rio Grande Rift which contains faulted and fractured rocks both on the surface and subsurface. The proposed well location in the western portion of the Salt Basin is separated from the eastern portion of the Basin by a series of major northwest-southeast trending faults. According to Shomaker & Associates, the area of highest vulnerability for contamination of the regional aquifer beneath Otero Mesa is where fracture density is highest; which occurs in the central part of the Salt Basin.

Sandia Laboratories and the U. S. Geological Survey (USGS) used 100 existing wells to estimate that as much as 57 million acre-feet of water lie under Otero Mesa. However, of the subject wells, only nine are located on or near Otero Mesa. That translates to one well per township in and around the area of Otero Mesa. Given what is known of Otero Mesa, it is uncertain how much usable water there is or where that water occurs. Information on water wells in the general area shows the following:

T. 26 S., R. 12 E., NMPM

Sec. 12, well depth-560 feet; water level 420 feet.

Sec. 16, well depth-610 feet; water level 540 feet.

T. 26 S., R. 13 E., NMPM

Sec. 07, well depth-560 feet; water level 535 feet.

Sec. 16, well depth-800 feet; water level 610 feet.

Sec. 34, well depth- no data; water level no data.

According to the State of New Mexico, Office of the State Engineer (via letter dated January 15, 2008) no logs are available for these wells. However, the State Engineer believes that the *"area hydrogeology indicates that they probably produce from the Permian Yeso Formation and/or the underlying Abo and Hueco Formations, which together form a regional aquifer system known as the Salt Basin aquifer."* The State Engineer further states that the aquifer may be over 1,000 feet thick in this area. HEYCO indicated in its APD that the Yeso is exposed at the surface of the proposed well site; and that the Yeso, Abo and Hueco formations together are approximately 2,100 feet thick.

HEYCO expects to encounter water at a level of 300 feet below surface in the Abo Formation; and again at 2,100 feet in the Powwow Formation. Neither of the two gas wells drilled in the BRU, the BRU #1-Y (T. 26 S., R. 12 E., sec. 14) and the BRU #25-1 (T. 26 S., R. 12 E., sec. 25), encountered water above 900 feet. The BRU #1-Y did encounter usable water below the gas zones at depths around 2,200 feet and 3,600 feet. The BRU #6 well would be drilled in a location between the #1-Y and #25-1 wells; and based on geologic inference the depth to ground water would not be above 900 feet. Regardless, the depth to ground water in this area is not expected to be any less than 300 feet.

3.7 GENERAL TOPOGRAPHY/SURFACE GEOLOGY

The topography of the Otero Mesa area is gently rolling terrain with thin to moderate topsoil and scattered surface exposures of caliche. The area is incised by shallow ephemeral drainages. The proposed well is on gently sloping ground with a southern exposure approximately 1 mile west of Alamo Mountain. The *Geologic Map of the Cornudas Mountains, Otero County, New Mexico* (J. Michael O'Neill and Constance J. Nutt, 1998) shows an exposure of Quaternary Colluvium, of Holocene age, at the approximate location of the proposed BRU #6 composed of weakly to strongly cemented caliche soil. The map also shows an anticline in close proximity to the proposed well that trends roughly northwest and southeast. There are occurrences of isolated igneous intrusive features in the Cornudas Mountains to the east.

3.8 MINERAL RESOURCES

The area is designated as having potential for the occurrence of oil and gas. However, to date only gas has been discovered in any quantity in two wells drilled by HEYCO. Flow testing and pressure analysis of the two wells has not taken place so it is currently unknown if economically producible natural gas

reserves have been found. There are no other known mineral resources in the area other than the widespread occurrence of caliche. Caliche, a shallow calcium carbonate deposit, is commonly used as a construction material for surfacing roads and well pads.

3.9 PALEONTOLOGY

The presence and extent of paleontological resources at the site is unknown. The entire area falls within Potential Fossil Yield Classification (PFYC) 2; San Andres Formation; limestone and dolomite with minor shale; Guadalupian in south, in part Leonardian to north. Invertebrate fossils may be abundant in limestones; however management concern for paleontological resources on Class 2 areas is low.

3.10 SOILS

The proposed project area occurs primarily on a low, rolling hills landscape typically with shallow soils on and near the crest of the hills and ridges and deeper soils near the bottom of the hills and in the draws. The slope at the proposed location is approximately 4.5 percent and the soils are typically calcareous and shallow over a caliche layer.

Soil textures are sandy loam on the surface and a sandy loam or light sandy clay loam subsurface. The cemented caliche layer generally occurs at a depth of 6-20 inches and in some cases may be slightly deeper. The soils down slope to the south are generally deeper with textures of sandy loam, light sandy clay loam or silt loams. The soils are calcareous throughout and a weakly cemented caliche layer or calcium carbonate coated gravels and cobbles may occur at a depth of 20 to 50 inches.

3.11 WATERSHED – HYDROLOGY

The watershed and hydrology of the area is affected by land and water use practices. The degree to which hydrologic processes are affected by land and water use depends on the location, extent, timing and type of activity. Factors that currently cause short-lived alterations to the hydrologic regime in the area include livestock grazing, groundwater pumping and surface developments such as roads and pipelines.

3.12 VEGETATION

In general, the project area is a grassland site with temperature and rainfall favoring warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of the site. Forb production fluctuates greatly from season-to-season and year-to-year.

The dominant range site is Shallow Sandy which occurs on upland plains, and tops of low ridges and mesas, associated with Sandy, Loamy Sand, and Shallow sites. The potential plant community consists primarily of grasses such as black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), bush muhly (*Muhlenbergia porteri*), and sideoats grama (*Bouteloua curtipendula*). Yucca, cholla cactus, creosotebush (*Larrea tridentatae*) and mesquite can also occur on the site.

Shrubs, especially mesquite and creosotebush can increase or colonize due to dispersal of seed by livestock or wildlife. This increase may be enhanced by proximity to areas with existing high shrub densities.

This ecological site is within the Southern Desertic Basins, Plains and Mountains Major Land Resource Area (SD-3), and is described by the Natural Resources Conservation Service (NRCS) on their web site: <http://www.nm.nrcs.usda.gov/technical/fotg/section-2/esd.html>

3.13 LIVESTOCK GRAZING

The project area is located within Alamo Mountain Allotment No. 09001 which is permitted for 573 cattle and 5 horses. The carrying capacity for the project area is about 10 cattle per section; with the allotment fenced into 5 pastures and a few small traps and is generally run using a “best pasture” approach. This entails continuously evaluating the different pastures as the cow/calf herd is moved from one pasture to another, based on forage conditions. Range improvement projects such as windmills, water delivery systems (pipelines, storage tanks, and water troughs), earthen reservoirs, and fences are located within the project area

3.14 WILDLIFE

The BLM conducted an inventory of wildlife habitats on Otero Mesa using the Integrated Habitat Inventory and Classification System (IHICS) in 1982. Standard Habitat Sites (SHS) occurring in the proposed well site location include:

- Grass Rolling Upland (approximately 90 percent)
- Grass Flat (approximately 10 percent)

The project area provides habitat for approximately 7 species of amphibians, 38 species of reptiles, 63 species of mammals, and 147 species of birds. Wildlife information by habitat type in Otero County is available for review at the BLM Las Cruces District Office.

3.15 SPECIAL STATUS SPECIES

3.15.1 Plants

The presence of special status plant species and their habitats in Otero County was considered using Las Cruces District species occurrence/habitat records and New Mexico Natural Heritage Program species records. Species descriptions and distributions were derived from Las Cruces District Office records and New Mexico Rare Plant Technical Council (NMRPTC) [1999, New Mexico Rare Plants, Albuquerque, NM: New Mexico Rare Plants Home Page. <http://nmrareplants.unm.edu> (Latest update: 18 January 2006)]. There are no known occurrences of special status plants within the lease boundary.

There is potential for one sensitive plant species to occur: grama grass cactus, a BLM sensitive plant. Grama grass cactus (*Sclerocactus papyracanthus*) occurs in two ecotypes at elevations from 5,000 to 7,300 feet. The two ecotypes include grama and galleta grasslands with sandy soils and alkali sacaton grasslands in gypseous soils.

3.15.2 Animals

In accordance with BLM Manual 6840, BLM manages certain sensitive species not Federally-listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. This category includes State listed endangered species and Federal candidate species which receive no special protections under the Endangered Species Act. Special status animal species lists for Otero County were compiled from the U.S. Fish and Wildlife Service website:

http://www.fws.gov/southwest/es/NewMexico/SBC_view.cfm?spcnty=Otero; the New Mexico

Department of Game and Fish website:

www.wildlife.state.nm.us/conservation/threatened_endangered_species/index.htm; and the BLM NM/OK/TX/KS Sensitive Species List. Known geographic distribution and habitat requirements were considered for each species in comparison with habitat types in the lease area. There are 17 special status species (see Table 2) considered to have potential habitat within the lease boundary. Habitat descriptions for these special status wildlife species are available for review at the BLM Las Cruces District Office.

Table 2 BLM Las Cruces District Special Status Wildlife Species

TABLE 2	
BLM LAS CRUCES DISTRICT SPECIAL STATUS WILDLIFE SPECIES	
SPECIES	STATUS
Peregrine falcon	FD, FWSS, NMT
Ferruginous hawk	BLMS
Northern aplomado falcon*	FE, NME
Mountain plover	FWSS
Common ground dove	NME
Loggerhead shrike	BLMS
Burrowing owl	BLMS, FWSS
Baird's sparrow	NMT, BLMS, FWSS
Texas horned lizard	BLMS
Western small-footed myotis	BLMS
Cave myotis	BLMS
Long-eared myotis	BLMS
Long-legged myotis	BLMS
Fringed myotis	BLMS
Spotted bat	BLMS, NMT
Townsend's big-eared bat	BLMS, FWSS
Big free-tailed bat	BLMS
<p>NOTES: FD=FEDERAL DELISTED, FWSS=USFWS SPECIES OF CONCERN, NMT=NEW MEXICO THREATENED, BLMS=BLM SENSITIVE, FE=FEDERAL ENDANGERED, NME=STATE OF NM ENDANGERED</p> <p>*The Federally endangered Northern aplomado falcon is currently listed under Section 10J of the Endangered Species Act as an experimental, nonessential population in New Mexico and Arizona. Under this listing, the falcon is treated as a Federally Proposed species, and the BLM must conference with the USFWS on any action that may affect this falcon.</p>	

3.16 VISUAL RESOURCES

The project area appears as an undifferentiated parcel of desert grassland, which is the characteristic landscape of the area. The site possesses no dominant features that make it stand out in the landscape. There is no sense of boundary restrictions when the site is viewed from points outside of the site.

Visual Resource Management (VRM) on public land is conducted in accordance with BLM Handbook 8410 and BLM Manual 8411. The project area is designated in the White Sands RMP (October 1986), as VRM Class IV which provides for management activities which allow major modification of the existing landscape. These management activities can focus the view of a casual observer and can dominate the landscape; however, every attempt should be made to minimize the impact of these activities. Changes may subordinate the original composition, but must reflect a natural occurrence.

3.17 RECREATION

The project area is remote, receiving little direct recreational use other than small-game hunting and backcountry driving. The area is also passed through by recreationists en route to the Alamo Mountain ACEC that was established to protect unique cultural resources that exist there. It is nearby, but outside of the project area and receives modest amounts of public visitation. From the western slope of the ACEC, the project area is within the immediate viewing area, and the southwestern portion of Alamo Mountain is visible from the site. The historic Butterfield Trail passes near the project area and attracts a few visitors annually. The region is visited by people from both New Mexico and Texas.

4.0 ENVIRONMENTAL CONSEQUENCES AND PROPOSED MITIGATION MEASURES

4.0.1 No Action Alternative

The No Action alternative serves as a baseline for comparison of environmental effects. Under the No Action Alternative, the APD would be denied and the proposed well would not be drilled. There would be no new impacts due to oil and gas exploration/production to the resources in this location. Current land and resource uses in the project area would continue at current levels. Denial of the APD could interfere with HEYCO's ability to develop the lease. The consequences to this particular lessee if the APD were denied include frustration of lessee expectations to develop the lease; lack of diligence as a violation of lease terms; and potential contraction of the unit area due to a lack of production information. Also, additional vital information regarding the productivity and commercial value of the potential oil and gas resources at this location would not be gathered for future decisions by the operator and the Federal government.

If the BLM does not approve the APD, it is assumed that the demand for oil and gas would not decrease. Demand would likely be addressed by production elsewhere within the U.S. or through imports. Due to less stringent environmental regulations in some areas outside of the U.S., it is possible there would be increased emissions of volatile organic compounds (VOC), air borne dust, and GHGs during exploration and production operations. In addition, there would likely be additional emissions of GHGs during transportation of these commodities to US ports.

The No Action Alternative may result in slightly reduced domestic production of oil and gas resulting in reduced Federal and State royalty income; and the potential for Federal land to be drained by wells on adjacent private or State lands. Because the proposed well is located within the BRU, the potential for uncompensated drainage is reduced. If the BLM foregoes the potential development of these minerals, it is assumed that the public's demand for the resource would not change. Instead, the resource foregone

would be replaced by other sources that may include a combination of imports, fuel switching, and other domestic production. This displacement of supply would offset any reductions in emissions achieved by not developing the subject tracts. The No Action Alternative will not be evaluated further in Chapter 4.

4.0.2 Alternative B

Under Alternative B (Proposed Action), the well would be drilled at the site proposed in the APD. Descriptions of potential impacts on individual resources for this alternative are presented in the following text. Also described are mitigation measures that would be incorporated by the BLM where appropriate as Conditions of Approval attached to the APD.

4.0.3 Alternative C

Under Alternative C, the well would be drilled at the site proposed in the APD. The operator would be required to use a closed loop system of steel tanks to contain fluids used or generated during drilling. Descriptions of potential impacts on individual resources for this alternative are presented in the following text. Also described are mitigation measures that would be incorporated by the BLM where appropriate as Conditions of Approval attached to the APD.

4.0.4 Alternative D

Alternative D would require directionally drilling the proposed well to the intended target from one of the existing well pads in the area, specifically the BRU #1-Y or the BRU #25-1 pad. The number of acres disturbed by well pad construction would remain the same as in Alternatives B & C. However, pad construction and drilling would take place on a previously disturbed area. Descriptions of potential impacts on individual resources for this alternative are presented in the following text. Also described are mitigation measures that would be incorporated by the BLM where appropriate as Conditions of Approval attached to the APD.

4.1 AIR RESOURCES (AIR QUALITY AND CLIMATE)

Methodology and assumptions for calculating air pollutant and greenhouse emissions are described in the Air Resources Technical Document. This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one well. The calculators give an approximation of criteria pollutants, HAP and GHG emissions to be compared to regional and National levels. Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator.

Alternative B: Air quality would be temporarily impacted by pollution from exhaust emissions, chemical odors, and dust from motorized equipment used to construct the well pad, reserve pit and by the rotary drill rig itself. No new access roads would be needed, but traffic to and from the drill site would raise dust on existing dirt roads in the area. Dust dissemination would be greatly reduced upon completion of the construction phase of the well pad. Air pollution from the motorized heavy equipment would discontinue entirely upon completion of the drilling phase of the operation, which is estimated to last for 30 days. A successful well would result in additional impacts to air quality due to servicing of the well, transport of oil, and disposal of production wastes.

Information about GHGs and their effects on National and global climate is presented in the Air Resources Technical Document. Analysis of the impacts of the Proposed Action on GHG emissions are reported below. Only the GHG emissions associated with exploration and production of oil and gas would be evaluated here because the environmental impacts of GHG emissions from oil and gas

consumption, such as refining and emissions from consumer-vehicles, are not effects of the Proposed Action as defined by the Council on Environmental Quality because they do not occur at the same time and place as the action. Thus, GHG emissions from consumption of oil and gas do not constitute a direct effect that is analyzed under NEPA. Nor is consumption an indirect effect of oil and gas production because production is not a proximate cause of GHG emissions resulting from consumption. However, emissions from consumption and other activities are accounted for in the cumulative effects analysis.

The two primary GHGs associated with the oil and gas industry are carbon dioxide (CO₂) and methane (CH₄). Because methane has a global warming potential that is 23 times greater than the warming potential of CO₂, the EPA's Office of Transportation and Air Quality (OTAQ) uses the "CO₂ equivalent" (CO_{2e}) which takes the difference in warming potential into account for reporting the national inventory for greenhouse gas emissions.

Total emissions for constructing the pad, drilling the well, disposing of wastes and well completion are estimated (in tons per year) to be:

CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC	CO₂
0.532	0.441	104	10.4	0.00063	0.342	117.4

Assuming it would take 30 days to drill and complete the well, total emissions in tons would be:

CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC	CO₂
0.044	0.037	8.7	0.87	0.000052	0.0285	9.78

Alternative C: The use of steel tanks would result in increased dust impacts from traffic to and from the site. While the well bore is being advanced, the steel circulation tanks must be emptied regularly into a tank truck to maintain the chemical composition of the fluid and remove cuttings. This material would have to be hauled off-site to an approved disposal facility. According to a report submitted by HEYCO (authored by Samuel Small, P.E.) approximately 1,173 cubic yards of solid waste and 11,849 barrels of liquid waste would be generated and require disposal. This would require a total of 158 trips (59 for solid and 99 for liquid) to dispose of the waste offsite. Total emissions for constructing the pad, drilling the well, disposing of wastes and well completion are estimated (in tons per year) to be:

CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC	CO₂
0.645	0.529	125	12.5	0.00313	0.367	141.4

Assuming it would take 30 days to drill and complete the well, total emissions in tons would be:

CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC	CO₂
0.054	0.044	10.4	1.04	0.00026	0.0306	11.78

This alternative would result in a slight increase in overall hydrocarbon emissions, including GHGs, released into the planet's atmosphere compared to Alternative B.

Alternative D: Impacts to air quality under Alternative D would be similar to those under Alternative B. However, there would be an increase in the amount of overall emissions due to the increased length of time that it would take to drill over a longer distance (approximately twice the distance); and the need to dispose of more waste materials (about twice the amount of wastes) from the steel tanks, also due to drilling over a longer distance. Total emissions using steel tanks are estimated (in tons per year) to be:

CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC	CO₂
0.954	0.752	146	14.6	0.00513	0.462	165.4

Assuming it would take 60 days to drill and complete the well, total emissions in tons would be:

CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂
0.159	0.125	24.3	2.43	0.00085	0.077	27.57

Use of a reserve pit would lessen the impacts to air quality since there would be no need to dispose of wastes as with the use of steel tanks. Total emissions using a lined reserve pit are estimated (in tons per year) to be:

CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂
0.841	0.665	125	12.5	0.00263	0.437	156.6

Assuming it would take 60 days to drill and complete the well, total emissions in tons would be:

CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	CO ₂
0.140	0.111	20.8	2.08	0.00044	0.073	26.1

This alternative would result in a slight increase in overall hydrocarbon emissions, including GHGs, released into the planet's atmosphere compared to Alternatives B & C.

4.1.1 Mitigation

The operator would utilize all means necessary to control surface erosion and airborne dust emissions from the site during construction and operation. Dust abatement measures would include water application and avoiding construction activity during periods of high winds.

The BLM encourages industry to incorporate and implement "Best Management Practices" (BMPs), which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include:

- adherence to BLM's Notice to Lessees' (NTL) 4(a) concerning the venting and flaring of gas on Federal leases; for natural gas emissions that cannot be economically recovered, flare hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion;
- water dirt roads during periods of high use in order to reduce fugitive dust emissions;
- collocate wells and production facilities to reduce new surface disturbance;
- implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and
- perform interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.

4.2 CULTURAL RESOURCES

Alternative B: The proposed well is located within Federal lease number NMNM-71526 which was issued on March 24, 1988 under the provisions of the White Sands RMP (October 1986). The White Sands RMP identified a number of well-preserved segments of the Butterfield Trail to be protected by a ¼-mile buffer on either side of the trail where no surface occupancy is allowed. The proposed well location is outside the well-preserved segments of the trail and is therefore not subject to the ¼-mile buffer zone. Additionally, no cultural artifacts were identified within the area proposed for the drill pad

during a site visit in September 2006 by a BLM archaeologist. Therefore, no impacts to the trail are expected under this alternative.

Alternative C: This alternative would use the same site as the one in Alternative B. There would be no impacts to the trail under this alternative.

Alternative D: No surface disturbance under Alternative D would occur within the ¼-mile buffer of the Butterfield Trail as defined in the White Sands RMP. Cultural clearances would not be required under this alternative due to the fact that the proposed well would be constructed on an area that was previously disturbed. No direct or indirect adverse effects to cultural resources are anticipated.

4.2.1 Mitigation

Mitigation is not required.

4.3 NATIVE AMERICAN RELIGIOUS CONCERNS

No impacts to Native American religious concerns are anticipated to result from any of the alternatives.

4.3.1 Mitigation

Mitigation is not required.

4.4 INVASIVE, NON-NATIVE SPECIES

Alternative B: Although there are no known weed populations on the proposed development site, there are known populations along the shoulder of the main access routes into the proposed development site. Weed seeds could be picked up on the wheels of equipment and carried onto the project area. Ground disturbing activities associated with roads and drill pads would create a favorable environment for the establishment and spread of noxious weeds.

Alternatives C & D: Impacts from invasive, non-native species under these alternatives would be the same as Alternative B.

4.4.1 Mitigation

If noxious weeds are detected, abatement measures would be implemented. These include weed inventory surveys and weed monitoring and control programs. The operator will be required to prevent/control any infestations of noxious weeds associated with the proposed operation. The following measures will be attached to any authorization of the APD as COAs:

- The BLM will determine the size and density of the noxious weed infestations requiring implementation of a control program.
- Mechanical, chemical, biological, or other methods approved by the BLM will be used to control infestations of noxious weeds in disturbed areas.
- The operator shall employ measures to prevent seed transport into relatively weed-free areas. These measures shall include surveillance of access routes and removal of weed sources that could be picked up and transported by passing vehicles, and washing vehicles prior to entering the project area and before leaving infested areas.

4.5 WASTES, HAZARDOUS OR SOLID

Alternative B: The lease action falls under Federal and State environmental regulations that impose responsibility and liability on the operator for the protection of human health and the environment from harmful waste management practices or discharges. These regulations ensure that adequate procedures are in place to provide for the safe handling and disposal of drilling fluids, additives, cuttings or saline water used or produced during drilling operations. The use of a lined reserve pit and the use of compressed air and foam; or when drilling fluids are required an underbalanced fresh water based drilling mud would reduce the potential for contamination. However, there could be leaks if the liner used in such systems failed which would result in the potential for minor contamination.

Alternative C: The use of a closed loop steel tank system would reduce the potential for contamination. All materials generated during drilling would be required to be removed from the site and disposed of in an approved manner. However, there could be leaks at the couplings used in such systems, as well as the possibility of an overflow which would result in the potential for minor contamination.

Alternative D: This alternative would result in the production of more wastes during drilling operations. However, the same handling and disposal requirements would be used as in Alternatives B & C. Overall, impacts under this alternative would be the same as Alternatives B & C.

4.5.1 Mitigation

The holder would comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder would comply with the Toxic Substances Control Act Of 1976, as amended (15 U.S.C. 2601, *et. seq.*) with regard to any toxic substances that are used, generated by or stored on the project/pipeline route or on facilities authorized. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.

An appropriately sized secondary containment system would be used with a closed loop steel tank system used to collect fluids during drilling operations.

A double liner with a leak detection system between the liners would be required for any reserve pit being used to collect fluids during drilling operations.

Leaking equipment would be promptly repaired or removed from the site to prevent contamination from spills. Any soil or water that has been contaminated would be placed in appropriate containers and removed from the site. Disposal of vehicle fluids on public land would not be authorized.

Storage tanks would have a berm constructed around them, of sufficient dimensions to contain the contents of the largest tank, to serve as secondary containment should a spill occur.

Copies of spill prevention, control, and countermeasure plans are required, and must be provided to the Authorized Officer. All drilling-related CERCLA hazardous substances removed from the location and not reused at another drilling location must be disposed of in accordance with applicable Federal and State regulations.

4.6 WATER QUALITY

4.6.1 **Surface Water**

Alternative B: There are no nearby surface waters in the area, and the site is approximately 300 feet from the head of a normally dry drainage. Surface disturbance from the construction of the well pad and ancillary facilities can result in minor degradation of surface water quality from non-point source pollution, increased soil losses, and increased gully erosion. Potential direct impacts that would occur due to construction of the well pad include increased surface water runoff and off-site sedimentation brought about by soil disturbance, increased salt loading and water quality impairment of surface waters and possible contamination of surface waters by produced water. The magnitude of these impacts to water resources are expected to be minor and would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration and time within which construction activity would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts would likely be greatest shortly after the start of construction activities and would decrease in time due to natural stabilization and reclamation efforts. Construction activities would occur over a relatively short period; therefore, the majority of the disturbance would be intense but short-lived. Direct impacts to surface water quality would be minor, short-term impacts which may occur during storm flow events. Indirect impacts to water-quality related resources, such as fisheries, would not occur.

During drilling and completion of the well circulating fluids would be collected and contained in a lined earthen reserve pit. There is a risk that the berm of the reserve pit may leak or break, releasing fluids off the well site. There is a remote possibility that the reserve pit could be compromised if a leak were to occur during a heavy rain event.

Petroleum products and other chemicals, accidentally spilled, could result in surface water contamination. Authorization of the proposed project would require full compliance with BLM directives and stipulations that relate to surface water protection.

Alternative C: Due to the use of steel tanks, impacts to surface water from circulating fluids would not occur unless an unanticipated water flow was encountered causing the tanks to overflow. Similarly, possible leaks from the steel tank system could degrade surface water quality. The proper use of blow out prevention and pressure control equipment along with the construction of secondary containment measures under the tanks would mitigate this impact.

Alternative D: A portion of an existing drill pad that has had some reclamation completed would be re-disturbed under this alternative. Impacts to surface water quality under Alternative D would be the similar to Alternatives B and C.

4.6.1.1 **Mitigation**

Spills or produced fluids (e.g., saltwater, oil, and/or condensate in the event of a breach, overflow, or spill from storage tanks) making contact with the ground would be immediately cleaned up and removed from the site to an approved disposal facility.

An appropriately sized secondary containment system would be used with a closed loop steel tank system used to collect fluids during drilling operations.

A double liner with a leak detection system between the liners would be required for any reserve pit being used to collect fluids during drilling operations.

Leaking equipment would be promptly repaired or removed from the site to prevent contamination from spills. Any soil or water that has been contaminated will be placed in appropriate containers and removed from the site. Disposal of vehicle fluids on public land will not be authorized.

Storage tanks would have a berm constructed around them, of sufficient dimensions to contain the contents of the largest tank, to serve as secondary containment should a spill occur.

Erosion control measures would be taken to decrease the potential for erosion to occur during construction of the drill pad and while drilling operations occur. These measures will include, but are not limited to, installation of hay bale check dams, silt fence and water bars on the upgrade and downgrade sides of the drill pad.

Following completion of a producing well, the well pad would be reduced in size to the minimum area required (but not more than 2 acres) for actual operation of the well. Caliche shall be removed from the balance of the disturbed area; all compacted areas will be ripped to a depth of 2 feet on 1-foot centers; followed by recontouring and topsoil reapplication. Seeding will be accomplished prior to the beginning of the next growing season to establish a vegetative cover that will reduce the speed of surface flows. Mulch, jute netting or other surface stabilizing materials will be used on the reclaimed area while waiting for vegetation to become established. Hay bale check dams, silt fence and water bars on the upgrade and downgrade sides of the drill pad will also be maintained until a sufficient vegetative cover to prevent erosion is established. These same measures would be required for the entire site if the well is a non-producer.

4.6.2 Ground Water

Alternative B: In the late 1970s, the New Mexico Environment Department (NMED) began evaluating existing information on vulnerable aquifers and major known and potential contamination sources. An initial inventory of known or suspected cases of groundwater contamination resulting from surface impoundments and other facilities was concluded in 1980 and updated in 2004. In general, ground water contamination most frequently occurred in vulnerable aquifer areas where the water table was shallow although other factors including precipitation, soil type and preferential flow pathways also affected vulnerability.

The New Mexico Oil Conservation Division has detected and documented 743 incidents of ground water contamination from oil and gas facilities across the State. More than half (398) of these incidents have been caused by contamination from oil and gas industry pits. Another 266 incidents are from oil and water pipelines; with the rest of the sites being contaminated by tank batteries or brine wells. There are no reports of contaminated ground water, which the BLM is aware of, within the area of the proposed APD. Likewise, the BLM is not aware of any reports of contaminated ground water associated with the two wells previously drilled in the area by HEYCO.

There is the possibility that drilling fluids and hydrocarbons could come into contact with, and infiltrate into, the ground during drilling operations. The depth to ground water for the proposed well is expected to be between 300 and 900 feet below ground surface. The possibility that accidental contamination of groundwater by drilling fluids and hydrocarbons seeping from the surface could occur during the drilling phase is extremely remote. There is the possibility that seepage from the use of an earthen reserve pit

would occur. This potential would be minimized by the use of compressed air, foam or underbalanced freshwater based drilling mud during drilling; and an approved impermeable double pit liner to contain pit contents.

Ground water could be contaminated by cross formation or intra-formational invasion of salt water whether from an aquifer or as produced (salt) water in association with hydrocarbons. Drilling with mud systems containing toxic chemicals could also invade useable aquifers. The use of compressed air, foam or underbalanced fresh water based drilling mud during drilling would lessen the chance of contamination.

Alternative C: The use of steel tanks lessens the possibility that drilling fluid contamination could occur. There is the potential for drilling fluids, cuttings, and returns to exceed the capacity of the steel tanks, in which case, contamination could still occur to soils and ground water. This impact would be mitigated with the proper use of blow out prevention, pressure control equipment and secondary containment. Removal of all drilling fluids, produced waters and other wastes from the site to an approved disposal site would further lessen the possibility of contamination.

Alternative D: There would be a slight increase in the potential for ground water contamination under this alternative due to an increased amount of wastes generated during the drilling process. However, the same handling and disposal requirements would be used as in Alternatives B and C. Overall impacts under this alternative would be the same as Alternatives B and C.

4.6.2.1 Mitigation

The casing and cementing requirements imposed on the proposed well will reduce or eliminate the potential for ground water contamination from drilling mud and other surface sources. Onshore Oil & Gas Order No. 1 clearly requires the BLM to protect both known and potential occurrences of useable water. Drilling with air or fresh water mud systems eliminates contamination of the useable water by drilling mediums. Setting surface or intermediate casing below the last known useable water and cementing the casing to surface reduces or eliminates the potential for ground water contamination from drilling mud and other surface sources. Based on the best available data derived from local water wells, the two gas wells drilled by HEYCO, and input from the State Engineer as shown in Section 3.7 above, the BLM will require the operator to set surface casing to a depth of at least the base of the Salt Basin aquifer or any deeper aquifer occurrence where useable groundwater (as defined by the State) is encountered.

4.7 GENERAL TOPOGRAPHY/SURFACE GEOLOGY

Alternative B: The surface disturbance anticipated from construction of the well pad would have minimal impacts on the area of operations. No major land or soil displacement would occur from operations associated with drilling the well. Direct impacts would result from the removal of the surface soils during construction and grading of the 3.7-acre well pad.

Alternative C: Impacts to general topography/surface geology under Alternative C would be similar to Alternatives B.

Alternative D: Impacts to general topography/surface geology under Alternative D would be similar to Alternatives B and C. Direct impacts would be the re-disturbance of 3.7 acres to construct the well pad. This would include the removal of topsoil previously redistributed during reclamation of the old pad.

4.7.1 Mitigation

Topsoil will be salvaged prior to construction of the pad. The salvaged soils will be stored in a manner that will protect it from wind and water erosion. See also mitigation measures listed in 4.6.1.1 for prevention of erosion.

4.8 MINERAL RESOURCES

Alternative B: Mineral materials may be used for construction of the well pad under the provisions for sundries in 43 CFR 3100. These materials would remain once the well pad is reclaimed. No locatable minerals are known to occur within the area of the Proposed Action, nor are there any active mining claims. Leasable minerals include oil and gas which would be impacted through extraction.

Placement of the well pad would tend to physically impede exploitation of mineral resources other than oil and gas if they existed beneath it. However, as there are no known resources besides the potential for oil and gas beneath the proposed well pad, it is unlikely that any such conflict would exist.

Alternatives C & D: Impacts to mineral resources under Alternatives C and D would be the same as Alternative B.

4.8.1 Mitigation

No mitigation is required.

4.9 PALEONTOLOGY

Alternative B: Ground disturbing activities are not likely to affect any paleontological resources. Drilling the well might result in impacting paleontological resources when the drill bit is being advanced through limestone formations. However, the impact would be small.

Alternatives C & D: Impacts to paleontological resources under Alternatives C and D would be the same as Alternative B.

4.9.1 Mitigation

The permittee will immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this authorization. The permittee will suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and will protect the discovery from damage or looting. The permittee may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered locality or be continued elsewhere. The Authorized Officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

4.10 SOILS

Alternative B: The construction of the well pad would physically disturb about 3.7 acres of topsoil material. No additional access road construction is anticipated since the well site is directly adjacent to an existing county road. Where exposed, soils would be susceptible to wind and water erosion. This impact could be remedied upon reclamation when the well pad is reseeded.

Direct impacts resulting from construction of the well pad and operation of the well site and facilities include removal of vegetation, exposure of the soil, compaction, loss of top soil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic. These impacts could result in a small increase in indirect impacts such as runoff, erosion and off-site sedimentation.

Contamination of soil from drilling and production wastes mixed into soil or spilled on the soil surface could cause long-term reduction in site productivity. Some direct impacts can be reduced or avoided through proper design, construction and maintenance and implementation of best management practices.

Alternative C: Impacts to soils under Alternative C would be similar to those in Alternative B.

Alternative D: The construction of the well pad would physically re-disturb about 3.7 acres of topsoil material. Impacts to soils under Alternative D would be similar to those in Alternative B.

4.10.1 Mitigation

All topsoil will be removed from the area and stockpiled in such a manner so as to prevent wind or water erosion. Following completion of a producing well, the well pad shall be reduced in size to the minimum area required (but not more than 2 acres) for actual operation of the well. Caliche shall be removed from the balance of the disturbed area; all compacted areas will be ripped to a depth of 2 feet on 1-foot centers; and followed by recontouring and topsoil reapplication. Seeding will be accomplished prior to the beginning of the next growing season to establish a vegetative cover that will reduce the speed of surface flows. Mulch, jute netting or other surface stabilizing materials will be used on the reclaimed area while waiting for vegetation to become established. Hay bale check dams, silt fence and water bars on the upgrade and downgrade sides of the drill pad will also be maintained until a sufficient vegetative cover to prevent erosion is established. These same measures would be required for the entire site if the well is a non-producer.

4.11 WATERSHED - HYDROLOGY

Alternative B: Surface disturbing activities from construction of the well pad can result in alterations to the hydrologic regime. The potential hydrologic effects, that would be small in nature, include sedimentation, reduced infiltration, bank erosion and channel widening. Small long-term direct and indirect impacts to the watershed and hydrology may occur for the life of the well and would decrease once well pad surfacing material has been removed and reclamation of the pad has taken place.

Alternatives C & D: Impacts to watershed/hydrology under Alternatives C and D would be similar to Alternative B.

4.11.1 Mitigation

See mitigation measure at 4.10.1.

4.12 VEGETATION

Alternative B: Construction of the well pad would require removal of about 3.7 acres of native vegetation to accommodate drilling and well completion equipment. Following well completion, the pad would be reduced in size to approximately 2.2 acres and the remaining 1.5 acres reclaimed. If it is a producing well, full reclamation would not commence until the well is a depleted producer and plugged and abandoned. Vegetative recovery of the well pad would depend on the life of the well. Native vegetation, which currently consists primarily of blue grama with a creosotebush over story, would encroach on the well pad over time with only high traffic areas remaining un-vegetated. If drilled as a dry hole and plugged, reclamation of the well pad would immediately follow. Vegetative impacts would be short-term when the well pad is re-vegetated within a few years, and reclamation is successful.

Alternative C: Impacts to vegetation under Alternative C would be similar to Alternative B.

Alternative D: Impacts to vegetation under Alternative D would be similar to Alternative B. However, the existing pads are only partially re-vegetated at this time so less vegetation would be affected. It should be noted that HEYCO completed some additional work seeding both sites the week of July 20, 2009. The BLM has also established two small study plots, one on each pad, for the planting and study of a variety of black grama.

4.12.1 Mitigation

Following completion of a producing well, the well pad shall be reduced in size to the minimum area required (but not more than 2 acres) for actual operation of the well. Caliche shall be removed from the balance of the disturbed area; all compacted areas will be ripped to a depth of 2 feet on 1-foot centers; and followed by recontouring and topsoil reapplication. Prior to seeding the area, soils will be tested to establish requirements for the proper levels of soil amendments. Proper amounts of soil amendments and seed will be applied and disked into the re-spread soil. Seeding will be accomplished prior to the beginning of the next growing season to establish a vegetative cover that will reduce the speed of surface flows. Mulch, jute netting or other surface stabilizing materials will be used on the reclaimed area while waiting for vegetation to become established. Hay bale check dams, silt fence and water bars on the upgrade and downgrade sides of the drill pad will also be maintained until a sufficient vegetative cover to prevent erosion is established. These same measures would be required for the entire site if the well is a non-producer.

4.13 LIVESTOCK GRAZING

Alternative B: Construction of the pad, and associated facilities would cause forage to be lost on affected BLM grazing allotments. On average, approximately 65 acres of forage are required to support one cow in this region. Using this figure and the extent of actual disturbance anticipated, adverse impacts to grazing are expected to be minimal and would not require adjustments to grazing permits.

In addition to forage loss, there could be occasional livestock injuries or deaths due to accidents such as collisions with vehicles and ingesting plastic or other materials present at the work site. These impacts make day-to-day livestock management actions more difficult.

Alternative C: Impacts to livestock under Alternative C would be similar to Alternative B.

Alternative D: There would be less of an impact to livestock grazing under this alternative. Fewer overall acres would be lost to grazing since an existing pad would be used. Otherwise, impacts under this alternative would be the same as under Alternative B.

4.13.1 Mitigation

If conflicts arise with livestock as a result of construction of the well pad, measures will be taken as necessary to mitigate those conflicts in coordination with the allottee and the Authorized Officer. Mitigation measures will likely include fencing the well pad to exclude livestock, dust abatement and road maintenance.

4.14 WILDLIFE

Alternative B: Development of the well would have impacts on wildlife habitat and populations. Mechanisms through which oil and gas activities impact wildlife and wildlife habitats include:

- Altered vegetation structure
- Altered fire regime
- Alteration of soil structure
- Alteration of water regimes
- Increased human and vehicular activity
- Habitat fragmentation

The development of this location would lead to the loss of approximately 4 acres of wildlife habitat due to construction of the well pad. If the well is a dry hole, the affected area would be reclaimed within 2 to 3 years. If the well proves successful, the loss of habitat would continue for the production life of the well. One well and a 4-acre well pad would not be anticipated to cause significant habitat fragmentation within the Otero Mesa landscape. Wildlife would be expected to either go around the well pad within adjacent intact habitat, or simply cross the well pad.

Alternative C: Impacts to wildlife under Alternative C would be similar to Alternative B.

Alternative D: There would be less of an impact to wildlife under this alternative since fewer overall acres would be lost due to an existing pad being used. Otherwise, impacts under this alternative would be the same as under Alternative B.

4.14.1 Mitigation

Adoption of the mitigation measures for vegetation at 4.12.1 would reduce the long term effects of either alternative.

4.15 SPECIAL STATUS SPECIES

Alternative B: Grama grass cactus (*Sclerocactus papyracanthus*): BLM Sensitive plant species. This cactus could be impacted through crushing of individual plants by equipment and vehicles during development. These impacts would be small and would not have an impact on the overall occurrence of the species.

American peregrine falcon (*Falco peregrinus anatum*): Development of this well site would degrade less than 0.0001 percent of the habitat for this species. Development is not anticipated to preclude this species from occurring.

Ferruginous hawk (*Buteo regalis*): There is suitable feeding habitat for ferruginous hawks that may winter on the proposed well site. Development of the well site would still allow adequate prey resources (rodents and rabbits) for this hawk and would, therefore, not have significant adverse impacts.

Northern aplomado falcon (*Falco femoralis septentrionalis*): The northern aplomado falcon habitat model indicates the proposed development would be in high potential habitat for aplomado falcons. Surveys for aplomado falcons have been conducted during the breeding season by two separate contract biologists for the past several years. The proposed well site is adjacent to an established survey route. Although recent sightings have occurred in Spring 2006 and 2007, follow-up surveys have not resulted in additional sightings, nesting activity, or evidence of established territories within the project area.

The proposed well site is located within the Bennett Ranch Unit Agreement Area (approved March 4, 1997). Consultation with USFWS has occurred for five previous APDs within the Bennett Ranch Unit (Bennett Ranch Wells #2 through #5, cons. #2-22-98-I-348 and Bennett Ranch Well 25-1, cons. #2-22-00-I-499) and the Bennett Ranch Pipeline Gathering System (cons. #2-22-01-F-F373). The USFWS concurred with BLM's determination that the proposed wells "*may affect, but not likely to adversely affect*" the aplomado falcon contingent on measures to minimize impacts. Mitigation measures included:

1. minimizing pad size where possible,
2. locating access roads and drill pads to avoid likely nest sites, such as large yuccas, and
3. conducting falcon surveys 2 weeks prior to any construction activity during the falcon breeding season (February 1- July 31).

The same falcon survey requirement was included in the Proposed Action for the Bennett Ranch Pipeline Gathering System. The USFWS issued a Biological Opinion stating the Proposed Action would not jeopardize the continued existence of the aplomado falcon. Mandatory terms and conditions included:

1. locating pipeline to minimize disturbance to nest structures,
2. reclaiming to prevent establishment of permanent roads, and
3. minimizing attracting potential nest predators. Only one of the above referenced wells was ever drilled and development of the Bennett Ranch Pipeline Gathering System has not begun to date.

The proposed BRU#6 well is in close proximity to one of the earlier proposed well sites that were never drilled. A site examination by the Las Cruces District Office biologist has verified that the well site would not disturb potential nest structures (trees or multi-branched yuccas).

The proposed action "*may affect, but is not likely to adversely affect*" the aplomado falcon based on the following rationale:

1. The proposed well site would not disturb potential nest sites.
2. On-going falcon surveys adjacent to the proposed well site have resulted in isolated falcon sightings but no nest sites or established territories have been documented within the project area.
3. Previous consultations with USFWS for proposed wells in the Bennett Ranch Unit have resulted in concurrence with a "*may affect, not likely to adversely affect*" determination for aplomado falcon contingent on the same measures to minimize impacts as outlined below under mitigation measures.

Aplomado falcons were designated a nonessential experimental population on July 26, 2006, under section 10(j) of the Endangered Species Act. For BLM, species with this designation are considered a "*proposed*" species for purposes of compliance with Section 7 of the Act. BLM NM/OK/KS/TX policy (IM NM 2007-12) states that for BLM actions that *may affect, not likely to adversely affect* a proposed

species, BLM is only required to send an informational courtesy letter to the USFWS that describes the action and documents the thought process to support the effect determination. The BLM would confer with the USFWS or National Marine Fisheries Service (NMFS) on any action that is likely to adversely affect a proposed species or proposed critical habitat.

Mountain plover (*Epode montana*): There are no prairie dog towns that could provide potential mountain plover habitat on the proposed well site. Clearing of the well site may enhance mountain plover habitat on a temporary basis when human activity is lacking.

Common ground dove (*Columbina passerina pallescens*): Implementation of the Proposed Action is anticipated to reduce seeds available to birds including the common ground dove.

Loggerhead shrike (*Lanius ludovicianus*): Fluid mineral development is anticipated to provide adequate habitat for loggerhead shrikes.

Burrowing owl (*Athene cunicularia hypugaea*): There are no known prairie dog towns that provide potential burrowing owl habitat in the lease area.

Baird's sparrow (*Ammodramus bairdii*): Development activities must be managed at levels that maintain grasslands, both as cover and seed sources for these sparrows. Selection of this alternative would not be anticipated to cause significant loss of grassland, grass cover, or grass seeds at a level that could cause detrimental impacts to either individuals or populations of Baird's sparrows.

Texas horned lizard (*Phrynosoma cornutum*): Development can have direct impacts on these lizards, since they move slowly enough that they are susceptible to vehicle mortality. Surface disturbance reduces grass seed availability, which is the food of harvester ants upon which Texas horned lizards feed, so development has a net detrimental impact on these lizards.

Western small-footed Myotis (*Myotis ciliolabrum melanorhinus*), cave myotis (*Myotis velifer*), long-eared myotis (*Myotis evotis*), long-legged Myotis (*Myotis volans*), fringed myotis (*Myotis thysanodes*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), big free-tailed bat (*Nyctinomops macrotis*). Development would likely reduce bat food (insects) on the landscape as a whole, and human activity may cause these bats to avoid feeding on or near the proposed well pad.

Alternatives C and D: Impacts to special status species under Alternatives C & D would be similar to Alternative B.

4.15.1 Mitigation

Based on previous informal consultation with the USFWS, site mitigation measures for the aplomado falcon will include:

- Minimize pad size as much as possible.
- Locate the pad away from potential nest sites (tall, multi-branched yuccas and tree-form mesquites with raptor nests).
- Conduct further NEPA analysis and Section 7 Conference for commercial production proposals.

BLM and other contractors have conducted surveys for aplomado falcons within the Bennett Ranch Unit for the past several years and during processing of this APD. Isolated falcon sightings occurred during spring 2006 and 2007. However, follow-up surveys have not resulted in additional sightings, nesting activity, or evidence of established territories within the project area. If construction of roads and well

pads occurs during the nesting season for aplomado falcon (February 1-July 31) additional surveys will be required within 2 weeks of construction. If aplomado falcons are sighted, the applicant will need to comply with Section 6 of the lease terms which state:

...Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

4.16 VISUAL RESOURCES

Alternative B: Visual impacts would be most pronounced during the drilling phase of the project and would diminish when only low profile structures are left on-site. Minimizing the size and number of structures and utilization of the recommended earth tone colors would greatly reduce the visual impacts. Proper restoration/reclamation efforts would be essential to restore the visual balance to the area.

Alternative C: Impacts to visual resources under Alternative C would be similar to Alternative B.

Alternative D: Impacts to visual resources under Alternative D would be greater than under Alternatives B & C during the drilling phase. This is due to the fact that it would take longer to drill the well.

4.16.1 Mitigation

The flat color Carlsbad Canyon (2.5Y 6/2) from the Standard Environmental Colors Chart will be used on all facilities to closely approximate the vegetation within the setting. All facilities, including the meter building, would be painted this color.

4.17 RECREATION

Alternative B: Although the proposed project area receives little direct recreational visitation, the recreational value of the land would be slightly to moderately diminished by the exploration and development of the area. People would tend to spend less time in an area that has lost a degree of naturalness and the feeling of remoteness. Sightseers, photographers, and birdwatchers would seek out other places that seem more natural. Many hunters would avoid using an area where conflicts may arise. Some visitors may not linger in an area that appears to be designated for other uses.

Alternatives C & D: Impacts to recreation under Alternatives C and D would be the same as Alternative B.

4.17.1 Mitigation

Minimizing the number and size of structures and bare ground will help to maintain the recreational appeal of the area. Proper restoration/reclamation efforts will also help in this regard. Restoration will take place as soon as areas are no longer needed.

4.18 CUMULATIVE IMPACTS

For purposes of assessing potential cumulative impacts that could be reasonably associated with the Proposed Action, an area of concern was established. The area of concern is assumed to be within the southwest quarter of the Salt Basin Hydrologic Area (SBHA), which includes approximately 432 square

miles or 276,480 acres surrounding the proposed well. The legal description for the southwest quarter of the SBHA includes:

T. 24 S., R. 11 E.	T. 25 S., R. 11 E.	T. 26 S., R. 11 E.
T. 24 S., R. 12 E.	T. 25 S., R. 12 E.	T. 26 S., R. 12 E.
T. 24 S., R. 13 E.	T. 25 S., R. 13 E.	T. 26 S., R. 13 E.
T. 24 S., R. 14 E.	T. 25 S., R. 14 E.	T. 26 S., R. 14 E.

The SBHA is located in a remote region where the predominant land use is livestock grazing. Due to its location, impacts to resources from activities other than grazing or oil and gas development are highly unlikely. The remote nature of the region and relative lack of available private land precludes industrial or residential development. No oil and gas development is anticipated on private land due to opposition of private landholders. Since livestock grazing is expected to continue at current levels for the foreseeable future, any future fluctuations in impact levels to resources would be due to the degree of oil and gas activity. At present, there are two shut-in gas wells, the #1-Y and the #25-1, located in the southwest quarter of the SBHA. Both are on Federal leases and were drilled in 1997 and 2001, respectively. An approximate acreage breakdown of land status in the southwest quarter of the SBHA includes:

Public Land open to exploration	152,963
Public Land currently under O&G lease	10,637
Public Land withdrawn in ACECs	5,857
Public Land in Military withdrawal	16,940
State Land	51,300
State Land currently under O&G lease	1,680
Private Land	27,560
Private Land with Federal Mineral Estate	5,880

For purposes of analyzing potential cumulative impacts to the area of concern from oil and gas development, a Reasonably Foreseeable Development (RFD) scenario for the southwest quarter of the SBHA was developed. This RFD was prepared using historic information on leasing and exploration as well as current conditions.

4.18.1 Reasonably Foreseeable Development

4.18.1.1 Introduction

Federal oil and gas leases on public land in the SBHA have declined in recent years (from more than 98,000 acres in 1996, to slightly more than 12,000 acres). Federal oil and gas leasing in the area was suspended in 2005 pending resolution of a lawsuit by the State of New Mexico and environmental groups challenging the BLM’s planning process. Federal leases in the area are those located within the BRU; and all oil and gas activity in the area has been limited to the BRU. The BRU is located in the south-central portion of the southwest quarter of the SBHA, specifically in T. 26 S., R. 12 E. and R. 13 E.

The BRU #1-Y was completed on November 12, 1997 with an initial potential of 1,294 thousand cubic feet (Mcf) of gas per day from the Mississippian Formation. The BRU #25-1 was completed on December 11, 2001 and had an initial potential of 3,000 Mcf per day from the Canyon Formation. Both wells are shut-in pending further drilling to determine the extent of the reservoirs, and establishment of reserves sufficient to justify construction of a pipeline.

4.18.1.2 Oil and Gas Exploration Activity

To date, there has been little oil and gas exploration activity in southern Otero County. PI/Dwights lists a total of 30 wells drilled in the area since 1929, with two-thirds (20 wells) drilled before 1970. Seismic exploration of the area took place in 1988 and again in 1998. Until HEYCO completed the BRU #1-Y well in 1997, only a few of the wells had any shows of oil or gas. HEYCO had another 4 APDs permitted for the BRU in 1998 which expired without drilling; and then drilled the #25-1 well in 2001.

In 1996, HEYCO applied for approval of the BRU. The current unit area is 10,637 acres, located in T. 26 S., Ranges 12 E. and 13 E. HEYCO proposed the unit as a means of exploring a structural play (along an anticline) within the Orogrande Basin. The proposed unit boundaries were based upon the interpreted extent of fault-bounded reservoir rock; the play was anticipated to be oil-charged. Instead, the BRU #1-Y well encountered gas at a depth of about 4,500 feet in the Mississippian Lime Formation and the BRU #25-1 encountered gas at a depth of about 2,250 feet in the Canyon Formation.

4.18.1.3 Oil and Gas Development Activity

The two BRU wells are the only wells in southern Otero County currently with the potential to produce. Both have been shut in since completion but are potentially capable of production in paying quantities. HEYCO has told the BLM that it needs to drill additional wells, and demonstrate additional gas reserves to justify construction of a pipeline to this remote area.

With so little drilling, and only two wells considered to have the potential to produce methane gas in paying quantities (but have not yet produced), southern Otero County is still considered to be a wildcat prospect. It is likely that HEYCO would prefer to drill new wells in proximity to the existing BRU wells rather than drill a well in a remote area far from existing well control.

4.18.1.4 Oil and Gas Development Potential

This portion of southern Otero County is in the Otero Platform portion of the Basin and Range Physiographic province. The platform is structurally flat with some folding and faulting expected, such as near the Hueco Mountains to the southwest and the Cornudas Mountains in the south. Faulting in the area produced weak pathways for the possible intrusion of Tertiary aged igneous rocks. These igneous rocks are exposed as the major peaks of the Cornudas Mountains. Hydrocarbons exposed to igneous intrusion will be destroyed thus reducing the potential for their occurrence in the area.

The area has mature source rock and fault-bounded reservoir rock similar in nature to those found elsewhere in the state that produces hydrocarbons. This is tempered by the fact that some exposure to igneous intrusions may have occurred which may have resulted in over-mature source rock. The SBHA has a low to medium development potential for oil and/or methane, based upon the geology and previously drilled wells.

4.18.1.5 RFD Baseline Scenario Assumptions and Discussions

Subject Area of Concern Scenario: In the southwest quarter of the SBHA, discovery of a gas field by wells drilled on the BRU area is assumed. Generally, when economically-recoverable production is discovered, operators will propose to drill additional wells in proximity to the discovery wells to delineate the reservoir. This is the case with the proposed BRU #6 well which is located between existing wells (#1-Y and #25-1). Further drilling will normally continue until the reservoir boundaries have been established.

Historic patterns of leasing and development activity in the area of concern make it reasonable to project that future oil and gas development will occur on public lands remaining under lease at this time. This area amounts to some 10,637 acres of the BRU. A total of 1,680 acres of State land is currently under lease for oil and gas (according to information found at <http://landstatus.nmstatelands.org/OandG.aspx>). All but 600 of those acres are adjacent to Federal land and are committed to, or included within the BRU. The 600 acres of leased State land are located in T. 25 S., R. 12 E., Section 16 (private surface/state minerals). The probability that the entire area overlies a continuous reservoir of recoverable natural gas is extremely remote.

On the BRU, HEYCO is exploring along an anticline which probably represents the highest likelihood for finding hydrocarbons in the lease area. Map 2 shows the probable trace of the anticline, the red dashed line, (based partially on the *GEOLOGIC MAP OF THE CORNUDAS MOUNTAINS, OTERO COUNTY, NEW MEXICO, 1998*) in relationship to the wells HEYCO has either drilled or proposed to drill. HEYCO has proposed a well spacing of one well per 640 acres for the unit based on its potential gas find. This would mean drilling of another four wells in addition to the two existing wells and the subject APD for a total of seven wells.

The probability of an oil discovery in the area appears to be low; however, it is not unreasonable to forecast the discovery of a small oil field with 4 additional delineation wells, developed on 40-acre spacing. This scenario leads to an assumption of a total of 11 wells on public land. Extension of the same level of development to State oil and gas leases assumes 2 wells on State land for a total of 13 overall.

4.18.1.6 Surface Disturbance due to Oil and Gas Activity

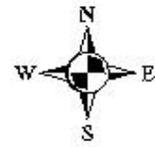
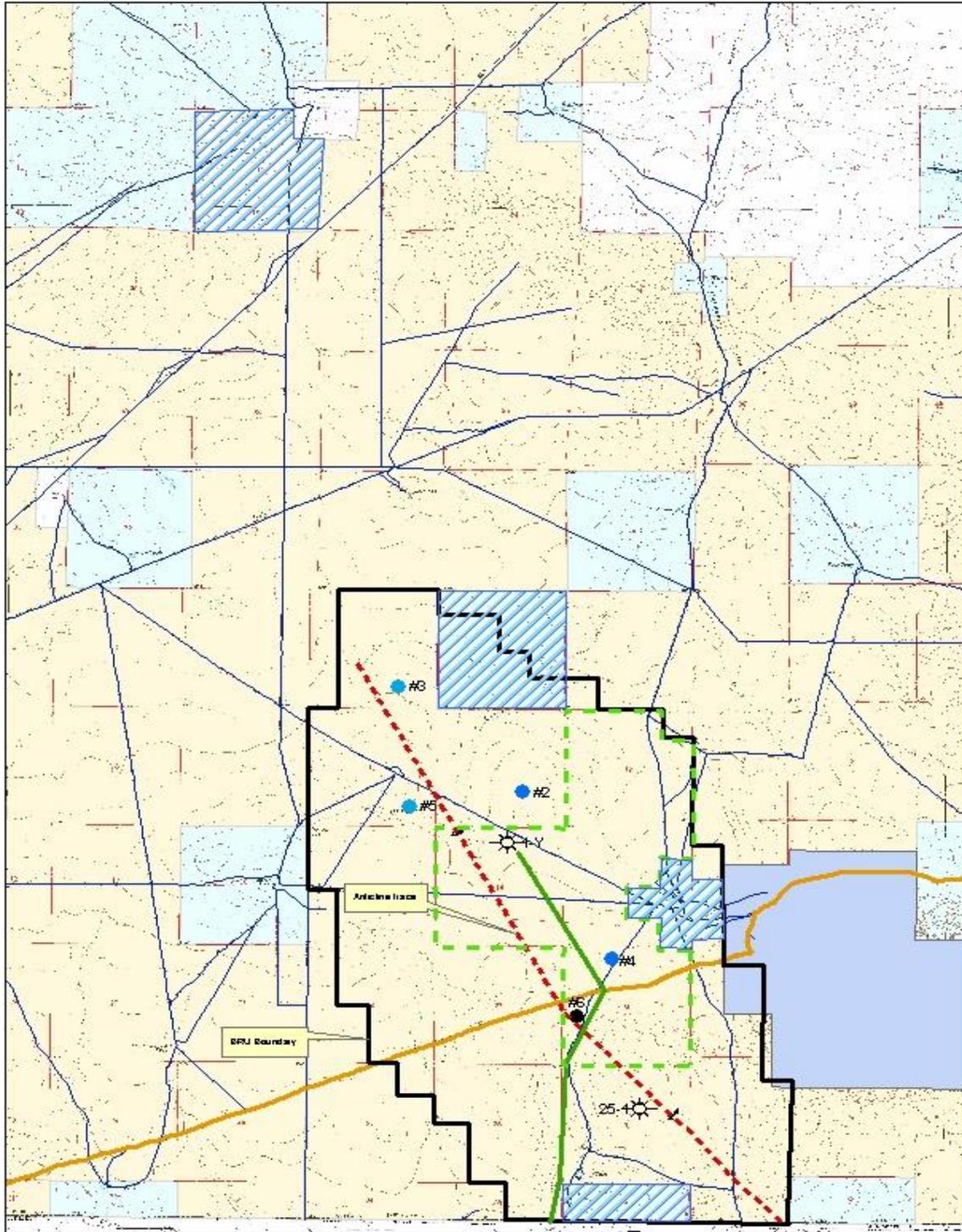
Surface Disturbance within the BRU: It is likely that operators will drill future wells to the Precambrian basement, at depths from 3,000 -7,000 feet. This will require a 3.7-acre well pad, and perhaps a ½-mile of temporary access road (25 feet x 2640 feet = 1.5 acres road per well). If production is not discovered, the well pad and access road would be reclaimed. Short-term disturbance by 11 wells would be 41 acres for the drilling pads, and 16 acres for roads, for a total of 57 acres.

If production is discovered, the access road will be improved to all-weather conditions. The well pad will be reduced to the area needed for the wellhead and production facilities (an estimated 2 acres long-term). Tanks may be constructed on site to hold produced fluids (oil and water). Oil production would likely be transported by truck to a refinery. Produced water is likely to be saline, and not useful for irrigation or for livestock. For this reason, it would need to be trucked off site to an approved disposal site. Long-term disturbance would be 3.5 acres per well for a total of 38 acres.

Natural gas is generally piped to a gas plant. In this remote location, installation of a pipeline may not be feasible unless significant reserves of gas are discovered. Gas collection lines would run from the well head to a single trunk line. Where possible, the collection lines would lie within the road right-of-way. HEYCO obtained approval in 2001 for a pipeline to run south (see Map 2) from the #1-Y well to the New Mexico and Texas border, a distance of 3.26 miles. The 8-inch line would affect 20 acres (50 feet x 17,213 feet) and would probably be extended another mile to the northwest affecting an additional 6 acres. It is estimated that there will be a total of 5 miles of collection lines, within a 25-foot right-of-way (15 acres). Total long-term disturbance is estimated at 41 acres.

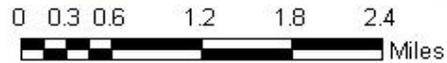
The total long-term surface disturbance anticipated to be a result of oil and gas development in the BRU amounts to 79 acres or less than one percent of the entire BRU area of approximately 10,637 acres.

MAP 2



- Legend**
- NMNM71526 Lease Boundary
 - BRU boundary
 - Central Trails
 - Other roads
 - Other ACEC
 - Ownership
 - Surface Ownership
 - Bureau of Land Management
 - Bureau of Reclamation
 - Dept. of Agriculture
 - Dept. of Defense
 - Dept. of Energy
 - Fish & Wildlife Service
 - Forest Service
 - National Park Service
 - Private
 - State
 - State Game & Fish
 - State Park
 - Tribal
 - Volc's Caldera
 - National Preserve
 - State leased lands
 - Expired APDs
 - Shut in gas well
 - Approved pipeline
 - NMNM71526 Lease Boundary

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by the BLM. Spatial information may not meet National Map Accuracy Standards. This information is subject to change without notification.



Surface Disturbance within the State Land: Short-term disturbance is based on a 3.7-acre well pad, and perhaps a ½-mile of temporary access road (25 feet x 2640 feet = 1.5 acres road per well). If production is not discovered, the well pad and access road would be reclaimed. Short-term disturbance of 2 wells would be 8 acres for the drilling pads, and 3 acres for roads, for a total of 11 acres.

If production is discovered, the same conditions identified for the BRU would apply. Long-term disturbance would be 3.5 acres per well for a total of 7 acres. An 8-inch pipeline would be run from the 600-acre parcel for approximately 4.5 miles along existing roads and would affect 27 acres (mostly on public land managed by the BLM). Gas collection lines would be a total of 1.5 miles within a 25-foot right-of-way (4.5 acres). Total long-term disturbance is estimated at 38 acres.

The total long-term surface disturbance anticipated to be a result of oil and gas development amounts to 117 acres or less than a quarter of a percent of the entire SBHA area of approximately 276,480 acres.

4.18.2 Cumulative Impacts to Resources

The SBHA is sparsely developed with a land ownership pattern mix of public, state and private lands. Activities associated with the private land are mainly those required for ranching. State land is available for various types of leasing with leases currently being limited to grazing and oil and gas.

One of the major disturbances in the area can be attributed to existing roads crisscrossing public, state and private lands. There are approximately 26 miles of road (189 acres based on a width of 60 feet) within the BRU alone. Impacts from travel on these roads will increase in the short-term while wells are drilled and wastes are hauled out for disposal. With completion of field development, travel would be reduced but not to previous levels. Most of these impacts would be located within the BRU and on roads leading to it from the southwestern part of the SBHA. No new roads would be added for the proposed well under Alternatives B, C or D. Under the RFD, another 19 acres (16 acres on Federal and 3 acres on State land) of roads is predicted for the long-term development of oil and gas.

There are no locatable minerals within the majority of the area contained within the SBHA. An exception to this is a nepheline syenite deposit which occurs on Wind and Deer Mountains. The area around Wind Mountain has also been identified as having the potential for the occurrence of rare earth minerals. The only mining claims located on public land in the SBHA are over these areas. Mining of the nepheline syenite deposit is not currently taking place and no plans for mining it are known at this time. A small scale (less than an acre of disturbance) exploration program is currently taking place to determine the extent, if any, that rare earth minerals might occur in mineable amounts. Mineral materials are abundant throughout the area but there does not appear to be a market for them at this time. It is not likely that there will be any additional cumulative impacts to the area due to either locatable mineral or mineral material mining.

Water requirements for fluid minerals development at the levels anticipated would be limited and are not anticipated to cause any impacts to the ground water supply. Water table declines are monitored by the Office of the State Engineer, and a water right allotment and well permit system are in place to ensure that all interested parties have access to their allotted water.

Measures to protect the aquifer from contamination due to oil and gas development activities will continue in place. According to the State of New Mexico, geologically similar gas wells to those planned for the BRU produce 38 barrels (1,596 gallons) of water per day. This estimate is used for the single well proposed under Alternatives B, C and D. Produced waters for the existing #1-Y, #25-1 and proposed #6 wells would amount to 114 barrels (4,788 gallons) of water per day. If the 13 wells in the RFD are drilled then a total of 494 barrels (20,748 gallons) of water could be produced per day. Produced water is likely

to be saline, and without a State permit for reinjection would be trucked off site to an approved disposal site. No cumulative effects to ground water are anticipated since the water would be removed to an approved disposal facility.

Contamination of the aquifer due to oil and gas development resulting from surface spills or well bore leakage is a remote possibility. BLM Stipulations, Conditions of Approval and Best Management Practices (BMPs) will be strictly enforced, and no near or long-term impacts to ground or surface water are expected.

Alternatives B and C would lead to 3.7 acres of new vegetative disturbance, while Alternative D would re-affect 3.7 acres previously disturbed by either the #1-Y or #25-1 pads. Of 276,480 total acres in the SBHA, 117 acres of existing vegetation would be lost in the long-term due to surface disturbance from oil and gas development estimated in the RFD. This level of impact is not expected to have any lasting effect on plant species distribution, populations or reproduction due to required mitigation. Best Management Practices would continue to be required throughout the productive life of any development that may occur and will prevent any increases in the spread of noxious weeds in the area.

Approximately 160,000 acres of public land are leased for grazing in the SBHA. Approval of Alternatives B and C would lead to the loss of 3.7 acres of forage through new disturbance. Alternative D would result in the re-disturbance of 3.7 acres previously disturbed by either the #1-Y or #25-1 pads. Under the RFD, a total of 117 acres of vegetation would be lost. The loss of 117 acres, at current stocking levels, would result in the long-term loss of approximately 6 animal unit months (AUMs) on Federal allotments. Grazing on State and private lands would be unaffected by oil and gas development.

The actual loss of wildlife habitat would be minor as viewed on the basis of disturbed acreage; however, the linear nature of some disturbance may increase the severity of adverse impacts. The amount of road development required would not be large relative to the existing road network (more than 26 miles of existing roads within the BRU alone, see Map 2); however, the density or location of new access roads may have an effect on previously undisturbed areas. In particular, the possibility exists that cumulative direct and indirect effects may be notable in terms of habitat fragmentation for larger wildlife. The effects of fragmentation would be more pronounced within the BRU than in the SBHA as a whole. This effect would be lessened where the need for roads could be limited to those already in existence.

Air quality would be affected in the short-term while the wells are being drilled. Cumulative emissions for constructing the pads, drilling the wells, disposing of wastes and well completion for the 13 wells are estimated (in tons per year) to be:

CO	NO_x	PM₁₀	PM_{2.5}	SO₂	VOC	CO₂
8.38	6.88	1629	162.9	0.04069	4.77	1838

Impacts to air quality would continue once the wells were completed. Waste waters would need to be hauled off site for disposal. Access to the wells for other types of servicing would also be needed. Some impacts to air quality would come from the production facilities located adjacent to the wells.

The very small increase in emissions that could result from the Proposed Action, or from Alternatives C and D, would not result in Otero County exceeding the NAAQs for any criteria pollutant. The emissions from the proposed well, or from Alternatives C and D, are not expected to impact any criteria pollutant standards in Otero County. This would also hold true for the estimated cumulative effects described above.

The very small increase in GHG emissions that might result from the Proposed Action, or from Alternatives C and D, would not produce climate change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the Proposed Action, or from Alternatives C and D, cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the proposed action on global or regional climate.

The Air Quality Technical Report discusses the relationship of past, present and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public land.

4.18.2.1 Mitigation

The BLM will incorporate all mitigation measures identified for the BRU #6 well; all appropriate Best Management Practices (BMPs) as Conditions of Approval for the subject APD as well as any future proposed oil and gas related actions. BMPs are innovative, dynamic, and economically feasible mitigation measures applied on a site-specific basis to reduce, prevent, or avoid adverse environmental or social impacts. BMPs are applied to management actions for the purpose of achieving desired outcomes for safe, environmentally sound resource development by preventing, minimizing, or mitigating adverse impacts and reducing conflicts. The early incorporation of BMPs into APDs by the oil and gas operator helps to ensure an efficient and timely APD process. BMPs set standards for minimizing adverse effects resulting from the construction of facilities and infrastructure, which should mitigate potential cumulative impacts and habitat fragmentation.

5.0 CONSULTATION/COORDINATION

5.1 COMMENTS RECEIVED

An initial public scoping letter identifying the proposed drilling project and soliciting comments was distributed by mail to interested parties on December 13, 2006. Responses were received from persons and organizations listed in Table 5.1. All comments received were considered and incorporated into the initial preliminary EA as appropriate.

An additional 30-day public scoping period followed completion of the preliminary EA beginning on November 7, 2007, and further comments were received from individuals and organizations listed in Table 5.2. A number of the comments received were incorporated into this document. In addition to the organizations in the above table, comments were received via fax and email from approximately 340 private citizens. *See Appendix A-1 for a summary of public comments.*

TABLE 5.1 SUMMARY OF PUBLIC CONTACTS MADE DURING PREPARATION OF DRAFT EA

PUBLIC CONTACT	TITLE	ORGANIZATION	PRESENT AT ONSITE?
Arturo Sinclair	Governor	Ysleta Del Sur Pueblo	Not present
Carlos Hisa	Lt. Governor	Ysleta Del Sur Pueblo	Not present
Ron Curry	Cabinet Secretary	New Mexico Environment Department	Not present
Lisa Kirkpatrick	Chief	Conservation Services Division, New Mexico Dept. of Game and Fish	Not Present
Glen Landers	Private Citizen	N/A	Present
Joanna Prukop	Cabinet Secretary	New Mexico Energy, Minerals and Natural Resources Dept.	Not present
Ruth Burstrom	President	New Mexico Audubon Council	Not present
Nada Culver	Senior Counsel	The Wilderness Society	Not present
Katherine Slick	State Historic Preservation Officer	New Mexico State Historic Preservation Office	Not Present

TABLE 5.2 SUMMARY OF PUBLIC CONTACTS MADE DURING PREPARATION OF FINAL EA

PUBLIC CONTACT	TITLE	ORGANIZATION
Joanna Prukop	Cabinet Secretary	New Mexico Energy, Minerals and Natural Resources Department
Nada Culver	Senior Council	The Wilderness Society
Ron Curry	Cabinet Secretary	New Mexico Environment Department
Matthew Wunder	Chief	Conservation Services Division, New Mexico Dept. of Game and Fish
Stephen Capra	Executive Director	New Mexico Wilderness Alliance
Kevin Bixby	Executive Director	Southwest Environmental Center
Jeff Bingaman	U.S. Senator	State of New Mexico
Ray Backstrum	Interim County Administrator	Otero County
Katherine Slick	State Historic Preservation Officer	New Mexico State Historic Preservation Office
Stephen P. Cook	Representative	South Sacramento Water Group
Sanford D. Schemnitz	Chairman	Southwest Consolidated Sportsmen
Wally Murphy	Field Supervisor	Fish and Wildlife Service
Clifford K. Larsen	Mining Issues Chair	Rio Grande Chapter of the Sierra Club,
Scott A. Verhines	State Engineer	State of New Mexico
George M. Yates	President	Harvey E. Yates Company

5.2 INTERDISCIPLINARY TEAM

Team Member	Title	Organization
Edward Seum	Supervisor, Lands & Minerals	Las Cruces DO
John Besse	Environmental Protection Specialist	Las Cruces DO
Lisa Phillips	Range Management Specialist	Las Cruces DO
Mark Hakkila	Wildlife Biologist	Las Cruces DO
Tom Holcomb	Archaeologist	Las Cruces DO
Bruce Call	Soil Scientist	Las Cruces DO
Oz Gomez	Outdoor Recreation Planner	Las Cruces DO
John Simitz	Geologist	Roswell FO

6.0 REFERENCES

U.S. Department of the Interior, Bureau of Land Management. White Sands Resource Management Plan Las Cruces, New Mexico: Las Cruces District Office, October 1986.

U.S. Department of the Interior, Bureau of Land Management, New Mexico State Office. Air Quality Technical Report for BLM Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas, November 2011.

EPA Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006. Environmental Protection Agency, Washington, D.C.

EPA, Natural Gas Star Program (2006 data) at: <http://www.epa.gov/gasstar/accomplish.htm>. Environmental Protection Agency, Washington, D.C.

Enquist, Carolyn and Gori, Dave. Implications of Recent Climate Change on Conservation Priorities in New Mexico. April 2008.

Goddard Institute for Space Studies. 2007. Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots. New York, New York. (Available on the Internet: <http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif>.)

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Basis (Summary for Policymakers). Cambridge University Press. Cambridge, England and New York, New York. (Available on the Internet: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>)

Intergovernmental Panel on Climate Change (IPCC). Climate Change 2007, Synthesis Report. A Report of the Intergovernmental Panel on Climate Change.

National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. (Available on the Internet: <http://dels.nas.edu/basc/Climate-HIGH.pdf>.)

US Government Accountability Office Report "Climate Change, Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources" GAO-07-863, August 2007 (1st paragraph, 1st page, GAO Highlights) at: <http://www.gao.gov/news.items/d07863.pdf>

7.0 APPENDICES

7.1 APD

The Bennett Ranch Unit #6 APD is available for review in the Las Cruces District Office.

7.2 AUTHORITIES

40 CFR, All Parts and Sections inclusive Protection of Environment, Revised as of July 1, 2006.

43 CFR, All Parts and Sections inclusive - Public Lands: Interior, Revised as of October 1, 2000.

U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors), 2001.

The Federal Land Policy and Management Act, as amended. Public Law 94-579.

7.3 OTHER SUPPORTING INFORMATION

7.3.1 Conditions of Approval

OPERATOR: Harvey E. Yates Company

LEASE NO: NM-71526

WELL NAME & NO.: Bennett Ranch Unit #6

LOCATION: Section 24, T. 26 S., R. 12 E., NMPM.

QUARTER/QUARTER & FOOTAGE: NW¼SW¼ - 660 feet FWL & 1140 feet FSL

COUNTY: Otero County, New Mexico

1. The Harvey E. Yates Company shall hereafter be identified as the operator in these requirements. The Authorized Officer is the person who approves the Conditions of Approval.
2. The operator shall indemnify the United States against any liability for damage to life or property arising from occupancy or use of public land under this authorization.
3. The operator shall have surface use approval prior to any construction work to change or modify the access road and/or well pad. The operator shall submit (Form 3160-5), Sundry Notice and Report on Wells, an original plus one (1) copy to the Las Cruces District Office, stating the basis for any changes to previously approved plans. Prior to any revised construction, the holder shall have an approved Sundry Notice and Report on Wells or written authorization to proceed with the change in plans ratified by the Authorized Officer.
4. Weed Control
 - A. The operator shall be held responsible if noxious weeds become established within the area. Evaluation of the growth of noxious weeds shall be made upon discovery. Weed control will be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipelines, and adjacent land affected by the establishment of weeds due to this action. The holder is responsible for consultation with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policy.
 - B. The operator shall insure that the equipment or vehicles that will be used to construct, maintain and administer the access roads, well pad and resulting well are not transporting invasive and noxious weed seed. Transporting of invasive and noxious weed seed could occur if the equipment and vehicles were previously used in noxious weed infested areas. In order to prevent the spread of noxious weeds, the Authorized Officer shall require that the equipment and vehicles be cleaned with either high pressure

water or air prior to moving the equipment to the site of construction, maintenance and administration of the access roads, well pad, and resulting well.

5. Hazardous Substances

A. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act Of 1976, as amended (15 U.S.C. 2601, *et. seq.*) with regard to any toxic substances that are used, generated by or stored on the project/pipeline route or on facilities authorized. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.

B. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substances or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, *et. seq.* or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, *et. seq.*) on this project/pipeline (unless the release or threatened release is wholly unrelated to the holder's activity on the pipeline). This agreement applies without regard to whether a release is caused by the operator, its agent, or unrelated third parties.

C. A double liner with a leak detection system between the liners will be required for any reserve pit being used to collect fluids during drilling operations.

D. An appropriately sized secondary containment system will be used with a closed loop steel tank system used to collect fluids during drilling operations.

E. Leaking equipment will be promptly repaired or removed from the site to prevent contamination from spills. Any soil or water that has been contaminated will be placed in appropriate containers and removed from the site. Disposal of vehicle fluids on public land will not be authorized.

F. Copies of spill prevention, control, and countermeasure plans are required, and must be provided to the Authorized Officer.

G. Use of pesticides and herbicides shall comply with applicable Federal and State laws. Prior to use of pesticides, the BLM Authorized Officer will approve a plan for its use.

H. Storage tanks will have a berm constructed around them, of sufficient dimensions to contain the contents of the largest tank, to serve as secondary containment should a spill occur.

I. All drilling-related CERCLA hazardous substances removed from the location and not reused at another drilling location must be disposed of in accordance with applicable Federal and State regulations.

J. All tanks containing liquids or semi-liquids, including drilling and work over tanks, will be covered with non-monofilament small mesh netting which extends to ground level to prevent the entrapment or contamination of wildlife. Netting shall be in place at all times when workers are not actually present at the site.

6. Well Pad Construction

- A. Construction must conform to the approved well site and layout plan in the Surface Use Plan of Operations (SUPO).
- B. All topsoil shall be removed from the area to be disturbed and stockpiled for reapplication during reclamation. The salvaged soils will be stored in a manner that will protect it from wind and water erosion.
- C. The total surface area disturbed for construction of the well pad shall be limited to the absolute minimum required subject to the approval of the Authorized Officer. Upon completion of the well, the pad shall be reduced to the minimum area necessary (but not more than 2.2 acres) for production and the remainder reclaimed.
- D. Control measures (hay bale check dams, silt fence, water bars, slope reduction, recontouring, terracing etc.) shall be utilized as necessary to prevent erosion of soil disturbed by construction of the well pad.
- E. Above ground structures shall be painted to blend with the natural color of the landscape. A flat color from the Standard Environmental Colors Chart specified by the Authorized Officer shall be used on all facilities to closely approximate the vegetation within the setting.
- F. The operator shall notify the BLM 15 days prior to commencing work at the site to provide for a pre-construction aplomado falcon survey.

7. Interim Well Pad Reclamation

- A. Following completion of a producing well, the well pad shall be reduced in size to the minimum area required (but not more than 2.2 acres) for actual operation of the well. Caliche shall be removed from the balance of the disturbed area; all compacted areas will be ripped to a depth of two feet on one foot centers and followed by recontouring and topsoil reapplication. Prior to seeding the area soils will be tested to establish requirements for the proper levels of soil amendments. Seeding will be accomplished prior to the beginning of the next growing season. Proper amounts of soil amendments and seed will be applied and disked into the re-spread soil. Mulch, jute netting or other surface stabilizing materials will be used on the reclaimed area while waiting for vegetation to become established.
- B. Hay bale check dams, silt fence and water bars shall be used and maintained until sufficient vegetative cover to prevent erosion is established. Seeded areas shall be fenced to exclude cattle for the duration of the re-vegetation process.

8. Well Pad Abandonment:

- A. All surface structures including tanks, poles, powerlines etc., shall be removed upon abandonment, relinquishment or termination of use.
- B. Proper disposal methods for debris and other trash including all toxic products shall be followed.
- C. Wells shall be plugged in accordance with BLM and New Mexico State requirements.
- D. All caliche applied for surfacing during construction/operation shall be removed from the site prior to recontouring. Caliche may be recovered and reused for road maintenance or other beneficial use. All compacted areas will be ripped to a depth of two feet on one foot centers and followed by recontouring

and topsoil reapplication. Prior to seeding the area soils will be tested to establish requirements for the proper levels of soil amendments. Seeding will be accomplished prior to the beginning of the next growing season. Proper amounts of soil amendments and seed will be applied and disked into the re-spread soil. Mulch, jute netting or other surface stabilizing materials will be used on the reclaimed area while waiting for vegetation to become established.

E. Hay bale check dams, silt fence and water bars shall be used and maintained until sufficient vegetative cover to prevent erosion is established. The entire disturbed area shall be fenced to exclude cattle for the duration of the re-vegetation process.

9. Seed Mixes:

The operator shall use a BLM prescribed seed mix the composition of which will be determined according to soil and range type.

10. Dust Control:

The operator shall utilize all means necessary to control surface erosion and airborne dust emissions from the site during construction and operation. Dust abatement measures shall include water application and avoiding construction activity during periods of high winds.

11. Protection of Ground Water

The operator will case and cement the well in a manner which will eliminate the potential for groundwater contamination from drilling mud and other surface sources. Drilling with air or fresh water mud systems should be used where possible. The operator will set surface or intermediate casing below the last known useable water and cement the casing to surface in order to reduce or eliminate the potential for groundwater contamination from drilling mud and other surface sources. Based on the best available data derived from local water wells and input from the State Engineer the operator is required to set surface casing to a depth of at least the base of the Salt Basin aquifer or any deeper aquifer occurrence where useable groundwater (as defined by the State) is encountered.

12. Reclamation Standards:

The operator shall be responsible for successful completion of reclamation to BLM standards and reclamation success will be evaluated using performance based standards. Reclamation will be considered successful when healthy, mature perennials are established with a composition and density that closely approximates the surrounding vegetation as prescribed by the BLM, and the reclamation area is free of noxious weeds. Parameters will include percent basal cover of mature approved species as compared to an adjacent undisturbed area. Timeframes for release will be at least 2 years. Operators shall use any BLM approved means necessary to achieve acceptable re-vegetation including, but not limited to:

- Importation of additional topsoil if stockpiled topsoil from the site proves insufficient in quantity or quality.
- Irrigation if rainfall during the growing season proves insufficient to sustain plant growth.
- Mulching to control wind erosion, evaporative water loss and seed loss.

Operators shall make every effort to accomplish reclamation of the site within two growing seasons. If re-vegetation is not acceptable at the end of that timeframe more intensive reclamation methods may be required by the Authorized Officer.

Under no circumstances will the operator be released from responsibility for reclamation until the site is determined to be fully recovered by the Authorized Officer based on BLM standards. Reclamation efforts by the operator shall continue for as long as required to achieve full recovery.

13. Archaeological, Paleontology, and Historical Sites:

A. Any cultural resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder shall be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

B. The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of the project work, the holder shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The holder or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes. Any unauthorized collection or disturbance of cultural resources may result in a shutdown order by the Authorized Officer.

C. The permittee shall immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this authorization. The permittee shall suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and shall protect the discovery from damage or looting. The permittee may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered locality or be continued elsewhere. The Authorized Officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

14. Sanitation:

The holder shall be responsible for maintaining the site in a sanitary condition at all times; waste materials shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

15. Open-top Tanks:

Any open-top tank containing oil or toxic fluids shall be covered with netting or equipped to prevent birds, bats, and other wildlife from entering the open-top tank.

16. Open Pits:

Any open pits containing fluids, toxic or otherwise, shall be covered with netting or equipped to prevent birds, bats, and other wildlife from entering the open-top tank.

17. Undesirable Events:

If, during any phase of the construction, operation, maintenance, or termination of the authorization, any oil or other pollutants should be discharged and impact Federal land, the control and total removal, disposal, and cleanup of such oil or other pollutants, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal land, or to repair all damages to Federal land resulting there from, the Authorized Officer may take such measures as deemed necessary to control and cleanup.

7.4 APPENDIX A-1 SUMMARY OF PUBLIC COMMENTS

1. The APD is premised on the improper assumption that HEYCO will obtain a waiver from applicable rules; the APD should compliance with the New Mexico Oil Conservation Commission's Rule 21.

Rule 21 by the New Mexico Oil Conservation Division (NMOCD) does require HEYCO to use steel tanks during the drilling process. This order has not been adopted by the Federal Authorized Officer as a directive under the Mineral Leasing Act and 43 CFR 3162.1. Therefore, the use of a lined earthen reserve pit was analyzed in the EA.

2. The BLM has the authority to deny the APD; the EA should thoroughly assess an alternative denying the APD.

The EA presents the No Action Alternative as a baseline for the analysis of the resource impacts of the other alternatives (Alternatives B, C and D). Under the No Action Alternative, the APD would be denied and the proposed well would not be drilled. There would be no impacts to resources in the area under the No Action Alternative and therefore no impacts to analyze.

3. The BLM has the authority to require directional drilling from the existing wells; the EA should thoroughly assess an alternative requiring HEYCO to drill the proposed well from an existing well pad.

As a result of this comment, a directional drilling alternative was included in the EA. Directional drilling is considered and analyzed under Alternative D.

4. The APD should require a survey of the presence and depths of ground water and specify additional protective measures or BLM should delay action on oil and gas drilling proposals on Otero Mesa pending completion of further Salt Basin Aquifer studies.

In 2006, the United States Geological Survey issued Open File Report 2006-1358, titled Knowledge and Understanding of the Hydrology of the Salt Basin in South-central New Mexico and Future Study Needs. This report, along with the Livingston Associates/John Shomaker and Associates report, provided basic information concerning the area of the Salt Basin, its aquifers, its recharge area and discharge locations.

We believe that there is already good information for the area covered by this APD, for the depth to aquifers in the Salt Basin based on information supplied by the Office of the State Engineer and previous drilling by HEYCO. There are aquifers shallower than HEYCO's target formation, as well as deeper

aquifers. What is not known with confidence is the potential volume of available ground water or its chemistry in different portions of the Salt Basin. The drilling and casing plan is designed to protect these known aquifers. We believe that the surface use and drilling plans are fully adequate to prevent contamination and degradation of the aquifers.

5. BLM should impose stringent survey requirements, subsequent mitigation and recovery measures for protection of Aplomado falcons.

The northern aplomado falcon habitat model indicates that the proposed development would be in high potential habitat for aplomado falcons. Surveys for aplomado falcons have been conducted during the breeding season by two separate contract biologists for the past several years. The proposed well site is adjacent to an established survey route.

The EA contains a number of mitigation measures designed to minimize impacts to aplomado falcon habitat including:

- Minimize pad size as much as possible
- Net any open tanks to prevent bird mortality
- Locate the pad away from potential nest sites (tall, multi-branched yuccas and tree-form mesquites with raptor nests)
- Conduct surveys for aplomado falcons
- Conduct further NEPA analysis and Section 7 Conference for commercial production proposals

For detailed discussion of potential impacts to aplomado falcons and mitigation measures, see section 4.15 of the EA.

6. BLM should impose re-vegetation requirements to protect Chihuahuan desert grasslands and ensure that they will be successful before approving this permit.

The EA identifies very stringent reclamation measures for an action of this type. These requirements will be attached to any authorization of the APD as conditions of approval (COAs). Refer to section 7.3.1 for a complete listing of the Conditions of Approval for the BRU #6 APD.

7. The EA should assess the benefits for the Butterfield Historic Trail of denying the APD or requiring directional drilling.

Effects to the Butterfield Historic Trail are assessed in the EA. The well location as proposed (Alternative B) is within the buffer zone of 0.25 miles on either side of the Butterfield Trail in the White Sands RMP. However, the proposed well location is outside the well-preserved segments of the Trail and therefore does not conflict with the RMP. In addition, the well location in Alternative B was field checked by a BLM archaeologist and no features or cultural artifacts associated with the trail were found. The proposed location would also not be visible from the Trail. Alternative D assesses directionally drilling the well from one of the existing pads.

8. A quantification of the anticipated emissions of pollutants (VOC's, Nitrogen Oxides, Hydrogen Sulfide) and determination of whether ambient air quality standards will be met should be included in the EA.

The anticipated emissions of pollutants have been quantified and included in the EA. Oil and gas exploration and development generate greenhouse gases during all phases of the process. Combustion of

gasoline and diesel fuels from vehicles used during construction of the access road and well pad will generate CO₂, N₂O among other emissions. The diesel-powered drilling rig will generate CO₂, N₂O and particulates during drilling. The use of low-sulfur diesel fuels will minimize the emission of sulfur dioxide. HEYCO cannot vent or flare the produced gas without approval. That should reduce the likelihood for significant emissions of VOCs and CO₂.

The two BRU wells already completed have yielded only 'sweet' gas. We do not anticipate any emissions of hydrogen sulfide during the drilling of the BRU #6 well, or during the production phase, if the well recovers natural gas in paying quantities.