

ENVIRONMENTAL ASSESSMENT
BLM Office: Carlsbad Field Office

DOI-BLM-NM-P020-2009-0303-EA

Mack Energy Corporation

Lease #: NMNM-120349

Frosty Federal Com. # 1, Grinch Federal Com. # 1

1. Purpose and Need for Action

- 1.1 Mack Energy Corporation has applied with permits to drill two horizontal oil wells and construct their associated access roads. The locations for the proposed wells are:

Frosty Federal Com. # 1:

Surface Hole: 2285' FNL & 330' FEL, Section 26, T. 16 S., R. 27 E.

Bottom Hole: 2285' FNL & 330' FWL, Section 26, T. 16 S., R. 27 E.

Grinch Federal Com. # 1:

Surface Hole: 355' FSL & 330' FWL, Section 24, T. 16 S., R. 27 E.

Bottom Hole: 365' FSL & 330' FEL, Section 24, T. 16 S., R. 27 E.

- 1.2 The need for this proposed action is for further development of a federal oil and gas lease.
- 1.3 The Carlsbad Resource Management Plan and 1997 Amendment has been reviewed, and it has been determined that the proposed action conforms with the land use plan terms and conditions as required by 43 CFR 1610.5.
- 1.4 The Carlsbad Field Office utilizes a resource conflict map that was prepared by an interdisciplinary team showing areas of concern. These areas of concern include Special Management Areas (SMA's), Threatened and Endangered (T&E) Habitat, known locations of Threatened and Endangered (T&E) species, areas with other Special Status species, Wildlife Habitat projects, Riparian/Wetland habitat, 100-year floodplains, etc. The conflict map is reviewed, and the author of the EA signs off the projects shown to be outside of the areas of concern. The projects, which occur in the areas of concern depicted on the map, are reviewed and signed off only by the resource specialist with the expertise for that area.

The critical elements subject to requirements specified in statute, regulation, or executive order listed below are either not present or not affected by the proposed action or alternative.

Areas of Critical Environmental Concern (ACEC's)
Hazardous/Solid Wastes
Native American Religious Concerns

Prime/Unique Farmlands
Special Status Species
Wild & Scenic Rivers
Wilderness
Wetlands/Riparian

1.5 **Legal requirements or considerations**

All State and Federal requirements have been met.

2. Alternatives Including the Proposed Action

2.1 **Description of Proposed Action**

Mack Energy Corporation proposes to construct two horizontal oil well locations with a 300' x 300 foot caliche pad. The company will be using a closed loop system with no need for reserve pits. The company will also place a tank battery on each individual well if the well location is found to be productive. There will be a need for the following access roads.

Frosty Federal Com. # 1: will require a 93' x 14 feet of new access road to the proposed well location. The centralized tank battery for this section will be located on the proposed well pad location.

Grinch Federal Com. # 1: will require a 295' x 14 feet of new access road to the proposed well location. The centralized tank battery for this section will be located on the proposed well pad location.

Mitigation Measures: The mitigation measures include the Pecos District Conditions of Approval, requirements for raptor nests, the standard stipulation for High Cave/Karst, and the standard stipulations for permanent resource roads.

Stipulations/Condition of Approval for Raptor Nests: Surface disturbance will not be allowed within up to 200 meters of nests or by delaying activity for up to 90 days, or a combination of both. Exceptions to this requirement for raptor nests will be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and will not result in continuing activity in proximity to the nest. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 ft. from the source of the noise.

Although these wells will be closed loop systems with no reserve pits. The pads will be constructed, with the v-door locations as follows:

Frosty Federal Com. # 1: V-door East

Grinch Federal Com. # 1: V-door East

2.2 **Description of Alternatives**

Alternative A: No Action (Reject Application)

Mitigation Measures: None

3. Affected Environment

This section is a discussion, by relevant resources, of the current condition of the affected environment.

Location: From the intersection of Highway 82 and county road 202 go north on county road 202 for 2.6 miles, turn right and go northeast for 1.2 miles. Then veer left and go northwest for 2.7 miles, turn right and go northeast for 0.5 miles, veer right and go east for 0.1 miles, turn left and go north for 0.2 miles. This will take you to the proposed road to the Grinch Federal Com. # 1 well location. From this point go south approximately 600 feet to the proposed road for the Frosty Federal Com. #1 proposed well pad location. Both well locations are located on Public surface with federal minerals. The grazing allotment is in the Turkey Track Allotment.

3.1 Air Quality

The area of the proposed action is within the Pecos River airshed and is classified as a Class II Air Quality Area. Air quality is generally considered excellent. During the spring, strong winds occasionally cause dust storms, which are the primary cause of air pollution in the project area. Particulates from nearby oil and gas production, agriculture burning and ambient dust effect air quality. More information about the area climate may be found in the *Soil Survey: Eddy Area, New Mexico*.

3.2 Range

The proposed action is within the Turkey Track Allotment. The allote is:
Bogle Farms
P.O. Box 460
Dexter, NM 88230

3.3 Soil

The locations are both in a fairly flat spot in a loamy to gypsum flats soil type.

3.4 Vegetation

The existing vegetation consists of Mesquite brush, Broom snakeweed, Opuntia spp, Creosote bush, Yucca spp., Coldenia Hirsuta, Burrow grass, Tobosa grass, Sporabulous spp., Three awn, Black grama, Blue grama, Gypsum grama, and Ephedra spp.

3.5 Wildlife Habitat

The wildlife habitat in the area supports populations of ungulates (primarily mule deer), carnivores, water birds, upland birds and raptors. Population composition and numbers vary with suitability of habitat.

Migratory Birds

Executive order #13186 titled “Responsibilities of Federal Agencies to Protect Migratory Birds” signed 1/10/01 requires that the BLM evaluate the effects of federal actions on migratory birds. A migratory bird inventory has not been completed for this area. Common migratory birds which may use the area as habitat include various species of song birds, owls, ravens, hawks, finches, doves, thrashers, and meadow larks.

3.6 **Raptors**

Several raptor species use the southeastern New Mexico region as either migratory or permanent resident. Potential nesting habitat includes but is not limited to escarpments, cliff faces, and any tree large enough to support a nest. Nesting territories of some raptors remain remarkably stable from year to year. Furthermore, several species seldom build new nests, but repeatedly repair and reuse old ones. Alternate nest sites are contained within territories; therefore a specific nest site may change annually. Limits of territories remain essentially constant (Newton 1979). The grasslands, riparian, and xeric-riparian areas provide hunting grounds. The area has an abundant food base to support a substantial population of raptors year round in most years.

3.7 **Cultural**

The project falls within the Southeastern New Mexico Archaeological Region. This region contains the following cultural/temporal periods: Paleoindian (ca. 12,000-8,000 B.C.), Archaic (ca. 8000 B.C. –A.D. 950), Ceramic (ca. A.D. 600-1540) Protohistoric and Spanish Colonial (ca. A.D. 1400-1821), and Mexican and American Historical (ca. A.D. 1822 to early 20th century). Sites representing any or all of these periods are known to occur within the region. A more complete discussion can be found in *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico An Overview of Cultural Resources in the Roswell District, Bureau of Land Management* published in 1989 by the U.S. Department of the Interior, Bureau of Land Management. A cultural resource inventory shall be conducted of the area of effect for the proposed project prior to any ground disturbing activities.

3.8 **Cave/ Karst**

The project is located in gypsum karst terrain, a landform that is characterized by underground drainage through solutionally enlarged conduits. Gypsum karst terrain may contain sinkholes, sinking streams, caves, and springs. Sinkholes leading to underground drainages and voids are common. These karst features, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of the region.

The BLM categorizes all areas within the Carlsbad Field Office as having either low, medium, high or critical cave potential based on geology, occurrence of known caves, density of karst features, and potential impacts to fresh water aquifers. This project occurs within a high karst zone. A high karst zone is defined as an area occurring in known soluble rock types and containing a high frequency of significant caves and karst features such as sinkholes, bedrock fractures that provide rapid recharge of karst aquifers, and springs that provide riparian habitat.

Sinkholes and cave entrances collect water and can accumulate rich organic materials and soils. This, in conjunction with the stable microclimate near cave entrances, support a greater diversity and density of plant life which provides habitat for a greater diversity and density of wildlife such as raptors, rodents, mammals, and reptiles.

The interior of the caves support a large variety of troglobitic, or cave environment-dependent species. The troglobitic species have adapted specifically to the cave environment due to constant temperatures, constant high humidity, and total darkness. Many of the caves in this area contain fragile cave formations known as speleothems.

4. Environmental Impacts or Consequences

This section is a discussion, by relevant resources, of the potential impacts of each alternative. The discussion includes direct, indirect, cumulative and residual impacts after mitigation actions have been applied.

4.1 Air Quality

Proposed Action: Air quality will be affected by increased dust during construction and from vehicles traveling to and from the location. In addition, various odors will be produced. These could include diesel fumes, hydrogen sulfide gas and chemical odors in association with drilling. Although these impacts will fall within limits set by the National Ambient Air Quality Standards, the affects will be felt on and around the location.

Alternative A: Alternative A will have no impact.

4.2 Range

Proposed Action: The resulting loss of vegetation will not affect the Animal Unit Months (AUMs) authorized for livestock use in this area. There are occasional livestock injuries or deaths due to accidents such as collisions with vehicles, falling into mud pits or other excavations and ingesting plastic or other materials present at the work site. If further development occurs, the resulting loss of vegetation could reduce the AUMs authorized for livestock use in this area.

Alternative A: Alternative A will have no impact.

4.3 **Soil**

Proposed Action: There is a potential for soil erosion due to the highly erosive nature of the gypsum soil in the area. There is always the potential for soil contamination around production facilities due to spills of salt water and/or hydrocarbons. If further development occurs this could result in increased soil erosion and soil contamination from surface spills.

Alternative A: Alternative A will have no impact.

4.4 **Vegetation**

Proposed Action: Vegetation will be removed when the well pad and access road are constructed. This impact will be permanent as long as the well is productive. When the well is plugged and abandoned, the area will potentially re-vegetate in 4-5 years, depending on timely rainfall. If further development occurs this could result in increased vegetation depletion.

Alternative A: Alternative A will have no impact.

4.5 **Wildlife**

Proposed Action: The severity of impacts depends on the sensitivity of the species affected, the nature of the environmental disruption, habitat characteristics, and the availability and condition of alternative habitat. The species present in this area tend to vacate traditional habitats under continued and increasing pressure from petroleum activities. This is probably due to the intensive nature of petroleum production occurring.

Under the proposed action, these species may vacate the area for several years and may never reoccupy this habitat again. This will depend on the long-term development in the area and whether suitable habitat exists elsewhere that can support additional animals. If suitable habitat is not available, species populations will likely sustain a decrease, especially if secondary habitat is also under pressure and/or degradation.

Alternative A: Alternative A will have no impact.

4.6 **Raptors**

The affects of human-associated disturbance is a primary threat to raptor populations. The construction and development associated with oil and gas exploration and/or development may adversely affect potential nest sites and associated foraging area that support the pairs nesting effort. The specific effects and tolerance limits to disturbance on raptors vary among and within raptor species. This is due to the broad range of direct and indirect human-associated impacts and the fluctuating levels of sensitivity for individual raptors, depending on life stage and time of year. Behavioral data suggests that adults that become sensitized to human presence are less than normally attentive to their young, which can reduce fledging success.

Furthermore, behavioral data suggests that raptors have the tendency to shift or expand their home ranges, or moved to new areas (Anderson et al. 1990). Disruption of foraging areas can result in lowered hunting success, increased intraspecific encounters, and reduced food intake (Anderson 1984). Raptors displaced from foraging areas may have increased energy expenditures and less time available for other activities, and their productivity could be adversely affected (Stalmaster and Kaiser 1997). The noise caused by pump jack engines could cause potential abandonment of nests or a shift or expansion of home range. Adherence to the conditions of approval and mitigation measures (as described in Sec. 2.1 of the EA) is critical for the protection of this resource. In order to minimize human disturbance spatial and/or temporal buffer zones can protect raptors during periods of extreme sensitivity. Raptors may tolerate considerable noise close to their nests if they are familiar with it, especially if humans are not visible or otherwise obviously associated with it (Schueck et al. 2001). Potentially, if a disturbance is periodic and ongoing when adults first arrive at their nests and not perceived as threatening, raptors may habituate to them.

4.7 **Cultural**

A cultural resource inventory was conducted for the area of effect (09-NM-523-297 & 09-NM-523-298), no Historic Properties were identified.

Alternative A: Alternative A will have no impact.

4.8 **Cave/Karst**

GENERAL IMPACT ANALYSIS

Cave and karst features provide direct conduits leading to groundwater. These conduits can quickly transport surface and subsurface contaminants directly into underground water systems and freshwater aquifers without filtration or biodegradation. In addition, contaminants spilled or leaked into or onto cave/karst zone surfaces and subsurfaces may lead directly to the disruption, displacement, or extermination of cave species and critical biological processes. In extreme or rare cases, a buildup of hydrocarbons in cave systems due to surface leaks or spills could potentially cause underground ignitions or asphyxiation of wildlife or humans within the cave.

In cave and karst terrains, rainfall and surface runoff is directly channeled into natural underground water systems and aquifers. Changes in geologic formation integrity, runoff quantity/quality, drainage course, rainfall percolation factors, vegetation, surface contour, and other surface factors can negatively impact cave ecosystems and aquifer recharge processes. Blasting, heavy vibrations, and focusing of surface drainages can lead to slow subsidence, sudden collapse of subsurface voids, and/or cave ecosystem damage.

A more complete discussion of the impacts of oil and gas drilling can be found in the *Dark Canyon Environmental Impact Statement of 1993*, published by the U.S. Department of the Interior, Bureau of Land Management.

GENERAL MITIGATION

To mitigate or lessen the probability of impacts associated with the drilling and production of oil and gas wells in karst areas, the guidelines listed in Appendix 3, Practices for Oil and Gas Drilling and Production in Cave and Karst Areas, as approved in the Carlsbad Resource Management Plan Amendment of 1997, page AP3-4 through AP 3-7 will be followed.

BLM maintains up to date locations and surveys of known cave and karst features. Projects will be located away from these features whenever possible. Drilling pads, roads, utilities, pipelines and flowlines will be routed around cave and karst features at an adequate distance to mitigate adverse impacts. Wellbore engineering plans will incorporate required cave and aquifer protection protocols.

Highly sensitive cave and karst areas with critical freshwater aquifer recharge concerns may have a number of special surface and subsurface planning and construction requirements based upon the risk of adverse impacts created by a specific location or process.

CONSTRUCTION IMPACT ANALYSIS

The construction of roads, pipelines, well pads and utilities can impact bedrock integrity and reroute, impede, focus, or erode natural surface drainage systems. Increased silting and sedimentation from construction can plug downstream sinkholes, caves, springs, and other components of aquifer recharge systems and result in adverse impacts to aquifer quality and cave environments. Any contaminants released into the environment during or after construction can impact aquifers and cave systems. A possibility exists for slow subsidence or sudden surface collapse during construction operations due to collapse of underlying cave passages and voids. This would cause associated safety hazards to the operator and the potential for increased environmental impact. Subsidence processes can be triggered by blasting, intense vibrations, rerouting of surface drainages, focusing of surface drainage, and general surface disturbance.

Blasting fractures in bedrock can serve as direct conduits for transfer of contaminants into cave and groundwater systems. Blasting also creates an expanded volume of rock rubble that cannot be reclaimed to natural contours, soil condition, or native vegetative condition. As such, surface and subsurface disruptions from blasting procedures can lead to permanent changes in vegetation, rainfall percolation, silting/erosion factors, aquifer recharge, and freshwater quality and can increase the risk of contaminant migration from drilling/production facilities built atop the blast area.

CONSTRUCTION MITIGATION

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD:

- In the event that any underground voids are encountered during construction activities, construction activities will be halted and the BLM will be notified immediately.
- No Blasting to prevent geologic structure instabilities.
- Pad Berming to minimize effects of any spilled contaminants.

DRILLING IMPACT ANALYSIS

During drilling, previously unknown cave and karst features could be encountered. If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids. Cementing operations may plug or alter groundwater flow, potentially reducing the water quantity at springs and water wells. Inadequate subsurface cementing, casing, and cave/aquifer protection measures can lead to the migration of oil, gas, drilling fluids, and produced saltwater into cave systems and freshwater aquifers.

DRILLING MITIGATION

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required.

- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional Drilling allowed after at least 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost Circulation zones logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See Drilling COAs.

PRODUCTION IMPACT ANALYSIS

Production facilities such as tank batteries, pump-jacks, compressors, transfer stations, and pipage may fail and allow contaminants to enter caves and freshwater systems. Downhole casing and cementing failures can allow migration of fluids and/or gas between formations and aquifers. Facilities may also be subject to slow subsidence or sudden collapse of the underlying bedrock.

PRODUCTION MITIGATION

In order to mitigate the impacts from production activities and due to the nature of karst terrain, the following Conditions of Approval will apply to this APD:

- Tank battery liners and berms to minimize the impact resulting from leaks.
- Leak detection system to provide an early alert to operators when a leak has occurred.
- Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of line failures used in production or drilling.

RESIDUAL AND CUMULATIVE IMPACT ANALYSIS

Any industrial activities that take place upon or within karst terrains or freshwater aquifer zones have the potential to create both short-term and long-term negative impacts to freshwater aquifers and cave systems. While a number of mitigation measures can be implemented to mitigate many impacts, it is still possible for impacts to occur from containment failures, well blowouts, accidents, spills, and structural collapses. It is therefore necessary to implement long-term monitoring studies to determine if current mitigations measures are sufficient enough to prevent long-term or cumulative impacts.

RESIDUAL AND CUMULATIVE MITIGATION

- Nontoxic fluorescent dyes will be added to the drilling fluid when the hole is spudded and will be circulated to the bottom of the karst layers. This provides data as part of a long-term monitoring study.
- Annual pressure monitoring will be performed by the operator. If the test results indicate a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

PLUGGING AND ABANDONMENT IMPACT ANALYSIS

Failure of a plugged and abandoned well can lead to migration of contaminants to karst resources and fresh water aquifers. While this action does not specifically approve plugging and abandonment procedures, the operator should be made aware that additional or special Conditions of Approval may apply at that time.

PLUGGING AND ABANDONMENT MITIGATION

Abandonment Cementing: Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

5. Consultations and Coordination

Prepared by: Cody Layton, Natural Resource Specialist BLM-CFO

Date: 01/15/2009

The following individuals have been consulted regarding the proposed action:

Lynn Robinson, Archaeologist, BLM-CFO

John Chopp, Wildlife Biologist, BLM-CFO

Aaron Stockton, NRS Cave/Karst, BLM-CFO

6. References

Anderson, D.E. 1984. Military training and the ecology of raptor populations at Fort Carson, Colorado. M.Sc. thesis, University of Wisconsin, Madison, WI.

Anderson, D.E., O.J. Rongstad, and W.R. Mytton. 1990. Home-range changes in raptors exposed to increase human activity levels in southeastern Colorado. *Wildlife Society Bulletin* 18: 134-142.

Newton, I. 1979. Population ecology of raptors. Buteo Books, Vermillion, SD.

Schueck, L.S., J.M. Marzluff, and K. Steenhof. 2001. Influence of military activities on raptor abundance and behavior. *The Condor* 103: 606-615.

Stalmaster, M. V., and J.L. Kaiser. 1997. Flushing responses of wintering bald eagles to military activity. *Journal of Wildlife Management* 61: 1307-1313.

**DECISION RECORD (DR)
AND
FINDING OF NO SIGNIFICANT IMPACT (FONSI)
BLM Office: Carlsbad Field Office**

NEPA No. DOI-BLM-NM-P020-2009-0303-EA
Lease No. NM120349
Mack Energy Corp
Application for Permit to Drill

Purpose and Need for Action:

The Mack Energy Corp has applied for a permit to drill 2 well(s). The location for the proposed well(s) is:

1-FROSTY FED COM, OIL WELL AND ROAD

SHL: 2285FNL 330FEL, Section 26, T.16 S., R.27 E.

BHL: 2285FNL 330FWL, Section 26, T.26 S., R.27 E.

1-GRINCH FED COM, OIL WELL AND ROAD

SHL: 355FSL 330FWL, Section 24, T.16 S., R.27 E.

BHL: 365FSL 330FEL, Section 24, T.24 S., R.27 E.

Mitigation Measures: The mitigation measures include the Pecos District Conditions of Approval, requirements for raptor nests, the standard stipulation for High Cave/Karst, and the standard stipulations for permanent resource roads.

Stipulations/Condition of Approval for Raptor Nests: Surface disturbance will not be allowed within up to 200 meters of nests or by delaying activity for up to 90 days, or a combination of both. Exceptions to this requirement for raptor nests will be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and will not result in continuing activity in proximity to the nest. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 ft. from the source of the noise.

Although these wells will be closed loop systems with no reserve pits. The pads will be constructed, with the v-door locations as follows:

Frosty Federal Com. # 1: V-door East

Grinch Federal Com. # 1: V-door East

Recommendation and Rationale:

Our analysis has shown with the mitigation described below or in Section 2.1 of the attached EA the proposed action would have minimal environmental impacts. The proposed action is consistent with the Carlsbad Resource Area Management Plan and Amendment. However, documentation may not have been received for a cultural

resource inventory, a location move, road/pipeline/electric line reroute or participation in the Permian Basin MOA. Therefore, only the wells identified as complete in the table below are recommended for approval at this time.

<u>Well Name</u>	<u>Status*</u>	<u>Decision</u>	<u>Decision Date</u>
1-FROSTY FED COM	COMPLETE		
1-GRINCH FED COM	COMPLETE		

/s/ Cody Layton 03/09/2009
Cody Layton, Project Lead Date

Finding of No Significant Impact/Decision Record:

I have reviewed this environmental assessment including the explanation and resolution of any potentially significant environmental impacts. I have determined that the proposed action with the mitigation measures described above or in Section 2.1 of the attached EA will not have any significant impacts on the human environment, no significant impacts to minority or low-income populations or communities have been identified for the proposed action and that an EIS is not required. I have determined that the proposed project is in conformance with the approved land use plan. It is my decision to implement the project with the mitigation measures attached.

/s/ Jim Stovall 3/12/2009
James Stovall, Field Manager Date
Carlsbad Field Office, BLM

***Status Definition**

Approved: Authorized officer has approved the proposal.

Canceled: BLM returned the application to the applicant because it could not be processed as received.

Complete: NEPA review has been completed and project is ready to be processed.

Denied: Authorized officer has denied the proposal.

Pending: NEPA review has not been completed.

Processed: NEPA review has been completed and is pending a decision from the authorized officer.

Withdrawn: Applicant has requested the proposal to be withdrawn from consideration.