

**U.S. Department of the Interior
Bureau of Land Management**

**June 2016 Competitive Oil and Gas Lease Sale
Preliminary Environmental Assessment**

DOI-BLM-NV-B000-2016-0002-EA

PREPARING OFFICE

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Chapter One: Purpose and Need for Action

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1.1. Background

It is the policy of the Bureau of Land Management (BLM) as mandated by various laws, including the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976, to make mineral resources available and to encourage development of mineral resources to meet national, regional and local needs.

The BLM-Nevada State Office (NVSO) conducts competitive sales for oil and gas lease parcels in the Battle Mountain District (BMD). The NVSO publishes a Notice of Competitive Lease Sale (NCLS) annually that lists lease parcels offered at the auction at least 90 days before it is held. The BLM bases its decision as to which parcels to offer for a competitive lease sale on current resource and land use information and the management framework developed in the appropriate district or field office Resource Management Plans (RMPs).

In the process of preparing a lease sale, the NVSO sends a list of parcelized lands, based on land nominated by the public, to each field office where the parcels are located. As part of the Scoping and Environmental Assessment (EA), the field office staff then reviews the parcels to determine:

- If they are in areas open to leasing;
- If new information has become available which might change any analysis conducted during the planning process;
- If appropriate consultations have been conducted;
- What appropriate stipulations should be included; and
- If there are special resource conditions of which potential bidders should be made aware.

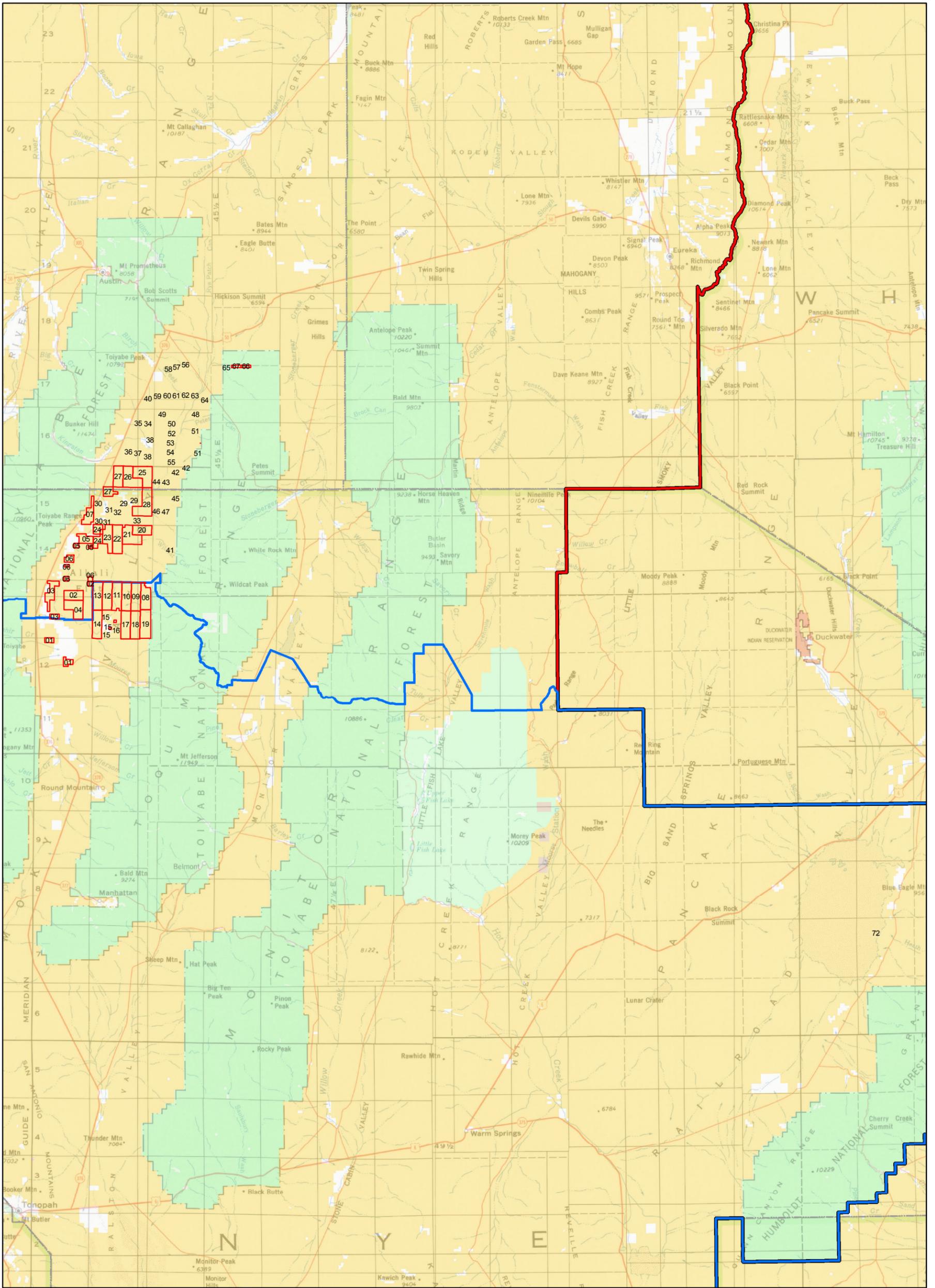
Minerals

Management would make a decision on which parcels to make available for leasing and which stipulations to attach to the parcels. Those parcels and stipulations that are included in the State Director's decision would then be made available to the public through a NCLS. Lease stipulations applicable to each parcel are specified in the Sale Notice. Occasionally, additional information obtained after the publication of the NCLS, may result in deferment of certain parcels prior to the day of the lease sale.

This EA documents the review and environmental analysis of 64 Battle Mountain District Office (BMDO) administered parcels nominated in the June 2016 Competitive Oil and Gas Lease Sale (Figure 1). The EA verifies conformance with the approved Land Use Plan (LUP) provides the rationale for any lease stipulations applied to specific parcels and identifies parcels proposed for deferral.

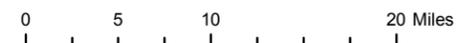
An assessment of potential environmental impacts, based on a Reasonably Foreseeable Development (RFD) scenario, was conducted by resource specialists who relied on historical data and personal knowledge of the areas involved, conducted field inspections and/or reviewed existing databases and file information to determine the appropriate stipulations to attach to specific parcels.

At the time of this review, it is not known whether the nominated parcels will receive bids, if leases would be issued, or what types of lease operations might be proposed in the future, if any. However, we can make some general assumptions about what type of activities that could occur on oil and gas leases and provide general analysis potential indirect impacts associated with those types of activities at the leasing stage. A detailed site-specific NEPA analysis would occur when an Application for Permit to Drill (APD) is submitted.



2016 Nominated Parcels Oil and Gas Lease Sale

- | | | |
|--------------------------|---------------------------|---------------------------|
| Legend | Land Status | Agency |
| OG Sale 2016 June | Department of Defense | Nevada State Lands |
| Field Office Boundary | Department of Energy | Park |
| Administrative Unit Name | Bureau of Indian Affairs | Forest Service |
| Mount Lewis Field Office | Bureau of Land Management | Fish and Wildlife Service |
| Tonopah Field Office | Bureau of Reclamation | National Park Service |
| County Boundary | | Water |



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Map Date: November 6, 2015

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1.2. Purpose and Need for Action:

Oil and gas leasing is necessary to provide oil and gas companies with new areas to explore and potentially develop. Leasing is authorized under the Mineral Leasing Act of 1920, as amended and modified by subsequent legislation, and regulations found at 43 CFR part 3100. Oil and gas leasing is recognized as an acceptable use of the public lands under the Federal Land Policy and Management Act of 1976 (FLPMA). BLM authority for leasing public mineral estate for the development of energy resources, including oil and gas, is listed in 43 CFR 3160.0-3.

Offering parcels for competitive oil and gas leasing provides for the orderly development of fluid mineral resources under BLM's jurisdiction in a manner consistent with multiple use management and consideration for the natural and cultural resources that may be present. This requires that adequate provisions are included with the leases to protect public health and safety and assure full compliance with the spirit and objectives of the National Environmental Policy Act (NEPA) and other federal environmental laws and regulations. This action is being initiated to facilitate the BMD implementation of the requirements in Executive Order (EO) 13212 (2001) and the National Energy Policy Act (2005).

The BLM is required by law to consider leasing of areas that have been nominated for lease if leasing is in conformance with the BLM LUP. The oil and gas parcels addressed in this EA cannot be considered for leasing without supplemental analysis of changes in environmental conditions that have occurred since the completion of the current LUP (e.g., increased growth, locations of special status species, identification of traditional cultural properties).

The BMD must determine whether or not to recommend leasing all or part of the nominated parcels in the upcoming June 2016 Competitive O&G Lease Sale to the Nevada BLM State Director by February 10, 2016. If there are known resource conflicts that cannot be addressed using a stipulation, then the parcel may be deferred until the known resource conflict is resolved. As a result, the BMD must determine which stipulations must be attached to the parcels in order to protect natural resources.

1.3. Land Use Plan Conformance:

The Proposed Action is in conformance with the Tonopah RMP, approved on October 6, 1997, for the Tonopah Assessment Area and the Shoshone Eureka RMP and associated Record of Decision (1986). The Proposed Action is in conformance with the Tonopah RMP because it is specifically provided for in the following LUP objective:

Page 22 of the RMP, under the heading "Fluid Minerals" subtitled "Objective":
"To provide opportunity for exploration and development of fluid minerals such

as oil, gas, and geothermal resources, using appropriate stipulations to allow for the preservation and enhancement of fragile and unique resources”.

The Proposed Action also in conformance with the Tonopah RMP because it has been determined that the lease parcels are a subset of:

“[The] total of 5,360,477 acres (88% of the Tonopah Assessment Area)[that] is open to fluid minerals leasing subject to standard terms and conditions (p.22).”

The Proposed Action is also in conformance with the Shoshone-Eureka RMP Part II, Section E, Management Actions Not Expressly Addressed by the Resource Management Plan, which includes Minerals Objectives and Management Decisions brought forward unaltered from the Management Framework Plan (Record of Decision p. 29). Minerals Objectives 1, 2 and 3 led to Management Decisions 1 through 5 for leasable minerals (oil and gas). The objectives are as follows:

Objective 1: Make available and encourage development of mineral resources to meet national, regional and local needs consistent with national objectives for an adequate supply of minerals.

Objective 2: Assure that mineral exploration, development and extraction are carried out in such a way as to minimize environmental and other resource damage and to provide, where legally possible, for the rehabilitation of lands.

Objective 3: Develop detailed mineral resource data in areas where different resources conflict so that informed decisions may be made that result in optimum use of the lands.

Management Decision #4, specifically addresses oil and gas leasing and states, “All areas designated by the BLM as prospectively valuable for oil and gas will be open to leasing except as modified by other resources.”

1.4. Relationship to Statutes, Regulations, Policy, and Other Environmental Analysis

Purchasers of oil and gas leases are required to abide by all applicable federal, state and local laws and regulations. This includes obtaining all required permits should lease development occur. Federal regulations and policies require the BLM to make public land and resources available based on the principle of multiple use. At the same time, it is BLM policy to conserve special status species and their habitats and ensure that actions authorized by the BLM do not contribute to the need for the species to become listed as threatened or endangered by the United States Fish and Wildlife Service (USFWS).

The BLM must adhere to Section 106 of National Historic Preservation Act (NHPA). The BLM also must comply with Nevada State Historical Preservation Office (SHPO) 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. All activities will be subject, but not limited to: EO 11990 Protection of Wetlands, EO 11988 Protection of Floodplains, the Clean Water Act, the Safe Drinking Water Act, the Onshore Oil and Gas Orders, Wild Free Roaming Horse and Burro Act, Endangered Species Act, Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

The Proposed Action and alternatives are in conformance with the NEPA of 1969, (P.L. 91-190 as amended (42 USC §4321 et seq.); Mineral Leasing Act (MLA) of 1920 as amended and supplemented (30 USC 181 et seq.); the Federal Oil and Gas Leasing Reform Act of 1987, which includes the regulatory authority under 43 Code of Federal Regulations (CFR) Part 3100, Onshore Oil and Gas Leasing, 43 CFR Part 3160, Onshore Oil and Gas Operations and Title V of the FLPMA of 1976 Right-of-Way (ROW) under regulatory authority under 43 CFR Part 2800 for ROWs.

1.5. Scoping and Public Involvement:

The BMDO interdisciplinary team participated in internal scoping meetings on November 23, 2015. During the scoping meeting, parcels were evaluated for deferral based on resource concerns and land use conflicts.

Interested public letters were sent to the BMD mailing list outlining that the preliminary nominated parcel list, along with a map of nominated parcels, was available for review at the BLM National ePlanning website, for a 15-day scoping period which ended November 30, 2015. The BLM issued a press release the same day providing a link to the documents and instructions on how to comment. A total of five scoping letters were received. Please refer to Figure 2 for a map of the BMD June 2016 Oil and Gas Sale Offered Parcels.

Native American consultation letters for the June 2016 Lease Sale were sent to the Duckwater Shoshone Tribe, Yomba Shoshone Tribe and a group of the Te-Moak Shoshone Tribe known as the Descendants of the Big Smoky Valley on November 17, 2015. On November 30, 2015, the Mount Lewis Field Manager, Tonopah Field Manger and the Battle Mountain District Native American Coordinator (NAC), met with the Tribal Council of the Duckwater Shoshone Tribe. At that meeting, they did not identify or request to defer any parcels but asked to be contacted if APDs are submitted for any of the parcels. They also requested the BLM speak with the tribal Environmental Coordinator regarding the parcels.

The BLM NAC also spoke with the Environmental Coordinator for the Yomba Shoshone tribe on December 9, 2015. She stated that she would speak to the

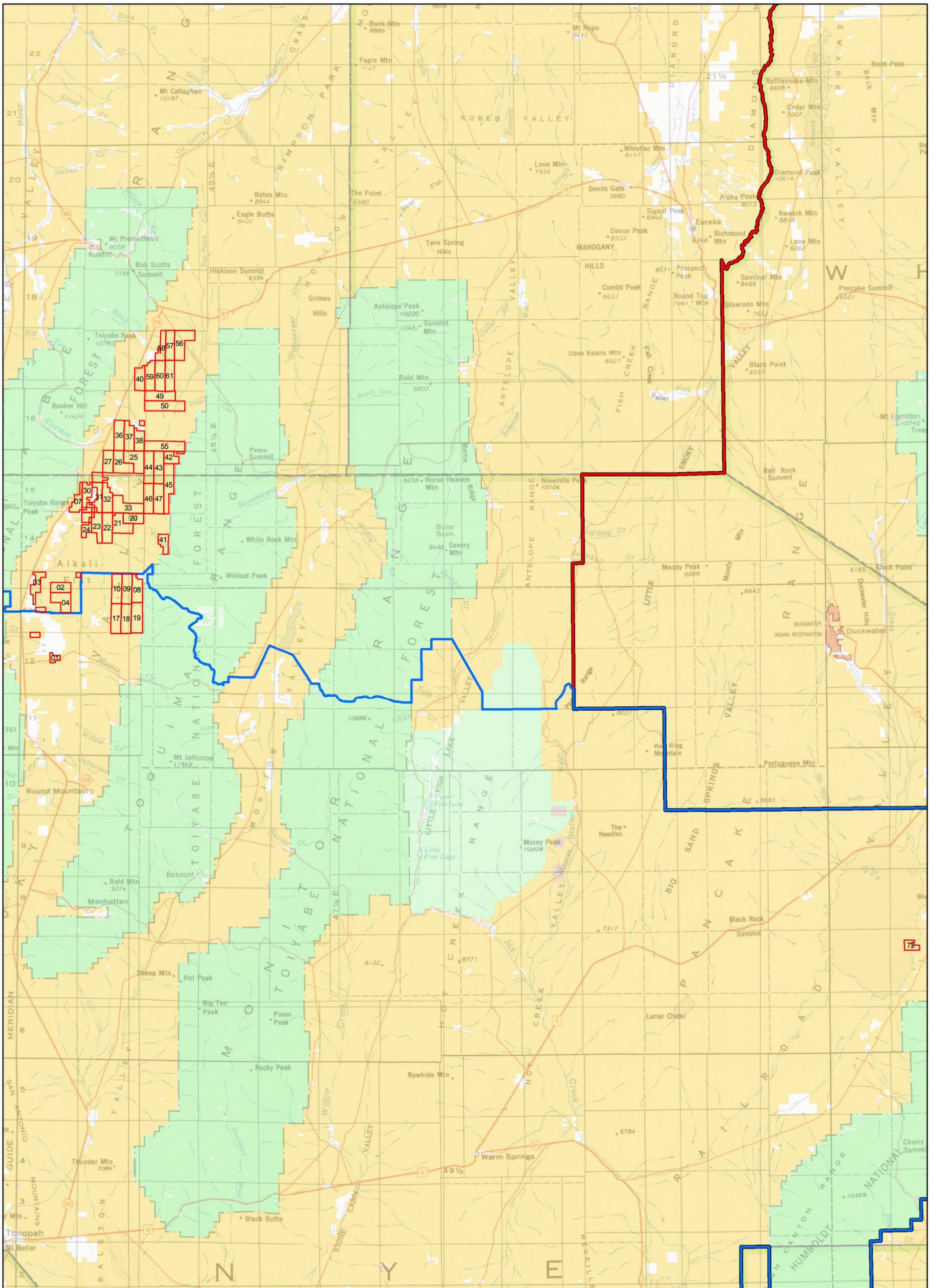
elders of the tribe to try and identify any concerns with the parcels. She expressed concern regarding fracking and asked that the tribe be coordinated with in the event that any of the parcels were leased.

The BMD NAC met with the Duckwater Environmental Coordinator on December 17, 2015. The BMD NAC also met with a representative from the Descendants of the Big Smoky Valley on December 17, 2015. Both representatives identified resource concerns on 10 of the nominated parcels.

During the scoping and tribal coordination process, BLM identified 20 of the 64 nominated parcels for deferral due to resource concerns that were not analyzed in the current LUP. These parcels were not carried forward to the proposed action. BMD will request that a portion of the parcels be removed permanently from future lease sales. The remaining parcels will be deferred until the district can analyze and incorporate appropriate stipulations to minimize or eliminate impacts to resources. See Appendix C.

Nevada Department of Wildlife (NDOW) responded to the scoping letter with a formal comment letter that was received by the BMD on November 25, 2015.

Only NDOW provided comments which recommended specific parcels for deferral or timing stipulations for wildlife. Commentors expressed concerns with regard to potential impacts to water usage, hydraulic fracturing, potential ground and surface water contamination, and wildlife impacts associated with potential exploration and development activities.



June 2016 Oil and Gas Lease Sale Offered Parcels

- | | | |
|--------------------------|---------------------------|---------------------------|
| Legend | Land Status | Agency |
| OG Parcels | Department of Defense | Nevada State Lands |
| Field Office Boundary | Department of Energy | Park |
| Administrative Unit Name | Bureau of Indian Affairs | Private |
| Mount Lewis Field Office | Bureau of Land Management | Fish and Wildlife Service |
| Tonopah Field Office | Bureau of Reclamation | National Park Service |
| County Boundary | | |

0 5 10 20 Miles



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Map Date: January 5, 2016

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Map 1.5. June 2016 Oil and Gas Lease Sale Offered Parcels

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Chapter Two: Proposed Action and Alternatives

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2.1. Description of the Proposed Action:

The Proposed Action is to offer for competitive sale 44 of the 64 nominated parcels that were sent to the BMDO for review. The acreage nominated for leasing was 116,251 acres and the acreage to be offered is 116,990 acres. Twenty parcels have been proposed for complete deferral due to natural resource concerns and land use conflicts. The parcels comprise 38,190 acres or approximately 33 percent of the original total. The specific parcels and reasons for proposed deferral may be found in Appendix C.

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; ownership of the minerals revert back to the federal government and the lease can be resold. The stipulations and notices that would be attached to the offered leases may be found in Appendix B.

2.2. Description of No Action Alternative:

In accordance with BLM NEPA guidelines H-1790-1, Chapter 6, this EA evaluates the No Action Alternative. The objective of the No Action Alternative is to describe the environmental consequences that would result if the Proposed Action were not implemented. The No Action Alternative forms the baseline from which the impacts of all other alternatives can be measured. In the case of a lease sale, this would mean that all proposed parcels for leasing would not be offered for lease.

2.3. Alternatives Considered but not Analyzed in Detail

The BMD staff considered leasing all 64 parcels that were nominated for leasing. However, during scoping, it was determined that there were specific resource and land use conflicts that would require proposing deferral of specific parcels. This Alternative has been eliminated from further analysis. As outlined above, of the 64 parcels nominated, 20 have been proposed for deferral. Rational for proposed parcel deferral may be found in Appendix C. Additionally, as a result of public scoping that was conducted in November 2015 (nominated parcels were available for public comment from 11/15/2015-11/30/2015), no other reasonable alternatives were developed.

2.4. Reasonably Foreseeable Development (RFD) Schedule

Oil production data from the Nevada Bureau of Mines and Minerals (Figure 3) show that oil and gas production in the state has fallen off since the early 1990's and has flattened out at less than 500,000 barrels per year over the last several years. As part of the 1997 Tonopah RMP, the BLM conducted a RFD scenario for oil and gas exploration and development. The RFD projected that 30 wildcat wells would be drilled through the year 2014 for a total disturbance of 296 acres. It also projected a number of additional production wells in established oil fields and estimated a total future surface disturbance of 131 acres. The 1997 RFD also projected the development of two additional oil fields with a total future disturbance of 944 acres.

The actual number of exploration wells approved within the Tonopah Field Office (TFO) during the 1997-2014 RMP RFD projected time period totaled 15 with none of these becoming production wells. Additionally, there were no new oil fields developed within the TFO between 1997 and 2015. The average amount of surface disturbance associated with the exploration wells (sumps, road construction, pads, etc.) was approximately 3.3 acres per well for an overall disturbance of approximately 50 acres. Compared to the actual amount of activity, the oil and gas RFD for the 1997 Tonopah RMP overestimated the amount of exploration and production activity and associated surface disturbance. This was a conservative approach, as it was impossible to predict with certainty how resource development would occur in the future.

The interaction of prices, markets, technology, environmental concerns, and viability of the potential oil and gas resource in the Project Area all play a role in estimating future surface disturbance related to oil and gas exploration/production. Based on past history and considering advancements in drilling and well stimulation techniques, it would be highly speculative to assume that production wells and additional oil fields would be developed within the TFO in areas other than Railroad Valley to the east where the potential is moderate to high and where current well fields exist.

This assessment provides a basis for estimating a low development potential for oil and gas disturbance that might indirectly result from the June 2016 Competitive Oil and Gas Lease Sale. Conservatively, based on historic information and anticipated activity, over the next ten years, approximately 20 exploration wells with approximately 50-75 acres (20 X 3.3 ac. = 66 ac.) of associated surface disturbance could be expected to occur in the TFO. Considering that the total number of acres in this lease sale for the TFO, the total amount of anticipated disturbance could be expected to be less than one percent of the proposed lease sale area (approximately 66 ac./12,900 ac. = .05 %).

The majority of the proposed lease sale parcels (36 parcels totaling approximately 65,161.27 acres) would be located in the Mount Lewis Field Office

(MLFO) area. According to the 2006 Environmental Assessment for Oil and Gas Leasing within Portions of the Shoshone-Eureka Assessment Area and 2008 Environmental Assessment Oil and Gas Leasing. Within the Western Portion of the Shoshone-Eureka Assessment Area, the overall potential for oil and gas exploration and development in this area is also low. The western portion of the Assessment Area was considered to have a lower potential when compared to that of the eastern portion. The eastern portion of the Shoshone-Eureka Assessment Area was considered to have moderate potential because it is located on a strike between Pine Valley and Railroad Valley, the two major production areas in the State. In addition, the geologic setting is similar. The RFDs for these environmental assessments estimated a total surface disturbance associated with oil and gas exploration/production of approximately 680 acres for the entire MLFO Assessment Area (4.5 million acres). Compared to actual acres of disturbance associated with oil and gas exploration/production within the MLFO during the projected period described below, the RFD overestimated the amount of surface disturbance.

While oil and gas interest has increased over the last 25 years in the MLFO area, very few exploratory wells have been drilled; an average of less than one exploration well was drilled per year between the years of 1980 and 2003. Exploration interest since this time has focused on the eastern portion of the MLFO area, specifically in Eureka County, which is consistent with the geologic potential of the area. Since 2003, there have only been four exploration wells approved on the MLFO and there have not been any wells drilled in the MLFO in the last eight years. The potential for oil and gas exploration and production in the MLFO can also be considered low. Conservatively, over the next ten years, based on previous and anticipated activity and interest, about 5 exploration wells and 15-25 acres of surface disturbance associated with oil and gas exploration/production activity could be expected to occur in the MLFO.

Conservatively, based on historic information and anticipated activity, over the next ten years, approximately 50-100 acres of surface disturbance associated with potential oil and gas exploration and production activities could be expected to occur in the BMDO.

2.4.1. Trends and Projections for Oil and Gas Exploration

Despite the low predicted potential of the proposed lease parcels, at any point during the 10-year term of the lease, the lessee, or operator may submit specific plans for some level of proposed development. Typical oil and gas development operations occur in phases, each of which occurs in a more or less predictable sequence that is contingent on the success or failure of the previous phase.

Geophysical Exploration

Geophysical exploration is used to obtain detailed geologic information. A variety of exploration methods are employed, ranging from placing electrodes or geophones in the ground, to detonating explosives to create shockwaves, to employing specially constructed off-road vehicles to produce vibrations. The most commonly used method in eastern Nevada is the vibroseis technique, which uses large off-road vehicles with “thumpers” to generate shockwaves for two or three dimensional surveys.

Exploration Drilling

Exploratory drilling (a wildcat well) begins development of a lease. An APD is filed with the BLM. A field examination is conducted by BLM resource specialists and NEPA review is completed before a drilling permit is issued. An access road and a well pad are constructed for each well, if needed. Total disturbance attributed to drilling an exploration well is usually limited to less than 10 acres for the pad and access road.

Statistically, over 95% of exploration wells are dry in Nevada. An operator must secure enough water to drill the well and maintain dust control on the pad and access road(s). Conventional oil wells in Nevada are typically drilled between 4,000 and 12,000 feet in depth and can typically consume between 50,000 -300,000 gallons of freshwater (Appendix E).

Well Stimulation and Hydraulic Fracturing (HF)

Well Stimulation may be used to enhance oil recovery. Several methods of well stimulation are available and are a common practice in today's industry. HF is one of these methods that may be reasonably foreseeable for leases proposed for this sale. HF is the process of applying high pressure fluid to a subsurface formation via a wellbore, to the extent that the pressurized fluid opens fractures in the rock. The opened fractures would be propped open with a type of sand granular called “proppant” to enhance fluid connectivity between the wellbore and formation. The process was developed experimentally in 1947 and has been used routinely since 1950. The Society of Petroleum Engineers (SPE) estimates that over one million HF procedures have been performed in the United States. Tens of thousands of directional or horizontal type wells have been drilled and incorporate the hydraulically fractured technology. The process can increase the yield of a well and enable production of oil and gas from tight formations formerly not economically feasible. Appreciable amounts of water (800,000 – 10,000,000 gallons) can be consumed during HF operations (Appendix E). Much of this water returns to the surface as backflow and can be cleaned for reuse on other wells or projects. To date, Nevada has documented the use of HF on four separate vertical wells where less than 350,000 gallons of freshwater was consumed per well.

HF procedures for mitigating potential environmental impacts may include:

- Wells have multiple casing and sealed in place with cement between the wellbore and the formation. Wellbore integrity is tested throughout the process.
- HF fluids are either contained in above ground tanks or a lined pit.
- HF fluids are recovered to a large degree in “flowback” or produced water when the well is tested or produced.
- All recovered fluids are generally handled by one of four methods:
 - Underground injection;
 - Captured in steel tanks and disposed of in an approved disposal facility;
 - Treatment and reuse; and
 - Surface disposal pits

Please refer to the “Hydraulic Fracturing White Paper” (Appendix E) for additional information on HF.

In addition, the State of Nevada has recently adopted new Hydraulic Fracturing Regulations (NRS 522 & NAC 522). See Appendix F.

In-Field Drilling

In-field drilling of additional exploration wells typically occurs in order to define the limits of the oil or gas reservoir when initial drilling has located oil or gas. The process of in-field drilling is the same as that employed for initial exploratory drilling, although new roads and pads may not be required in every instance.

Production

Production only occurs if oil or gas can be transported to a market and sold at a profit. In the BMD, pumped oil is generally piped a short distance for temporary storage, then trucked to a refinery for processing. This basic method of transport is not likely to change because of the small quantity of resource estimated to be present in the BMD. Production facilities may include one or more of the following: a well head; pumping equipment; a separation system; pipelines; a metering system; storage facilities; water treatment and injection facilities; cathodic protection systems; electrical distribution lines; compressor stations; communication sites; roads; salt water disposal systems; dehydration sites; and fresh and salt water plant sites.

Well Abandonment

Well abandonment may be temporary or permanent. Wells are sometimes shut-in because pipelines or roads needed for production and marketing don't exist and the cost for construction is not justified by the quantity of oil discovered. These wells may later be reentered when their production can be marketed. The permanent abandonment of a well occurs when the well is determined to no longer have a potential for economic production, or when the well cannot be used for other purposes.

Reclamation

Reclamation includes removal of all manmade objects and restoration of surface disturbance. In the case of a producing well, reclamation would be done after production has ceased. In the case of exploration wells which do not find economically recoverable amounts of oil, initial reclamation (re-contouring), is usually completed the following year which provides for sufficient time for the reserve pit to dry out. After re-vegetation of the site is completed, reclamation is complete.

Chapter Three: Affected Environment and Environmental Consequences

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3.1. Supplemental Authorities to be Considered

To comply with the NEPA, the Bureau of Land Management is required to address specific elements of the environment that are subject to requirements specified in statute, regulation or by executive order (BLM 1988, BLM 1997, BLM 2008). The following table (Table 1) outlines the elements that must be addressed in all environmental analyses, as well as other resources deemed appropriate for evaluation.

Supplemental Authority	Not Present	Present/Not Affected	Present/May be Affected	Rationale
Air Quality			√	See discussions in Sections 3.4.1 and 4.3.1.
Area of Critical Environmental Concern (ACEC)	√			The proposed lease parcels are not located in or near any ACECs.
Cultural/Historical			√	See discussions in Sections 3.4.2 and 4.3.2.
Environmental Justice	√			Based on a review of existing data, no minority or low-income groups would be disproportionately affected by health or environmental effects of implementing the proposed action. This element is not further analyzed in this EA.
Farmlands Prime or Unique	√			There are no Prime or Unique Farmlands in the Battle Mountain District.
Noxious Weeds/Invasive Non-native Species			√	See discussion in Sections 3.4.7 and 4.3.7.
Native American Cultural Concerns			√	See discussion in Sections 3.4.3 and 4.3.3.
Floodplains			√	See discussion in Section 3.4.5 and 4.3.5.
Riparian/Wetlands/			√	See discussion in Sections 3.4.5 and 4.3.5.
Threatened, Endangered Species			√	See discussion in Sections 3.4.4 and 4.3.4.
Migratory Birds			√	See discussion in Sections 3.4.4 and 4.3.4.
Waste – Hazardous/Solid			√	See discussion in Sections 3.4.6 and 4.3.6.
Water Quality			√	See discussion in Sections 3.4.5 and 4.3.5.
Wild & Scenic Rivers	√			The proposed parcels are not located in or near any wild and scenic rivers.

Supplemental Authority	Not Present	Present/Not Affected	Present/May be Affected	Rationale
Wilderness	√			None of the proposed parcels are within or near a Wilderness Study Area (WSA) and WSAs are not affected by the proposed lease parcels.
Forests and Rangelands (HFRA only)	√			This is not a Healthy Forest Restoration Act (HFRA) related proposal, thus the HFRA does not apply.

3.2. Other Resources

Other resources that have been considered for this environmental assessment (EA) are listed in Table 2 below. Elements that may be affected are further described in the EA. For those resources that would not be affected, rationale is provided.

Other Resources	Not Present	Present/Not Affected	Present/May be Affected	Rationale
Fire Management	√			The Proposed Action is limited to leasing and there is no authorized ground disturbing activity associated with the lease. Standard fire management stipulations would be included in any lease sale. Any potential impacts from subsequent exploration and development activities would be analyzed under a separate, site specific analysis.
Forestry			√	See discussion in Sections 3.4.17 and 4.3.17
Grazing Management			√	See discussion in Sections 4.4.11 and 4.3.11.
Land Use Authorization			√	See discussion in Sections 3.4.12 and 4.3.12.
Minerals			√	See discussion in Sections 3.4.8 and 4.3.8.
Paleontological Resources			√	See discussion in Sections 3.4.2 and 4.3.2
Recreation			√	See discussion in Sections 3.4.14 and 4.3.14.
Socio-Economic Values			√	See discussion in Sections 3.4.15 and 4.3.15.
Soils			√	See discussion in Sections 3.4.9 and

Table 3.2: Other Resources Considered in the EA				
Other Resources	Not Present	Present/Not Affected	Present/May be Affected	Rationale
				4.3.9
Special Status Species			√	See discussion in Sections 3.4.4 and 4.3.4
Vegetation			√	See discussion in Sections 3.4.10 and 4.3.10.
Visual Resources			√	See discussion in Sections 3.4.13 and 4.3.13
Wild Horses and Burros			√	See discussion in Section 3.4.16 and 4.3.16.
Wildlife			√	See discussion in Sections 3.4.4 and 4.3.4.

3.3. Environmental Impacts of the No Action Alternative

Under the No Action alternative, the proposed lease parcels would not be sold. No on-the-ground actions would occur (geophysical exploration, exploration drilling, etc.) that would have the potential to impact resources. Surface management would remain the same and ongoing oil and gas development would only continue on previously leased federal, private and state lands.

The indirect impacts from the No Action Alternative would be similar to those described in the Proposed Action within areas that have already been leased. The No Action alternative will not be carried forward for each resource in this EA. Since there would not be additional potential impacts to resources under the No Action alternative, it is not considered further in the EA.

3.4. Impacts Requiring Further Analysis

Through internal scoping, the following resources have been determined to be present and potentially affected by the Proposed Action: air quality, cultural resources, noxious weeds, wetlands/riparian zones, forestry, minerals, soils, migratory birds, water quality/hydrology, vegetation, wild horses and burros, visual resource management, wastes (hazardous and solid), threatened and endangered species, special status species, Native American concerns, wildlife, range resources, lands and realty, recreation and socioeconomics. The effects of the Proposed Action on these resources will be brought forth for further analysis.

There would be no direct impacts (i.e., impacts that would occur during the implementation of the Proposed Action) from issuing new oil and gas leases because leasing does not directly authorize ground disturbing activities.

However, if a lease is sold, the lessee retains certain irrevocable rights. For example, according to 43 CFR § 3101.1-2, once a lease is issued to its owner, that owner has the "right to use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold" subject to specific nondiscretionary statutes and lease stipulations.

If an Approval to Drill (APD) is received for a purchased parcel, additional site-specific NEPA analysis would be required to disclose any potential environmental impacts to resources on public lands. Potential impacts may be caused by any or all of the oil and gas exploration and development activities described in Section 3.4. The reader should note that in the following sections only indirect impacts (i.e., impacts that occur at some point after the implementation of the Proposed Action) are considered.

The term "mitigation" used in the following sections refers to resource protection measures that could be implemented when actual leases are developed subsequent to a lease sale.

3.4.1. Air Quality

Affected Environment

Climate and Meteorology

The State of Nevada is largely a plateau on the eastern side of the Sierra Nevada mountain range. The Assessment Area is in south-central Nevada and has elevations ranging from 4,500 to 11,000 feet above mean sea level (amsl). The highest elevations are found in the US Forest Service (USFS)-administered lands of the Humboldt-Toiyabe National Forest. Winds in the Assessment Area are predominantly from the west, but southerly or southwesterly winds occur in some areas due to channeling from the local topography. In valleys, winds are generally light in the morning and stronger in the afternoon. Dust storms can occur, especially in the southern part of the Assessment Area in the spring, when there is a higher frequency of storms.

When air masses approach from the west, moisture condenses and precipitation falls on the western slope of the Sierra Nevada. As the air masses descend on the eastern slope of the Sierra Nevada, most of the moisture has fallen out, and these areas are typically low in humidity and precipitation. Most of the Assessment Area's annual precipitation averages 5 to 10 inches, although precipitation totals are generally higher over the mountainous areas. Precipitation is greatest from November to March in the form of mountain snow, and is lightest in the summer.

Typical summertime temperatures range from around 50 degrees Fahrenheit (°F) at night to near 90°F in the daytime, with cooler temperatures at the higher elevations. In the winter, temperatures are typically in the upper teens at night to near 40°F in the daytime (BLM 2012a).

Regulatory Considerations

The Clean Air Act (CAA; 42 USC, 7401–7642) established the principal framework for national, state, and local efforts to protect air quality in the US. Under the CAA, the US Environmental Protection Agency (EPA) has set time-averaged standards known as national ambient air quality standards (NAAQS) for six air pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less [PM10] and particulate matter with an aerodynamic diameter of 2.5 microns or less [PM2.5]). States may set their own ambient air quality standards, but they must be at least as stringent as the national standards. The State of Nevada has adopted most of the national ambient air quality standards to regulate air pollution but has adopted a more stringent carbon monoxide standard for areas higher than 5,000 feet amsl. It also has a more stringent sulfur dioxide standard and a standard for hydrogen sulfide, for which there is no national standard (Nevada Administrative Code 445B.22097).

A NAAQS is composed of two parts: an allowable concentration of a criteria pollutant and an averaging time over which the concentration is measured. Averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposure to a high concentration for a short time or to a lower average concentration over a longer period.

For some pollutants, there is more than one air quality standard, reflecting both short-term and long-term effects. Primary standards set limits to protect public health, including the health of sensitive populations, such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Criteria air pollutants may have local effects or regional effects or both. Oxides of nitrogen and volatile organic compounds are precursors for producing photochemical smog (ozone) and secondary particulate matter. Ozone (including its precursors), PM2.5, and sulfur dioxide are considered regional air pollutants, typically affecting air quality regionally. Such pollutants as carbon monoxide and lead are considered local, typically accumulating close to their emission sources. PM10 can be considered both a regional and local air

pollutant, depending on the particular circumstance. In addition, long-range transport of nitrogen dioxide, PM₁₀, PM_{2.5}, and sulfur dioxide can contribute to regional visibility degradation, as well as atmospheric deposition on sensitive areas, such as national parks and wilderness areas, many miles downwind of individual emission sources.

Ozone, particulate matter (PM₁₀ and PM_{2.5}), and carbon monoxide are the air pollutants of greatest concern in most parts of the country. Ozone is seldom released directly into the atmosphere but forms from complex chemical reactions that occur in sunlight. The atmospheric chemical reaction processes that produce ozone also produce chemically formed particulate matter and acidic compounds. Combustion processes and evaporation of volatile organic compounds are the major emission sources for organic compounds. Common fuel combustion sources include fuel combustion in motor vehicles, fuel combustion in industrial processes, agricultural burning, prescribed burning, and wildfires. Common evaporative sources of organic compounds include paints, solvents, liquid fuels, or liquid chemicals. Combustion processes are the major source of emissions for nitrogen oxides. Biogenic natural sources are also a source for volatile organic compound emissions.

The major emission source categories for PM₁₀ and PM_{2.5} are combustion sources (fuel combustion in motor vehicles and industrial processes, agricultural burning, prescribed burning, and wildfires); industrial grinding and abrasion processes; soil disturbance by construction equipment, agricultural and forestry equipment, recreational vehicles, or other vehicles and equipment; mining and other mineral extraction; and wind erosion from exposed soils and sediments. PM_{2.5} and, to a lesser extent, PM₁₀ are also formed by the types of atmospheric chemical reactions that produce ozone and acidic compounds. In Nevada, dust is the greatest contributor of both PM₁₀ and PM_{2.5} (EPA 2008).

The major sources of carbon monoxide are combustion processes, such as fuel combustion in motor vehicles, and industrial processes, agricultural burning, prescribed burning, and wildfires.

In addition to criteria pollutants, the CAA regulates 187 hazardous air pollutants under the National Emissions Standards for Hazardous Air Pollutants program. Hazardous air pollutants are those pollutants known or suspected to cause cancer or other serious health effects or adverse environmental impacts. The EPA has issued rules covering 80 categories of major industrial sources, as well as categories of smaller sources. Controls are usually required at the source to limit the release of these air toxics into the atmosphere.

Section 176(c) of the CAA requires that federal actions conform to the appropriate state implementation plan. This is a plan developed at the state level that provides for the implementation, maintenance, and enforcement of NAAQS, and it is enforced by the EPA. The EPA has promulgated rules establishing conformity analysis procedures for transportation-related actions and for other general federal agency actions (40 CFR, Parts 6, 51, and 9). The EPA general conformity rule requires preparation of a formal conformity determination document for federal agency actions that are undertaken, approved for, or funded in federal nonattainment or maintenance areas when the total net change in direct and indirect emissions of nonattainment pollutants (or their precursors) exceeds specified thresholds. Because the Assessment Area is not in a nonattainment area, the proposed action is exempt from the CAA general conformity rule.

As an attainment area, counties in the Assessment Area (Eureka, Esmeralda, Lander, and Nye) are classified as Class II under Prevention of Significant Deterioration (PSD) guidelines. Air quality control regions are classified either as Class I, II, or III to indicate the degree of air quality deterioration that the state or federal government will allow, while not exceeding NAAQS (though no Class III areas have been designated). In a Class II area, a moderate change in air quality due to industrial growth, while still maintaining air quality that meets the NAAQS, would be allowed. Class I areas are special areas of natural wonder and scenic beauty, such as national parks, national monuments, and wilderness areas, where air quality should be given special protection. Class I areas are subject to maximum limits on air quality degradation. There are no PSD Class I visibility protection areas in the Assessment Area.

The CAA requires each state to identify areas that have ambient air quality in violation of federal standards. The status of areas with respect to federal ambient air quality standards is categorized as nonattainment, attainment (better than national standards), or unclassified (due to an absence of monitoring data). Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. Unclassified areas are treated as attainment areas for most regulatory purposes. All of the Assessment Area is considered attainment or unclassified for all federal ambient air quality standards.

The Nevada Bureau of Air Quality Planning operates and maintains a network of ambient air quality monitors throughout rural Nevada. The only active monitors within the Assessment Area are within the Pahrump Valley at the southern tip of Nye County (also the southern tip of the Assessment Area). These monitors measure PM₁₀. Excluding one exceptional event (e.g., high wind conditions), no exceedances of the PM₁₀ NAAQS occurred from 2010 through 2012.

PM10 was monitored at two locations in Battle Mountain (at the northern tip of the Assessment Area) from 1992 to 1998 and from 1998 to 2002. These monitors were taken off-line because measurements were consistently well below the NAAQS for PM10 (NDEP, Bureau of Air Quality Planning 2011).

The nearest active monitoring stations outside the Assessment Area are located in Fallon and Fernley to the west and Elko to the east. The Fallon station monitors ozone, the Fernley station monitors ozone and PM2.5, and the Elko station monitors PM10. Excluding one exceptional event in Elko in 2010, no exceedances of the monitored NAAQS occurred from 2010 through 2012 at these stations.

Current Conditions

The BLM published the final Rapid Ecoregional Assessment (REA) for the Central Basin and Range in June 2013 (Comer et al. 2013). REAs examine climate change and other widespread environmental influences that are affecting western landscapes. REAs look across an ecoregion to more fully understand ecological conditions and trends; natural and human influences; and opportunities for resource conservation, restoration, and development. The REAs provide regional information that can inform local management efforts.

Over the past 100 years, the weather, vegetation cover, and wildfire regimes of the Central Basin and Range ecoregion have changed, suggesting a change in the ecoregion's climate regime. Changes in temperature and precipitation have resulted in changes to vegetation cover and wildfire regimes. Changes are expressed in species composition, changes in vegetation communities, and increasing quantities of invasive species. Many areas once dominated by sagebrush have piñon-juniper encroachment as well as downy brome (cheatgrass).

Greenhouse Gas Emissions

Greenhouse gases (GHGs) are those that allow short-wave solar radiation to enter the earth's atmosphere but absorb long-wave infrared radiation reemitted from the earth's surface. Greenhouse gases can affect climate patterns, which in turn can affect resource management.

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide, methane, and nitrous oxide are examples of greenhouse gases that have both natural and man-made sources, while other greenhouse gases, such as chlorofluorocarbons, are exclusively man-made

Climate Change

Climate represents the long-term statistical characterization of daily, seasonal, and annual weather conditions such as temperature, relative humidity, precipitation, cloud cover, solar radiation, and wind speed and direction. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. A region's climate is affected by latitude, terrain, and altitude, as well as nearby water bodies and their currents.

Warmer and more arid conditions, coupled with a shorter snow season, have led to limited water supplies and severe drought in parts of the state. By 2100, the average temperature in Nevada is predicted to increase by 3°F to 4°F in the spring and fall and by 5°F to 6°F in the summer and winter. El Niño events are predicted to increase in frequency and duration as a result of global climate change. These temperature changes would affect evaporation and precipitation in the state, likely resulting in the decreased availability of water (National Conference of State Legislatures 2008).

In the Central Basin and Range ecoregion, climate models suggest there is no strong trend toward either wetter or drier conditions either in the near future (through the 2020s) or in the long term (through the 2050s; Comer et al. 2013). However, models show significant increases in maximum monthly temperatures by 2020, primarily in the summer months (July, August, and September). The highest maximum temperature increase projected is 6 °F. These increases are predicted to occur mostly in the southern and northeastern edges of the ecoregion. Forecasts for 2060 predict substantial increases in maximum temperature for all months. Similar to forecasts for 2020, the greatest increases are predicted during the summer months and along the southern and northeastern edges of the ecoregion (Comer et al. 2013). Model forecasts for minimum temperatures show a considerable change in both rate and magnitude over most of the study area. July through September showed the greatest degree of change over most of the region.

Data for precipitation suggest no strong trend toward either wetter or drier conditions in any month for the ecoregion. With the exception of a slight increase in summer monsoon rains toward the south and east, there were no significant forecasted trends in precipitation for any other months in either the near-term (2020s) or midcentury (2050s) projections (Comer et al. 2013).

Potential effects of these forecasts on the landscape could include increased fuel loads in higher elevations, increased frequency and duration of droughts, expansion of invasive species in higher elevations, increased wind erosion, and changes in wildfire regimes (Comer et al. 2013).

Environmental Consequences

While the act of leasing the parcels would produce no air quality effects, potential future development of the lease could lead to increases in area and regional emissions. Since it is unknown if the parcels would be developed, or the extent of the development, it is not possible to reasonably quantify potential air quality effects through dispersion modeling or another applicable method at this time. Further, the timing, construction and production equipment specifications and configurations, and specific locations of activities are also unforeseeable at this time. However, if all 25 projected wells in the reasonably Foreseeable Development (RFD) scenario were actually drilled, it is highly doubtful that air quality would be significantly affected, even if HF technology was utilized. Site-specific air effects would be addressed in a subsequent analysis when a lessee files an APD. All proposed activities including, but not limited to, exploratory drilling activities would be subject to applicable local, State, and Federal air quality laws and regulations. The Bureau of Land Management National Operations Center (BLM NOC) retained the Kleinfelder Team (which consisted of staff from Kleinfelder, Inc. and ENVIRON International Corporation) to prepare an emissions inventory estimate of criteria pollutants, greenhouse gases (GHG), and key hazardous air pollutants (HAPs) for a representative oil and gas well in the western United States (US). The emissions inventory was designed to be used by BLM staff, such as NEPA planners, air resource specialists, and natural resource specialists, to evaluate emissions from small, which for purposes of this inventory is approximately five wells or less, oil and gas projects. The table, below, is taken from this March 2013 report: Erbes, Air Emissions Inventory Estimates for a Representative Oil and Gas Well in the Western United States. The RFD developed for this lease sale EA is a maximum of 25 exploration wells drilled within the parcels in the Battle Mountain District and no production wells. As previously stated, even though no production wells or oil fields are anticipated under the RFD, the table is provided to reflect emissions that may be produced from these subsequent activities. The number of holes that could be drilled in any given area is unknown but potential emissions would be multiplied appropriately

Any subsequent activity authorized after APD approval could include soil disturbances resulting from the construction of well pads, access roads, pipelines, power lines, and drilling. Any disturbance is expected to cause increases in fugitive dust and potentially inhalable particulate matter (specifically PM10 and PM2.5) in the project area and immediate vicinity. Particulate matter, mainly dust, may become airborne when drill rigs and other vehicles travel on dirt roads to drilling locations. Air quality may also be affected by exhaust emissions from engines used for drilling, transportation, gas processing, compression for transport in pipelines, and other uses.

These sources would contribute to potential short and long term increases in the following criteria pollutants: carbon monoxide, ozone (a secondary pollutant, formed photochemically by combining VOC and NOX emissions), nitrogen dioxide, and sulfur dioxide. Non-criteria pollutants (for which no national standards have been set) such as carbon dioxide, methane, nitrous oxide, air toxics (e.g., benzene), and total suspended particulates (TSP) could also be emitted. Certain pollutants may be significant when evaluating AQRV for effects on visibility and atmospheric deposition. Significance would depend greatly on the proximity to sensitive receptors, area meteorology, and the background levels of AQRV at any sensitive receptor. Dust control measures, such as applying a layer of gravel over the travel surfaces, watering travel surfaces, and reducing speed along the roadways can be very effective in mitigating dust issues.

In Nevada, during exploration and development, 'natural gas' may at times be flared and/or vented from conventional oil wells and shale oil wells. The gas is likely to contain volatile organic compounds that could also be emitted from reserve pits, produced water disposal facilities, and/or tanks located at the site. The development stage may likely include the installation of pipelines for transportation of raw product. New centralized collection, distribution and/or gas processing facilities may also be necessary. The decision to offer the identified parcels for lease would not result in any direct emissions of air pollutants. However, any future exploration or development of these leases will result in emissions of criteria, HAP and GHG pollutants. The additional emissions could result in an incremental increase in overall emissions of pollutants, in the region depending on any contemporaneous activities occurring at the same time when potential exploration and development occurring on the lease would happen.

Climate Change Impacts

The primary sources of greenhouse gases associated with oil and gas exploration and production are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). In addition, nitrous oxide and VOCs are indirect air pollutants that contribute to ozone production and aid in prolonging the life of methane in the atmosphere. With respect to climate change, climate plays a significant role in the production of ozone. Sunlight and high temperatures are a major catalyst in reactions between VOCs and NO_x in the production of ozone. With an increase in overall temperature, we can expect to have more hot days and less precipitation that will lead to a higher production of ozone.

GHGs are produced and emitted by various sources during phases of oil and gas exploration, well development, production, and site abandonment. The American Petroleum Institute (API) categorizes

sources of emissions from all oil and gas operations into the following classifications:

Direct Emissions

- Combustion Sources – includes stationary devices (boilers, heaters, internal combustion engines, flares, burners) and mobile devices (barges, railcars, and trucks for material transport; vehicles for personnel transport; forklifts, construction equipment, etc.).
- Process Emissions and Vented Sources - includes process emissions from glycol dehydrators, stacks, vents, ducts; maintenance/turnaround; and non-routine activities such as pressure relief valves, emergency shut-down devices, etc.
- Fugitive Sources- includes fugitive emissions from valves, flanges, pumps, connectors, etc.; and other non-point sources from wastewater treatment.

Indirect Emissions

Emissions associated with company operations, such as off-site generation of electricity, hot water or steam, and compression for on-site power, heat and cooling. Direct and indirect GHG emissions may occur from various sources during each phase of exploration and development. During exploration and development, emissions are generated from well pad and access road construction, rigging up/down, drilling, well completion, and testing phases. GHG emissions for these phases are mainly CO₂ emissions from fuel in internal combustion engines of diesel trucks, equipment, and rigs.

There are currently no established thresholds of significance for GHG, but the EPA has used a reporting threshold of direct GHG emissions of 25,000 tons per year of carbon dioxide equivalent (74 FR 56260, October 30, 2009).

For this analysis, the RFD predicts that up to 20 wells may be drilled as a result of the proposed action, however, the offered parcels are scattered across the district and predictions of how many holes would actually be drilled in any location would be highly speculative. More accurate analysis would be completed at the exploration and development phase, once a permit is requested.

In addition to the mandatory GHG reporting requirement and regulatory requirements to reduce GHGs, the BLM encourages federal oil and gas lessees and/or operators to implement “Best Management Practices (BMPs)” that reduce GHG emissions. As identified in the EPA Inventory of US Greenhouse Gas Emissions and Sinks, the BLM holds regulatory jurisdiction over portions of natural gas and petroleum systems. Exercise of this regulatory jurisdiction

has led to development of BMPs designed to reduce emissions from field production and operations. Analysis and approval of future development would include applicable BMPs as Conditions of Approval (COAs) in order to reduce or mitigate GHG emissions. Additional measures developed at the project development stage would be incorporated as COAs in the approved APD, which is binding on the operator.

Since oil and gas exploration activity is expected to be minimal (see Section 3.4), significant impacts to air quality are highly doubtful, even if HF technology was utilized. The Proposed Action would not result in an exceedance of the National Ambient Air Quality Standards (NAAQS) standards.

3.4.2. Cultural and Paleontological Resources

Affected Environment - Cultural Resources

Cultural resources include prehistoric and historic-period resources such as buildings, sites, structures, objects, and districts. Prehistoric cultural resources are associated with the human occupation and use of Nevada before long-term European occupation and include traces of Native American life such as camp sites, rock art, and trails, some dating to over 12,000 years. Historic-period cultural resources represent both the archaeological and built-environment, including structures, historic districts, and the foundations of industrialization.

Parcels proposed for the 2016 lease sale are located primarily in the northern two thirds of Big Smoky Valley (Figure X). One parcel is located in Railroad Valley between Butterfield Springs and Bullwhacker Springs. Although limited cultural resource surveys have been completed within the proposed parcels, (about 5% of the total parcel acreage has been surveyed at the Class III level) all are likely to contain areas of moderate or high sensitivity for cultural resources.

Environmental Consequences - Cultural Resources

The act of issuing oil and gas leases in itself does not have the potential to impact cultural resources, as lease sales do not authorize exploration, development, or production that could directly or indirectly affect the environment; however, once issued, a lease bestows upon its owner the “right to use so much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold” (43 CFR§ 3101.1-2) subject to specific nondiscretionary statutes and lease stipulations (Appendix B).

Cultural resources located within the proposed parcels would be subject to direct and indirect effects from oil and gas exploration and development activities (e.g. ground disturbance and facilities construction); therefore, identification and evaluation of these resources on a case-by-case basis for compliance with Section 106 of the National Historic Preservation Act (NHPA) would be required prior to project implementation or ground disturbing activities. Section 106 compliance activities would include the identification of cultural resources within parcels, evaluation of cultural resources for their eligibility for listing in the National Register of Historic Places (NRHP), and resolution of any adverse effects to historic properties (i.e., resources eligible for or listed in the NRHP). Resolution of adverse effects to historic properties, including mitigation, would be conducted in accordance with all applicable authorizes, including the State Protocol Agreement between the Bureau of Land Management and the Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act (Protocol; revised December 2014). The Protocol also includes certain actions exempt from inventory, such as conducting minerals exploration that conforms to casual use in accordance with 43 CFR §3802.1-2 and 43 CFR §3809.5(1).

Affected Environment - Paleontological Resources

Paleontological resources are defined in the federal Paleontological Resources Preservation Act (PRPA [also commonly known as the Omnibus Act]) as the “fossilized remains, traces, or imprints of organisms, preserved in or on the earth’s crust, that are of paleontological interest and that provide information about the history of life on earth” (16 United States Code [U.S.C.] 470aaa[1][c]).

Parcels proposed for the 2016 lease sale are located primarily in the northern two thirds of Big Smoky Valley. One parcel is located in Railroad Valley between Butterfield Springs and Bullwhacker Springs (Figure X). Formations or rock units which are known to yield vertebrate or significant invertebrate, plant, or trace fossils, have a high potential for containing significant paleontological resources. Parcels within Big Smoky Valley have the potential to contain rock units with vertebrate or other significant fossils. The parcel in Railroad Valley has low to moderate potential for significant paleontological resources.

Environmental Consequences - Paleontological Resources

Paleontological resources may be subject to direct and indirect impacts from potential oil and gas exploration and production activities; therefore, identification and evaluation of these resources would be required on a case-by-case basis prior to project implementation or ground disturbing activities. BLM Instruction Memorandum (IM) No. 2009-011 provides guidelines for assessing potential impacts to paleontological resources in order to determine mitigation steps for federal actions on public lands under the Federal Lands Policy and Management Act (FLPMA) of 1976 (Public Law [PL] 94–579, codified at 43 U.S.C. 1701–1782 and 18 U.S.C. 641) and NEPA. Additionally, this IM provides procedures for field survey and monitoring to avoid adversely affecting significant paleontological resources.

3.4.3. Native American Cultural Concerns

Affected Environment

The area described in the Proposed Action lies within the traditional territory of the Western Shoshone Tribes. Sites and resources considered sacred or necessary to the continuation of tribal traditions include, but are not limited to: prehistoric and historic village sites, pine nut gathering locations, sites of ceremony and prayer, archaeological sites, burial locations, “rock art” sites, medicinal/edible plant gathering locations, areas associated with creation stories, or any other tribally designated Traditional Cultural Property. Future Native American Consultations in the area may reveal such sites, activities, or resources.

Tribal Consultation/Information Sharing

The BLM, Battle Mountain District, Mount Lewis and Tonopah Field Offices have ongoing invitation for consultation and information sharing with the tribes. Consultation and communication with these tribal/band governments have included letters, phone calls, e-mails, and visits with individual Tribal/Band Environmental Coordinators. Consultation/Information Sharing will continue throughout the life of the project.

Tribal ethnographic resources are associated with the cultural practices, beliefs, and traditional history of a community. In general, ethnographic resources include places in oral histories or traditional places, such as particular rock formations, the geothermal water sources, or a rock cairn; large areas, such as landscapes and viewscapes; sacred sites and places used for religious practices; social or traditional gathering areas, such as racing grounds; natural

resources, such as plant materials or clay deposits used for arts, crafts, or ceremonies; and places and natural resources traditionally used for non-ceremonial uses, such as trails or camping locations.

The NEPA process does not require a separate analysis of impacts to religion, spirituality, or sacredness. As a result, references to such beliefs or practices convey only the terminology used by participants involved in the ethnographic studies and tribal consultation. This terminology does not reflect any BLM evaluation, conclusion, or determination that something is or is not religious, sacred, or spiritual in nature, but conveys only the information that has been gathered through tribal consultation and coordination and current and historic ethnographic study.

The majority of lands within the proposed action area have not been analyzed for cultural resources or Native American Cultural Concerns. Therefore, the BLM contacted the Duckwater Tribe of Western Shoshone, Yomba Tribe of Western Shoshone, the Descendants of the Big Smokey Valley which are Members of the Te-Moak Tribe of Western Shoshone to identify areas of concern, mitigation measures, operating procedures or alternatives that may eliminate or reduce impacts to any existing tribal resources.

Environmental Consequences

Although the act of issuing oil and gas leases does not directly authorize exploration, development, or production, or any other related ground disturbing activities, the potential exists to impact Native American sites of a spiritual, cultural, or traditional nature. The types of resource uses by traditional activities and current religious practices are difficult to effectively mitigated for, however, impacts can be minimized and/or mitigated when affected Tribes provide input and actively and fully participate in the decision making process.

During coordination meetings with the Duckwater Tribe and representatives of the Descendants of the Big Smokey Valley, they identified the whole valley as a significant area regarding the creation of the Shoshone People. Several Parcels were identified specifically and were deferred from this lease sale (Appendix C).

Given the importance of the entire valley, The Duckwater tribe, the Yomba tribe and the subgroup known as the Descendants of the Big Smokey Valley have requested that they be involved with the development of any of the parcels from the very beginning of the development process. Many of the parcels may require extensive mitigation and very specific COAs (i.e placement of facilities and wells) to avoid adverse effects to these areas of importance. The tribes have indicated that many of the elders may have additional

information regarding the significance of the valley and have reserved the right to address issues during development.

If parcels were developed in the future, the BLM would consult with the tribes and site-specific mitigation measures and BMPs would be attached as COAs (i.e. placement of facilities) for each proposed activity, which would be analyzed under their own site-specific NEPA analysis.

3.4.4. Wildlife Resources

Regulatory Framework

BLM Special Status Species

The lease area may contain BLM BMD (Battle Mountain District) special status species (SSS) plants, animals or their habitat (see Appendix D for the BMDSSS list). BLM SSS are defined as those plant and animal species for which population viability is a concern, as evidenced by:

- 1) significant current or predicted downward trend in population numbers or density, or
 - 2) a significant current or predicted downward trend in habitat capability that would reduce the species' existing distribution.
- SSS also include federally listed species under the Endangered Species Act (ESA; i.e., threatened, endangered or candidate; see section below). These SSS animals are protected under provisions of the ESA or under BLM Manual 6840, Special Status Species Management. BLM has species-specific recommendations to avoid or modify activities that are likely to disturb SSS or severely degrade critical habitat. In many cases, the BLM requires that surveys are conducted for SSS species. BLM would not approve any ground-disturbing activity that may negatively affect federally listed species or critical habitat, until it completes its obligations under applicable requirements of the ESA as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Endangered Species Act (ESA)

In accordance with Section 7 of the ESA, federal agencies must "insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species." The purpose of the ESA is to provide a means for conserving the ecosystems upon which threatened and endangered species depend and to provide a program for protecting these species. The ESA defines an endangered species as a species

that is in danger of extinction throughout all or a major portion of its range. A threatened species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a major portion of its range. This Act also addresses species that have been proposed for listing as either threatened or endangered, but for which a final determination has not been made. These “candidate” species are those for which the US Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other, higher priority listing activities. Critical habitat is a specific area or type of area that is considered to be essential for the survival of a species, as designated by the USFWS under the ESA. Within the BMD, there are seven listed as threatened, endangered, proposed, or candidate species by the USFWS (see Appendix D).

BLM and Nevada Department of Wildlife Memorandum of Understanding

Wildlife and fish resources and their habitat on public lands are managed cooperatively by the BLM and NDOW under a MOU as established in 1971. The MOU describes the BLM's commitment to manage wildlife and fisheries resource habitat and the NDOW's role in managing populations. The BLM meets its obligations by managing public lands to protect and enhance food, shelter and breeding areas for wild animals. The NDOW assures healthy wildlife numbers through a variety of management tools including wildlife and fisheries stocking programs, hunting and fishing regulations, land purchases for wildlife management, cooperative enhancement projects and other activities.

Nevada Department of Wildlife Programs

The Nevada Department of Wildlife (NDOW) is the state agency responsible for the restoration and management of fish and wildlife resources within the state. The NDOW administers state wildlife management and protection programs as set forth in NRS Chapter 501, Wildlife Administration and Enforcement and NAC Chapter 503, Hunting, Fishing and Trapping; Miscellaneous Protective Measures. NRS 501.110 defines the various categories of wildlife in Nevada, including protected categories. NAC 503.010-503.080, 503.110 and 503.140 lists the wildlife species currently placed in the state's various legal categories, including protected species, game species and pest species.

Migratory Bird Treaty Act and Migratory Bird Conservation Act

Migratory birds, with the exception of native resident game birds, are protected under the provisions of the Migratory Bird Treaty Act (MBTA) of 1918. Under this act, nests with eggs or the young of

migratory birds may not be harmed, nor may any migratory birds be killed. Measures to prevent bird mortality must be incorporated into the design of a given project. To comply with the MBTA, it is recommended that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to avoid potential disturbance of breeding birds or their nests and young. Disturbance of breeding birds or destruction of nests with eggs or young is a violation of the MBTA. The BLM recommends that land clearing be conducted outside the avian breeding season. For most birds, the breeding season is considered to be from March 1 – July 31 (but see guidelines for Raptors and Eagles below). If land clearing is not feasible outside of the breeding season, the BLM recommends that a qualified biologist survey the area prior to land clearing. These surveys are only good for 14 days. If activity is not completed before that window is finished then another survey may be needed. If nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nesting material, transporting of food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided until young fledge or the nest is no longer occupied.

Guidance for raptors differs from migratory songbirds in that 1) the nesting season is extended (March 1- July 31) and 2) the survey area is larger (surveys will be conducted in the project area in addition to a 1 mile buffer surrounding the proposed surface disturbance). This survey buffer may be reduced or enlarged based on topography and the presence of other physical barriers.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668) applies primarily to taking, hunting and trading activities that involve any bald or golden eagle. The act prohibits the direct or indirect take of an eagle, eagle part or product, nest, or egg. The term “take” includes “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” Golden eagles are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, both of which prohibit take.

The USFWS has guidance for proposed projects that have the potential to impact eagles or their habitat. Generally, the steps in these guidelines include 1) surveying for nests within an appropriate radius of the project, 2) developing an eagle conservation plan (ECP) in cases where eagles and/or their nests are likely to be impacted, 3) determining if the project has the potential to disturb breeding behavior and 4) determining if the proponents need to apply for a permit to authorize unintentional take. Surveys for golden eagle nests would be designed in coordination with BMD biologists to target the most probable locations near the parcels.

Other Regulations

The Sikes Act is federal legislation that authorizes the U.S. Department of Interior to plan, develop, maintain and coordinate programs with state agencies for the conservation and rehabilitation of wildlife, fish and game on public lands. The Fish and Wildlife Conservation Act of 1980 encourages federal agencies to conserve and promote the conservation of non-game fish and wildlife species and their habitats.

Affected Environment

The BMD provides habitat for approximately 73 mammals, 231 birds, 24 reptiles, 7 amphibians, 19 fish species and numerous invertebrate species (many of which have yet to be inventoried or identified to species). Several of these wildlife species are likely to occupy the oil and gas proposed lease sale parcels, including migratory birds, golden eagles and other raptors, greater sage-grouse, bats, pronghorn antelope, mule deer and several fish species. In particular, parcels that contain or are adjacent to riparian areas (e.g., streams, springs, seeps and wet meadows) are likely to support a high density of wildlife species including endemic fish listed by NDOW as state sensitive species. Other important wildlife habitat types within the sale parcels include big sagebrush (mountain and Wyoming big sagebrush), low sagebrush, pinyon-juniper woodlands, aspen woodlands and salt desert scrub vegetation.

The following sections briefly discuss a few select wildlife species that are likely to occur on the oil and gas lease sale parcels and for which federal law or BLM policy and guidance directs management actions.

Migratory Birds

A wide variety of bird species protected by the MBTA are found throughout all habitat types within the proposed lease parcels. These include raptors (i.e., hawks, eagles and owls) and many songbirds. Major avian communities within the BMD occur in sagebrush, salt shrub, pinyon-juniper, montane, riparian and aspen habitats. Species commonly occurring in pinyon-juniper habitats and that are known to occur or have the potential to occur include the pinyon jay, western bluebird, Virginia's warbler, black-throated gray warbler and Scott's oriole. Sage thrasher, Brewer's sparrow and sage sparrow use sagebrush habitats, while loggerhead shrike and green-tailed towhee also have potential to occur in the sagebrush habitats. Many songbird species are heavily dependent on healthy riparian systems. Seventy-seven bird species have been identified as either riparian obligate or riparian dependent in the western United States (Rich 2002) and these communities are requisite for a diverse migratory bird community.

Eagles

Golden eagles are widespread year-round residents across the BMD. Golden eagles typically nest on large cliffs and forage on small mammals such as jackrabbits, cottontails and ground squirrels in open shrub, grassland and forested habitats. Alternatively, bald eagles do not nest in the BMD, but they do occur during the winter near relatively large, open bodies of water.

Greater Sage-Grouse

Greater Sage-Grouse occur within sagebrush habitat in Eureka, Lander and northern portions of Nye County on the BMD. Greater Sage-Grouse are largely dependent on sagebrush for nesting, brood rearing and foraging. Greater Sage-Grouse are known to occur in foothills, plains and mountain slopes where sagebrush meadows and aspen are in close proximity.

Mule Deer

Mule deer use a variety of vegetation types and habitats seasonally within the project area in their pursuit of forage, thermal cover and escape cover for seasonal needs. Vegetation important for mule deer includes serviceberry, snowberry, mountain mahogany, sagebrush, aspen, cottonwood, willows, chokecherry, wild roses, Pinyon pine, juniper, eriogonum, arrowleaf balsamroot, penstemon, phlox sp., sorrel, hawksbeard, lupine and numerous forbs. Riparian vegetation along streams, meadow areas and aspen stands are important fawn-rearing areas.

Pygmy rabbits

Pygmy rabbits are North America's smallest rabbits and the only ones that construct their own burrows. These burrows usually occur in stands of tall, dense sagebrush in areas with deep, loose soils. Big sagebrush is the primary food and may comprise up to 99 percent of food taken in winter and 51 percent in the summer. Wheatgrass and bluegrass are highly preferred foods in the summer. Cheatgrass invasion is detrimental to pygmy rabbits. Shrub cover is necessary for protection during dispersal and cheatgrass monocultures may provide a barrier to dispersal.

Bats

Bats inhabit or utilize many niches across the Nevada and the BMD. These include caves, abandoned mines, cliffs, springs, riparian, aspen, pinyon-juniper, subalpine coniferous forest and desert shrub habitats. Bats frequently forage in riparian areas and some of the most important bat habitat exists along perennial stream corridors.

Environmental Consequences

As previously stated, the sale of parcels and issuance of oil and gas leases is strictly an administrative action. The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to wildlife resources. Direct and indirect effects on specific wildlife species cannot be determined until site specific project proposals are analyzed at the Application for Permit to Drill (APD) stage of development. In general, mammals such as pronghorn antelope would avoid and move away from oil drilling activities. Based on the Reasonable Future Development scenario, oil and gas exploration and production activities are expected to disturb a total of 100 acres over the course of a ten year period. These activities are temporary in nature and wildlife would move back into the area after successful reclamation.

If parcels were developed in the future, site-specific mitigation measures and Best Management Practices (BMP) would be attached as Conditions of Approval (COAs) for each proposed activity, which would be analyzed under their own site specific NEPA analysis. In addition, to reduce potential impacts to wildlife, several parcels known to contain habitat for SSS of fish and wildlife have specific stipulations added to a parcel (see Appendix B). These include all parcels that may contain 1) SSS fish, 2) parcels within 3.1 miles of GRSG leks, and 3) occupied bighorn sheep habitat (including lambing areas). Several parcels were also deferred because they contain (or were adjacent to) perennial streams, a high-density of riparian habitat, or uplands important to mule deer and other wildlife.

3.4.5. Water Quality (Surface and Ground) and Quantity

Water in the lease area is owned by the public of Nevada; however, the right to use surface and groundwater and management of water appropriations are administered by the Nevada Division of Water Resources (NDWR). The water quality standards of Nevada support other Federal laws such as the Clean Water Act of 1977, the Water Resources Planning Act of 1962, the Pollution Prevention Act of 1990 and the Safe Drinking Water Act of 1977 and are administered by the Nevada Division of Water Quality (NDWQ). The lease area is part of the Basin and Range Physiographic Province, a semiarid and arid desert environment with most precipitation originating as snow or occasional Monsoon Rainfall. Annual precipitation is highly variable. The average annual precipitation in Tonopah is 4.95 inches and March and April are the wettest months (WRCC 2015b). The average annual precipitation in Battle Mountain is 6.3 inches and April and May are the wettest months (WRCC 2015a).

Hydrographic Basins

The hydrographic basin is the basic management unit used by the USGS and NDWR (see Figure X). Table XX identifies the hydrographic basin numbers, basin names, regions in which the proposed parcels are located and number of parcels in that basin. The proposed lease parcels are located in hydrographic region 10, Central Region. All but one of the lease parcels are within hydrographic basin 137B, Big Smoky Valley-Northern Part.

Table 3.4.5: Hydrographic Basins

Basin #	Basin Name	Region	Designated (Yes/No)	Perennial Yield (Acre)	Appropriation (Acre Feet/ Year)	# Parcels
137B	Big Smoky Valley-Northern	Central	Yes	65,000.00	57,698.94	63
173B	Railroad Valley-Northern	Central Region	No	75,000.00	31,130.64	1

Source: State of Nevada Division of Water Resources 2015

Surface Water

Stream flows in the project area primarily occur as intermittent flows from isolated springs, as short-term seasonal runoff from snowmelt or winter storms, or as ephemeral flow from intense but infrequent thunderstorms. Numerous drainages leave the mountain fronts and cross over alluvial fans, where flows typically dissipate. When water does reach the valley floor during larger runoff events, the water is soon used up by evapotranspiration and seepage into valley-floor sediments. In general, perennial surface water bodies within the vicinity of the proposed lease parcels are expressions of where the water table intersects the land surface and fluctuates with groundwater levels.

The lease area consists of closed drainage basins. According to the National Hydrography Dataset and the National Wetlands Inventory, the offered lease area contains at least 34 springs/seeps, 3.9 miles of perennial streams and 127.9 miles of ephemeral and intermittent streams. National Hydrography Dataset (USGS) features in the lease area include 286 acres of swamps/marsh, 300 acres of lakes and ponds, and 13,044 acres of playa. National Wetlands Inventory features in the lease area include 326 acres of freshwater emergent wetlands, 348 acres of freshwater forested/shrub wetlands, and 9,118 acres of lakes. Unsurveyed features may exist. The area of lakes, wetlands and ponds constitutes about 13% of project area.

The magnitude of surface water discharge varies in space and time. With the exception of moist winters in 2006 and 2010-2011, the Great Basin has been abnormally dry or within drought conditions since 2000. Since early 2012, the BMD and much of the Central Great Basin have consistently been in states of moderate to exceptional drought. The magnitude of the impacts to surface water resources from future development activities depends on the proximity of disturbances to drainage channels, slope aspect and gradient, degree and area of soil disturbance, soil character, duration of construction activities, and the timely implementation and success/failure of mitigation measures. Natural factors which attenuate the transport of sediment and salts into susceptible water bodies include water available for overland flow; the texture of the eroded material; the amount and kind of ground cover; the slope shape, gradient, and length; and surface roughness. Impacts would likely be greatest shortly after the start of construction activities and would likely decrease in time due to stabilization, reclamation, and revegetation efforts.

The Nevada Administrative Code Chapter 445A identifies class waters, which generally include smaller perennial streams that are tributaries to the large rivers in the state. The classification process is ongoing and not all water bodies have been classified. Water bodies are classified according to their quality and potential beneficial uses. The water quality standards correspond to these classes.

Groundwater

Runoff from upland areas of the lease area often infiltrates into the groundwater as it flows across the broad alluvial fans that transition into wide basins. Groundwater is either directed toward the playa and is lost to the atmosphere as evapotranspiration or seeps into deeper aquifers that compose larger regional flow systems. Two regional flow systems have been extensively studied by the USGS, the Death Valley Regional Flow System (Belcher 2004) and the Basin and Range Carbonate Aquifer System (USGS 2007). However, the Assessment area has not been studied. Perennial base flow from springs is largely driven by snowmelt runoff recharge. Depth to groundwater is highly variable throughout the offered Lease Area ranging from a few feet to hundreds of feet depending on location.

Nevada's groundwater quality standards are based on the assumption that groundwater should be maintained suitable for use as a drinking water source, unless the natural water quality prevents this. The State adopts the Federal primary and secondary drinking water standards (maximum contaminant limits) for groundwater resources. The chemical character and quality of groundwater varies in the lease area and depends largely on the mineral content of the rock, residence time, evapotranspiration and temperature.

The perennial yield is defined as the maximum amount of groundwater that can be harvested each year over the long term without depleting the groundwater reservoir or it being in disequilibrium. Perennial yields were quantified by USGS reconnaissance reports from the late 1940s to the 1970s. A hydrographic basin that has more appropriations than perennial yield is identified as a designated basin.

Of the 256 groundwater basins in Nevada, 120 are designated or partially designated (Nevada Department of Conservation and Natural Resources 2015); the BMD has approximately 29 basins that are fully or partially designated.

Riparian/Wetland Zones

Water quality and supply is intimately related to the health of riparian and wetland ecosystems. Riparian and wetland areas are the most productive and important ecosystems on the BMD. They represent less than one percent of the area, but contain the majority of biodiversity and are vital ecologic functions. Research has shown that riparian and wetland habitat characteristically has a greater diversity of plant and animal species than adjoining areas. According to the National Hydrography Dataset and the National Wetlands Inventory, the offered lease area contains approximately at least 34 springs/seeps, 3.9 miles of perennial streams and 127.9 miles of ephemeral and intermittent streams. These streams may have associated riparian/wetland habitat. National Hydrography Dataset (USGS) features in the lease area also include 286 acres of swamps/marsh, 300 acres of lakes and ponds, and 13,044 acres of playa. National Wetlands Inventory features in the lease area also include 326 acres of freshwater emergent wetlands, 348 acres of freshwater forested/shrub wetlands and 9,118 acres of lakes. Unsurveyed features may exist.

Floodplains

Federal Emergency Management Agency (FEMA)-designated Zone A flood hazard areas, which would be flooded during a 100-year, 24-hour runoff event, have been delineated in some low-lying areas in the offered leasing area. There are a total of 17,551 acres of the offered lease parcels identified within Zone A flood hazard areas that would be subject to Federal Regulation and mitigation. Site specific analysis, to identify potential flood plain complications, would be required prior to drilling in parcels that meet this designation.

Municipal Watersheds

One area within the lease area have been identified as having Municipal Water Supplies within the HUC-12 boundaries (Eco-Vision, Inc.; Parcel NV-16-06-040). Site-specific analysis, to identify potential impacts, would be required prior to drilling in this or other parcels that meet this designation.

Environmental Consequences

The sale of parcels and issuance of oil and gas leases is strictly an administrative action. The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to water quality and surface water. On-the-ground impacts would not occur until a lessee applies for and receives approval to drill on the lease. The BLM cannot determine at the leasing stage whether or not a proposed parcel will actually be sold, or if it is sold and issued, whether or not the lease would be explored or developed. Consequently, the BLM cannot determine exactly where a well or wells may be drilled or what technology may be used to drill and produce wells, so the impacts listed below are generic, rather than site-specific. Subsequent development of a lease may result in long- and short-term alterations to the hydrologic regime depending upon the location and intensity of development. Clearing, grading, and soil stockpiling activities associated with exploration and development actions could alter short-term overland flow and natural groundwater recharge patterns.

Groundwater

There would be no direct impacts to groundwater due to oil and gas leasing because issuing leases does not authorize on the ground action. Impacts from development activities would be analyzed under a separate site-specific environmental analysis. All activities would be subject to BMPs, State and Federal Regulations and COAs. Potential impacts to groundwater by the development of a lease may include degradation of water quality and drawdown of existing water levels. Water quality issues may arise from either underground or surface contamination. The primary cause of underground degradation would be from improperly functioning well casings. Surface activities can degrade groundwater by infiltration of contaminants, particularly from sumps and spills. Areas with shallow groundwater levels would be at greater risk and may be subject to COAs. All required state and federal regulations would apply and site-specific COAs and mitigation should be an integral part of on the Application for Permit to Drill (APD).

Hydraulic Fracturing (HF) is one method of well stimulation used in oil and gas production. HF is designed to change the producing formations' physical properties by increasing the flow of water, gas, and/or oil around the wellbore. This change in physical properties may open up new fractures or enhance existing fractures that could result in freshwater aquifers being contaminated by natural gas, condensate and/or chemicals used in drilling, completion and hydraulic fracturing. Historically, impacts to groundwater resources are due to improper well integrity, poor cement job, surface spills, and/or the loss of drilling, completion and hydraulic fracturing fluids into groundwater. Types of chemical additives used in completion activities may include acids, hydrocarbons, thickening agents, lubricants, and other

additives that are specific for the well being treated. The potential for negative impacts to groundwater caused from HF, are continually being investigated by the Environmental Protection Agency. At this time all HF operations would be subject to the regulations required by the State of Nevada, Third Revised Proposed Regulation R011-14. Nationally, the BLM is using the State Regulations but is also working on an additional policy. For additional information on risks to groundwater from HF, refer to Appendix E.

Surface Waters

There would be no impacts to Surface Waters due to oil and gas leasing because no direct authorization of surface disturbance is expected. Impacts from development activities would be analyzed under a separate site-specific environmental analysis. Runoff associated with storm events could increase sediment/salt loads in surface waters down gradient of the disturbed areas. Sediment may be deposited and stored in minor drainages where it could be readily moved downstream (within closed basins) during heavy storms. Sediment from future development activity may be carried into contained basins and sloughs. All activities would be subject to BMPs, State and Federal Regulations and COAs. Potential impacts of lease development on surface waters may include changes to water quantity and quality. If future surface disturbing activities are proposed near surface waters or wetlands/riparian zones, the environmental analysis and decision record/record of decision would require additional mitigation. All operations would be required to comply with all state and federal regulations.

Riparian Areas and Wetlands

There would be no impacts to Riparian and Wetlands due to oil and gas leasing because issuing of leases does not give surface disturbance authorization. Impacts from development activities would be analyzed under a separate site-specific environmental analysis. All activities would be subject to BMPs, State and Federal Regulations and COAs. Surface disturbance adjacent to wetlands/riparian zones and adjacent flood plains has the potential to adversely affect the functioning condition of a riparian area's soil and watershed attributes, as well as, disturb or displace wildlife.

Nine (9) parcels with important riparian and wetland resources have been recommended for deferral until further analysis is completed. The stipulations currently available to the BMD are not adequate to address the issues in these parcels. (See Appendix C).

When considering the RFD, environmental impacts cannot be determined for individual leases or for exploration and development of production activities. Existing data describing existing water systems, ground water reservoirs, oil and gas reservoirs, the interrelationships of these systems, or specific exploration, development and production

activities are inadequate to determine specific effects of these activities within the offered parcels. Project and site specific analysis would be conducted at the APD stage.

Potential impacts from exploration and production activities would be minimized through site-specific mitigation measures, COAs, and BMPs, which may help ensure the long-term health of the assessment areas hydrologic system and water quality.

3.4.6. Waste, Hazard, and Solid

Affected Environment

Oil and gas development, which can include exploration drilling, extraction, production facilities, pipeline transport, tanker loading and unloading, affect the environment through production of waste fluids, emissions and site impacts resulting from field development and related infrastructure. Hazards that may be encountered include the following: oil spills, produced waters, drill cuttings, and hazardous materials.

Environmental Consequences

Examples of indirect environmental impacts from hazardous materials, hazardous waste, and solid waste, which might be encountered during exploration and development are provided below. However, most of these incidental impacts, if not all, can be avoided or lessened through proper inspection and enforcement.

Exploration

Impacts could include drilling fluid or hydrocarbon spills, leakage from improperly constructed reserve pits, wastewater collection systems, improperly handled brine backflow water from drilling that may or may not have used HF technology, and accumulations of solid waste, which could impact water quality or contaminate soils. Hydrocarbon spills could consist of hydraulic fluid, gasoline, diesel, oil, or grease from vehicles, generators, and exploration drill rigs. Backflow water from exploration drilling can be extremely saline, if improperly disposed of, it could raise the pH of existing surface waters to unacceptable levels. Accumulations of nonhazardous solid waste could include trash, drill cuttings, wastewater, bentonite and cement generated during drilling operations.

Production / Development

Impacts could be the same as in the exploration phase; however, the quantities of hazardous materials, hazardous waste, or solid waste used and generated could be greater. Additionally stormwater runoff

could contain elevated quantities of heavy metals and volatile organic compounds. When fracked water comes back to the surface as backflow, it can contain high levels of salts, introduced chemical additives, and various chemicals and compounds that occur naturally within the earth. Backflow spills have been known to kill off all vegetation and render the soil unusable. Nonhazardous solid waste could be generated at this stage, which would increase the potential for contamination of water and soil, as well as toxic impacts to wildlife.

Production

Impacts of the long-term production phase could include spills and leaks from routine plant operations. Examples of these substances could be hydraulic fluid, gasoline, diesel, oil, paint, antifreeze, cleaning solvents, transformer insulating fluid, and grease. These discharges could result in impacts to water, soil, air, and wildlife. Accidental releases from reserve pits or waste water collection systems could include hazardous water treatment chemicals such as chlorine. Stormwater runoff containing heavy metals and VOCs could be problematic. Nonhazardous solid waste would also be generated (i.e., drilling muds).

Final Abandonment

The operator would identify, remove, and properly dispose all hazardous materials, hazardous waste, and solid waste. Spills could occur during the removal operations. Based on meeting regulatory requirements and implementing leasing stipulations, adverse impacts from hazardous materials would be minor.

When the RFD for the BMD is considered, impacts to natural resources would be negligible because the substances used for these operations (as described in the affected environment) would be properly handled, stored, and disposed of. Proper management of these substances as defined by federal and state regulations would ensure that no soil, ground water, or surface water contamination would occur with any adverse effect on wildlife, worker health and safety, or surrounding communities. The Proposed Action would allow inclusion of updated mitigation measures, BMPs, and COAs. Performance standards would be defined during site-specific analysis for exploration, production, and development.

3.4.7. Noxious Weeds and Invasive, Non-native Species

Affected Environment

Noxious weeds, invasive and non-native species are species that are highly competitive, aggressive and spread easily. They typically establish and infest disturbed sites, along roadsides and waterways. Changes in plant community composition from native species to non-native species can change fire regimes, negatively affect habitat quality, biodiversity, and ecosystem structure and function.

Noxious weeds and invasive plant species have been defined as pests by law or regulation. The BLM defines a noxious weed as, “a plant that interferes with management objectives for a given area of land at a given point in time.” (BLM 2015). The Federal Noxious Weed Act of 1974 (as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990) authorizes cooperation among federal and state agencies in the control of weeds. The BLM Battle Mountain District recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture (NDOA) statute, found in NAC 555.010. Currently the list contains 47 noxious weed species. When considering whether to add a species to the list, the NDOA makes a recommendation after consulting with outside experts and a panel comprising Nevada Weed Action Committee members. Per NAC 555.005, if a species is found probable to be “detrimental or destructive and difficult to control or eradicate”, the NDOA, with approval of the Board of Agriculture, designates the species as a noxious weed. The species is then added to the noxious weed list in NAC 555.010. Upon listing, the NDOA will also assign a rating of “A”, “B”, or “C” to the species. The rating reflects the NDOA view of the statewide importance of the noxious weed, the likelihood that eradication or control efforts would be successful, and the present distribution of noxious weeds within the state.

An “invasive species” is defined as a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO 13112, signed February 3, 1999).

The BLM’s policy relating to the management and coordination of noxious weeds and invasive plant species is set forth in the BLM Manual 9015 – Integrated Weed Management. The BLM’s primary focus is providing adequate capability to detect and treat smaller weed infestations before they have a chance to spread. Noxious weed control is based on a program of prevention, early detection, and rapid response.

Environmental Consequences

There would be no direct impacts from issuing new oil and gas leases because leasing does not directly authorize oil and gas exploration and development activities. However, it is reasonably foreseeable

that oil and gas exploration and development would occur within the next 10 years. Direct impacts from these activities would be analyzed under separate site-specific EAs.

Based on historic information and anticipated activity, within the next 10 years, approximately 50-100 acres of surface disturbance associated with potential oil and gas exploration and development could be expected, including activities such as road construction and maintenance, vehicles traveling on transportation corridors, construction of production facilities and staging areas. These subsequent activities may increase the potential for new and expanded infestations of noxious weeds, invasive and non-native species. Wind, water, recreation vehicles, livestock and wildlife would also assist with the distribution of weed seed into the newly disturbed areas. If parcels were developed in the future, site-specific mitigation measures, BMPs, and COAs would be implemented to reduce impacts.

3.4.8. Geology and Minerals

Affected Environment

The geologic history of central and southern Nevada and the Assessment Area is very complex and includes two major cycles of sedimentation (western and eastern facies sources), episodic thrust faulting, mountain building, and associated intrusive and igneous activity. More recent geologic history includes a period of crustal extension that was accompanied by bimodal (rhyolite-basalt) volcanism, large volume caldera volcanism, and basin and range block-faulting resulting in high-levels of shallow crustal heat flow. The regional and local geologic setting has been instrumental in the location of and potential for numerous economic metallic mineral deposits in the Assessment Area, as well as development of economic geothermal resources.

As summarized in Mineral Assessment Report January 2012, the Assessment Area is located in the Great Basin portion of the Basin and Range physiographic province of the western United States. Faults bound each of the mountain ranges and cut them and the basins between them. The ranges are the result of multiple geologic events, including the Late Devonian/Early Mississippian Antler orogeny, the Early Triassic Sonoma orogeny, and the Jurassic Nevadan and Sevier orogenies. The Basin and Range province extends west to the Sierra Nevada and Cascade Ranges in California and Oregon, and east to the Wasatch Mountains in Utah.

The Oil and Gas Lease area projected for sale in the MLFO is bounded by the Desatoya Mountains and the Tobin Range on the west and Diamond Mountains and Sulphur Spring Range on the east. The proposed parcels in the TFO are located within three valleys: the Big Smoky Valley, which is bounded by the Toquima and Monte Cristo Ranges to the east and the Toiyabe and San Antonio Ranges to the west; the Lone Valley, which is bounded by the Cedar Mountain Range to the west, the Royston Hills to the south and the Toiyabe Range to the east; and the Big Sand Springs Valley, which is bounded by the Pancake Range to the east and the Hot Creek Range to the west. The BMD is located in the Basin and Range province. The Basin and Range province is comprised of north-south oriented mountain ranges separated by broad valleys, which covers most of Nevada. These mountains were formed by crustal blocks that moved relatively upward along parallel normal faults. Basins, or valleys, were formed by fault-bounded crustal blocks that moved relatively downward. Many of these faults are still active and earthquakes can occur. BMD geology has been deformed by successive orogeny (mountain building) events and extensive volcanism has occurred. There are no geothermal plants in the proposed lease parcels. There are six proposed parcels that lie within mine plan areas.

A variety of rock types can be found within the BMD. These rock types include: Lower Paleozoic sedimentary and volcanic rocks, Tertiary volcanic rocks, Upper Tertiary volcanic rocks and Quaternary alluvial and playa deposits. The Paleozoic and Mesozoic rocks include high quality limestone that is mined near the Assessment Area. Mississippian Chainman Shale is thought to be the major source for petroleum generation in both Railroad and Pine Valleys (Grabb 1994). Traps are created by faulting and hydrothermal or contact metamorphism has altered organic matter contained in marine shales.

Locatable Minerals

Locatable minerals historically or currently mined within the Assessment Area include metallic minerals (i.e., gold, silver copper, mercury, zinc, molybdenum, manganese, uranium, and tungsten and industrial minerals (i.e., limestone, barite, gypsum, diatomaceous earth, sulfur, and fluorspar). Currently, there are four open pit gold/silver mines (Ruby Hill, Cortez Hills/Pipeline, Phoenix, and Round Mountain). Industrial mineral mines operating in the Assessment Area include two barite producers (Argenta and Greystone Mines), lithium compounds (Silver Peak Operation), and diatomite (Basalt Mine). Approximately 23 mining plans of operation are currently administered by the BMDO. A total of 2,507 mining notices (as of 1 January 2012) have been administered by the BMDO since 1990 and 18 are currently pending decisions. The US Geological Survey (USGS) has identified over 1400 mines and prospects in the state of Nevada, approximately 446 of which fall within the four counties in the BMD.

The potential that oil and gas interests may overlap with those of mineral exploration exists. However, based on past experience in Nevada most of the lands that are used for oil and gas exploration and production would be reclaimed within ten years. The majority of oil and gas exploration and development would be short-term and hence would not appreciably affect mineral exploration and development. However, mining claims overlap the parcels and coordination with the claimant may be necessary.

Saleable Minerals

Saleable minerals can only be acquired by purchase. They include, but are not limited to, the following: petrified wood, common varieties of sand, stone, gravel, pumice, pumicite, cinder, clay and rock. The most common are sand and gravel deposits. Gravel deposits are associated with colluvium, which was eroded off the mountain ranges. Other types of deposits include topsoil and sand. The minerals program administers 39 active sales and 175 free-use permits. Saleable mineral sites with a priority for use include sand, gravel, and rock quarries located along State, County, and BLM managed roads.

These types of saleable minerals are distributed throughout the BMD, but there is no ongoing major exploration for saleable minerals or active mining on the proposed lease parcels. Prior history in Nevada shows that oil and gas exploration and development activities would require up to 2.5 acres in gravel pit expansion. This small acreage would not greatly increase the amount of gravel pits, nor would it burden the communities that utilize gravel.

Leasable Minerals

Leasable minerals are those that may be extracted from leases on public lands and are subdivided into solid and fluid leasable mineral groups. Solid minerals include the following: coal, sodium, sulfur, potassium and phosphate (and under certain conditions, sand, gravel and locatable minerals). Fluid minerals include oil, gas, and geothermal resources.

Oil and Gas

Knowledge of existing geology of the Assessment Area, as it relates to oil and gas occurrences, is based on bedrock geologic mapping, detailed basin analysis (Anna et al. 2007), and oil and gas test wells drilled in the Assessment Area. Detailed bedrock geologic maps of 1:250,000 quadrangles were compiled by the USGS by county and are available as electronic files from the Nevada Bureau of Mines and Geology. Oil and gas fields in the BMD occur in Railroad Valley and Pine Valley located in central Nevada. Oil and gas in Railroad Valley occurs mainly in Miocene and younger age basins formed during the Basin and Range Orogeny. Hydrocarbon traps are stratigraphic and structural in nature. The majority of oil and gas are trapped in the fractured, Oligocene age volcanic rocks and are believed to be sourced from deeper Cretaceous and early Tertiary marine sediments. Natural gas is not produced in commercial quantities in Nevada. Pine Valley oil production comes primarily from Oligocene and Miocene sedimentary and volcano sedimentary rocks, but rocks as old as the Devonian Telegraph Canyon Formation host oil in the Assessment Area. For more information on where there is oil and gas potential in Nevada, go to:

http://gisweb.unr.edu/flexviewers/map_162_and_of11_2/ that has an interactive map.

The oil and gas program currently consist of drilling wildcat wells and exploratory based production wells on existing oil fields in the Railroad Valley. A total of 1,565 leases totaling 2.5 million acres have been authorized since 1990. Since 1954, 771 oil and gas wells have been drilled in the BMD. Total oil production from 1950 to 2011 is 50.1 million barrels of oil. Oil production in 2012 amounted to 367,717 barrels of oil.

Shale Oil

The outlook for production of petroleum products from shale oil within the Assessment Area is poor in the short-term and probably poor in the long-term. Shale oil contains significant crude oil and may be used as a source of petroleum that Noble Energy is currently exploring in the northeastern part of Nevada. Shale oil production typically requires a very large resource, access to energy, and access to large volumes of water. Shale oil has been reported in the Chainman Formation (Mississippian), Vinini Formation (Ordovician), Woodruff Formation (Devonian), Sheep Pass Formation (Eocene), and the Elko Formation (Eocene-Oligocene) are potential sources of shale oil (Anna et al, 2007). The Chainman, Vinini, Woodruff, and Sheep Pass Formations all occur within the Assessment Area. The Sheep Pass Formation hosts some oil in the Railroad Valley area. The Elko Formation may occur within the BMD in the lower stratigraphy of Pine Valley but the bulk of the Elko Formation is northeast of the BMD.

Geothermal

All land within the Assessment Area is open to geothermal leasing and development with exception of Wilderness Areas, Wilderness Study Areas, community watersheds, critical wildlife habitat areas, and military reservations. The Assessment Area currently has 70 authorized geothermal leases, covering 148,441 acres, and 3 pending geothermal applications, covering 3,654 acres. The MLFO prepared a "Programmatic Environmental Assessment Geothermal Leasing and Exploration - Shoshone- Eureka Assessment Area" in 2002. The Tonopah Field Office (TFO) implemented the "Proposed Tonopah RMP and Final Environmental Impact Statement" (1994) and a programmatic Environmental Assessment for geothermal leasing to expedite processing geothermal lease applications. In addition, The Geothermal Programmatic Environmental Impact Statement (PEIS) for Geothermal Leasing in the Western US was approved on December 17, 2008 to expedite processing geothermal lease applications. About 20 percent of the land within the Battle Mountain District is potentially valuable for geothermal resources, located mainly in Esmeralda and Lander counties. Pending lease applications cover less than one percent and are near the town of Carvers in Nye County and in Crescent Valley in Lander County. The current geothermal program includes six exploration projects and three production/utilization projects in the Mt Lewis Field Office and Tonopah Field Office Assessment Areas.

Environmental Consequences

The potential that oil and gas interests may overlap with those of solid mineral exploration exists. However, the majority of acres that may be used for oil and gas exploration and production are usually reclaimed

within 5 years and 25 years, respectively. In most instances, oil and gas exploration is a short-term endeavor (2-10 months) and hence would not appreciably affect mineral exploration and development. Agreements between oil and gas and mineral operators could help to mitigate those acres that would be used for oil and gas production on a more long-term basis.

Oil and gas exploration and development activities could require up to 2.5 acres in gravel pit expansion. This small acreage would not greatly increase the amount of gravel pits, nor would it burden the communities that utilize gravel.

There are currently no geothermal leases that overlap proposed oil and gas lease sale parcels. These potential impacts could be mitigated through negotiations between operators.

Nevada is a seismically active state that frequently receives numerous earthquakes and temblors each year. However, most are small in size and the epicenters can be several miles below the ground surface. It is unlikely that any of Nevada's oil wells would be impacted from minor earthquakes (< 5.5 magnitude) that are often felt but only cause minor damage (UPSeis).

If any of these parcels are to be developed, design features, site-specific mitigation measures, and BMPs would be attached as COAs for each proposed activity, which would be developed through site-specific NEPA analysis.

3.4.9. Soils

Affected Environment

Differences in climate, relief, aspect, slope, landform, elevation and parent material among other factors contribute to the formation of different soil types. High variability of these factors within the project area creates a wide variety of soil types. Soils within the project area range from those typical in the valley floors that tend to be deep, poorly drained due to high clay content and highly alkali to those common in the higher mountain elevations which tend to be shallow young gravely soils with near neutral pH.

Existing soils surveys of the project area are used to for evaluating land-use potential, potential plant communities and developing reclamation and rehabilitation plans. Three major soil order dominate the soil types in the project area these are: Aridisols, Entisols and Mollisols. A brief description of each soil order is provided below.

Aridisols

Aridisols are soils that are too dry for the growth of mesophytic plants. The lack of moisture greatly restricts the intensity of weathering processes and limits most soil development processes to the upper part of the soils. These soils often accumulate gypsum, salt, calcium carbonate, and other materials that are easily leached from soils in more humid environments. They have properties typical of soils in arid regions and are low in organic matter. Aridisols are mainly found in valley bottoms, but may occur at higher elevations. They do not have water continuously available to them during the growing season and typically have a water stress period of about 3 months. Aridisols tend to be finer in texture than the other two orders.

Entisols

Entisols are found on recent landscapes, such as alluvium and disturbed sites. Soil texture tends to be more gravely and well drained. These are mineral soils that are very young and have not yet developed appreciable accumulations of soluble salts and lime. Soil horizon development is typically minimal. They occur in both the valley bottoms as well as the mountains. In the mountains these tend to make up the steeper more erodible soils whereas lower elevation they tend to be found in areas of deposition such as alluvial fans and floodplains. Though these sites are typically xeric however, they are not as dry as the Aridisols.

Mollisols

Mollisols are found on dark-colored fertile surface horizons that have been formed under semiarid to sub-humid climate. Moisture availability is typically the highest in this type than the other two. These soils are rich in organic matter and are very fertile. In the project area, these soils mainly form in the mountains with grass communities. These soils are older and generally occur on more stable alluvial fans and terraces.

Microbiotic Crusts

Microbiotic crusts are a complex mosaic of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria found throughout the Great Basin and Project Area. Cyanobacterial and microfungi filaments weave through the top few millimeters of soil, gluing loose particles together and forming a matrix that stabilizes and protects soil surfaces from erosive forces. Microbiotic crusts retain soil moisture, discourage invasion by annual species, reduce wind and water erosion, fix atmospheric nitrogen and contribute to soil organic matter. These crusts can be impacted by surface disturbing activities. The Greater the disturbance the Greater the impact and time associated with recovery. Microbiotic crusts can also be indirectly impacted from increased erosion, whether eroded away or covered by soil from wind or water events. Slight covering by soil does not affect microbiotic crusts (Technical reference 1730-2, 2001).

Environmental Consequences

Although there would be no direct impacts to soil due to oil and gas leasing because no authorization for surface disturbance would be granted, there could be indirect impacts to soils associated with leasing from such activities as, seismic studies, exploratory drilling, developing a well for production (with or without using HF), and reclamation activities. It is reasonably foreseeable that oil and gas exploration and development would occur over the next 10 years within the Assessment Area. It is foreseeable that 50-100 acres will be disturbed by activities associated with oil and gas exploration and production including exploration wells, production infrastructures, road construction, and gravel pit expansion. These actions would remove vegetation potentially increasing wind and water erosion, cause soil compaction and disturb microbiotic crusts. Removal and crushing of vegetation would occur through exploration and development activities. Considering the amount of disturbance in the RFD (50-100 acres), the impacts to soils are expected to be comparatively minor when compared to the areas offered for lease (256,401 acres) and temporary in nature because the majority of the disturbance (roads and pads) would be reclaimed. Impacts to soil from these activities would be more thoroughly analyzed under separate site-specific EAs when an action is proposed and specifics are known, like location, well depth, water consumption needs, and area of disturbance. Through this process, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity.

3.4.10. Vegetation

Affected Environment

Vegetation within the proposed lease area provides forage and cover for wildlife, livestock, wild horses and burros within the project area. It also provides ground cover and root mass to stabilize soils and aids in infiltration of water into the ground. The type of vegetation that grows in a particular area depends largely on soil types and average precipitation. The Natural Resource Conservation Service completed soil surveys and has developed ecological site descriptions from the information collected. Each ecological site description provides detailed information regarding vegetative communities and precipitation zones and is used for evaluating land-use potential, potential plant communities and developing reclamation and rehabilitation plans. The following vegetative communities are those identified within the lease parcel area and are discussed in detail below. Notably several plant species in the BMD have been identified as SSS (Appendix D). These occur in several of the vegetation communities described here.

Greasewood

This community occurs on floodplains and closed-basin bottomlands adjacent to playas. Greasewood is located on slopes that range from 0-2% with an elevation between 4,500-5,000 feet and occur in precipitation zones of 3-5 and 5-8 inches. Vegetation in this type is normally restricted to mounded areas that are surrounded by playa-like depressions or nearly level, usually barren, interspaces. This plant community is characterized by black greasewood (*Sarcobatus vermiculatus*), Basin wildrye (*Leymus cinereus*), inland saltgrass (*Distichlis spicata*) and alkali sacaton (*Sporobolus airoides*). Saltgrass may extend into the interspace in some areas. Potential vegetative composition is typically 25% grasses, 5% forbs and 70% shrubs.

Salt Desert Shrub

This vegetative community occurs on alluvial terraces, fans and foothills on all aspects. Salt desert shrubs are located on slopes that range from 0-30%, with 0-8% slopes the most typical. Salt Desert Shrub occurs at elevations between 4,500-6,000 feet and within precipitation zones of 3-5 and 5-8 inches. The plant community is characterized by shadscale (*Atriplex confertifolia*), bud sagebrush (*Artemisia spinescens*) and some winterfat (*Krascheninnikovia lanata*). Bud sagebrush and winterfat are palatable salt desert shrub species. Bottlebrush squirreltail (*Elymus elymoides*) and Indian ricegrass (*Achnatherum hymenoides*) are key grass species associated with this vegetative community. Alkali meadows are included in this plant community and consist of inland saltgrass and basin wildrye. Potential vegetative composition is typically 10% grasses, 5% forbs and 85% shrubs.

Big Sagebrush

This is the most extensive community within the lease parcel area, which occurs on terraces, alluvial fans and low rolling hills on all exposures. Wyoming and Big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*; *Artemisia tridentata* ssp. *tridentata*) occurs on slopes that range from 2-50 percent with elevations ranging from 4,500-6,000 feet and within the 8-12 inch precipitation zone. This plant community is characterized by Wyoming and Basin big sagebrush, Thurber's needlegrass (*Achnatherum thurberianum*), Indian ricegrass, Basin wildrye, bottlebrush squirreltail and Sandberg's bluegrass (*Poa secunda*). Arrowleaf balsamroot (*Balsamorhiza sagittata*) and Tapertip hawkbeard (*Crepis acuminata*) are important forb species associated with this vegetation type. Potential vegetative composition is typically 50% grasses, 15% forbs and 35% shrubs.

Black Sagebrush

This vegetative community occurs on low arid foothills, mountain side slopes and plateaus. Black sagebrush (*Artemisia nova*) occurs on slopes that range from 4-50% with elevations ranging from 5,000-7,000 feet and are associated with the 4-8 inch precipitation zone.

Soils are often shallow over a calcareous pan, which limits effective water holding capacity and seeding success. Vegetation that characterizes this community consists of black sagebrush, bottlebrush squirreltail and Sandberg's bluegrass. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is characteristic for communities that occur in the higher elevations. Potential vegetative composition is typically 50% grasses, 15% forbs and 35% shrubs.

Low Sagebrush

This vegetative community occurs on mountain side slopes and plateaus. Low sagebrush occurs on slopes that range from 4-75% with elevations ranging from 5,000-9,000 feet and are associated with the 8-12 inch precipitation zone. Soils are often shallow over a calcareous pan, which limits effective water holding capacity and seeding success. This vegetative community is characterized by low sagebrush (*Artemisia arbuscula*), bottlebrush squirreltail, Sandberg's bluegrass and bluebunch wheatgrass. Potential vegetative composition is typically 50% grasses, 15% forbs and 35% shrubs.

Mountain Brush

This community occurs on upland terraces and inset mountain valleys on all slope aspects. Mountain brush occurs on slopes that range from 4-50% with elevations ranging from 6,000-9,000 feet. These communities generally occur within the 12+ inch precipitation zone. The vegetative community is characterized by Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass, snowberry (*Symphoricarpos albus*), antelope bitterbrush (*Purshia tridentata*) and serviceberry (*Amelanchier utahensis*). Mountain brome (*Bromus carinatus*), mountain spray (*Holodiscus discolor*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*) and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) are other species associated with this community. Potential vegetative composition is typically 55% grasses, 15% forbs and 30% shrubs.

Pinyon-Juniper Woodlands

This community occurs on upper alluvial fans and in the higher mountainous regions with slopes ranging from 30-50%. Elevations range from 5,500-9,000 feet. This community occurs within the 10-22 inch precipitation zone. Lower elevations (5,000-6,500 feet) communities are dominated by juniper, mid elevations (6,500-7,500 feet) by both pinyon and juniper and high elevations (above 7,500 feet) are predominately pinyon pine. These plant communities are characterized by single-leaf pinyon pine (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*). There are localized ecosystems which support other juniper species such as common juniper (*Juniperus communis*) and Rocky Mountain juniper (*Juniperus scopulorum*). The understory, although sparse, consists of bluebunch wheatgrass, Sandberg's bluegrass, Thurber's needlegrass, basin wildrye and needleandthread grass (*Hesperostipa comata*). Juniper

and pinyon trees dominate these areas; however, mountain big sagebrush, antelope bitterbrush and curl-leaf mountain mahogany can be found within the community. Heavily wooded areas provide little forage and have a large amount of bare ground. Potential vegetative composition is typically 40% grasses, 15% forbs and 45% shrubs and trees.

Riparian

Small riparian communities occur within the project area and are associated with streams, springs and seeps where water is at or near the surface for the majority of the year. Species associated with this community include willow (*Salix* spp.), quaking aspen (*Populus tremuloides*), cottonwoods (*Populus fremontii*, *P. Balsamifera* ssp. *Trichocarpa trichocarpa*, *augustifolia*), water birch (*Betula occidentalis*), red-osier dogwood (*Cornus sericea*), rushes (*Juncus* spp.) and sedges (*Carex* spp.) and cattail (*Typha latifolia*). Potential vegetative composition is typically 70% grasses and grass like species, 25% forbs and 5% shrubs.

Winterfat Bottoms

Winterfat communities occur generally in flats of drainage and flood plains. They typically occur in areas where slopes range from 0-2%. The elevation of this community ranges from 4000-6000 feet and within precipitation zones of 5-8 inches. Soils are typically sandy loam. The plant community is characterized and dominated by winterfat. It also includes vegetation such as bud sagebrush, Indian ricegrass and squirreltail. Potential vegetative composition is typically 10% grasses, 5% forbs and 85% shrubs.

Annuals

Although this vegetation type is not considered an ecological type, it is a plant community that accounts for portions of the project area. Areas that have been disturbed may be invaded by invasive annual species, sometimes to the exclusion of native species. Dominant plants are cheatgrass (*Bromus tectorum*) and/or halogeton (*Halogeton glomeratus*). Other plants often present in these areas are Russian thistle (*Salsola kali*), clasping pepperweed (*Lepidium perfoliatum*), tumble mustard (*Sisymbrium altissimum*) and Russian knapweed (*Centaurea repens*).

Environmental Consequences

Although there would be no direct impacts to vegetation due to oil and gas leasing because no authorization for surface disturbance would be granted, there could be indirect impacts to soils associated with leasing from such activities as, seismic studies, exploratory drilling, developing a well for production (with or without using HF), and reclamation activities. It is reasonably foreseeable that oil and gas

exploration and development would occur over the next 10 years within the Assessment Area and that 50-100 acres will be disturbed by activities associated with oil and gas exploration and production including exploration wells, production infrastructures, road construction, and gravel pit expansion.

Removal and crushing of vegetation would occur through exploration and development activities. It is anticipated that the majority of the exploration is likely to occur in saltbush shrub or sagebrush type vegetation areas, rather than pinyon-juniper woodlands. Removal of vegetation would increase the amount of bare ground, thus increasing wind and water erosion; increase the potential for invasion by nonnative and noxious species. Considering the amount of disturbance in the RFD (50-100 acres), the impacts to vegetation are expected to be comparatively minor when compared to the areas offered for lease (256,401 acres) and temporary in nature because the majority of the disturbance (roads and pads) would be reclaimed. Impacts to vegetation from these activities would be more thoroughly analyzed under separate site-specific EAs when an action is proposed and specifics are known, like location, well depth, water consumption needs, and area of disturbance. Through this process, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity.

Within the next ten years, it is predicted that 50-100 acres would be disturbed by activities associated with oil and gas exploration and production including seismic lines, exploration wells, production wells, road construction, and gravel pit expansion.

Based on the RFD, impacts to vegetation from exploration/development are expected to be relatively minor, short term, and localized. In addition, site-specific mitigation measures, BMPs, and COAs would be implemented to reduce impacts.

3.4.11. Range Resources

Affected Environment

Livestock production is a major industry within the BMD. Within the BMD the Range Program permits and manages public land grazing on 91 allotments for 88 permittees and approximately 366,946 Animal Unit Months (AUMs). An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. Eight grazing allotments include all or portions of the parcels proposed for leasing (Figure 3). Most grazing allotments are comprised of both public and private lands; however, the majority of the allotments are dominated by public lands.

Grazing permits are issued to qualified individuals or entities that specify livestock numbers, season of use, kind of livestock and number of AUMs allowed for use. Other terms and conditions may be added to grazing permits for the orderly management of the permit and/or the livestock within an allotment(s). Each allotment may have one or multiple permittees. Various range improvement projects are also located within these allotments and may include: fences, cattle guards, troughs, wells, pipelines, seedings, and vegetation manipulation projects.

The following table (Table 4) shows the allotments within the Project Area, the public acres within the allotment, the number of acres of offered lease parcels within each allotment, the number of authorizations/permittees within each allotment, the kind of livestock authorized and Active AUMs.

Table 3.4.11: Allotments Within the Project Area						
Allotment Name	Allotment Public Acres	Lease Parcel Acres	Number of Authorizations	Kind	AUMs	Suspended AUMs
Simpson Park	97,670	978	1	Cattle	511	470
Kingston	80,101	52,403	2	Cattle	1,606	0
Millet Ranch	1,205	630	1	Cattle	72	0
Nielson	964	64	1	Cattle	116	0
Trail Canyon	25,121	4,780	2	Cattle	225	0
Wildcat Canyon	68,450	33,050	1	Cattle	150	226
Smoky	136,655	22,572	2	Cattle	5,593	0
Butterfield	120,474	768	1	Cattle	4,776	0
Total	530,640	115,245	11		13,049	696

3.4.12. Lands and Realty

Affected Environment

All of the proposed lease parcels are located on public lands with federally controlled surface and subsurface mineral estate. Many of the offered parcels would require a right-of-way (ROW) in order to access the lease parcels. Some proposed parcels include pre-existing land use authorizations such as grants, leases, permits and withdrawals. Table X provides a summary of the land use authorizations in the lease area.

Table 3.4.12: A summary of the Rights-of-Way (ROWs) in the Lease Area

ROW Case File	ROW Holder	ROW Description	Affected Lease Parcel
N-56922	Truckee River Ranches	Varied width RS 2339 Ditch	001
N-46509	Sierra Pacific Power Company dba NV Energy	24-ft wide distribution line	001, 035, 040
N-59172	BLM	Moore's Creek Community Pit	Moore's Creek Community Pit
N-06971	US Forest Service	66-ft wide, FS 20023; 13.12 mile long Northumberland Canyon Rd.	005, 022, 023, 024
NVCC 023330	Nevada Department of Transportation	Mineral Material Site	007
NVCC 022622	Nevada Department of Transportation	400-ft wide road - Darrough Hot Springs to Jct US 50 – SR 376	007, 027, 030, 035, 040
N-63200	Nevada Bell dba AT&T Nevada	20-ft wide, underground fiber optic	007, 030, 035, 040
N-46509	Sierra Pacific dba NV Energy	25-ft wide, 24.9 kV distribution line; Kingston Smoky Valley Powerline	007, 030
N-39908	Nevada Bell dba AT&T Nevada	10-ft wide, underground Round Mtn to Kingston Canyon telephone line	007, 030
N-48809	Sierra Pacific dba NV Energy	25-ft wide, 24.9 kV distribution line	007, 030
N-25341	Sierra Pacific Power Company dba NV Energy	140-ft wide, 230 kV transmission line	008, 018, 019, 041, 042, 045, 047, 048, 050, 052, 053, 054, 055, 056, 062, 063
N-33014	Nevada State Division of Lands	Carey Act Application	015, 016
N-39410	BLM	DLE Area	015, 016
N-39525	USGS	Observation Wells	023, 056
N-05795	US Forest Service	24-ft wide road; Bowman Creek Road	030
N-50102	Sierra Pacific Power Company dba NV Energy	45-ft wide, 24.9 kV distribution line – Triple T Extension	030
N-56102	Sierra Pacific Power Company dba NV Energy	10-ft wide, 24.9 kV distribution line – Triple T	030
N-54887	Nevada Bell dba AT&T Nevada	NV Bell Microwave Site	030
N-61833	RO Livestock	Varied width RS 2339 Ditch; Bowman Creek	030

Table 3.4.12: A summary of the Rights-of-Way (ROWs) in the Lease Area

ROW Case File	ROW Holder	ROW Description	Affected Lease Parcel
N-65994	Gomes	20-ft wide access road	030
Nev 064382	Young Brothers	Varied width RS 2339 Ditch	034, 035, 036, 037, 038
Nev 064382	Ralph Young (Pending)	Varied width RS 2339 Ditch	034, 037, 038, 053, 054
N-34387	Nevada Bell dba AT&T Nevada	20-ft wide; 21.05 mile long Austin to Kingston Canyon telephone line	035, 040
N-51091	Ralph Young (Pending)	Varied width RS 2339 Ditch	036
N-93465	Young Brothers (Pending)	Agricultural Pivot	037
N-07219	US Forest Service	66-ft wide; 9.61 miles long; Pete's Summit Road	056, 064
N-52554	Lander County	66-ft wide; 9.61 miles long; Pete's Summit Road	063, 064
N-88009	Lander County	Mineral Material Pit (FUP)	056
N-41035	Foreland Refining & Asset Coporation	Site Type ROW for crude oil fractionation and refining	072
N-60244	BLM	Community Pit – Mineral Material	072
N-91869	Nye County Road Dept	Free Use Permit – Mineral Material	072
N-57821	Lone Mt Production	Free Use Permit – Mineral Material	072
N-85752	Makoil	30-ft wide; 6.727 miles long access road	072
N-88197	Breck Energy	16-ft wide; 6.539 miles long	072

Additionally, grants, leases and permits may be authorized prior to any proposals for exploration by an oil and gas lessee. In these instances, the holder of land use authorization would have a valid existing right to the authorized use of public lands within the lease.

Environmental Consequences

Leasing creates a valid existing right, which could conflict with other existing or future land use authorizations. These conflicts would be mitigated through agreements between relevant operators.

Applications for ROW's may be required for roads for oil and gas exploration and production activities. These off-lease ROW's would be non-exclusive where possible, that is, they can be used by the general public for other purposes such as access to public lands.

The Federal Land Policy and Management Act (FLPMA) requires that prior existing rights must be recognized. If parcels were developed in the future, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity. Impacts to existing ROW's may occur as a result of disturbance activities associated with potential exploration and development activities.

3.4.13. Visual Resources

Affected Environment

BLM Manual Series 8400 outlines the visual resource management (VRM) program. The BLM assigns VRM classes to public lands through the land use planning process. Lands are assigned a class ranging from one to four, with one containing the highest visual values and four containing the lowest values. Attempts are made to mitigate visual contrasts from surface-disturbing activities regardless of the VRM class assigned. The offered parcels have six parcels classified as Class III and the remaining parcels are Class IV.

Environmental Consequences

No direct impacts to visual resources on public lands would occur as a result of the oil and gas lease sale. However, there are certain potential indirect impacts that could occur from associated leasing activities, such as exploration and development. These indirect impacts may include, but are not limited to: contrast of line, shape, color, or texture due to the emplacement of roads, drill pads, drill rigs, tank batteries, temporary and long-term facilities and pump jacks.

The purchase of a parcel does not guarantee that a parcel will be developed for oil and gas resources in the future. Based on the RFD, oil and gas exploration or production activities are expected to disturb a total of 50-100 acres over a 10 year period. The majority of Nevada's leases expire without any development ever occurring on them. However, if parcels were developed in the future, site-specific visual resource mitigation measures and BMPs would be developed and attached as COAs for each proposed activity, which would be developed through site-specific NEPA analysis.

Potential methods to reduce impacts to visual resources on public lands include, but are not limited to: utilizing screening on any

proposed stationary lights and light plants, proposed lighting would be directed onto the pertinent site only and away from adjacent areas not in use with safety and proper lighting of the active work areas being the primary goal, proposed lighting fixtures would be hooded and shielded as appropriate, proposed lighting would be designed to reduce the impacts to night skies, moving drill site locations up to 200 meters, use of low profile tanks, coloring facilities and equipment, road alignment, reducing the size or changing the configuration of drill pads and utilizing topographic features to visually screen facilities. At the conclusion of activities related to oil and gas development, reclamation of the drill site would be required. Potential reclamation may include, but is not limited to: re-contouring drill pads, reclaiming roads, re-seeding drill sites and roads and the removal of equipment and facilities related to oil and gas development.

The utilization of the outlined mitigation and reclamation methods, as well as any others identified at the APD stage, have the potential to minimize impacts to visual resources on public lands to the greatest extent practicable.

3.4.14. Recreation

Affected Environment

The proposed lease parcels are all within dispersed recreation areas subject to public use. Dispersed recreation areas are areas that are used by recreationists as they desire. Activities including sightseeing, pleasure driving, rock collecting, photography, hunting, four-wheeling, hiking and bird watching occur in dispersed recreation areas. The lease area is used by the public for camping, hunting, hiking and other outdoor recreation activities.

Environmental Consequences

No direct impacts to recreation on public lands would occur as a result of the oil and gas lease sale. However, there are certain potential indirect impacts that could occur from associated leasing activities, such as exploration and development. The following are potential environmental impacts on recreation considering the RFD scenario.

During the exploration phase, survey and drilling crews are likely to use available access roads and trails that are also used for recreation access. The survey activities conducted during the exploration phase are likely to minimally impact recreation, if at all, due to the short duration, small crew size and temporal nature of the surveys and

drilling of wells as well as the dispersed nature of recreation activities in these areas.

Potential exploration activities may include construction of access roads and well pads. Increased truck traffic during this phase could affect recreation due to increased noise and dust levels and could cause temporary delays or closures on access roads. Construction sites are likely to have limited access to the public which could, in turn, slightly decrease access to the area for recreation.

The production stage may include operation and maintenance of the constructed facilities. These activities require a small number of employees who would utilize access roads in the area but are not likely to limit the recreational use of these roads. Oil and gas production facilities are likely to have limited access to the public; however, improved access to the area for recreation may be available because of the maintained access road to the production facility.

If parcels were developed in the future, site-specific mitigation measures and BMPs would be developed and attached as COAs for each proposed activity, which would be analyzed under their own site-specific NEPA analysis. Some parcels or portions of parcels were proposed for deferral based on existing or pending recreation conflicts such as: existing recreational facilities, areas proposed for extensive recreation areas or lands with wilderness characteristics being considered during the BMD Resource Management Plan Revision. Please refer to Appendix C for a list of recommended deferrals and rationales.

3.4.15. Socioeconomics

Affected Environment

The proposed lease parcels are located within three counties in Central Nevada: Eureka, Esmeralda, and Nye Counties. The primary economic activities that contribute to the economic base for lands within the lease area are mining, agriculture and recreation. All three counties offer rural lifestyles with less than 3 persons per square mile.

Eureka County

Eureka County is a rural county. The Eureka County economy is primarily dependent on ranching, agriculture, and mining (Eureka County 2011a). Demand for energy and precious metals has historically bolstered economic activity through the production of gold. Eureka County, at just under 2,000 people, has the second smallest population of any county in the state of Nevada. Population density as of 2010 was estimated at around 0.5 people per square mile and the median household income was \$61,472 as per 2005-2009 average.

Nye County

The majority of the proposed lease parcels are located within Nye County. Nye County's total population, according to the 2010 Census, is approximately 43,946 with a population density of 2.4 persons per square mile. The median household income is \$39,150 with 20.1 percent of the population living below the poverty level.

Environmental Consequences

The only direct impact of issuing new oil and gas leases on socioeconomics within the Assessment Area would be the generation of revenue from the sale of the leases as the State of Nevada retains 49 percent of the proceeds from lease sales. From March 2010 to July 2014 total revenue generated from both competitive and non-competitive oil and gas lease sales on the BMD was \$2,411,377.

Subsequent oil and gas exploration, development and production could create impacts to the county economy in terms of additional jobs, income and tax revenues. During the exploration phase, oil and gas companies typically provide in-house scientists and technicians to do the majority of this work. After initial surveys have been completed, road building and drill pad construction could occur as a result of oil and gas exploration and development activities. Road and drill pad construction could be contracted to local contractors. Wells would typically be drilled over a period of time and not at the same time. The exploration crews, ranging from 20 to 30 people, would spend portion of their salary (approximately \$200-\$250 per person per day) in the local community for the duration of the project (four to eight weeks).

During development and production phase, the potential for socioeconomic impacts within the Assessment Area could increase. More long-term roads and drill pads may be constructed, along with associated support facilities. Typically, the majority of this work is supplied by local contractors. Additionally, local businesses may realize increased revenue from the purchase of supplies, meals, rooms, etc. Local trucking and delivery companies may also benefit economically by transporting supplies, building materials and oil products. Oil production from federal lands is subject to a 12.5 percent royalty payment to the federal government. Fifty percent of that amount is provided to the state government which then provides a portion back to the counties.

These positive indirect impacts to socioeconomics within the Assessment Area from the proposed action based on above scenario could be minimal.

3.4.16. Wild Horse and Burros

Affected Environment

The Battle Mountain District administers 28 Herd Management Areas (HMAs) encompassing approximately 3.6 million acres of public land. Two other HMAs within the district boundary are administered by adjoining Districts. The BMD also cooperatively manages several United States Forest Service (USFS) Wild Horse or Burro Territories (WHTs and WBTs). The estimated BMD population as of January 1, 2015 is approximately 6,000 wild horses and 450 wild burros.

HMAs are areas identified in Land Use Planning for long term management of wild horses or burros and are designated "Special Management Areas". Many HMAs encompass mountain ranges and include mountain browse, meadow, mahogany and pinyon and juniper vegetation types interspersed with perennial streams and springs. Wild horses and burros also use sparsely vegetated, rocky terrain and habitat with limited water. Winter habitat typically consists of valley bottoms and lower elevations that may support winterfat or other salt desert shrub vegetation. Wild burros are able to thrive in more desert type conditions than wild horses. Wild horse and burro populations generally move throughout or between HMAs in response to a number of factors.

Wild horse and burro distribution throughout HMAs varies greatly throughout the year and is influenced by forage and water availability, as well as climatic factors such as precipitation and temperature. Demographic factors such as population size and resulting animal density (competition) also influence herd movement and distribution. Lastly, human presence causes disturbance due to OHV use, roads, mining, exploration, recreation and other uses that occur on the public lands.

Management of wild horses and burros involves periodic inventory activities, typically completed with helicopter, as well as on the ground monitoring of habitat, animal health and distribution. Burro populations may foal year round and may not increase at the same levels as wild horses. Throughout the BMD, populations typically increase by 10-22% annually. Appropriate Management Levels (AMLs) have been established for all HMAs administered by the BMD. When inventory and other data indicate that the AMLs have been exceeded, gathers are planned to reduce the populations within HMAs to the AML in order to prevent deterioration of the range associated with an overpopulation of wild horses or burros.

The Bureau of Land Management is responsible for the protection, management and control of wild horses and burros on public lands in accordance with the Wild Free-Roaming Horse and Burro Act of 1971

as amended (Public Law 92-195 Act) which states that BLM “shall manage wild free-roaming horses and burros in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands.”

The BLM is also mandated to manage wild horses and burros only within those areas where they were found at the time the WFRHBA was passed in 1971. Wild horses and burros cannot be relocated somewhere else within the District and new HMAs cannot be created for them. Nor is BLM allowed to expand the HMAs beyond the 1971 Herd Area boundaries to replace habitat lost.

The 2016 lease sale includes proposed parcels located within one HMA managed for wild burros. The following table provides an overview of the HMA involved.

HMA	Field Office	Acres	AML	Estimated Population
Hickison	Mount Lewis	57, 285	16–45	116 ^a

^aThe population shown includes both the Hickison Burro HMA and the USFS Hickison Wild Burro Territory.

Hickison HMA

The Hickison HMA is administered with the adjoining USFS Hickison Wild Burro Territory (WBT). The BLM managed Hickison HMA includes the Kingston and Simpson Park Allotments. The Hickison HMA/WBT is located approximately 12 miles east of the town of Austin in Lander County and covers an area that is approximately 26 miles long and averages about 10 miles wide. The Hickison HMA contains 57,285 acres of public lands. The USFS administered WBT is located east of the HMA, and covers a total of 52,570 acres of public land. The U.S. Highway 50 right-of-way fence separates the northern portion of the Hickison HMA from the southern portion. Approximately 19,000 acres of BLM managed land exists in the northern portion of the HMA and is unavailable to wild burro use. The HMA and WBT are managed for wild burros, and there are no wild horses known to inhabit the HMA or WBT south of U.S. Highway 50.

It is believed that burros utilize higher elevations in the USFS Hickison WBT predominantly in summer and move to lower elevations during the winter months. Inventory flights conducted since 2002 show that most of the observations made of the burros were within the WBT; however use within the HMA does occur, especially in the northern portion of the HMA, and near the Spencer Hot Springs.

Wild burros are distributed mainly throughout the eastern portion of the Hickison HMA near one of the limited sources of water available to wild burros. Spencer Hot Spring is the only water source available to wild burros in the BLM managed HMA. The abundance of tracks and trailing seen near the hot spring, in addition to inventory observations indicates concentrated and heavy use by burros in the area.

The vegetation communities in the Hickison Burro HMA are not highly productive and vegetation is sparse. Due to the limited nature of vegetation, the burros must move throughout the HMA and WBT to locate forage throughout the year. Due to the limited water sources in the Hickison HMA, there are only a few riparian areas. Overflow from the Spencer Hot Spring creates a 1.33 acre riparian meadow that provides forage for wild burros.

Parcels NV-16-06-062 through NV-16-06-064 are proposed for deferral due to their close proximity to Spencer Hot Springs, a critical source of water and forage for wild burros in the Hickison HMA. Wild burros frequently utilize this portion of the HMA due to its close proximity to water that is available year round and sizeable riparian meadow. The other thirteen proposed parcels identified within the HMA are not located within areas known to be heavily utilized by wild burros as derived through long term field monitoring and inventory flights.

Table 3.4.16.1: Hickison HMA Parcels

Parcel Number	Total Acres	Acres with HMA	Deferred
NV-16-06-042	1175	1062	NO
NV-16-06-043	2065	1366	NO
NV-16-06-044	1991	399	NO
NV-16-06-045	2560	887	NO
NV-16-06-048	2506	2502	NO
NV-16-06-049	1917	298	NO
NV-16-06-050	2517	1143	NO
NV-16-06-051	1797	1602	NO
NV-16-06-052	2525	1402	NO
NV-16-06-053	2299	1524	NO
NV-16-06-054	2501	1695	NO
NV-16-06-055	2550	1888	NO

NV-16-06-056	2526	149	NO
NV-16-06-61	1767	10	NO
Total Acres	30,696	15,927	

Environmental Consequences

Direct impacts to wild burros would not occur due to oil and gas leasing as no action would be implemented within the HMA. However, indirect and cumulative impacts could result from future exploration activities, well drilling and development/production. Should exploration or development be proposed within these leased areas, additional, site-specific NEPA analysis would be completed to assess the potential impacts to wild burros and their habitat.

The primary indirect impacts would include the influence to herd distribution and movement patterns throughout the HMA and disturbance to the forage resource.

Mining exploration activities are common throughout the BMD and oil and gas exploration activities would produce similar impacts to wild burros. Impacts to wild burros from exploration activities (drilling) could include displacement of burros due to increase human activity. These impacts would likely be short term in nature and would consist of wild burros moving out of the area or changing movement patterns do avoid noise possible noise disturbance and human presence. The degree of disturbance to wild burros would be equivalent to the levels of exploration/development and increased activity in the area.

Wild burros that commonly utilize a particular area that is subsequently developed for oil or gas production would be pressured to move from that portion of the HMA and no longer use it, thus changing their movement patterns. The magnitude of this change in movement would depend on the duration and extent of any future exploration.

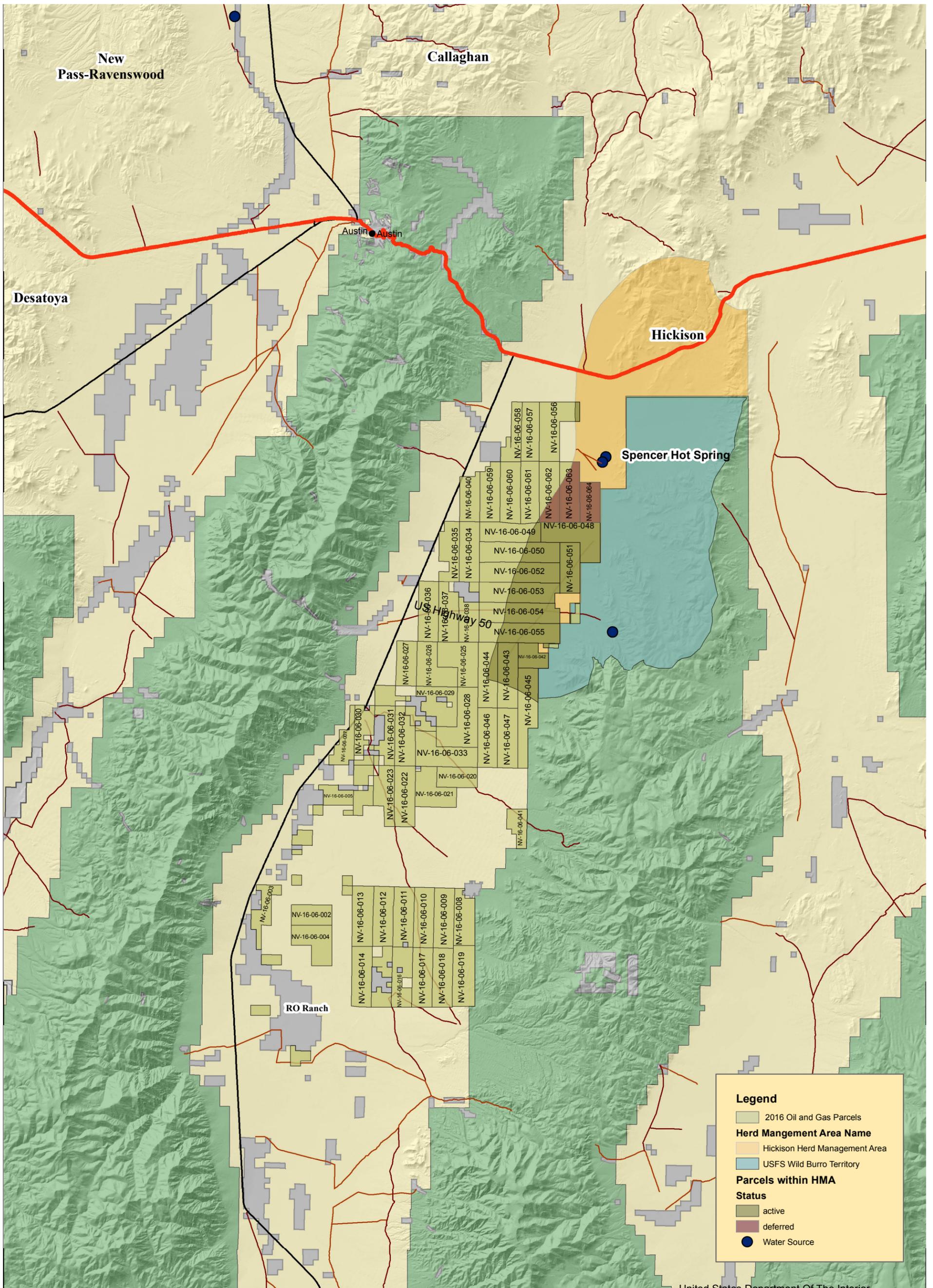
Should there be exploration implemented in the future as a result of the lease sale, localized and small scale vegetation disturbance or forage habitat fragmentation could occur due to seismic testing, road construction, overland travel and drill pad construction. These activities could result in construction of 1.5 acre drill pads, which could have short term impacts to the forage available at the location of a single well pad, or an estimated 5 acres for long term drill pads with multiple wells. Within the 38,300 acres of HMA south of U.S. Highway 50, five acres of disturbance would equate to just 0.013% of the HMA. Additionally, 4,234 acres of land surrounding the Spencer Hot Spring and riparian meadow have been recommended for deferral

to decrease potential future impacts to burros(Appendix C). However, if exploration were to occur, or parcels were developed in the future, site-specific mitigation measures would be attached as COAs for each proposed activity, which would be analyzed in a site-specific NEPA analysis, which would include involvement with the interested public.

There is no expected direct wild burro injury resulting from increased traffic or possible road construction in the HMA due to the proposed lease of parcels. There have been no documented injuries to wild horses or burros resulting from current and historic traffic patterns, and there are no documented burro traffic related injuries or fatalities within the area. If there is an increase in traffic due to possible future exploration and development, this may cause and increased risk.

On average, access roads for a single well would require on average 0.4 miles of additional road construction with a 23 foot maximum width. This could create an impact of less than 0.001% on the total proposed lease acres. Should parcels within the HMA be proposed for exploration or production, site specific NEPA would be completed, and site specific BMPs to minimize or prevent vehicular related issues.

Should the lease sale result in future exploration or development, the aforementioned increased vehicle traffic, road construction, noise pollution and human presence could cause the wild burros to use the developed area less and use other areas within the HMA more due to changed distribution. This could result in increased vegetation utilization and degradation in previously unused areas of the HMA. The impact of no action and the proposed action will be the same until possible future developments are analyzed.



Legend

- 2016 Oil and Gas Parcels
- Herd Mangement Area Name**
- Hickison Herd Management Area
- USFS Wild Burro Territory
- Parcels within HMA**
- Status**
- active
- deferred
- Water Source

United States Department Of The Interior

Bureau of Land Management
 Battle Mountain District Office
 50 Bastian Road
 Battle Mountain NV, 89820



Map Date: December 14, 2015

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.



Map 4.1.16 Battle Mountain District 2016 Oil and Gas Lease Sale Wild Burro Deferrals

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3.4.17. Forestry and Woodland Products

Affected Environment

The lease area contains alluvial fans, foothills and valley bottoms which support mostly shrub and herbaceous species, and also consists of a large portion of barren or sparsely vegetated areas as well. As such there are no forestry or woodland concerns with the parcels in question. The exception is the potential for riparian associated species such as cottonwood and willows. Several seeps, springs, and drainages can be found in within parcel boundaries, within which the potential for impacts to riparian woodland species exists.

Cottonwood

Cottonwoods (*Populus* spp.) are deciduous hardwood poplars belonging to the willow family. They are found naturally in riparian areas along stream banks, on the periphery of springs and ponds and planted in agricultural areas within the lease area. These native cottonwoods rapidly grow to heights of greater than 80 feet, with girths up to five feet and are relatively short-lived (i.e., 150 years). Unlike their aspen cousins, they can regenerate both from sprouting and seed. These species can also be propagated by transplanting suckers or small limbs. Currently, the BMD protects the trees from any type of harvesting, including deadwood.

Willow

Willows (*Salix* spp.) are hardwood members of the Salicaceae family with deciduous foliage and affinities for riparian habitats with high water tables. Ranging in height from ten to 40 feet, there are more individual species of willow than any other hardwood found in the Assessment Area. Like their poplar relatives, they require relatively large, consistent amounts of water to thrive and regenerate. They are not legally harvested in the Battle Mountain District. In the Assessment Area, willows can be found in monotypic communities or associated with other riparian vegetation such as sedge, rush and poplars.

Environmental Consequences

Impacts associated with exploration, development and production could have impacts on riparian vegetation (e.g., cottonwoods and willows). Oil and gas exploration would utilize off-road vehicles and equipment for exploration. This equipment could include four-wheel drive trucks as well as larger and heavier wheeled vehicles. Damage to woodland species such cottonwood and willow could result from the contact of such equipment with individual plants. Based on the history of oil and gas exploration in the BMD, it is likely that the majority of exploration and development efforts would be focused on

the lower elevation alluvial fans and playas. If parcels were developed in the future, site-specific mitigation measures and BMPs would be attached as COAs for each proposed activity, which would be analyzed under their own site-specific NEPA analysis.

Chapter Four: Cumulative Impact Analysis

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The Proposed Action has been examined for cumulative effects to the Assessment Area and the surroundings. Cumulative impacts are those effects on resources within an area or region caused by a combination of past, present and reasonable foreseeable future actions (RFFA's). These impacts may be individually minor but added together over time may become significant (40 CFR 1508.7).

The cumulative effect study area (CESA) for this EA encompasses the entire BMD (Figure 6). Oil and gas leases are leased for a 10-year time period; therefore, the same timeframe was selected for the cumulative effect study analysis.

The term "mitigation" used in the following sections refers to resource protection measures that could be used when actual leases are developed subsequent to this lease sale.

4.1. Past and Present Actions

Land-use authorization; like new road, powerline and pipeline ROW's and renewal of existing ROW's associated with oil and gas production and grazing can be expected in the future.

Historical oil and gas lease sales have included hundreds of parcels in the CESA where expressions of interest were submitted by prospective lessees. Between 20 and 50 percent of the parcels have typically been sold during and the day after the lease sales. There are currently 32 oil producing leases within the BMD. Since 2001, there have been 14 oil and gas well permits issued in the CESA. BMDO typically authorizes fewer than 4 APD's per year and 1-2 geophysical exploration permits every decade, most of which are in Nye County.

The oil and gas program consist mainly of speculative leasing and the drilling of wildcat wells in and around existing oil fields in the Railroad Valley. Three wildcat wells have been drilled since 2009. All three have been plugged and abandoned.

Livestock grazing has been authorized in the past and is currently authorized. In the CESA there are approximately 10.5 million acres of land under 94 grazing allotments

4.2. Reasonably Foreseeable Future Actions (RFFA's)

The Proposed Action does not include exploration, development, production, or final reclamation of oil and gas resources; however, authorization of oil and gas leasing does convey a right to subsequent exploration and production activities. These indirect activities are associated with oil and gas leasing; therefore, they are analyzed as part of the Proposed Action.

As noted in the Draft Tonopah Resource Management Plan and Environmental Impact Statement (June, 1993), the extremely complex geologic structure of the area has limited the success rate of wells. The 2006 and 2008 Environmental Assessments for Oil and Gas Leasing Within Portions of the Shoshone-Eureka Assessment Area outlined minimal Oil and Gas activity within the respective Assessment Area.

The RMP projections for oil and gas exploration and development in the Assessment Area (see p. 14 of this EA) appear to have been somewhat overestimated; however, modest amounts of oil and gas exploration are expected to continue in the BMD over the next ten years even with the current technological advances in HF. Geophysical surveys may be conducted prior to any exploratory drilling. Surface disturbance associated with geophysical surveys are usually minimal. An APD may then be submitted for a wildcat well in the CESA, or a production well within an existing field. A site-specific NEPA document would be prepared prior to approval of any application to conduct surface disturbing activities.

Within the BMD, the most recently discovered oil field, Sans Spring, was discovered in 1993. There have been no new discoveries within the BMD in over 20 years. Based on oil and gas exploration/production well history within the BMD, it is unlikely that another oil field would be expected to be developed within the next ten years. As previously outlined in the RFD, it is anticipated that surface disturbance associated with oil and gas exploration, production, and development within the BMD would be approximately 50-100 acres.

Other RFFAs would include activities such as, geothermal exploration, geothermal development, wind power construction, livestock grazing, off-highway vehicle use, mineral exploration, mining, recreation (hunting, mountain biking, geo-caching), withdrawal of water for irrigation (agriculture) and mining, gravel pit development and production, communication site construction, road building, powerline construction, wild horse gathers, noxious weed treatment, fire suppression and rehabilitation, construction of wildlife habitat improvement projects, realty actions, and fence construction.

4.3. Cumulative Impacts Evaluation

4.3.1. Cumulative Impacts on Air Quality

Past, continued, proposed and foreseeable road, power line and pipeline construction, minerals exploration and recreation all create air quality impacts. Increased volumes of carbon dioxide, carbon monoxide and particulates have been and would be caused by vehicle exhaust, disturbing the soil cover from additional travel on existing dirt roads and the construction of new access roads and well pads and additional drilling.

Geophysical exploration has in the past and would in the foreseeable future cause very little impact to air quality because the exploration equipment would be in the area for a very short time (typically less than a week) and little or no additional surface disturbance would be created to disturb the soil.

Activities associated with drilling oil wells typically last a few months and the potential to increase particulate matter from multiple trips is mitigated by placing gravel on the access roads and protecting the soil. As outlined in the environmental consequences section, these localized, temporary impacts are not expected to significantly affect air quality in the area or exceed air quality standards.

Mitigation

The BLM encourages industry to incorporate and implement BMPs to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. In accordance with a recent BLM Memorandum of Understanding (MOU) regarding air quality analysis and mitigation; BLM would coordinate with the EPA early in the APD process to determine how best to model and mitigate for impacts to air quality. Measures may also be required as COAs on permits by either the BLM or the applicable state air quality regulatory agency. The BLM also manages venting and flaring of gas from federal wells as described in the provisions of Notice to Lessees (NTL) 4A, Royalty or Compensation for Oil and Gas Lost. Some of the following measures could be imposed at the development stage:

- Flaring or incinerating hydrocarbon gases at high temperatures to reduce emissions of incomplete combustion;
- Emission control equipment of a minimum 95 percent efficiency on all condensate storage batteries;
- Emission control equipment of a minimum 95 percent efficiency on dehydration units, pneumatic pumps, produced water tanks;
- Vapor recovery systems where petroleum liquids are stored;
- Tier II or Greater, natural gas or electric drill rig engines;
- Secondary controls on drill rig engines;
- No-bleed pneumatic controllers (most effective and cost effective technologies available for reducing VOCs);
- Gas or electric turbines rather than internal combustion engines for compressors;
- NOx emission controls for all new and replaced internal combustion oil and gas field engines;

- Water dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- Interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.
- Co-located wells and production facilities to reduce new surface disturbance;
- Directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- Gas-fired or electrified pump jack engines;
- Velocity tubing strings;
- Cleaner technologies on completion activities (i.e. green completions), and other ancillary sources;
- Centralized tank batteries and multi-phase gathering systems to reduce truck traffic;
- Forward looking infrared (FLIR) technology to detect fugitive emissions; and
- Air monitoring for NOx and ozone.

Site-specific mitigation measures will be analyzed, along with other impacts, on a parcel-by-parcel basis upon approval of exploration and/or development.

4.3.2. Cumulative Impacts on Cultural and Paleontological Resources

Cumulative Effects to Cultural Resources

Several ongoing and potential actions in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact cultural resources. The majority of parcels nominated for the 2016 Oil & Gas Lease Sale have not been inventoried for cultural resources; therefore, the types of resources that may be present in any particular area within parcels is unknown. A cumulative effects study area (CESA) cannot be defined until the presence of such resources is known. A Class III cultural resources inventory would be required prior to development within parcels; once an inventory is completed

the geographic and temporal scope for analysis would be defined, followed by an analysis to determine what, if any, impacts there would be to cultural resources resulting from past, present, or reasonably-foreseeable actions within the CESA.

The 2016 Oil & Gas Lease Sale does not authorize any ground disturbance and therefore has no direct effect to cultural resources; however, the reasonably foreseeable role of oil and gas exploration and development could cumulatively result in adverse effects to cultural resources. Appropriate mitigation, BMPs, and COAs would be implemented to resolve any adverse effects to historic properties.

Cumulative Effects to Paleontological Resources

Several ongoing and potential actions in the area, such as mining, mineral and geothermal exploration, off-highway vehicle use, and livestock grazing, have the potential to cumulatively impact paleontological resources.

The geographic scope or extent for paleontological resources is generally the geographic formation in question. None of the parcels identified for the 2016 Oil & Gas Lease Sale have been surveyed to determine the boundaries and geographic extent of fossil resources or any paleontological localities. Parcels identified as having low potential for containing significant paleontological resources would not be subject to cumulative effects; however, BMPs and COAs would apply in the event a significant paleontological resource were encountered as a result of any ground-disturbing oil and gas exploration or development activities. Parcels identified as having moderate to high potential for containing significant paleontological resources may require a field determination to map locations of any vertebrate fossils or any scientifically significant fossils; once mapped, the geographic and temporal scope for paleontological resources can be defined, followed by an analysis to determine what, if any, impacts there would be to paleontological resources resulting from past, present, or reasonably-foreseeable actions within the CESA.

It is expected that the proposed action may contribute to cumulative impacts, through the reasonably foreseeable role of oil and gas exploration and development; however, with implementation of appropriate mitigation, BMPs, and the COAs, impacts to significant paleontological resources may be avoided.

Mitigation

Avoidance through project redesign is the preferred method of eliminating adverse effects to historic properties and paleontological resources; however, when avoidance is not feasible, measures may be implemented to mitigate impacts. Examples of mitigation, BMPs, and the COAs for cultural

resources may include additional studies, data recovery, and stabilization of historic structures.

Site-specific mitigation measures will be analyzed, along with other impacts, on a parcel-by-parcel basis upon approval of exploration and/or development.

4.3.3. Cumulative Impacts on Native American Cultural Concerns

Fluid mineral leasing and exploration may affect sites and associated activities of a cultural, traditional and spiritual nature. Presently, impacts to many cultural, traditional, spiritual sites and associated activities have been avoided through Native American consultation efforts. Only the potential impacts to tribal resources were analyzed in this EA because it evaluates the leasing of oil and gas proposed parcels and does not analyze areas of proposed surface disturbance where impacts might be expected. In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P. L.94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L.101-601) and Executive Order 13007, the BLM must also provide affected tribes an opportunity to comment and consult on proposed actions. BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities, and resources. As stated above, if, as a result of leasing, a ground disturbing plan to explore or develop is submitted to BLM, all applicable laws, regulations, directives, SOPs, and stipulations and limitations would apply.

BLM would work with the operator to mitigate effects to traditional/cultural or religious sites on activities associated with any surface occupancy that results from oil and gas, leasing. Consequently, the BLM must take steps to identify locations having traditional/cultural or religious values to Native Americans and insure that its actions do not unduly or unnecessarily burden the pursuit of traditional religion or traditional values.

4.3.4. Cumulative Impacts on Wildlife Resources

Disturbance and fragmentation of wildlife habitat, including oil and gas development, may impact wildlife species by displacement, or temporarily or permanently altering habitat. In turn, habitat loss and displacement can have negative impacts on wildlife populations. For example, reduced habitat availability can increase competition,

particularly if preferred habitats are limited or near carrying capacity. In these cases, an overall reduction in population size is expected, which is of particular concern for small or isolated populations. A number of other ongoing projects and future activities in the offered parcels, such as locatable mineral exploration, off-highway vehicle use and livestock grazing could cumulatively impact wildlife.

These activities could result in loss of habitat, habitat fragmentation and disruption of movement patterns. It is expected that the proposed action may contribute to cumulative impacts if exploration and development of the lease parcels is authorized in the future. However, as outlined in the RFD, the reasonably foreseeable role of oil and gas exploration and development in overall impacts within the offered parcels is low (50-100 acres of overall surface disturbance over a ten year period). Combined with the low disturbance potential and with the implementation of site-specific COAs, BMPs and mitigation measures, potential impacts of oil and gas exploration and development are anticipated to be negligible. Please see Appendix B for a list of wildlife stipulations and notices that would be applied to the offered parcels. In addition, several parcels were proposed for deferral that contain important habitat for SSS fish, Greater Sage-Grouse, and riparian dependent species (Appendix C).

4.3.5. Cumulative Impacts on Water Quality (Surface and Ground) and Quantity

The Proposed Action would not result in any direct incremental increase in cumulative impacts to water resources, but subsequent oil and gas development would likely increase impacts as described above in the Proposed Action section. Specifically, potential exploration and development would likely result in additional water diversion; surface water quality could be affected by development. The incremental increase in these impacts is small when compared to the level of impacts that already exist in the sub-basins as described above in the Affected Environment section. With the relatively small amount of surface disturbance associated with the RFD and through the implementation of site-specific mitigation measures, COAs, and BMPs, the incremental cumulative impacts on water quality and quantity, in combination with past and present actions and RFFAs, would not be significant. This has been confirmed from past experience.

Mitigation

Protection of water resources would be accomplished through implementation of best management practices along with specific restrictions that may be applied to individual parcels. COAs may be

applied to mitigate any known environmental or resource conflicts that may occur on a given lease parcel. For example, lessees may be required to locate facilities a distance of 400 feet from streams or off of the 24-hr 100-year floodplain. These restrictions would be implemented on an individual lease basis and would be required as a as COAs for exploration and/or development.

Site-specific mitigation measures will be analyzed, along with other impacts, on a lease-by-lease basis upon approval of exploration and/or development.

4.3.6. Cumulative Impacts on Wastes, Hazardous and Solid

Other major hazardous and solid waste generating activities include mineral exploration, mining, and geothermal exploration. When these activities are combined with the small acreage of oil and gas activity disturbance identified in the RFD (50-100 acres), as well as any mitigation developed during site-specific analysis for oil and gas exploration and development, the cumulative impacts would be negligible. Additionally, federal and state governments specifically regulate each project to ensure that there are no releases of hazardous materials into the environment.

4.3.7. Cumulative Impacts on Noxious Weeds and Invasive, Non-native Species

The Proposed Action would not result in any direct incremental increase in cumulative impacts to native plant communities from the introduction and establishment of noxious weeds, invasive and non-native species, but subsequent oil and gas exploration and development activities would likely increase the impacts as described in the Proposed Action. Specifically, potential exploration and development would increase surface-disturbing activities that remove vegetation, compact soil, increase erosion and sediment yield, may result in fragmented native plant communities and increase competition from noxious weeds, invasive and non-native species. With the relatively small amount of surface disturbance associated with the RFD and through the implementation of site-specific mitigation measures, BMPs, and COAs, the incremental cumulative impacts for noxious weeds, invasive and non-native species, in combination with past and present actions and RFFAs, would not be significant.

4.3.8. Cumulative Impacts on Geology and Minerals

A number of other ongoing activities such as mining, mineral exploration, geothermal exploration and production, sand and gravel pit development, could cumulatively impact mineral resources within the BMD. These impacts include conflicts between exploration and development of minerals resources and loss of access to mineral resources. However, based on the small scale of expected disturbance from oil and gas-related activities outlined in the RFD (50-100 acres), the cumulative impact to minerals and geology is expected to be negligible. Impacts that may exist could be mitigated by negotiations between operators.

4.3.9. Cumulative Impacts on Soils

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wild fires, fire rehabilitation and range improvement projects. The creation of new roads, construction of drill pads and the development of wells and mines removes available vegetation and increases the susceptibility of soil erosion and soil compaction and disturbs microbiotic crusts. However, the cumulative impacts of oil and gas exploration and development on soils are expected to be minimal due to the relatively small area of disturbance (50-100 acres), concurrent reclamation, and the development of site-specific mitigation and BMPs.

4.3.10. Cumulative Impacts on Vegetation

The disturbance associated with potential oil and gas exploration and production would add to the disturbances from mining exploration, mine development, grazing management, wild fires, fire rehabilitation and range improvement projects. The creation of new roads, construction of drill pads and the development of wells and mines removes vegetation utilized by wildlife, livestock, wild horses and burros for forage and habitat. Disturbed areas would be more susceptible to wind and water erosion, soil compaction and invasion by invasive species. However, the cumulative impacts of oil and gas exploration and development are expected to be minimal due to the relatively small area of disturbance (50-100 acres), concurrent reclamation, and the development of site-specific mitigation and BMPs

4.3.11. Cumulative Impacts on Range Resources

The disturbance associated with oil and gas exploration and production would add to the disturbances from mining exploration, mining and off-highway vehicle use. The creation of new roads, construction of drill pads and the development of wells and mines removes available forage for wildlife, livestock, wild horses and burros. Reductions of available forage could have an impact on ranching operations. However, based on the RFD, the cumulative impacts of the proposed action on range resources are expected to be minimal due to the relatively small area of disturbance (50-100 acres), concurrent reclamation and developed site-specific mitigation.

4.3.12. Cumulative Impacts on Land and Realty

There is little appreciable potential for the Proposed Action to have substantial cumulative impacts from past, present and RFFAs to realty actions within the Assessment Area. Based on the RFD, only a small percentage of acres of constructed roads associated with exploration/development would potentially remain after 10 years. This small acreage, when combined with site-specific mitigation measures for exploration and development, indicates that the potential cumulative impacts from the Proposed Action are negligible and would not be significant.

4.3.13. Cumulative Impacts on Visual Resources

The cumulative impacts from past, present and future activities as previously outlined, remain low to moderate for visual resources due to the likelihood of large distances between actions and limited surface disturbance. Most of the future activities would be on valley floors. Visual resources are mitigated on a case-by-case basis and many of the activities would be temporary in nature.

4.3.14. Cumulative Impacts on Recreation

Increased commercial developments would increase the population of the area, which would in turn create an increase in all recreational activities such as visits to WSAs, hunting and off-highway vehicle use in the Assessment Area. Given that many recreational activities are dependent upon a high quality visual/aesthetic environment, commercial developments, including fluid mineral development, has the potential to lower the quality of recreational experiences in the

Assessment Area. However, given the RFD scenario for fluid minerals along with other existing and foreseeable developments and any mitigation measures developed during site-specific analysis in the Assessment Area, it is not anticipated that the quality of recreational experiences would be significantly reduced.

4.3.15. Cumulative Impacts on Socioeconomics

Specific information regarding the timing, duration, and level of employment is not available for other RFFAs that may occur within the CESA, precluding a comprehensive analysis of potential cumulative socioeconomic impacts. As stated earlier, site-specific analysis for exploration and development would be required prior to implementation and a more thorough examination of socioeconomics would be done at that time. The Proposed Action does not: Induce substantial growth or concentration of population, displace a large number of people, cause a substantial reduction in employment, reduce wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services. In the volatile economy of the foreseeable future, it is expected that the cumulative and incremental socioeconomic effects of the proposed action, would be beneficial and not significant.

4.3.16. Cumulative Impacts on Wild Horses and Burros

Cumulative impacts to wild horses from oil and gas leasing would consist of the impacts occurring as a result of exploration and production which could occur in lease areas associated with the RFD. The CESA for wild horse and burro management would include the HMAs in which the leases are located as well as those HMAs adjoining the affected HMAs.

Past, present and reasonably foreseeable projects that have had and could continue to have impacts to wild horses include mining exploration, geothermal exploration, oil and gas exploration, power line construction, wild land urban interface activities, wild horse gathers, communication site construction and noxious weed treatment. These activities have the result of isolated and usually limited soil and vegetation disturbance or loss.

Two primary impacts to wild horses were considered that could occur from oil and gas exploration and development – increased fragmentation of wild horse habitat and cumulative increases in

vegetation and soil disturbances, which result in incremental losses in availability of quality habitat used for wild horses.

Oil and gas exploration could involve overland travel, road construction, seismic testing and drilling which could cause surface disturbance. Increased vehicular traffic could affect wild horses due to increased noise and dust levels. Over time, the areas of disturbance would cumulatively increase and impact the quality and quantity of habitat available to wild horses, as well as increase risks for erosion and noxious weed invasion.

Mining activity, oil and gas production, geothermal development, gravel pit expansion, road building, fencing and wild horse gathers, are all activities, which can impact wild horse distribution and seasonal movement throughout and between HMAs. Each activity could result in incremental restrictions to free roaming behavior of wild horses and over time may influence utilization patterns, genetic interchange and use of water sources.

According to the Trends and Projections Scenario described in Section 2.4.1, it is unlikely that large areas of disturbance would occur within the parcels offered for lease within wild horse HMAs and therefore the effects are anticipated to be minimal.

Exploration and production activities would be analyzed on a site specific basis. Effects of potential proposed actions to wild horse populations in the HMAs would be analyzed and mitigation measures developed to avoid or reduce impacts, or COAs would be implemented to protect the long term health of wild horses, such as the examples shown below:

- To protect wild horses and wildlife flag all new fences every 16 feet with white flagging that is at least 1 inch wide and has at least 12 inches hanging free from the top wire of the fence.
- If a project involves heavy or sustained traffic, require road signs for safety and protection of wild horses and wildlife.

4.3.17. Cumulative Impacts on Forestry and Woodland Products

A number of past, present and RFFAs in the area such as mining, mineral and geothermal exploration, off-highway vehicle use and livestock grazing could contribute to cumulative impacts. Based on the RFD, foreseeable impacts could result in the construction of a number of drilling sites, production facilities and transportation corridors. The long-term change in

vegetation and associated potential loss of woodland productivity (cottonwood and willow) would not likely result in substantial impacts since the Assessment Area contains no woodlands and only small isolated patches of riparian areas. To mitigate any potential impacts, it is recommended that the majority of exploration and development efforts be focused outside and away from riparian vegetation. Based on the RFD and when considering site-specific mitigation measures that would be developed for potential exploration and development, cumulative impacts to forest and woodland resources would be minimal.

Mitigation

Measures to reduce potential impacts as a result of leasing activities on forest resources would include avoiding the removal of trees. Best management practices along with specific restrictions would be implemented to minimize negative impacts to forest resources. Site specific mitigation would be developed to minimize or avoid potential impacts to any woodland resources present.

Site-specific mitigation measures will be analyzed, along with other impacts, on a parcel-by-parcel basis upon approval of exploration and/or development.

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Chapter Five: Consultation and Coordination

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5.1 Tribes and Agencies Contacted

Duckwater Shoshone Tribe

Yomba Shoshone Tribe

Nevada Department of Wildlife (NDOW)

State of Nevada Clearinghouse

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Chapter Six: List of Preparers

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6.1. List of Preparers

Andrea Dolbear, Mount Lewis Field Office, Project Manager, Planning and Environmental Coordinator

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William O'Neill, Mount Lewis Field Office, Wildlife Biologist

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Chapter Seven: References

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- Anna L.O., Roberts L.N.R., Potter C.J. 2007. *Geologic Assessment of Undiscovered Oil and Gas in the Paleozoic–Tertiary Composite Total Petroleum System of the Eastern Great Basin, Nevada and Utah.* , in Geological Assessment of Undiscovered Oil and Gas Resources of the Eastern Great Basin Province, Nevada, Utah, Idaho, and Arizona, p 55. U.S. Geological Survey Digital Data Series DDS–69–L
- Belcher, W.R., ed., 2004, Death Valley regional ground-water flow system, Nevada and California --hydrogeologic framework and transient ground-water flow model: U.S. Geological Survey Scientific Investigations Report: 2004
- Bureau of Land Management (BLM). 1986, *Visual Resource Inventory*. BLM Manual Handbook H-8410-1.
- BLM. 1988. *National Environmental Policy Act*. BLM Manual Handbook H-1790-1.
- BLM. 1993. *Draft Tonopah Resources Management Plan and Environmental Impact Statement*, BLM, Battle Mountain District, Tonopah Field Office.
- BLM. 1994. *Proposed Tonopah Resource Management Plan and Final Environmental Impact Statement*, Battle Mountain District, Tonopah Field Office.
- BLM. 1997. *Tonopah Resource Management Plan and Record of Decision*, Battle Mountain District, Tonopah Field Office.
- BLM. 2013. *Oil and Gas Leasing within Portions of the Shoshone-Eureka Assessment Area*, Battle Mountain District, BLM, Environmental Assessment NV063-EA06-092,
- BLM. 2014. "Land and Mineral Legacy Rehost 2000 System- LR2000" *BLM Nevada*. <http://www.blm.gov/lr2000/>.
- BLM. 2015. "BLM Nevada's War Against Weeds" *BLM Nevada* http://www.blm.gov/nv/st/en/prog/more_programs/invasive_species.print.html
- BLM. 2015. "Oil and Gas" *Nevada BLM*, http://www.blm.gov/nv/st/en/prog/minerals/leasable_minerals/oil_____gas.html
- BLM and United States Department of Agriculture (USDA). 2006. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, The Gold Book: Fourth Edition, 76 p.
- Bureau of Land Management and USDA, 2012. Final Mineral Assessment Report for the Battle Mountain District Resource Management Plan: http://www.blm.gov/nv/st/en/fo/battle_mountain_field.html
- Buqo, Thomas S. 2009. Nye County Water Resources Plan, prepared for Nye County Department of Natural Resources and Federal Facilities, August 2004, 120 pp.
- CFBD & SC v. BLM & Salazar. 2013. United States District Court Northern District of California San Jose Division: Center for Biological Diversity and Sierra Club v. The Bureau of Land Management and Ken Salazar, Secretary of the Department of Interior, Case No.: C 11-06174 PSG, March 31, 2013.
- Committee on Energy and Commerce. (2011). United States House of Representatives Committee on Energy and Commerce: Chemicals Used in Hydraulic Fracturing. Retrieved 2015, from <http://democrats.energycommerce.house.gov/sites/default/files/documents/Hydraulic-Fracturing->

Chemicals-2011-4-18.pdf.

EPA. (2002). Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations. Retrieved 2015, from <http://www.epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf>.

http://www.blm.gov/nv/st/en/prog/more_programs/invasive_species.print.html

Jenner, S. & Lamadrid, A.J. (2013). Shale Gas vs. Coal: Policy Implications from Environment Impact Comparisons of Shale Gas, Conventional Gas, and Coal on Air, Water, and Land in the United States. *Energy Policy* 53:442-453.

Kharaka, Y.K., Thorsden, J.J., Conaway, C.H. & Thomas, R. B. (2013). The Energy-Water Nexus: Potential Groundwater-Quality Degradation Associated with Production of Shale Gas. *Procedia Earth and Planetary Science* 7:417-422.

Natural Resources Conservation Service. (2013). Web Soil Survey. Retrieved 2015, from <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Nevada Bureau of Mines and Geology. (2015). The Nevada Mineral Industry Annual Report. Retrieved 2015, from <http://www.nbmjg.unr.edu/>

Nevada Bureau of Mines and Geology. (2010). Earthquakes Magnitude Scale and Classes. Retrieved 2015, from: https://gisweb.unr.edu/flexviewers/quaternary_faults/

Nevada Commission on Mineral Resources, Division of Minerals. (2009). Oil, Gas and Geothermal. Retrieved 2015, from <http://minerals.nv.gov/Programs/Programs/>

Nevada Department of Conservation and Natural Resources. 2015. Nevada Water Law 101. From: <http://dcnr.nv.gov/documents/documents/nevada-water-law-101/>. On December 4, 2015.

Nevada Natural Heritage Program. (2010). Endangered, Threatened, Candidate and/or at Risk Taxa recorded on or near the Railroad Valley Area. Nevada Department of Conservation and Natural Resources. Carson City, Nevada.

Nevada Water Law (2013). State of Nevada Division of Water Resources. Retrieved 2015, from <http://water.nv.gov/waterrights/waterlaw/>.

Paschke, S. (2011). USGS, Denver, Colorado. September 2011. Railroad Valley, From Wikipedia, http://en.wikipedia.org/wiki/Railroad_Valley.

Rush, F. E., 1966. Water-Resources Appraisal of Little Fish Lake, Hot Creek and Little Smoky Valleys, Nevada-Reconnaissance Series, Report 38, State of Nevada, Department of Conservation and Natural Resources Water Resource.

Schalla, R. A., & Johnson, E. H. 1994. Oil Fields of The Great Basin, Nevada petroleum Society, Reno, Nevada.

State of Nevada Division of Water Resources. 2015. Underground Active Basin Summaries. From: <http://water.nv.gov/data/underground/>. On December 4, 2015.

Swackhamer, Deborah. 2013. Potential Impacts of Hydraulic Fracturing on Water Resources. In C. Coussens and R. M. Martinez (eds.), *Health Impact Assessment of Shale Gas Extraction: Workshop Summary*. Washington D.C., National Academies Press, pp. 61-69.

United States Geological Survey (USGS). 2007. Water Resources of the Basin and Range Carbonate-Rock Aquifer System, White Pine County, Nevada and Adjacent Areas in Nevada and Utah. Welch, Alan H., Bright, Daniel J. and Knochenmus, Lari A., Editors. U.S. Geological Survey, Scientific Investigations Report 2007-5261. From: <http://pubs.usgs.gov/sir/2007/5261/>. On December 4, 2015.

Urbina, I. 2011. Records Show Risks to Water in New Gas Drilling Method, New York Times News Service, Retrieved 2015, from <http://www.bendbulletin.com/article/20110227/NEWS0107/102270382/>.

U.S. Department of the Interior and USDA. 2006. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST- 06/021+3071. Bureau of Land Management. Denver, Colorado. 84 pp.

Van Denburgh, A. S. & Rush, F. E. 1974. Water Resources Appraisal of Railroad and Penoyer Valleys, East-Central Nevada- Reconnaissance Series, Report 60, State of Nevada, Department of Conservation and Natural Resources Water Resource.

Welch, A. H., Bright, D. J. & Knochenmus, L.A. 2007. USGS Publication, Water Resources of the Basin and Range Carbonate-Rock Aquifer System, White Pine County, Nevada and Adjacent Areas in Nevada and Utah, 2007

Western Regional Climate Center. 2015a. Battle Mtn, Nevada (260688): Period of Record Monthly Climate Summary. From: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nv0688>. On December 4, 2015.

Western Regional Climate Center. 2015b. Tonopah, Nevada (268160): Period of Record Monthly Climate Summary. From: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nvtonp>. On December 4, 2015.

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Appendices

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APPENDIX A: LIST OF PARCELS OFFERED FOR SALE IN THE JUNE 2016 OIL AND GAS LEASE SALE

NV-16-06-001 764.960 Acres

T.0120N, R.0430E, 21 MDM, NV

Sec. 005 LOTS 1-4;

005 S2N2;

015 S2NE,NWNW,S2NW,SW,N2SE;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-002 1440.000 Acres

T.0130N, R.0430E, 21 MDM, NV

Sec. 001 LOTS 1,2;

001 S2NE;

010 ALL;

011 ALL;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-003 1657.940 Acres

T.0130N, R.0430E, 21 MDM, NV

Sec. 004 LOTS 3,4;

004 S2NW;

005 LOTS 1-3;

005 S2NE,SE;

008 NE,S2NW,S2;

017 E2W2,NWNW;

020 NENW,SE;

021 SW;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-004 1920.000 Acres

T.0130N, R.0430E, 21 MDM, NV

Sec. 014 ALL;

015 ALL;

023 ALL;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-007 1240.000 Acres
T.0150N, R.0430E, 21 MDM, NV
Sec. 024 E2E2;
025 S2NE,NENE,SENE,E2SW,SE;
035 E2SE;
036 N2,SW,N2SE,SWSE;
Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-008 1670.080 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 001 LOTS 7-11;
001 W2SENE,E2SW,S2NWSE,SWSE;
001 SESE,S2NESE;
012 LOTS 1-4;
012 E2,E2W2;
013 LOTS 1-6;
013 E2,E2W2;
Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-009 1915.680 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 002 LOTS 1-4;
002 S2N2,S2;
011 ALL;
014 ALL;
Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-010 1916.480 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 003 LOTS 1-4;
003 S2N2,S2;
010 ALL;
015 ALL;
Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-017 1885.880 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 022 ALL;
027 ALL;
034 LOTS 1-16;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-018 1871.820 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 023 ALL;
026 ALL;
035 LOTS 1-16;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-019 2115.440 Acres
T.0130N, R.0440E, 21 MDM, NV
Sec. 024 LOTS 1-8;
024 NE,E2W2,SE;
025 LOTS 1-8;
025 NE,E2W2,SE;
036 LOTS 1-8;
036 NE,E2W2,SE;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-020 1286.260 Acres
T.0140N, R.0440E, 21 MDM, NV
Sec. 001 LOTS 1-4;
001 S2N2,S2;
002 LOTS 1-4;
002 S2N2,S2;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-021 1882.570 Acres
T.0140N, R.0440E, 21 MDM, NV
Sec. 003 LOTS 1-3;
003 S2N2,S2;
010 ALL;
011 ALL;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-022 1923.580 Acres
T.0140N, R.0440E, 21 MDM, NV
Sec. 004 LOTS 1-4;
004 S2N2,S2;

009 ALL;

016 ALL;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-023 1522.730 Acres

T.0140N, R.0440E, 21 MDM, NV

Sec. 005 LOTS 1-3;

005 S2NE, SENW, S2;

008 ALL;

017 E2;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-024 1191.770 Acres

T.0140N, R.0440E, 21 MDM, NV

Sec. 006 LOTS 1-7;

006 S2NE, SENW, S2SW, W2SE;

007 LOTS 2-4;

007 E2E2, SWNE, SENW, E2SW, W2SE;

018 LOTS 1,2;

018 E2NW;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-025 2213.820 Acres

T.0150N, R.0440E, 21 MDM, NV

Sec. 001 LOTS 1-8;

001 SW, SE;

002 LOTS 1-8;

002 SW, SE;

012 ALL;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-026 2068.640 Acres

T.0150N, R.0440E, 21 MDM, NV

Sec. 003 LOTS 1-8;

003 SW, SE;

010 ALL;

011 ALL;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-027 2549.020 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 004 LOTS 1-8;
004 SE,SW;
009 ALL;
016 N2SW;
017 ALL;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-030 1617.200 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 019 LOTS 1-4;
019 NENE,S2NE,E2W2,SE;
030 LOTS 1-4;
030 NE,E2W2,N2SE,SWSE;
031 LOTS 1,2,4;
031 NENE,E2NW,SESW,SE;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-031 1360.000 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 020 E2,NW;
029 E2,SESW;
032 E2,NWNW,E2NW,W2SW;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-032 1680.000 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 021 W2,W2SE;
028 ALL;
033 ALL;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-033 2400.000 Acres
T.0150N, R.0440E, 21 MDM, NV
Sec. 027 S2N2,S2;
034 ALL;
035 ALL;
036 ALL;

Nye County
Battle Mountain DO

Formerly Lease No.

NV-16-06-036 1920.000 Acres
T.0160N, R.0440E, 21 MDM, NV
Sec. 022 ALL;
027 ALL;
034 ALL;
Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-037 1760.000 Acres
T.0160N, R.0440E, 21 MDM, NV
Sec. 023 NW,S2;
026 ALL;
035 ALL;
Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-038 1480.000 Acres
T.0160N, R.0440E, 21 MDM, NV
Sec. 024 NE,SWSW;
025 ALL;
036 ALL;
Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-040 1520.000 Acres
T.0170N, R.0440E, 21 MDM, NV
Sec. 024 S2S2,E2SE;
025 ALL;
036 ALL;
Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-041 1000.000 Acres
T.0140N, R.0450E, 21 MDM, NV
Sec. 016 W2;
017 E2;
020 NENE;
021 NW;
021 PROT SW;
Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-042 1174.830 Acres

T.0150N, R.0450E, 21 MDM, NV

Sec. 003 LOTS 3-5,8;

003 SW;

004 LOTS 1-8;

004 S2;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-043 2065.340 Acres

T.0150N, R.0450E, 21 MDM, NV

Sec. 005 LOTS 1-8;

005 S2;

008 ALL;

017 ALL;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-044 1991.280 Acres

T.0150N, R.0450E, 21 MDM, NV

Sec. 006 LOTS 1-12;

006 E2SW,SE;

007 LOTS 1-4;

007 E2,E2W2;

018 LOTS 1-4;

018 E2,E2W2;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-045 2560.000 Acres

T.0150N, R.0450E, 21 MDM, NV

Sec. 009 ALL;

016 ALL;

021 ALL;

028 W2;

033 W2;

Nye County

Battle Mountain DO

Formerly Lease No.

NV-16-06-046 1860.020 Acres

T.0150N, R.0450E, 21 MDM, NV

Sec. 019 LOTS 1-4;

019 E2,E2W2;

030 LOTS 1-4;

030 E2,E2W2;
031 LOTS 1-4;
031 E2,E2W2;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-047 1920.000 Acres
T.0150N, R.0450E, 21 MDM, NV
Sec. 020 ALL;
029 ALL;
032 ALL;

Nye County
Battle Mountain DO
Formerly Lease No.

NV-16-06-049 1917.190 Acres
T.0160N, R.0450E, 21 MDM, NV
Sec. 004 LOTS 1-4;
004 S2N2,S2;
005 LOTS 1-4;
005 S2N2,S2;
006 LOTS 1-7;
006 S2NE,SE,SW,E2SW,SE;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-050 2517.480 Acres
T.0160N, R.0450E, 21 MDM, NV
Sec. 007 LOTS 1-4;
007 E2,E2W2;
008 ALL;
009 ALL;
010 LOTS 1-7;
010 S2NE,SE,SW,E2SW,SE;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-055 2549.840 Acres
T.0160N, R.0450E, 21 MDM, NV
Sec. 031 LOTS 1-4;
031 E2,E2W2;
032 ALL;
033 ALL;
034 LOTS 1-7;
034 NE,E2NW,NESW,N2SE;

Lander County

Battle Mountain DO
Formerly Lease No.

NV-16-06-056 2526.000 Acres
T.0170N, R.0450E, 21 MDM, NV
Sec. 002 ALL;
003 ALL;
010 ALL;
015 ALL;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-057 1689.120 Acres
T.0170N, R.0450E, 21 MDM, NV
Sec. 004 LOTS 3,4;
004 S2NW;
004 PROT E2,SW;
009 PROT ALL;
016 PROT ALL;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-058 1283.080 Acres
T.0170N, R.0450E, 21 MDM, NV
Sec. 005 LOTS 1,2;
005 S2NE,SE;
008 E2,SESW;
017 E2,NENW,S2NW,SW;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-059 1786.560 Acres
T.0170N, R.0450E, 21 MDM, NV
Sec. 019 LOTS 3,4;
019 E2,SENW,W2SW;
030 LOTS 1-4;
030 E2,E2W2;
031 LOTS 1-4;
031 E2,E2W2;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-060 1920.000 Acres
T.0170N, R.0450E, 21 MDM, NV
Sec. 020 ALL;

029 ALL;

032 ALL;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-061 1767.000 Acres

T.0170N, R.0450E, 21 MDM, NV

Sec. 021 PROT ALL;

028 PROT ALL;

033 SW;

033 PROT N2,SE;

Lander County
Battle Mountain DO
Formerly Lease No.

NV-16-06-072 760.000 Acres

T.0070N, R.0570E, 21 MDM, NV

Sec. 008 E2;

009 N2NW,SWNW,S2;

Nye County
Battle Mountain DO
MAT SITE NVN091869
COMM P NVN060244
PRESALE OFFER NVN093638
Formerly Lease No.

Number of Parcels – 44

Total Acreage – 78,061.610 Acres

Total number of Parcels with Presale Offers – 1

Total Acreage with Presale Offer – 760.000

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APPENDIX B: OIL AND GAS LEASE PARCEL STIPULATIONS AND LEASE NOTICES

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TIMING LIMITATION STIPULATION

Migratory Birds

Surface-disturbing activities during the migratory bird nesting season (March 1 to July 31) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, or if other evidence of nesting is observed (mating pairs, territorial defense, carrying of nesting material, transporting of food), the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites. Protection measures may include avoidance or restricting or excluding development in certain areas until nests and nesting birds will not be disturbed. After July 31, no further avian survey will be conducted until the following year.

Parcels / Description of Lands

All Parcels

LEASE NOTICE

Threatened, Endangered, and Special Status Species

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species

or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. &1531 et seq., including completion of any required procedure for conference or consultation.

Authority: BLM Washington Office Instruction Memorandum 2002-174; Endangered Species Act

Plants

A list of BLM special status plant species can be found in Appendix D, and seasonally appropriate surveys for the respective species by a qualified biologist will be required before surface disturbance will be authorized.

Parcels / Description of Lands

All Parcels

Greater Sage-Grouse

Following Management Decision Mineral Resources (MD MR) 8 in the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (GRSG ARMPA, BLM 2015) which states to review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing Leased Federal Fluid Mineral Actions in proposed GRSG habitat. The BLM has followed MD SSS 1 for this oil and gas EA by nominating parcels located outside of GRSG Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA) which is priority number one for this Management Decision (GRSG ARMPA, BLM 2015). The remaining nominated parcels for this EA are mapped as GRSG non-habitat but there are seven parcels located within 3.1 miles of GRSG leks (Table B.1). As per the GRSG ARMPA, these parcels may have required design features (RDFs) and specific seasonal restrictions. The leks located near the seven parcels will need to be surveyed for GRSG during the lekking season. Based on the survey results, certain stipulations and RDFs may be required prior to any surface disturbing activities.

Parcel	Description of Lands
NV-16-06-027	All Lands
NV-16-06-035	All Lands
NV-16-06-036	All Lands
NV-16-06-040	All Lands
NV-16-06-048	All Lands
NV-16-06-058	All Lands
NV-16-06-059	All Lands

NDOW Sensitive Fish

Big Smokey Valley Tui Chub (*Gila bicolor ssp. 8*) and Big Smokey Valley Speckled Dace (*Rhinichthys osculus lariversi*) are endemic fish species that occur within the Big Smokey Valley and are NV state protected and classified as Sensitive by NDOW. Prior to ground disturbing activities and drilling activities, surveys of any water bodies including seeps and springs in the following parcels will need to be surveyed:

Parcel	Description of Lands
NV-16-06-31	Partial Lands
NV-16-06-32	Partial Lands
NV-16-06-33	Partial Lands

LEASE NOTICE

NO SURFACE OCCUPANCY

Desert Bighorn Sheep (*Ovis canadensis nelsoni*)

Desert bighorn sheep (DBS) habitat overlaps a portion of parcel NV-16-06-019. In coordination with BLM and NDOW biologists, field surveys will be completed to further delineate DBS habitat and where it specifically occurs within the parcel. Once field surveys for DBS are completed, no surface occupancy is recommended or allowed for the following parcel that contains DBS habitat only.

Parcel	Description of Lands
NV-16-06-008	Partial Lands
NV-16-06-019	Partial Lands

MATERIAL SITE STIPULATION

The lessee accepts this lease subject to the authorized use by local, state, or federal government to remove mineral material from the land embraced in the parcels listed below and agrees that its operations will not interfere with the material operations of the Department of Transportation.

Parcels / Description of Lands

NV-16-06-001

NV-16-06-007

NV-16-06-056

NV-16-06-072

LEASE NOTICE

CULTURAL AND PALEONTOLOGICAL RESOURCES STIPULATIONS

Cultural Resources

The Archeological Resource Protection Act (ARPA: 43 CFR 7.4, 7.14, 7.15, 7.16) provides for civil and/or criminal penalties for the disturbance of archaeological resources on federal lands. In addition, the Native American Graves Protection and Repatriation Act (NAGPRA: 43 CFR 10) protects items of cultural patrimony, Native American funerary items, Native American remains and sacred objects. This lease may be found to contain historic properties and/or resources protected under ARPA, NAGPRA, the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Executive Order 13007, and/or other statutes and executive orders.

The BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

In the event Native American skeletal remains, funerary items, sacred items, or objects of cultural patrimony, are discovered during any phase of project implementation, all operations must cease in the vicinity of the discovery and adequate protection must be provided to the discovery. The BLM must be notified immediately, by telephone, with written confirmation to follow (43 CFR 10.4 (c), (d), (g); and Nevada State Protocol Agreement VIII (B). Notification shall be made to Doug Furtado, District Manager, Battle Mountain District Office, 50 Bastian Road, Battle Mountain, NV, 89820, (775-635-4000). No activity in the vicinity of the discovery shall resume until the operator has been issued a Notice to Proceed by the Authorized Officer.

Paleontological Resources

Paleontological resources are managed and preserved under various authorities, including the Omnibus Act (PRPA), the Federal Cave Resources Protection Act (16 U.S.C. 4301 et seq.) and the Archeological Resources Protection Act (16 U.S.C. 470 et seq.) which establishes penalties for the unauthorized excavation, removal, or damage to a paleontological resource when it is found in a direct physical relationship with an archaeological resource. In addition, FLPMA establishes penalties for the theft and/or degradation of federal property which includes paleontological resources. The BLM will not authorize any ground-disturbing activities that may affect significant paleontological resources prior to assessing impacts in accordance with BLM IM No. 2009-011 and other relevant authorities. The BLM may require modification to exploration or development proposals to protect such significant paleontological resources, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided or mitigated.

Paleontological resources constitute a fragile and non-renewable scientific record of the history of life on earth. Although no paleontological resources are known or identified in the immediate

area, this project may have an unintended adverse effect on such resources. The operator should note that fossils are not part of the mineral estate. Paleontological resources are protected by

the Paleontological Resources Protection Act (OPLA-PRP: Omnibus Public Land Management Act of 2009 Paleontological Resources Preservation Subtitle 123 Stat. 1172, 16 U.S.C. 470aaa et seq.) which establishes criminal and civil penalties. The operator should also be aware that if paleontological resources are found in direct association with cultural resources, then such occurrences are subject to Archaeological Resource Protection Act (ARPA: 43 CFR 7.4, 7.14, 7.15, 7.16) provisions. OPLA-PRP requires that the nature and location of paleontological resources on public lands be kept confidential. If paleontological resources are discovered, the operator must cease operations in the vicinity of the discovery and ensure adequate protection to the discovery, then notify the BLM immediately, by telephone, with written confirmation to follow. Notification should be made to the BLM, Battle Mountain District Office, 50 Bastian Road, Battle Mountain, NV, 89820, (775-635-4000). No activity in the vicinity of the discovery should resume until the operator has been issued a Notice to Proceed by the Authorized Officer.

Parcels / Description of Lands

All Parcels

LEASE NOTICE

WILD HORSE AND BURROS STIPULATIONS

The use of helicopter below 500' AGL would be prohibited between March 1 and June 30 to prevent disruption during the foaling period and orphan or abandoned foals.

The BLM has long standing policy about the use of aircraft during the foaling period and is essentially restricted from using aircraft to inventory or gather wild horses during the peak foaling season. Wild horses will run when in the presence of aircraft. Mares may not wait for foals and may abandon them, especially when foals are young.

If operations cause a water source to become unavailable to wild horses, the Authorized Officer may require a new well to be drilled or another water development to be constructed in the general area to provide adequate water for the wild horses. If the lease area is within an HMA, the Field Manager may require additional measures for the protection of wild horses such as seasonal restrictions during the peak foaling period. Additional measures could include placement of equipment away from important water sources, or placement of equipment outside of areas suitable for use or movement by wild horses. Please refer to Tables 6-11 for the list of proposed parcels located within HMAs.

Parcels/Description of Lands

NV-16-06-042
NV-16-06-043
NV-16-06-044
NV-16-06-045
NV-16-06-048
NV-16-06-049
NV-16-06-050
NV-16-06-051
NV-16-06-052
NV-16-06-053
NV-16-06-054
NV-16-06-055
NV-16-06-056
NV-16-06-61

LEASE NOTICE

FIRE STIPULATIONS

The following precautionary measures should be taken to prevent wildland fires. In the event your operations should start a fire, you could be held liable for all suppression costs.

- All vehicles should carry fire extinguishers and a minimum of 10 gallons of water.
- Adequate fire-fighting equipment i.e. shovel, pulaski, extinguisher(s) and a minimum 10 gallons of water should be kept at the drill site(s).
- Vehicle catalytic converters should be inspected often and cleaned of all brush and grass debris.
- When conducting welding operations, they should be conducted in an area free from or mostly free from vegetation. A minimum of 10 gallons water and a shovel should be on hand to extinguish any fires created from the sparks. Extra personnel should be at the welding site to watch for fires created by welding sparks.
- Report wildland fires immediately to the BLM Central Nevada Interagency Dispatch Center (CNIDC) at (775) 623-3444. Helpful information to reported is location (latitude and longitude if possible), what's burning, time started, who/what is near the fire and direction of fire spread.
- When conducting operations during the months of May through September, the operator must contact the BLM Battle Mountain District Office, Division of Fire and Aviation at (775) 635-4000 to find out about any fire restrictions in place for the area of operation and to advise this office of approximate beginning and ending dates for your activities.

Parcels/Description of Lands

All Parcels

LEASE NOTICE

NATIVE AMERICAN CONSULTATION STIPULATIONS

In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P.L. 94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves

Protection and Repatriation Act (p.L. 101-601) and Executive Order 13007, the BLM must also provide affected tribes an opportunity to comment and consult on the proposed project. BLM must attempt to limit, reduce, or possibly eliminate any negative impacts to Native American traditional/cultural/spiritual sites, activities and resources.

BLM reserves the right to deny or alter proposed activities associated with any surface occupancy that results from Oil, Gas and Geothermal leasing. Maintaining physical and spiritual integrity of certain locations within the BMD administrative boundary is detrimental to present and future cultural/spiritual/traditional activities. In accordance with Federal legislation and executive orders, Federal agencies must consider the impacts their actions may have to Native American traditions and religious practices. Consequently, the BLM must take steps to identify locations having traditional/cultural or religious values to Native Americans and insure that its actions do not unduly or unnecessarily burden the pursuit of traditional religion or traditional lifeways.

(All parcels included in Appendix A are recommended to include this notice. Due to the sensitivity of the unique resources of the Big Smoky Valley, Native American related stipulations should be applied. Companies or individuals moving forward with lease purchases within or in close proximity to sensitive areas noted above can expect an extensive, complex and lengthy Native American consultation process.)

Parcels/Description of Lands

All Parcels

LEASE NOTICE

GENERAL OCCUPANCY STIPULATIONS

Surface occupancy may be restricted for specific periods by the BLM's authorized officer for reasons that include, but are not limited to (a) extended periods of high soil moisture or runoff when unusual road damage or land surface rutting can occur and (b) disturbance activity that could have a significant effects on sage-grouse breeding or brood-rearing, raptor nesting, or crucial deer or pronghorn antelope wintering areas.

Warming and cooling trends during winter, spring runoff events and other large precipitation events can contribute to extended periods of high soil moisture or runoff that can cause road damage or land surface rutting. These issues can be compounded in areas where slopes are Greater than 30%.

Parcels/Description of Lands

All Parcels

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APPENDIX C: DEFERRED PARCELS

The following parcels were proposed for deferral because of resource concerns or conflicts identified by the BLM IDT or through public responses to scoping. A combination of resource conflicts may have contributed to the rationale for deferral. Resource elements considered for proposed lease deferrals includes: shallow ground water table, floodplains, wetland & riparian, playas, potential Extensive Recreation Area (ERMA), potential Special Recreation Area (SRMA), potential lands with wilderness characteristics (LWC), occupied desert bighorn sheep habitat (DBS), raptor nest, right-of-ways (ROWs), herd management areas (HMAs) and Native American Concerns (NAC).

LEASE SALE DATE: 06/14/ 2016					
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre-sale Offer (Y/ N)	District Office: Battle Mountain Deferral Rationale
NV-16-06-005	All	T.0140N, R.0430E, 21 MDM, NV Sec. 011 NE,NENW,SE; 012 S2N2,NWNW,S2; 013 S2NE; 014 NW;	1120.0	N	The parcel is located on a wetland/floodplain, playa/pond wetland, and there are seeps/springs present. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-006	All	T.0140N, R.0430E, 21 MDM, NV Sec. 027 S2NW; 034 SW; 036 SE; 022 S2NE,SENW,S2;	840.0	N	The parcel is located on a wetland/floodplain, playa wetland, and there are seeps/springs present. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-011	All	T.0130N, R.0440E, 21 MDM, NV Sec.	1830.94	N	The parcel is located on a wetland, playa wetland, and

LEASE SALE DATE: 06/14/ 2016					DISTRICT OFFICE: Battle Mountain
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre- sale Offer (Y/ N)	Deferral Rationale
		004 LOTS 1,2,5-12; 004 S2NE,SE; 009 ALL; 016 N2,SW,N2SE,SESE;			there are seeps/springs present. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-012	All	T.0130N, R.0440E, 21 MDM, NV Sec. 005 LOTS 1,2; 005 S2NE; 005 PROT NW,S2; 008 PROT ALL;X	1926.160	N	The parcel is located on a lake wetland, playa wetland, and the depth to groundwater on most of the parcel is less than 25 meters. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-013	All	T.0130N, R.0440E, 21 MDM, NV Sec. 006 LOTS 3-5; 006 SENW; 006 PROT NE,S2; 007 PROT ALL; 018 PROT ALL;	1923.00	N	The parcel is located on a floodplain, lake and freshwater forested/shrub wetlands and playa and lake/pond wetlands. Depth to water table is less than 25 meters. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-014	All	T.0130N, R.0440E, 21 MDM, NV Sec. 019 PROT ALL; 030 SE;	1920.36	N	The parcel is located within lake and freshwater forested/shrub wetlands,

LEASE SALE DATE: 06/14/2016					
DISTRICT OFFICE: Battle Mountain					
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre-sale Offer (Y/ N)	Deferral Rationale
		030 PROT N2,SW; 031 LOTS 3,4; 031 E2,E2SW; 031 PROT NW;			playa and swamp/marsh wetlands, and multiple seeps/springs are present. Most of the parcel has a depth to groundwater of less than 25 meters. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-015	All	T.0130N, R.0440E, 21 MDM, NV Sec. 020 N2SE,SWSE; 020 PROT NE,SW; 029 NE,NENW,SESE; 032 LOTS 1-6; 032 NENW,S2NW,SW;	1340.81	N	The parcel is located within lake wetlands, playa and swamp/marsh wetlands, and multiple seeps/springs are present. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-016	All	T.0130N, R.0440E, 21 MDM, NV Sec. 021 ALL; 028 NE,NWNW-,S2NW,SW; 033 LOTS 1-12; 033 NE;	1868.620	N	The parcel is located within lake wetlands, playa and swamp/marsh wetlands, and multiple seeps/springs are present. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-028	All	T.0150N, R.0440E, 21 MDM, NV 024 ALL;	2560.00	N	BLM recommends deferring this parcel due to Native

LEASE SALE DATE: 06/14/2016					
DISTRICT OFFICE: Battle Mountain					
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre-sale Offer (Y/ N)	Deferral Rationale
		025 ALL; 026 ALL;			American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales.
NV-16-06-029	All	T.0150N, R.0440E, 21 MDM, NV Sec. 014 NE,NW,S2SW,SE; 015 N2,SESW,SE; 016 NWSE; 021 NE,E2SE; 022 NE,NENW,N2S-W,SESW, SWSE; 023 ALL; 027 N2N2;	2520.00	N	<p>The parcel is located within a floodplain, freshwater emergent wetlands, lake/pond and swamp/marsh wetlands, and multiple seeps/springs are present. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.</p> <p>BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales.</p>
NV-16-06-034	All	T.0160N, R.0440E, 21 MDM, NV Sec. 001 LOTS 1-4; 001 S2N2,S2; 012 ALL; 013 LOTS 1-4; 013 W2,SE;	1915.32	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be

LEASE SALE DATE: 06/14/ 2016					
DISTRICT OFFICE: Battle Mountain					
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre-sale Offer (Y/ N)	Deferral Rationale
					removed from future lease sales.
NV-16-06-035	All	T.0160N, R.0440E, 21 MDM, NV Sec. 002 LOTS 1-3; 002 S2NE, SENW, S2; 011 ALL; 014 NE, S2;	1683.06	N	. BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales.
NV-16-06-048	All	T.0160N, R.0450E, 21 MDM, NV Sec. 001 LOTS 3-6; 001 S2N2, S2; 002 LOTS 5-11; 002 S2NE, SESW-, E2SW, SE; 003 LOTS 1-4; 003 S2N2, S2; 012 ALL;	2505.74	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales.
NV-16-06-051	All	T.0160N, R.0450E, 21 MDM, NV Sec. 011 LOTS 1-7; X 014 ALL; 023 N2; 026 SENE, SE;	1798.09	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales.
NV-16-06-052	All	T.0160N, R.0450E, 21 MDM, NV Sec. 015 LOTS 1-4; 015 E2, E2W2; 016 ALL; 017 ALL; 018 LOTS	2524.65	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific

LEASE SALE DATE: 06/14/ 2016					DISTRICT OFFICE: Battle Mountain
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre- sale Offer (Y/ N)	Deferral Rationale
		1-4; 018 E2,E2W2;			area of the concern and request that the area be removed from future lease sales.
NV-16-06-053	All	T.0160N, R.0450E, 21 MDM, NV Sec. 019 LOTS 1-4; 019 E2,E2W2; 020 ALL; 021 ALL; 022 LOTS 1-4; 022 NE,W2SE;	2297.92	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales.
NV-16-06-054	All	T.0160N, R.0450E, 21 MDM, NV Sec. 027 LOTS 1-4; 027 NWN- E,S2NE,SE,E2W2; 028 ALL; 029 ALL; 030 LOTS 1-4; 030 E2,E2W2;	2501.02	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the tribes to identify the specific area of the concern and request that the area be removed from future lease sales. The parcel is located within freshwater emergent wetlands and over 25 percent of the parcel is within a floodplain. Wetlands are a sensitive resource that was not analyzed during the RMP process. BMD does not have stipulations to adequately address the resource concerns.
NV-16-06-062	All	T.0170N, R.0450E, 21	1915.00	N	Heavy and concentrated use

LEASE SALE DATE: 06/14/ 2016					
DISTRICT OFFICE: Battle Mountain					
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre-sale Offer (Y/ N)	Deferral Rationale
		MDM, NV Sec. 022 PROT ALL; 027 PROT ALL; 034 PROT ALL;			by burros occurs in the vicinity of the Spencer Hot Springs. This is the only water source available on the BLM managed lands and one of the few water sources available to burros in the combined HMA/WBT. Burro distribution in this area is high as shown by a surplus of tracks and burro trails in the vicinity of the Spencer Hot Spring, and it is considered critical habitat within the small HMA.
NV-16-06-063	All	T.0170N, R.0450E, 21 MDM, NV Sec. 023 PROT ALL; 026 PROT ALL; 035 PROT ALL;	1919.00	N	Heavy and concentrated use by burros occurs in the vicinity of the Spencer Hot Springs. This is the only water source available on the BLM managed lands and one of the few water sources available to burros in the combined HMA/WBT. Burro distribution in this area is high as shown by a surplus of tracks and burro trails in the vicinity of the Spencer Hot Spring, and it is considered critical habitat within the small HMA.
NV-16-06-064	All	T.0170N, R.0450E, 21 MDM, NV Sec. 025 PROT ALL; 036 PROT ALL;	1280.00	N	BLM recommends deferring this parcel due to Native American Concerns. The BMD is working with the

LEASE SALE DATE: 06/14/ 2016				DISTRICT OFFICE: Battle Mountain	
Parcel #	All or Part	Legal Lands Description	Deferred Acreage	Pre- sale Offer (Y/ N)	Deferral Rationale
					<p>tribes to identify the specific area of the concern and request that the area be removed from future lease sales.</p> <p>Heavy and concentrated use by burros occurs in the vicinity of the Spencer Hot Springs. This is the only water source available on the BLM managed lands and one of the few water sources available to burros in the combined HMA/WBT. Burro distribution in this area is high as shown by a surplus of tracks and burro trails in the vicinity of the Spencer Hot Spring, and it is considered critical habitat within the small HMA.</p>

APPENDIX D: BATTLE MOUNTAIN DISTRICT SPECIAL STATUS SPECIES LIST

BMD Special Status Plant Species List		
Common Name	Scientific Name	Status*
Eastwood milkweed	<i>Asclepias eastwoodiana</i>	NS
Cima milkvetch	<i>Astragalus cimae</i> var. <i>cimae</i>	NS
Tonopah milkvetch	<i>Astragalus pseudodanthus</i>	NS
Toquima milkvetch	<i>Astragalus toquimanus</i>	NS
Currant milkvetch	<i>Astragalus uncialis</i>	NS
Elko rockcress	<i>Boechera falcifruca</i>	NS
Monte Neva paintbrush	<i>Castilleja salsuginosa</i>	NS
Tecopa birdbeak	<i>Cordylanthus tecopensis</i>	NS
Goodrich biscuitroot	<i>Cymopterus goodrichii</i>	NS
Nevada willowherb	<i>Epilobium nevadense</i>	NS
Windloving buckwheat	<i>Eriogonum anemophilum</i>	NS
Beatley buckwheat	<i>Eriogonum beatleyae</i>	NS
Tiehm buckwheat	<i>Eriogonum tiehmii</i>	NS
Sand cholla	<i>Grusonia pulchella</i>	NS
Lunar Crater buckwheat	<i>Johanneshowellia crateriorum</i>	NS
Holmgren lupine	<i>Lupinus holmgrenianus</i>	NS
Low feverfew	<i>Parthenium ligulatum</i>	NS
Pahute Mesa beardtongue	<i>Penstemon pahutensis</i>	NS
Lahontan beardtongue	<i>Penstemon palmeri</i> var. <i>macranthus</i>	NS
Bashful beardtongue	<i>Penstemon pudicus</i>	NS
Tiehm beardtongue	<i>Penstemon tiehmii</i>	NS
Clarke phacelia	<i>Phacelia filiae</i>	NS
Williams combleaf	<i>Polycytenium williamsiae</i>	NS
Blaine pincushion	<i>Sclerocactus blainei</i>	NS
Tonopah pincushion	<i>Sclerocactus nyensis</i>	NS
Railroad Valley globemallow	<i>Sphaeralcea caespitosa</i> var. <i>williamsiae</i>	NS
Lone Mountain goldenhead	<i>Tonestus graniticus</i>	NS
*Status FE = Federal Endangered		

FP = Federal Proposed Endangered
 FT = Federal Threatened
 FC = Federal Candidate
 NS = Nevada BLM Sensitive Species

BMD Special Status Species List		
Common Name	Scientific Name	Status*
BIRDS		
Northern goshawk	<i>Accipiter gentilis</i>	NS
Golden eagle	<i>Aquila chrysaetos</i>	NS
Burrowing owl	<i>Athene cunicularia</i>	NS
Ferruginous hawk	<i>Buteo regalis</i>	NS
Swainson's hawk	<i>Buteo swainsoni</i>	NS
Greater sage-grouse	<i>Centrocercus urophasianus</i>	FC, NS
Snowy plover	<i>Charadrius alexandrinus</i>	FT, NS
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	FT, NS
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE
Peregrine falcon	<i>Falco peregrinus</i>	NS
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	NS
Bald eagle	<i>Haliaeetus leucocephalus</i>	NS
Loggerhead shrike	<i>Lanius ludovicianus</i>	NS
Black rosy-finch	<i>Leucosticte atrata</i>	NS
Lewis' woodpecker	<i>Melanerpes lewis</i>	NS
Sage thrasher	<i>Oreoscoptes montanus</i>	NS
Brewer's sparrow	<i>Spizella breweri</i>	NS
FISH		
Railroad Valley springfish	<i>Crenichthys nevadae</i>	FT
Hot Creek Valley tui chub	<i>Gila bicolor</i> ssp. 5	NS
Railroad Valley tui chub	<i>Gila bicolor</i> ssp. 7	NS
Fish Lake Valley tui chub	<i>Gila bicolor</i> ssp. 4	NS
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	FT
Monitor Valley speckled dace	<i>Rhinichthys osculus</i> ssp. 5	NS
MAMMALS		
Pallid bat	<i>Antrozous pallidus</i>	NS
Pygmy rabbit	<i>Brachylagus idahoensis</i>	NS
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	NS

Big brown bat	<i>Eptesicus fuscus</i>	NS
Spotted bat	<i>Euderma maculatum</i>	NS
Silver-haired bat	<i>Lasionycteris noctivagans</i>	NS
Western red bat	<i>Lasiurus blossevillii</i>	NS
Hoary bat	<i>Lasiurus cinereus</i>	NS
Dark kangaroo mouse	<i>Microdipodops megacephalus</i>	NS
Pale kangaroo mouse	<i>Microdipodops pallidus</i>	NS
California myotis	<i>Myotis californicus</i>	NS
Western small-footed myotis	<i>Myotis ciliolabrum</i>	NS
Long-eared myotis	<i>Myotis evotis</i>	NS
Little brown myotis	<i>Myotis lucifugus</i>	NS
Fringed myotis	<i>Myotis thysanodes</i>	NS
Long-legged myotis	<i>Myotis volans</i>	NS
Western pipistrelle	<i>Pipistrellus hesperus</i>	NS
Pika	<i>Ochotona princeps</i>	NS
Bighorn sheep	<i>Ovis canadensis</i>	NS
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	NS
Fish Spring pocket gopher	<i>Thomomys bottae abstrusus</i>	NS
San Antonio pocket gopher	<i>Thomomys bottae curatus</i>	NS
AMPHIBIANS		
Amargosa toad	<i>Anaxyrus nelsoni</i>	NS
Columbia spotted frog	<i>Rana luteiventris</i>	FC, NS
REPTILES		
Desert tortoise	<i>Gopherus agassizii</i>	FT, NS
INSECTS		
Crescent Dunes aegialian scarab	<i>Aegialia crescenta</i>	NS
Aegialian scarab beetle	<i>Aegialia knighti</i>	NS
Crescent Dunes aphodius scarab	<i>Aphodius</i> sp. 2	NS
Big Smoky wood nymph	<i>Cercyonis oetus alkalorum</i>	NS
White River wood nymph	<i>Cercyonis pegala pluvialis</i>	NS
White Mountains skipper	<i>Hesperia miriamae longaevicola</i>	NS
Railroad Valley skipper	<i>Hesperia uncas fulvapalla</i>	NS
White River valley skipper	<i>Hesperia uncas grandiosa</i>	NS
Great Basin small blue	<i>Philotiella speciosa septentrionalis</i>	NS
Crescent Dunes serican scarab	<i>Serica ammomenisco</i>	NS
Sand Mountain serican scarab	<i>Serica psammobunus</i>	NS
MOLLUSCS		
Southern duckwater pyrg	<i>Pyrgulopsis anatine</i>	NS

Large-gland carico pyrg	Pyrgulopsis basiglans	NS
Carinate duckwater pyrg	Pyrgulopsis carinata	NS
Dixie Valley pyrg	Pyrgulopsis dixensis	NS
Oasis Valley pyrg	Pyrgulopsis micrococcus	NS
Wong's pyrg	Pyrgulopsis wongi	NS
<p>*Status FE = Federal Endangered FP = Federal Proposed Endangered FT = Federal Threatened FC = Federal Candidate NS = Nevada BLM Sensitive Species</p>		

APPENDIX E: HYDRAULIC FRACTURING WHITE PAPER

This White Paper on hydraulic fracturing is derived from the Hydraulic Fracturing White Paper (BLM 2013) written and developed by the Bureau of Land Management, Wyoming State Office. It has been modified to meet the criteria for the State of Nevada

I. BACKGROUND

Hydraulic fracturing (HF) is a well stimulation process used to maximize the extraction of underground resources – oil, natural gas and geothermal energy. The HF process includes the acquisition of water, mixing of chemicals, production zone fracturing, and HF flowback disposal.

In the United States, HF has been used since the 1940's. Early on, the HF process utilized pressures that are of a much smaller magnitude than those used today.

The HF process involves the injection of a fracturing fluid and propping agent into the hydrocarbon bearing formation under sufficient pressure to further open existing fractures and/or create new fractures. This allows the hydrocarbons to more readily flow into the wellbore. HF has gained interest recently as hydrocarbons previously trapped in low permeability or "tight" sand and shale formations are now technically and economically recoverable. As a result, oil and gas production has increased significantly in the United States.

Prior to the development of HF in hydrocarbon bearing tight gas and shale formations, domestic production of conventional resources had been declining. In response to this decline, the federal government in the 1970's through 1992, passed tax credits to encourage the development of unconventional resources. It was during this time that the HF process was further advanced to include the high-pressure multi-stage HF operations being conducted today.

Generally, HF can be described as follows:

1. Water, proppant, and chemical additives are pumped at extremely high pressures down the wellbore.
2. The fracturing fluid is pumped through perforated sections of the wellbore and into the surrounding formation, creating fractures in the rock. The proppant holds the fractures open during well production.
3. Company personnel continuously monitor and gauge pressures, fluids and proppants, studying how the sand reacts when it hits the bottom of the wellbore, slowly increasing the density of sand to water as HF progresses.
4. This process may be repeated multiple times, in "stages" to reach maximum areas of the formation(s). The wellbore is temporarily plugged between each stage to maintain the highest fluid pressure possible and get maximum fracturing results in the rock.
5. The plugs are drilled or removed from the wellbore and the well is tested for

results.

6. The pressure is reduced and the fracturing fluids are returned up the wellbore for disposal or treatment and re-use, leaving the sand in place to prop open the fractures and allow the oil/gas to flow.

II. OPERATIONAL ISSUES

Wells that undergo HF may be drilled vertically, horizontally, or directionally and the resultant fractures induced by HF can be vertical, horizontal, or both. Wells in Nevada (NV) may extend to depths Greater than 10,000 feet or less than 1,000 feet, and horizontal sections of a well may extend several thousand feet from the production pad on the surface. Prior to initiating HF, a cement bond log and pressure test is required and evaluated to ensure the integrity of the cement and its bond to both the well casing and the geologic formation.

The total volume of fracturing fluids is generally 95-99% water. The amount of water needed to fracture a well in NV depends on the geologic basin, the formation, and depth and type of well (vertical, horizontal, directional), and the proposed completion process.

In general, approximately 50,000 to 300,000 gallons may be used to fracture shallow vertical wells in NV, while approximately 800,000 to 10 million gallons may be used to fracture deep tight sand gas horizontal or directionally drilled wells in NV.

Proppant, consisting of synthetic or natural silica sand, may be used in quantities of a few hundred tons for a vertical well to a few thousand tons for a horizontal well.

Drilling muds, drilling fluids, water, proppant, and HF fluids are stored in onsite tanks or lined pits during the drilling and/or completion process. Equipment transport and setup can take several days, and the actual HF and flowback process can occur in a few days up to a few weeks. For

oil wells, the flowback fluid from the HF operations is treated in an oil-water separator before it is stored in a lined pit or tank located on the surface. Where gas wells are flowed back using a “green completion process” fluids are run through a multi-phase separator, which are then piped directly to enclosed tanks or to a production unit. Nevada currently does not have large volumes of gas production, but this may change depending on the formation.

Gas emissions associated with the HF process are captured when the operator utilizes a green completion process. Where a green completion process is not utilized, gas associated with the well may be vented and/or flared until “saleable quality” product is obtained in accordance with federal and state rules and regulations. The total volume of emissions from the equipment used (trucks, engines) will vary based on the pressures needed to fracture the well, and the number of zones to be fractured.

Under either completion process, wastewaters from HF may be disposed in several ways. For example, the flowback fluids may be stored in tanks pending reuse; the resultant waste may be re-injected using a permitted injection well, or the waste may be hauled to a licensed facility for treatment, disposal and/or reuse.

Disposal of the waste stream following establishment of “sale-quality” product, would be handled in accordance with Onshore Order #7 regulations and other State/Federal rules and regulations.

Fracturing Fluids

As indicated above, the fluid used in the HF process is approximately 95 to 99 percent water and a small percentage of special-purpose chemical additives and proppant. There is a broad array of chemicals that can be used as additives in a fracture treatment including, but not limited to, hydrochloric acid, anti-bacterial agents, corrosion inhibitors, gelling agents (polymers), surfactants, and scale inhibitors. The 1 to 5 percent of chemical additives translates to a minimum of 5,000 gallons of chemicals for every 1.5 million gallons of water used to fracture a well (Paschke, Dr. Suzanne. USGS, Denver, Colorado. September 2011). Water used in the HF process is generally acquired from surface water or groundwater in the local area. Information on obtaining water and water rights is discussed below.

The Nevada Division of Minerals (NDOM) has regulations that require the reporting of the amount and type of chemicals used in a HF operation in “FracFocus” within 60 days of HF completion for public disclosure. For more information concerning FracFocus and HF, refer to the FracFocus website at www.fracfocus.org and the NDOM website at minerals.state.nv.us.

Re-Fracturing

Re-fracturing of wells (RHF) may be performed after a period of time to restore declining production rates. RHF success can be attributed to enlarging and reorienting existing fractures while restoring conductivity due to proppant degradation and fines plugging. Prior to RHF, the wellbore may be cleaned out. Cleaning out the wellbore may recover over 50% of the initial proppant sand. Once cleaned, the process of RHF is the same as the initial HF. The need for RHF cannot be predicted.

Water Availability and Consumption Estimates

According to the Nevada State Water Plan (March 1999), total statewide water withdrawals for NV are forecasted to increase about 9 percent from 4,041,000 acre-feet in 1995 to 4,391,000 acre-feet in 2020, assuming current levels of conservation. Approximately one-half of these withdrawals are consumptively used. This projected increase in water use is directly attributable to Nevada’s increasing population and related increases in economic endeavors.

The anticipated rise in total statewide water withdrawals primarily reflects expected increases in public supply for M&I water usage to meet the needs of a growing urban population, with expanding commercial and industrial activities. Nevada’s population is projected to reach about 3,047,000 by the year 2020, with about 95 percent of these residents served by public water systems (NDWP, March 1999).

M&I withdrawals currently account for about 13 percent of the water used in NV. Annual M&I water use is projected to increase from 525,000 af in 1995 to 1,034,000 af in 2020 (24 percent of total water withdrawals) based upon existing water use patterns and conservation measures. About 77 percent of water withdrawals are for agricultural use. Approximately 6 to 7 percent of statewide water withdrawals occur in the mining industry (NDWP, March 1999).

Interest in obtaining the necessary water supplies for wildlife and environmental needs is increasing. Additionally, the popularity of water-based outdoor recreation continues to grow. It is

anticipated that these trends will continue, resulting in increased water supply demands for wildlife, environmental and recreational purposes.

Currently, surface water supplies are virtually fully appropriated. The increase in total statewide demand, particularly M&I water use, is expected to be met via better demand management (conservation), use of alternative sources (reused water, reclaimed water and greywater), purchases, leases or other transfers from existing water users, and by new groundwater appropriations. Much of the state's unappropriated groundwater is located in basins at a distance from urban centers. Thus, increasing attention will be placed on interbasin and intercounty transfers, and implementation of underutilized water management tools such as water marketing and water banking. Water for instream flow purposes, wildlife protection, environmental purposes and recreation will likely be generated by increased conservation and the acquisition of existing water rights (NDWP, March 1999).

Potential Sources of Water for Hydraulic Fracturing

Freshwater-quality water is required to drill the surface-casing section of the wellbore per Federal regulations; other sections of the wellbore (intermediate and/or production strings) would be drilled with appropriate quality makeup water as necessary. This is done to protect usable water zones from contamination, to prevent mixing of zones containing different water quality/use classifications, and to minimize total freshwater volumes. With detailed geologic well logging during drilling operations, geologists/mud loggers on location identify the bottoms of these usable water zones, which aids in the proper setting of casing depths.

Several sources of water are available for drilling and/or HF in NV. Because Nevada's water rights system is based in the prior appropriation doctrine, water cannot be diverted from a stream/reservoir or pumped out of the ground for drilling and/or HF without reconciling that diversion with the prior appropriation doctrine. Like any other water user, companies that drill or hydraulically fracture oil and gas wells must adhere to NV water laws when obtaining and using specific sources of water.

Below is a discussion of the sources of water that could potentially be used for HF. The decision to use any specific source is dependent on BLM authorization at the APD stage and the ability to satisfy the water appropriation doctrine. From an operators' standpoint, the decision regarding which water source will be used is primarily driven by the economics associated with procuring a specific water source.

Water transported from outside the state.

The operator may transport water from outside the state. As long as the transport and use of the water carries no legal obligation to NV, this is an allowable source of water from a water rights perspective.

Irrigation water leased or purchased from a landowner.

The landowner may have rights to surface water, delivered by a ditch or canal that is used to irrigate land. The operator may choose to enter into an agreement with the landowner to purchase or lease a portion of that water. This is allowable, however, in nearly every case; the use of an irrigation water right is likely limited to irrigation uses and cannot be used for well drilling and HF operations. To allow its use for drilling and HF, the owner of the water right and the operator must apply to change the water right through a formal process.

Treated water or raw water leased or purchased from a water provider.

The operator may choose to enter into an agreement with a water provider to purchase or lease water from the water provider's system. Municipalities and other water providers may have a surplus of water in their system before it is treated (raw water) or after treatment that can be used for drilling and HF operations. Such an arrangement would be allowed only if the operator's use were compliant with the water provider's water rights.

Water treated at a waste water treatment plant leased or purchased from a water provider.

The operator may choose to enter into an agreement with a water provider to purchase or lease water that has been used by the public, and then treated as wastewater. Municipalities and other water providers discharge their treated waste water into the streams where it becomes part of the public resource, ready to be appropriated once again in the priority system. But for many municipalities a portion of the water that is discharged has the character of being "reusable." As a result, it is possible that after having been discharged to the stream, it could be diverted by the operator to be used for drilling and HF operations. Such an arrangement would only be appropriate with the approval of the Nevada Department of Environmental Protection, State Engineer's Office (NDEP) and would be allowed only if the water provider's water rights include uses for drilling and HF operations.

New diversion of surface water flowing in streams and rivers.

New diversion of surface waters in most parts of the state are rare because the surface streams are already "over appropriated," that is, the flows do not reliably occur in such a magnitude that all of the vested water rights on those streams can be satisfied. Therefore, the only time that an operator may be able to divert water directly from a river is during periods of high flow and less demand. These periods do occur but not reliably or predictably.

Produced Water.

The operator may choose to use water produced in conjunction with oil or gas production at an existing oil or gas well. The water that is produced from an oil or gas well is under the administrative purview of the NDEP, Underground Injection Control Program (UIC) and is either non-tributary, in which case, it is administered independent of the prior appropriation doctrine; or is tributary, in which case, the depletions from its withdrawal must be fully augmented if the depletions occur in an over-appropriated basin. The result in either case is that the produced water is available for consumption for other purposes, not just oil and gas operations. The water must not be encumbered by other needs and the operator must obtain a proper well permit from the NDEP before the water can be used for drilling and HF operations.

Reused or Recycled Drilling Water.

Water that is used for drilling of one well may be recovered and reused in the construction of subsequent wells. The BLM encourages reuse and recycling of both the water used in well drilling and the water produced in conjunction with oil or gas production. However, as described above, the operator must obtain the right to use the water for this purpose.

On-Location Water Supply Wells.

Operators may apply for, and receive, permission from the NDEP to drill and use a new water supply well. These wells are usually drilled on location to provide an on-demand supply. These industrial-type water supply wells are typically drilled deeper than nearby domestic and/or stock wells to minimize drawdown interference, and have large capacity pumps. The proper construction, operation and maintenance, backflow prevention and security of these water

supply wells are critical considerations at the time they are proposed to minimize impacts to the well and/or the waters in the well and are under the jurisdiction of the NDEP. Plugging these wells is under the jurisdiction of the NDEP and BLM.

III. Potential Impacts to Usable Water Zones

Impacts to freshwater supplies can originate from point sources, such as chemical spills, chemical storage tanks (aboveground and underground), industrial sites, landfills, household septic tanks, and mining activities. Impacts to usable waters may also occur through a variety of oil and gas operational sources which may include, but are not limited to, pipeline and well casing failure, and well (gas, oil and/or water) drilling and construction of related facilities. Similarly, improper construction and management of open fluids pits and production facilities could degrade ground water quality through leakage and leaching.

Should hydrocarbons or associated chemicals for oil and gas development, including HF, exceeding US Environmental Protection Agency (EPA)/NDEP standards for minimum concentration levels migrate into potable water supply wells, springs, or usable water systems, it could result in these water sources becoming non-potable. Water wells developed for oil and gas drilling could also result in a draw down in the quantity of water in nearby residential areas depending upon the geology; however it is not currently possible to predict whether or not such water wells would be developed.

Usable groundwater aquifers are most susceptible to pollution where the aquifer is shallow (within 100 feet of the surface depending on surface geology) or perched, are very permeable, or connected directly to a surface water system, such as through floodplains and/or alluvial valleys or where operations occur in geologic zones which are highly fractured and/or lack a sealing formation between the production zone and the usable water zones. If an impact to usable waters were to occur, a Greater number of people could be affected in densely populated areas versus sparsely populated areas characteristic of NV.

Potential impacts on usable groundwater resources from fluid mineral extraction activities can result from the five following scenarios:

1. Contamination of aquifers through the introduction of drilling and/or completion fluids through spills or drilling problems such as lost circulation zones.
2. Communication of the induced hydraulic fractures with existing fractures potentially allows for HF fluid migration into usable water zones/supplies. The potential for this impact is likely dependent on the local hydraulic gradients where those fluids are dissolved in the water column.
3. Cross-contamination of aquifers/formations may result when fluids from a deeper aquifer/formation migrate into a shallower aquifer/formation due to improperly cemented well casings.
4. Localized depletion of perched aquifer or drawdown of unconfined groundwater aquifer.

5. Progressive contamination of deep confined, shallow confined, and unconfined aquifers if the deep confined aquifers are not completely cased off, and geologically isolated, from deeper oil bearing units. An example of this would be salt water intrusion resulting from sustained drawdown associated with the pumping of groundwater.

The impacts above could occur as a result of the following processes:

Improper casing and cementing

A well casing design that is not set at the proper depths or a cementing program that does not properly isolate necessary formations could allow oil, gas or HF fluids to contaminate other aquifers/formations.

Natural fractures, faults, and abandoned wells

If HF of oil and gas wells result in new fractures connecting with established natural fractures, faults, or improperly plugged dry or abandoned wells, a pathway for gas or contaminants to migrate underground may be created posing a risk to water quality. The potential for this impact is currently unknown but it is generally accepted that the potential decreases with increasing distance between the production zone and usable water zones. This potential again is dependent upon the site specific conditions at the well location.

Fracture growth

A number of studies and publications report that the risk of induced fractures extending out of the target formation into an aquifer—allowing hydrocarbons or other fluids to contaminate the aquifer—may depend, in part, on the formation thickness separating the targeted fractured formation and the aquifer. For example, according to a 2012 Bipartisan Policy Center report, the fracturing process itself is unlikely to directly affect freshwater aquifers because fracturing typically takes place at a depth of 6,000 to 10,000 feet, while drinking water aquifers are typically less than 1,000 feet deep. Fractures created during HF have not been shown to span the distance between the targeted oil formation and freshwater bearing zones. If a parcel is sold and development is proposed in usable water zones, those operations would have to comply with federal and/or state water quality standards or receive a Class II designation from the NDEP.

Fracture growth and the potential for upward fluid migration, through volcanic, sedimentary and other geologic formations depend on site-specific factors such as the following:

1. Physical properties, types, thicknesses, and depths of the targeted formation as well as those of the overlying geologic formations.
2. Presence of existing natural fracture systems and their orientation in the target formation and surrounding formations.
3. Amount and distribution of stress (i.e., in-situ stress), and the stress contrasts between the targeted formation and the surrounding formations.

Hydraulic fracture stimulation designs include the volume of fracturing fluid injected into the formation as well as the fluid injection rate and fluid viscosity; this information would be evaluated against the above site specific considerations.

Fluid leak and recovery (flowback) of HF fluids

Not all fracturing fluids injected into the formation during the HF process may be recovered at the surface. Fluid movement into smaller fractures or other geologic substructures can be to a point where flowback efforts will not recover all the fluid or that the pressure reduction caused by pumping during subsequent production operations may not be sufficient to recover all the fluid that has leaked into the formation. It is noted that the fluid loss due to leakage into small fractures and pores is minimized by the use of cross-linked gels.

Willberg et al. (1998) analyzed HF flowback and described the effect of pumping rates on cleanup efficiency in initially dry, very low permeability (0.001 millidarcy) shale. Some wells in this study were pumped at low flowback rates (less than 3 barrels per minute (bbl/min)). Other wells were pumped more aggressively at Greater than 3 bbl/min. Thirty-one percent of the injected HF fluids were recovered when low flowback rates were applied over a 5-day period. Forty-six percent of the fluids were recovered when aggressive flowback rates were applied in other wells over a 2-day period. In both cases, additional fluid recovery (10 percent to 13 percent) was achieved during the subsequent gas production phase, resulting in a total recovery rate of 41 percent to 59 percent of the initial volume of injected HF fluid. Ultimate recovery rate however, is dependent on the permeability of the rocks, fracture configuration, and the surface area of the fracture(s).

The ability of HF chemicals to migrate in an undissolved or dissolved phase into a usable water zone is likely dependent upon the location of the sealing formation (if any), the geology of the sealing formation, hydraulic gradients and production pressures.

HF fluids can remain in the subsurface unrecovered, due to "leak off" into connected fractures and the pores of rocks. Fracturing fluids injected into the primary hydraulically induced fracture can intersect and flow (leak off) into preexisting smaller natural fractures. Some of the fluids lost in this way may occur very close to the well bore after traveling minimal distances in the hydraulically induced fracture before being diverted into other fractures and pores. Once "mixed" with the native water, local and regional vertical and horizontal gradients may influence where and if these fluids will come in contact with usable water zones, assuming that there is inadequate recovery either through the initial flowback or over the productive life of the well. Faults, folds, joints, etc., could also alter localized flow patterns as discussed below.

The following processes can influence effective recovery of the fracture fluids:

Check-Valve Effect

A check-valve effect occurs when natural and/or newly created fractures open and HF fluid is forced into the fractures when fracturing pressures are high, but the fluids are subsequently prevented from flowing back toward the wellbore as the fractures close when the fracturing pressure is decreased (Warpinski et al., 1988; Palmer et al., 1991a).

A long fracture can be pinched-off at some distance from the wellbore. This reduces the effective fracture length. HF fluids trapped beyond the "pinch point" are unlikely to be recovered during flowback and oil/gas is unlikely to be recovered during production.

In most cases, when the fracturing pressure is reduced, the fracture closes in response to natural subsurface compressive stresses. Because the primary purpose of HF is to increase the effective permeability of the target formation and connect new or widened fractures to the wellbore, a closed fracture is of little use. Therefore, a component of HF is to “prop” the fracture open, so that the enhanced permeability from the pressure-induced fracturing persists even after fracturing pressure is terminated. To this end, operators use a system of fluids and “proppants” to create and preserve a high-permeability fracture-channel from the wellbore deep into the formation.

The check-valve effect takes place in locations beyond the zone where proppants have been placed (or in smaller secondary fractures that have not received any proppant). It is possible that some volume of stimulation fluid cannot be recovered due to its movement into zones that were not completely “propped” open.

Adsorption and Chemical Reactions

Adsorption and chemical reactions can also prevent HF fluids from being recovered. Adsorption is the process by which fluid constituents adhere to a solid surface and are thereby unavailable to flow with groundwater. Adsorption to coal is likely; however, adsorption to other geologic material (e.g., shale, sandstone) is likely to be minimal. Another possible reaction affecting the recovery of fracturing fluid constituents is the neutralization of acids (in the fracturing fluids) by carbonates in the subsurface.

Movement of Fluids outside the Capture Zone

Fracturing fluids injected into the target zone flow into fractures under very high pressure. The hydraulic gradients driving fluid flow away from the wellbore during injection are much greater than the hydraulic gradients pulling fluid flow back toward the wellbore during flowback and production (pumping) of the well. Some portion of the fracturing fluids could be forced along the hydraulically induced fracture to a point beyond the capture zone of the production well.

The size of the capture zone will be affected by the regional groundwater gradients, and by the drawdown caused by producing the well. Site-specific geologic, hydrogeologic, injection pressure, and production pumping details should provide the information needed to estimate the dimension of the production well capture zone and the extent to which the fracturing fluids might disperse and dilute.

Incomplete Mixing of Fracturing Fluids with Water

Steidl (1993) documented the occurrence of a gelling agent that did not dissolve completely and actually formed clumps at 15 times the injected concentration in an induced fracture. Steidl also directly observed gel hanging in stringy clumps in many other induced fractures. As Willberg et al. (1997) noted, laboratory studies indicate that fingered flow of water past residual gel may impede fluid recovery. Therefore, some fracturing fluid gels appear not to flow with groundwater during production pumping and remain in the subsurface unrecovered. Such gels are unlikely to flow with groundwater during production, but may present a source of gel constituents to flowing groundwater during and after production.

Authorization of any future proposed projects would require full compliance with local, state, and federal regulations and laws that relate to surface and groundwater protection and would

be subject to routine inspections by the BLM and the State of Nevada Commission on Mineral Resources, Division of Minerals Memorandum of Understanding dated January 9, 2006, prior to approval.

IV. Geologic Hazards (including seismic/landslides)

Nevada is the 3rd most tectonically active state in the union. Since the 1850s there have been 63 earthquakes with a magnitude Greater than 5.5, the cutoff for a destructive earthquake. Potential geologic hazards caused by HF include induced seismic activity in addition to the tectonic activity already occurring in the state. Induced seismic activity could indirectly cause a surficial landslide where soils/slopes are susceptible to failure. Landslides involve the mass movement of earth materials down slopes and can include debris flows, soil creep, and slumping of large blocks of material. Any destructive earthquake also has the potential to induce liquefaction in saturated soils.

Earthquakes occur when energy is released due to blocks of the earth's crust moving along areas of weakness or faults. Earthquakes attributable to human activities are called "induced seismic events" or "induced earthquakes." In the past several years induced seismic events related to energy development projects have drawn heightened public attention. Although only a very small fraction of injection and extraction activities at hundreds of thousands of energy development sites in the United States have induced seismicity at levels that are noticeable to the public, seismic events caused by or likely related to energy development have been measured and felt in Alabama, Arkansas, California, Colorado, Illinois, Louisiana, Mississippi, Nebraska, Nevada, New Mexico, Ohio, Oklahoma, and Texas.

A study conducted by the National Academy of Sciences (Induced Seismicity Potential in Energy Technologies, National Academy of Sciences, 2012) studied the issue of induced seismic activity from energy development. As a result of the study, they found that:

1. The process of hydraulic fracturing a well as presently implemented for shale gas recovery does not pose a high risk for inducing felt seismic events; and
2. Injection for disposal of waste water derived from energy technologies into the subsurface does pose some risk for induced seismicity, but very few events have been documented over the past several decades relative to the large number of disposal wells in operation.

The potential for induced seismicity cannot be made at the leasing stage; as such, it will be evaluated at the APD stage should the parcel be sold/issued, and a development proposal submitted.

V. Spill Response and Reporting

Spill Prevention, Control, and Countermeasure (SPCC) Plans – EPA's rules include requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires that operators of specific facilities prepare, amend, and implement SPCC Plans. The SPCC rule is part of the Oil Pollution

Prevention regulation, which also includes the Facility Response Plan (FRP) rule. Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires the operator of these facilities to develop and implement SPCC Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C). In 1990, the Oil Pollution Act amended the Clean Water Act to require some oil storage facilities to prepare FRPs. On July 1, 1994, EPA finalized the revisions that direct facility owners or operators to prepare and submit plans for responding to a worst-case discharge of oil.

In addition to EPA's requirements, operators must provide a plan for managing waste materials, and for the safe containment of hazardous materials, per Onshore Order #1 with their APD proposal. All spills and/or undesirable events are managed in accordance with Notice to Lessee (NTL) 3-A for responding to all spills and/or undesirable events related to HF operations.

Certain oil and gas exploration and production wastes occurring at or near wellheads are exempt from the Clean Water Act, such as: drilling fluids, produced water, drill cuttings, well completion, and treatment and stimulations fluids. In general, the exempt status of exploration and production waste depends on how the material was used or generated as waste, not necessarily whether the material is hazardous or toxic.

VI. Public Health and Safety

The intensity, and likelihood, of potential impacts to public health and safety, and to the quality of usable water aquifers is directly related to proximity of the proposed action to domestic and/or community water supplies (wells, reservoirs, lakes, rivers, etc.) and/or agricultural developments. The potential impacts are also dependent on the extent of the production well's capture zone and well integrity. Nevada's Standard Lease Stipulations and Lease Notices specify that oil and gas development is generally restricted within 500 feet of riparian habitats and wetlands, perennial water sources (rivers, springs, water wells, etc.) and/or floodplains. Intensity of impact is likely dependent on the density of development.

VII. References

BLM. (July 5, 2013). Bureau of Land Management Wyoming State Office: Hydraulic Fracturing White Paper.

National Academy of Sciences. (June 2012). Induced Seismicity Potential in Energy Technologies--Report in Brief, by Committee on Induced Seismicity Potential in Energy Technologies.

Nevada Division of Water Planning (NDWP). (March 1999). Nevada State Water Plan: Future Water Needs. P. ES-1. http://water.nv.gov/programs/planning/stateplan/documents/NV_State_Water_Plan-complete.pdf

Paschke, Suzanne, Dr. (September 2011). Effects of Development on Groundwater Quality in the Denver Basin, Colorado.

Steidl, P. (1993). Evaluation of induced fractures intercepted by mining, Proceedings 1993 Coalbed Methane Symposium, University of Alabama, pp.675-686.

Warpinski, N.R., Branagan, P.T., Satler, A.R., Cippolla, C.L., Lorenz, J.G., and Thorne, B.J. 1988. A case study of a stimulation experiment in a fluvial, tight, sandstone gas reservoir. Society of Petroleum Engineers Paper No. 18258, Proceedings 63rd Annual Technology Conference, October 1988 (Houston), pp. 616-632.

Willberg et al. (1997). Determination of the Effect of Formation Water on Fracture Fluid Cleanup Through Field Testing in the East Texas Cotton Valley.

Willberg DM, Steinsberger N, Hoover R, Card RJ, Queen J (1998) Optimization of fracture cleanup using flowback analysis. SPE 39920. Presented paper. SPE Rocky Mountain Regional/Low-permeability Reservoirs Symposium and Exhibition, Denver CO, 5-8 April 1998.

APPENDIX F: STATE OF NEVADA, THIRD REVISED PROPOSED REGULATION R011-14

--1-- LCB Draft of Third Revised Proposed Regulation R011-14

THIRD REVISED PROPOSED REGULATION OF THE DIVISION OF MINERALS OF THE COMMISSION ON MINERAL RESOURCES

LCB File No. R011-14

July 24, 2014

EXPLANATION – Matter in *italics* is new; matter in brackets [omitted material] is material to be omitted.

AUTHORITY: §§1-19 and 22, NRS 522.040 and 522.119; §20, NRS 522.040 and 522.150; §21, NRS 534A.090.

A REGULATION relating to natural resources; providing for the regulation of hydraulic fracturing in this State; revising provisions governing the operation of wells for the extraction of oil, gas and geothermal resources; and providing other matters properly relating thereto.

Legislative Counsel's Digest:

Existing law authorizes the Division of Minerals of the Commission on Mineral Resources to regulate wells drilled for the production of oil, gas and geothermal resources. (Chapters 522 and 534A of NRS) In 2013, Senate Bill No. 390 required the Division of Minerals and the Division of Environmental Protection of the State Department of Conservation and Natural Resources, jointly, to develop a hydraulic fracturing program for the State of Nevada. This regulation generally establishes that program.

Sections 9-13 of this regulation provide for the regulation of a well for which an operator intends to engage in hydraulic fracturing. **Section 9** provides for the sampling, testing and continued monitoring of certain water sources located within a specified sampling area. **Section 10** requires an operator to include with his or her application to drill certain information. **Section 11** establishes certain additional requirements for the installation and cementing of certain casing strings in a well used for hydraulic fracturing. **Section 12** establishes certain notice, reporting, monitoring and certification requirements for the operator of a hydraulic fracturing operation and additionally establishes certain requirements for the use of chemicals during the hydraulic fracturing process and the containment and disposal of liquids that are returned to the surface and discharged from the wellbore during

hydraulic fracturing. **Section 13** authorizes an operator of certain existing oil or gas wells to request and the Division to approve a hydraulic fracturing operation at the oil or gas well.

Sections 14-20 of this regulation revise provisions of general applicability to all oil and gas wells.

Section 14: (1) requires an operator to maintain a copy of the drilling permit at the site of the well during the operation of the well; (2) prescribes certain notice requirements relating to spudding a well and installing or cementing casing or equipment for the prevention of a blowout; (3) requires an operator to ensure compliance with certain industry standards relating to casing;

and (4) provides for the management, containment and disposal of spills or releases and liquids that are returned to the surface and discharged from the wellbore during the drilling operation.

Section 15 prescribes certain safety measures for the safe operation of the well.

Section 18 revises provisions governing certain applications submitted to and permits issued by the Division.

Section 19 revises provisions relating to the installation and cementing of the surface casing string, an intermediate casing string or liner and a production casing string or liner in an oil or gas well.

Section 19 additionally requires an operator to report certain information to the Division of Minerals to ensure the safe operation of the well.

Section 20 increases the amount of the administrative fee that a producer or purchaser of oil or natural gas must pay to offset the expenses of the Division.

Section 21 of this regulation revises provisions prescribing certain safety measures for the safe operation of geothermal wells.

Section 22 of this regulation repeals certain regulations relating to wells drilled with cable tools and administrative fees for the new production of oil or natural gas.

Section 1. Chapter 522 of NAC is hereby amended by adding thereto the provisions set forth as sections 2 to 15, inclusive, of this regulation.

Sec. 2. “Area of review” means:

- 1. The area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing; and*
- 2. Any additional area of land prescribed by the Division or specified by an operator pursuant to subsection 3 of section 10 of this regulation.*

Which the person who owns, holds or has the right of use to the water source has consented to the sampling and testing of the water source and to making the results of the sampling and testing available to the public.

Sec. 4. *“Division of Environmental Protection” means the Division of Environmental Protection of the State Department of Conservation and Natural Resources.*

Sec. 5. *“Hydraulic fracturing” has the meaning ascribed to it in paragraph (b) of subsection 3 of NRS 522.119.*

Sec. 6. *“Sampling area” means the area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing.*

Sec. 7. *“Water source” means a water well or spring that is regulated by the Division of Water Resources of the State Department of Conservation and Natural Resources.*

Sec. 8. *Except as otherwise provided in section 13 of this regulation, the provisions of sections 2 to 13, inclusive, of this regulation, apply for each oil or gas well for which the operator intends to engage in hydraulic fracturing.*

Sec. 9. 1. *Except as otherwise provided in subsections 2 and 4, an operator shall collect an initial baseline sample and subsequent monitoring samples from each available water source, not to exceed four available water sources, located within the sampling area. If more than four available water sources are located within the sampling area, the operator shall select the four available water sources for sampling based on:*

(a) The proximity of the available water sources to the proposed oil or gas well. Available water sources closest to the proposed oil or gas well are preferred.

(b) The orientation of the sampling locations. To the extent that the direction of the flow of groundwater is known or can reasonably be inferred, sample locations from both down-gradient and up-gradient locations are preferred over cross-gradient locations.

(c) The depth of the available water sources. The sampling of the deepest of the available water sources is preferred.

(d) The condition of the available water sources. An operator is not required to sample an available water source if the Administrator determines that the available water source is improperly maintained or nonoperational, or has physical characteristics which would prevent the safe collection of a representative sample or which would require nonstandard sampling equipment.

2. An operator may, before a well is spudded or drilled for oil or gas, request an exception from the requirements of this section by filing a sundry notice (Form 4) with the Administrator. The Administrator may grant the request for an exception if the Administrator finds that:

(a) No available water sources are located within the sampling area;

- (b) The only available water sources are unsuitable pursuant to paragraph (d) of subsection 1; or*
- (c) Each owner of a water source that is suitable for testing and located within the sampling area has refused to grant the operator access to the water source for sampling and additionally finds that the operator has made a reasonable and good faith effort to obtain the consent of the owner to conduct the sampling*

3. Except as otherwise provided in subsections 2 and 4, an operator shall collect from each available water source for which the operator is required to collect samples pursuant to this section:

- (a) An initial sample during the 12-month period immediately preceding the commencement of hydraulic fracturing at an oil or gas well.*
- (b) A first subsequent sample, collected not earlier than 6 months but not later than 12 months after the commencement of hydraulic fracturing. If a well that has been drilled produces hydrocarbons for a period of less than 6 months after the commencement of hydraulic fracturing and the well is subsequently plugged and abandoned, or if the well is plugged and abandoned without having produced hydrocarbons after the commencement of hydraulic fracturing, the operator shall collect each first subsequent sample at the time the well is plugged.*
- (c) A second subsequent sample, collected not earlier than 60 months but not later than 72 months after the commencement of hydraulic fracturing. If a well that has been drilled produces hydrocarbons for a period of less than 60 months and the well is subsequently plugged and abandoned, the operator shall collect each second subsequent sample at the time the well is plugged. An operator is not required to collect second subsequent samples if a well that is drilled is plugged and abandoned without having produced hydrocarbons.*

4. For the purposes of satisfying the requirements for sampling available water sources pursuant to paragraphs (a) and (b) of subsection 3, an operator may rely on the test results of a previous sample from an available water source if:

- (a) The previous sample was collected and tested during the respective period prescribed for sampling pursuant to paragraph (a) or (b) of subsection 3.*
- (b) The procedure for collecting and testing the sample, and the constituents for which the sample was tested, are substantially similar to those required by this section.*
- (c) The Administrator receives the test results not less than 14 days before the commencement of hydraulic fracturing.*

5. The Administrator may require an operator to collect and test samples of an available water source in addition to the collection and testing protocol prescribed by this section if the Administrator finds that additional testing is warranted.

6. The testing of a water sample pursuant to this section must be conducted by a laboratory certified pursuant to NAC 445A.0552 to 445A.067, inclusive. Upon request, an operator shall provide his or her protocol for collection and testing to the Administrator.

7. The test results of initial and subsequent samples collected pursuant to this section must include, without limitation:

(a) The level of each analyzed constituent identified in the routine domestic water analysis of the Nevada State Public Health Laboratory of the University of Nevada School of Medicine.

(b) The levels of benzene, toluene, ethylbenzene and xylene.

(c) The levels of dissolved methane, ethane, propane and hydrogen sulfide gases within the sample.

8. If a dissolved methane concentration greater than 10 milligrams per liter (mg/l) is detected in a sample of water collected pursuant to this section, an analysis of the gas composition, including, without limitation, an analysis of the stable isotope ratios of carbon (^{13}C vs. ^{12}C) and hydrogen (^2H vs. ^1H) and an analysis of the origin (biogenic vs. thermogenic), must be performed on the sample using gas chromatography and mass spectrometry, as necessary.

9. An operator shall immediately notify the Administrator and the owner of an available water source if the test results of a sample collected pursuant to this section indicate:

(a) The presence of benzene, toluene, ethylbenzene, xylene or hydrogen sulfide in a concentration greater than the specified maximum contaminant level set forth in the primary and secondary standards for drinking water pursuant to NAC 445A.453 and 445A.455.

(b) If the sample is a subsequent sample, any change in water chemistry indicative of a degradation in water quality.

10. An operator shall provide copies of the test results of each sample collected pursuant to this section to the Administrator and to the respective owner of the available water source not later than 30 days after the operator receives the test results from a laboratory. The Division will, upon request, make the test results available to a member of the public for inspection at the office of the Division located in Carson City.

11. An operator shall include with the copy of the test results of a sample provided pursuant to subsection 10 a description of the location of the available water source and any field observations recorded by the operator during the collection of the sample. The operator shall describe the location of the available water source by public land survey and the county assessor's parcel number and shall include the global positioning system coordinates of the available water

source in the manner prescribed by subparagraph (2) of paragraph (b) of subsection 2 of NAC 534.340.

12. An operator shall not commence hydraulic fracturing at a well until the operator has complied with the provisions of this section. 13. As used in this section, "public land survey" has the meaning ascribed to it in NAC 534.185.

Sec. 10. 1. An operator must include with his or her application to drill an oil or gas well:

(a) The water appropriation permit number and the name of the owner of each water source within the area of review that is on file with the Division of Water Resources of the State Department of Conservation and Natural Resources.

(b) The well log number, well depth and the diameter of the water well casing.

(c) The static water level below the surface of the ground or the rate of flow of the water, if any.

(d) A description of the location of each water source located within the area of review in the manner prescribed by subsection 11 of section 9 of this regulation.

(e) Publically available maps and cross-sections of the area of review which describe the surface and subsurface geology of the area of review, including, without limitation, the location of known or suspected faults.

(f) A map showing the location of each water source or perennial stream located within the area of review, the overall project area or lease holdings, the boundaries of the area of review, all known well locations, land ownership and applicable assessor parcel numbers.

(g) The source and estimated volume of water required for hydraulic fracturing in each well.

(h) A plan for the management and disposal of all fluids to be used in the proposed hydraulic fracturing operation.

2.If an operator discovers inconsistencies with respect to publically available and proprietary hydrologic or geologic information within an area of review that the operator reasonably believes to be a cause for concern with respect to potential contamination from hydraulic fracturing, the operator shall disclose the inconsistencies to the Division.

3.The Division may prescribe or an operator may specify an area of review that includes an area of land in addition to that area of land located within a radius of 1 mile of a proposed oil or gas well and any surface projection of any lateral component of the wellbore that is proposed for hydraulic fracturing for the purposes of compliance with this section or the collection of additional data based on population density, residential locations, water source locations or for other good cause as the Division or an operator may deem reasonable.

Sec. 11. In addition to the requirements prescribed by NAC 522.265, the operator of an oil or gas well shall:

1.Ensure that:

(a) The surface location of the well is at a lateral distance of not less than 300 feet from any known perennial water source, existing water well or existing permitted structure.

(b) The edge of the drilling pad is at a lateral distance of not less than 100 feet from any known perennial water source, existing water well or existing permitted structure.

2. For the intermediate casing string installed in the well directly below the surface casing, install the intermediate casing string through the surface casing from the installed depth of the intermediate casing string to the surface of the ground.

3. For a production casing string, conduct a pressure test of the casing string in which the casing is pressurized to 3,000 pounds or more per square inch gauge (psig), not to exceed 80 percent of the burst-pressure rating of the casing, for a period of not less than 30 minutes. A pressure test must be conducted and the results of the test must be reported in the manner prescribed by subsection 7 of NAC 522.265.

Sec. 12. 1. An operator of an oil or gas well shall:

(a) Not less than 14 days before the commencement of hydraulic fracturing:

(1) Provide written notice to each owner of real property and any operator of an oil, gas or geothermal well located within the area of review of the hydraulic fracturing operation.

(2) Provide written notice to the board of county commissioners in the county in which the oil or gas well is located.

(3) Submit to the Division an affidavit (Form 15) certifying that each strata is sealed and isolated with casing and cement in accordance with NAC 522.260. The affidavit must be signed by the operator or a competent person designated by the operator and must incorporate and include a copy of each relevant cement evaluation log as evidence of compliance with NAC 522.260.

(4) Submit for approval by the Division a sundry notice (Form 4) and a report describing all specific aspects of the proposed hydraulic fracturing operation. The report must identify each stage of the hydraulic fracturing operation, the measured depth and true vertical depth below the surface of the ground for each stage, the duration of each stage, all intervals to be perforated in measured depth and true vertical depth below the surface of the ground, the number and diameter of perforations per foot and the estimated hydraulic pressures to be utilized.

(b) Maintain a record as to the manner in which each owner, operator and board of county commissioners was notified pursuant to subparagraphs (1) and (2) of paragraph (a), including, without limitation, the method of notification.

(c) Before the commencement of hydraulic fracturing:

(1) Ensure that each chemical used in the hydraulic fracturing process is identified on the Internet website maintained by the Division as a chemical which is approved by the Division for hydraulic fracturing. An operator may request and the Division may approve the use of a chemical that is

not identified as an approved chemical if the operator submits the request to the Division on a sundry notice (Form 4) not less than 30 days before the commencement of hydraulic fracturing.

(2) Disclose to the Division each additive that the operator intends to use in the hydraulic fracturing fluid, including, without limitation, any additive that may be protected as a trade secret. The operator shall include with the identity of each additive the trade name and vendor of the additive and a brief description of the intended use or function of the additive.

2. The operator shall monitor and record all well head pressures, including each annular space pressure, during the hydraulic fracturing operation. The maximum hydraulic pressure to which a segment of casing is exposed must not exceed the burst-pressure rating of the casing, but the Division may require a lower maximum hydraulic pressure as the Division determines is necessary. The operator shall immediately stop the hydraulic fracturing process and notify the Division if any change in annular space pressure is observed which suggests communication with the hydraulic fracturing fluids. The operator shall provide the Division with a report documenting all recorded hydraulic fracturing pressures for each stage of the hydraulic fracturing operation not later than 15 days after the completion of each stage.

3. The operator shall contain all liquids that are returned to the surface and discharged from the wellbore at the conclusion of each stage of the hydraulic fracturing operation. The operator shall contain the liquids in enclosed tanks or in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC.

4. Except as otherwise provided in subsection 5 and not later than 60 days after the completion of a hydraulic fracturing operation, the operator shall report, at a minimum, to www.fracfocus.org for inclusion in FracFocus, or its successor registry:

(a) The name of the operator, the well name and well number, and the American Petroleum Institute well number.

(b) The date of the hydraulic fracturing treatment, the county in which the well is located, any public land surveys relevant to the location of the well and the global positioning system coordinates of the well.

(c) The true vertical depth of the well and the total volume of water used in the hydraulic fracturing treatment of the well or if the operator utilizes a base fluid other than water, the type and total volume of the base fluid used in the hydraulic fracturing treatment.

(d) The identity of each additive used in the hydraulic fracturing fluid, including, without limitation, the trade name and vendor of the additive and a brief description of the intended use or function of the additive.

(e) The identity of each chemical intentionally added to the base fluid.

(f) The maximum concentration, measured in percent by mass, of each chemical intentionally added to the base fluid.

(g) The Chemical Abstracts Service Registry Number for each chemical intentionally added to the base fluid, if applicable.

5. Proprietary information with respect to a trade secret does not constitute public information and is confidential. An operator may submit a request to the Division to protect from disclosure any information which, under generally accepted business practices, would be considered a trade secret or other confidential proprietary information of the business. The Administrator shall, after consulting with the operator, determine whether to protect the information from disclosure. If the Administrator determines to protect the information from disclosure, the protected information:

(a) Is confidential proprietary information of the operator.

(b) Is not a public record. c) Must be redacted by the Administrator from any report that is disclosed to the public.

(d) May only be disclosed or transmitted by the Division:

(1) To any officer, employee or authorized representative of this State or the United States:

(I) For the purposes of carrying out any duties pursuant to the provisions of this chapter or chapter 522 of NRS; or

(II) If the information is relevant in any judicial proceeding or adversary administrative proceeding under this chapter or chapter 522 of NRS or under the provisions of any federal law relating to oil or gas wells or hydraulic fracturing, and the information is admissible under the rules of evidence; or

(2) Upon receiving the consent of the operator.

6. The Division shall make available to the public for inspection any information, other than a trade secret or other proprietary information that is maintained confidentially pursuant to subsection 5, that is submitted by an operator pursuant to this section.

7. As used in this section, "trade secret" has the meaning ascribed to it in NRS 600A.030.

Sec. 13. 1. Notwithstanding any provision of sections 2 to 12, inclusive, of this regulation to the contrary, an operator of an oil or gas well that was drilled and spudded before the effective date of this regulation may request approval from the Division to conduct a hydraulic fracturing operation at the oil or gas well by submitting a sundry notice (Form 4) to the Division. The sundry notice must include:

(a) A cement evaluation log of the production casing string that has been conducted not less than 5 years before the submission of the sundry notice.

(b) A pressure test of the production casing string conducted in the manner prescribed by subsection 7 of NAC 522.265.

(c) Any other information required by the Division.

2. The Division will, upon receipt of a request pursuant to subsection 1, evaluate each well design which is the subject of the request and approve or disapprove the request.

Sec. 14. An operator of an oil or gas well shall:

1. Maintain a copy of the approved drilling permit at the site of the well during the operation of the well, including, without limitation, during the stages of drilling, hydraulic fracturing, reconditioning and completion.

2. Not less than 24 hours before a well is spudded for oil or gas, notify the Division by telephone or electronic mail.

3. *Not less than 24 hours before installing or cementing casing, installing any equipment for the prevention of a blowout or conducting a formation integrity test, notify the Division by telephone or electronic mail.*
4. *Ensure that the casing installed in the well meets the minimum specifications for casing prescribed by the American Petroleum Institute in Specification 5CT, "Specification for Casing and Tubing, Ninth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.*
5. *Notify the Division if any casing or casing material has been previously used in a hydraulic fracturing operation or in any other oil or gas well.*
6. *Ensure that the cementing of each casing string meets the minimum specifications prescribed by the American Petroleum Institute in Specification 10A, "Specification for Cements and Materials for Well Cementing, Twenty-Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.*
7. *Store and contain all materials at the site of the well in a safe and orderly manner.*
8. *Manage spills or releases in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC.*
9. *Except as otherwise provided in subsection 3 of section 12 of this regulation, contain all liquids that are returned to the surface and discharged from the wellbore in the manner prescribed by the Division of Environmental Protection pursuant to chapters 445A of NRS and 445A of NAC. A reserve pit for drilling liquids must not subsequently be used for the discharge of wellbore liquids during the testing of the well without the prior approval of the Administrator.*
10. *If an unintentional mechanical failure of the well or an uncontrolled flow or spill from the well site occurs, immediately notify:*
 - (a) *The Division at the telephone number of the Division.*
 - (b) *The Division of Environmental Protection at the spill reporting hotline maintained on its Internet website.*

An operator may obtain information on the types of spills which must be reported pursuant to this subsection at http://ndep.nv.gov/BCA/spil_rpt.htm.

Sec. 15. 1. *An operator shall take all precautions which are necessary to keep wells under control and operating safely at all times. Well control and wellhead assemblies used in an oil or gas well must meet the minimum specifications for assemblies prescribed by the American Petroleum Institute in Standard 53, "Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.*

2. Equipment for the prevention of a blowout which is capable of shutting in the well during operation must be installed on the surface casing and maintained in good operating condition at all times. The equipment must have a rating for pressure greater than the maximum anticipated pressure at the wellhead. The equipment must include casing outlet valves with adequate provisions for mud kill and bleed-off lines of appropriate size and working pressure.

3. An operator shall test the equipment for the prevention of a blowout under pressure immediately after installing the casing and the equipment at the wellhead. A representative of the Division must observe the test in person or otherwise approve the results of the test before the operator drills the shoe out of the casing. An operator shall notify the Division not less than 24 hours before conducting a test pursuant to this subsection.

4. The operator shall submit to the Division the pressure data and supporting information for the equipment for the prevention of a blowout as soon as practicable after the conclusion of the test. The operator shall record the results of each test in the daily drilling log of the operator.

Sec. 16. NAC 522.100 is hereby amended to read as follows:

522.100 “Gas well” means a well which produces primarily natural gas or any well classified as a gas well by the Division. *The term includes an exploratory well or a well that is otherwise drilled for exploratory purposes.*

Sec. 17. NAC 522.115 is hereby amended to read as follows:

522.115 “Oil well” means any well which is not a gas well and which is capable of producing oil or condensate. *The term includes an exploratory well or a well that is otherwise drilled for exploratory purposes.*

Sec. 18. NAC 522.210 is hereby amended to read as follows:

522.210

1. Before any well is spudded in or drilled for oil or gas, application must be made to and a permit obtained from the Division.

2. The application must be made on Form 2, properly completed and accompanied by Form 1, the required fee and a location plat prepared by a land surveyor licensed in Nevada. Evidence of a federal bond for drilling on a federal lease must be included in the space provided on Form 2. *The source and estimated volume of water required for drilling each well must be included with the application.*

3. If the well is to be drilled on state or private land, Form 3 or 3a, properly completed, must accompany the application.

4. The Division will, upon the approval of an application for a permit to drill or a sundry notice (Form 4) for a permit to conduct a hydraulic fracturing operation, make a copy of the permit available on the Internet website maintained by the Division.

Sec. 19. NAC 522.265 is hereby amended to read as follows:

522.265 Unless a special provision requires otherwise, the following applies to all *oil and gas* wells [drilled with rotary tools:

1. Suitable and safe surface casing must be used in all wells for proper anchorage. In all wells being drilled, surface and other protection casing must be run to sufficient depth to afford safe control of any pressures which might be encountered and must be sufficiently tested therefor. Surface casing must be set into an impervious formation and be cemented with sufficient cement

to circulate to the top of the hole. If cement does not circulate, the annulus outside the casing must be cemented before drilling plug or initiating tests.

2. On all strings of casing below surface pipe, sufficient cement must be used to fill the annular volume behind the casing for a minimum distance of 500 feet above the bottom of the casing. A cement plug or shoe must not be drilled until a minimum compressive strength of 300 pounds per square inch at bottom hole conditions has been attained according to the manufacturer's tables of cement strength for the particular cement mix being used.

3. After cementing the surface casing, each well being drilled must be equipped with adequate blowout preventers. The use of blowout equipment must be in accordance with good established oil field practice. The control equipment must include casing outlet valves with adequate provisions for mudkill and bleed-off lines of proper size and working pressure. All equipment must be in good operating condition at all times.] :

1. An operator shall install conductor casing and cement the annular space surrounding the conductor casing from the shoe to the surface with cement, cement grout or concrete grout.

2. An operator shall install surface casing to a depth of not less than 500 feet below the surface of the ground. The annular space surrounding the surface casing string must be cemented with sufficient cement to circulate to the top of the hole. If the cement does not circulate to the top of the hole, the operator shall:

(a) Measure the distance from the surface of the ground to the top of the cement and report the measurement to the Division.

(b) Take any remedial action that may be required by the Administrator to ensure compliance with NAC 522.260 before the operator resumes drilling or conducts any testing pursuant to this section.

3. Except as otherwise provided in section 11 of this regulation, each successive intermediate casing string or liner or production casing string or liner installed in a well below an existing casing string must overlap with the shoe of the existing casing string or liner, as applicable, by not less than 100 feet.

4. For each intermediate casing string or production casing string installed in a well, the operator shall cement the annular space surrounding the casing string to a depth of not less than 500 feet above the shoe of the casing string or, if the casing string enters a known hydrocarbon-producing zone of interest, to a depth of not less than 500 feet above the zone of interest.

5. As soon as practicable after an operator has completed the cementing of the surface casing string, an intermediate casing string or a production casing string, the operator shall submit

to the Division a cementing evaluation report to ensure that the operator has complied with the cementing requirements prescribed by this section. The report must include, without limitation, the weight and volume of cementing materials used to cement the respective casing string and the pumping rates and pressures which are related to the cementing of the respective casing string.

6.If the Administrator determines that an operator must take remedial action to ensure compliance with NAC 522.260, the operator shall complete such remedial action before the operator resumes drilling or conducts any testing pursuant to this section.

7.Except as otherwise provided by section 11 of this regulation, before drilling the cement out of the bottom joints of the surface casing string, an intermediate casing string or a production casing string, an operator shall conduct a pressure test of the respective casing string in which the casing is pressurized to 0.22 pounds per square inch gauge (psig) per foot of casing string length or 1,500 pounds per square inch gauge (psig), whichever is greater, not to exceed the maximum anticipated bottom-hole pressure or 80 percent of the burst-pressure rating of the casing. The casing string must be pressurized for a period of not less than 30 minutes. The operator shall submit to the Division the pressure test results for the respective casing string as soon as practicable after the conclusion of the test. If the results of the test indicate a drop in pressure of 10 percent or more, the operator shall notify the Division of a failed pressure test and shall immediately cease operations at the well. In the event of a failed pressure test, an operator shall not resume operations at the well until the Administrator approves a remediation plan, the operator successfully implements the plan and the operator conducts a successful pressure test for the respective casing string. A subsequent pressure test resulting in a drop in pressure of less than 10 percent after 30 minutes or more shall be deemed to be proof satisfactory that the condition has been corrected.

8.The Administrator may require the operator to submit a cement evaluation log evaluating the bonding integrity of the cement from the shoe of the surface casing string to the surface. The Administrator may require the submission of an initial cement evaluation log pursuant to this subsection if:

(a) The Administrator determines that a significant amount of cement was lost during the cementing of the surface casing string; or

(b) The surface casing string fails a formation integrity test conducted pursuant to subsection 10.

9.An operator shall, upon completion of cementing operations with respect to an intermediate casing string or production casing string, submit to the Division a cement evaluation log evaluating the bonding integrity of the cement at the level of the respective casing string from the shoe of the casing string to the surface of the cement filling the annular space surrounding the casing string. If the initial cement evaluation log does not indicate sufficient bonding integrity of the cement occupying the annular space, the Administrator may require the operator to submit a subsequent cement evaluation log evaluating the bonding integrity of the cement occupying the

annular space. An operator shall provide to the Division a copy of each cement evaluation log required pursuant to this subsection as soon as practicable after a copy of the cement bond log becomes available to the operator.

10. An operator shall, to verify that the cement and the formation below the casing shoe can withstand the wellbore pressure which is required to safely drill to the next depth at which casing will be installed, conduct a formation integrity or leakoff test at the time the operator drills the cement out of the bottom joints of the surface casing string, an intermediate casing string or a production casing string. The operator shall submit to the Division the results of a formation integrity or leakoff test conducted pursuant to this subsection as soon as practicable after the conclusion of the test. If the results of the formation integrity or leakoff test indicate

a poor cement bond at the casing shoe, an operator shall not resume operations at the well until the Administrator approves a remediation plan, the operator successfully implements the plan and the operator conducts a successful pressure test for the respective casing string to ensure compliance with NAC 522.260.

Sec. 20. NAC 522.342 is hereby amended to read as follows:

522.342

1. The amount of the administrative fee that a producer or purchaser of oil or natural gas must pay pursuant to subsection 2 of NRS 522.150 is [10] **15** cents per barrel of oil or per 50,000 cubic feet of natural gas, as appropriate.

2. **The administrative fee must be paid on or before the last day of each month and must be prorated to reflect the amount of oil or natural gas produced during the preceding month.**

Sec. 21. NAC 534A.270 is hereby amended to read as follows:

534A.270 1. [All necessary] **An operator shall take all** precautions [must be taken] **which are necessary** to keep wells under control and operating safely at all times. **Well control and**

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wellhead assemblies used in any geothermal well must meet the minimum specifications for assemblies prescribed by the American Petroleum Institute in Standard 53, "Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition," or by its successor organization, or as may be otherwise prescribed by the Administrator.

2. Equipment for the prevention of a blowout, capable of shutting in the well during any operation, must be installed on the surface casing and maintained [ready for use] ***in good operating condition*** at all times. This equipment must [be made of steel and] have a rating for pressure [equal to] ***greater than*** the maximum anticipated pressure at the wellhead. Equipment for the prevention of a blowout is required on any well where temperatures may exceed 250°F.

3. [Immediately after installation, the casing and] ***An operator shall test the*** equipment for the prevention of a blowout [must be tested] under pressure. [These tests must be witnessed by] ***A representative of the Division must observe the test in person or otherwise approve the results of the test*** before the [guide] ***operator drills the casing*** shoe [is drilled] out of the casing. [The Division must be given reasonable notice of any such test. If necessary, conductor pipe must be equipped with annular blowout equipment which is hydraulically activated from a remote control station.] ***An operator shall notify the Division not less than 24 hours before conducting a test pursuant to this subsection.***

3. The [use of any equipment for the prevention of a blowout must be in accordance with established good practices of the oil field.] ***operator shall submit to the Division the pressure data and supporting information for the equipment for the prevention of a blowout as soon as practicable after the conclusion of the test conducted pursuant to subsection 3. The operator shall record the results of each test in the daily drilling log of the operator.***

Sec. 22. NAC 522.270 and 522.343 are hereby repealed.

TEXT OF REPEALED SECTIONS

522.270 Wells drilled with cable tools. The following applies to all wells drilled with cable tools:

1. Before drilling begins, adequate slush pits must be constructed.
2. Surface casing must be set in the same manner as described in NAC 522.265. Surface casing must be tested by bailing or pressure test to ensure a shutoff before drilling proceeds below the casing point.
3. The use of blowout equipment must be in accordance with good established oil field practice. After cementing the surface casing, a well being drilled must be equipped with adequate blowout preventers. All equipment must be in good operating condition at all times.

522.343 Reduced administrative fee for new production. (NRS 522.040, 522.150)

1. Notwithstanding the provisions of NAC 522.342, the amount of the administrative fee that a producer or purchaser of oil or natural gas must pay pursuant to subsection 2 of NRS 522.150 for new production is one-half cent per barrel of oil or per 50,000 cubic feet of natural gas, as appropriate, and in accordance with the provisions of this section.

2. Upon the filing of Form 5, the well completion report, pursuant to NAC 522.510, the Division shall determine whether the production from the well that is the subject of the report qualifies as new production. If the Division determines that the production from the well qualifies as new production, the producer or purchaser is entitled to pay the administrative fee required by subsection 2 of NRS 522.150 for that new production at the reduced rate prescribed in subsection 1 for 12 consecutive calendar months, beginning on the put-on-production date reported in Form 5 for that well. At the end of the 12-month period, the producer or purchaser must pay the administrative fee required by NRS 522.150 for further production from the well in the amount prescribed in NAC 522.342.

3. A producer or purchaser may, pursuant to NRS 522.110, challenge a determination made by the Division pursuant to subsection 2.

4. As used in this section, “new production” means production from a new or existing well that is completed in a new interval, as determined by the Division.