

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

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## **McGinness Hills Geothermal Development Phase III Project Volume II**

### **Final Environmental Assessment**

DOI-BLM-NV-B010-2017-0048-EA

#### **Preparing Office**

**U.S. Department of the Interior  
Bureau of Land Management  
Mount Lewis Field Office  
50 Bastian Road  
Battle Mountain, Nevada 89820**

**January 2018**



# Chapter 8      Appendices

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## **Appendix A: Acronyms and Abbreviations**



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<b>ACHP</b>	Advisory Council on Historic Preservation
<b>AIRFA</b>	American Indian Religious Freedom Act
<b>APD</b>	Application for Permit to Drill
<b>APE</b>	Area of Potential Effect
<b>ARMPA</b>	Approved Resource Management Plan Amendments
<b>AUM</b>	Animal Unit Month
<b>BAPC</b>	Bureau of Air Pollution Control
<b>BBCS</b>	Bird and Bat Conservation Strategy
<b>BGEPA</b>	Bald and Golden Eagle Protection Act
<b>BLM</b>	Bureau of Land Management
<b>BMP</b>	Best Management Practice
<b>CCD</b>	Census County Division
<b>CCS</b>	Conservation Credit System
<b>CEQ</b>	Council on Environmental Quality
<b>CESA</b>	Cumulative Effects Study Area
<b>CFR</b>	Code of Federal Regulation
<b>CH<sub>4</sub></b>	Methane
<b>CIEA</b>	Consultants in Engineering and Acoustics
<b>CO</b>	Carbon Monoxide
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CO<sub>2</sub>e</b>	Carbon Dioxide Equivalent
<b>COA</b>	Condition of Approval
<b>dB</b>	Decibel
<b>dBA</b>	A-Weighted Decibel
<b>DOT</b>	Department of Transportation
<b>DP</b>	Demographic Profile
<b>EA</b>	Environmental Assessment
<b>EIS</b>	Environmental Impact Statement
<b>EO</b>	Executive Order
<b>EPA</b>	Environmental Protection Agency
<b>EPM</b>	Environmental Protection Measure
<b>ESA</b>	Endangered Species Act of 1973
<b>ESD</b>	Ecological Site Description
<b>FLPMA</b>	Federal Land Policy and Management Act of 1976
<b>FONSI</b>	Finding of No Significant Impact
<b>GDP</b>	Geothermal Drilling Permit
<b>GHG</b>	Greenhouse Gas
<b>GHMA</b>	General Habitat Management Area
<b>Gold Book</b>	Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development
<b>GPS</b>	Global Positioning System
<b>GWP</b>	Global Warming Potential
<b>HAP</b>	Hazardous Air Pollutant
<b>HMA</b>	Herd Management Area
<b>HPTP</b>	Historic Properties Treatment Plan

<b>HQT</b>	Habitat Quantification Tool
<b>IM</b>	Instruction Memorandum
<b>kHz</b>	Kilohertz
<b>LR2000</b>	Bureau of Land Management's Legacy Rehost 2000 System
<b>MBTA</b>	Migratory Bird Treaty Act of 1918
<b>MD</b>	Management Decision
<b>MHAD</b>	McGinness Hills Archaeological District
<b>MLFO</b>	Mount Lewis Field Office
<b>mph</b>	Miles Per Hour
<b>MOU</b>	Memorandum of Understanding
<b>MU</b>	Map Unit
<b>MW</b>	Megawatt
<b>N<sub>2</sub>O</b>	Nitrous Oxide
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NAC</b>	Nevada Administrative Code
<b>NAGPRA</b>	Native American Graves Protection and Repatriation Act
<b>NDEP</b>	Nevada Division of Environmental Protection
<b>NDOT</b>	Nevada Department of Transportation
<b>NDOW</b>	Nevada Department of Wildlife
<b>NEPA</b>	National Environmental Policy Act of 1969
<b>NHPA</b>	National Historic Preservation Act
<b>NO<sub>x</sub></b>	Nitrogen Oxide
<b>NRCS</b>	Natural Resources Conservation Service
<b>NRHP</b>	National Register of Historic Places
<b>NRS</b>	Nevada Revised Statute
<b>NVE</b>	NV Energy
<b>Ormat</b>	Ormat Nevada, Inc.
<b>PHMA</b>	Priority Habitat Management Area
<b>PL</b>	Public Law
<b>PM<sub>2.5</sub></b>	Particulate Matter Less than 2.5 Microns in Diameter
<b>PM<sub>10</sub></b>	Particulate Matter Less than 10 Microns in Diameter
<b>PMU</b>	Population Management Unit
<b>Project</b>	Phase II Power Plan and Associated Facilities
<b>Project Area</b>	McGinness Hills Geothermal Unit (NVN-84268X)
<b>RDF</b>	Required Design Feature
<b>RFFA</b>	Reasonably Foreseeable Future Actions
<b>RMP</b>	Resource Management Plan
<b>ROW</b>	Right-of-Way
<b>RV</b>	Recreational Vehicle
<b>SETT</b>	Sagebrush Ecosystem Technical Team
<b>SHPO</b>	State Historic Preservation Office
<b>SO<sub>2</sub></b>	Sulfur Dioxide
<b>SSS</b>	Special Status Species
<b>Strategic Plan</b>	2013 Bureau of Land Management Strategic Plan for Migratory Bird Conservation

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<b>TCP</b>	Traditional Cultural Properties
<b>TGH</b>	Thermal Gradient Holes
<b>UIC</b>	Underground Injection Control
<b>U.S.C.</b>	United States Code
<b>USACE</b>	United States Army Corps of Engineers
<b>USFS</b>	United States Forest Service
<b>USFWS</b>	United States Fish and Wildlife Service
<b>USGS</b>	United States Geological Survey
<b>VOC</b>	Volatile Organic Compound
<b>VRM</b>	Visual Resource Management
<b>WFRHBA</b>	Wild Free-Roaming Horse and Burro Act of 1971
<b>WSA</b>	Wilderness Study Area

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## **Appendix B: Federal Geothermal Lease Stipulations**

Bureau of Land Management

McGinness Hills Geothermal Development Project EA

Environmental Assessment: DOI-BLM-NV-B010-2011-0015-EA

Appendix B: Federal Geothermal Lease Stipulations

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## LEASE STIPULATIONS:

### ENDANGERED SPECIES ACT SECTION AND CONSULTATION STIPULATION

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The Bureau of Land Management (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 modifications 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, 16 USC 1531 *et seq.*, as amended, including completion of any required procedure for conference or consultation.

### CULTURAL RESOURCE PROTECTION LEASE STIPULATION

This lease may be found to contain historic properties or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, 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 exploration or development proposals to be modified to protect such properties, or it may disapprove any activity that is likely to result in adverse effects that could not be successfully avoided, minimized, or mitigated.

### GREATER SAGE-GROUSE LEK STIPULATIONS

Operations would avoid active leks (strutting grounds) by two miles during strutting season (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, October 2000).

Approximate dates: March 1-May 15

Locations listed below will be avoided during strutting seasons:



Description of Lands

Parcel ID	Section	Description
NV-07-08-041	<b>T. 20 N., R. 45 E., MDM, Nevada</b>	
	09	E2, E2NW, E2NWNW, E2SWNW, NESW, E2SESW
	10	All
	11	All
	12	All
	13	All
	14	All
	15	All
	16	E2, E2NENW, SENW, NESW, SESW
NV-07-08-042	<b>T. 20 N., R. 45 E., MDM, Nevada</b>	
	21	E2, NWNW, E2SESW, E2SESW
	22	E2, NWNW, E2SESW, E2SESW
	23	All
	24	All

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## **Appendix C: Instruction Memorandums**

### **IM 2016-143 and IM 2018-026**

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U.S. DEPARTMENT OF THE INTERIOR  
**BUREAU OF LAND  
MANAGEMENT (I)**

(/)



## **IMPLEMENTATION OF GREATER SAGE-GROUSE RESOURCE MANAGEMENT PLAN REVISIONS OR AMENDMENTS " OIL & GAS LEASING AND DEVELOPMENT SEQUENTIAL PRIORITIZATION**

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**IM 2016-143**

Instruction Memorandum

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

WASHINGTON, DC 20240-0036

<http://www.blm.gov> (<http://www.blm.gov>)

September 1, 2016

In Reply Refer To:

3100 (310) P

EMS TRANSMISSION 09/07/2016

Instruction Memorandum No. 2016-143

Expires: 09/30/2019

To: State Directors (California, Colorado, Idaho, Montana/Dakotas, Nevada, Oregon/Washington, Utah, and Wyoming), and  
Center Directors

From: Deputy Director

Subject: Implementation of Greater Sage-Grouse Resource Management Plan Revisions or Amendments – Oil & Gas Leasing and  
Development Sequential Prioritization

**Program Areas:** Oil and Gas Leasing and Operations, Land Use Planning, National Environmental Policy Act (NEPA) Compliance, and  
Wildlife – Greater Sage-Grouse.

**Purpose:** This Instruction Memorandum (IM) provides guidance on prioritizing implementation decisions for Bureau of Land  
Management (BLM) oil and gas leasing and development, to be consistent with the Approved Resource Management Plan Amendments  
for the Rocky Mountain and Great Basin GRSG Regions and nine Approved Resource Management Plans in the Rocky Mountain GRSG  
Region (collectively referred to as the GRSG Plans). This IM applies to activities in the areas covered by both the Rocky Mountain (RM)  
and Great Basin (GB) Regions Records of Decision (RODs), issued by the BLM in September 2015.<sup>[1]</sup> This IM also contains reporting  
requirements for communication between State Offices and the Washington Office.

The objectives of this IM are: to ensure consistency across BLM offices when implementing the GRSG Plans decisions aimed at avoiding or limiting new surface disturbance in Priority Habitat Management Areas (PHMAs), including Sagebrush Focal Areas (SFAs), and minimizing surface disturbance in General Habitat Management Areas (GHMAs); and to provide clarity to the BLM Field Offices on how to move forward with oil and gas leasing and development activities within designated GRSG habitats[2]. This IM provides guidance on how the BLM will exercise the Secretary of the Interior's discretion with regard to leasing activities in order to fulfill the conservation commitments in the GRSG Plans, to facilitate efforts to reduce the costs to project proponents and the BLM from the potentially extended time it may take for leasing and permitting within GRSG habitat, and to demonstrate that the GRSG Plans are being implemented consistently and transparently. BLM offices are encouraged to work collaboratively with relevant state and federal agencies as well as stakeholders to develop strategies and incentives to encourage and prioritize leasing and development outside of GRSG habitats.

**Policy/Action:** The BLM's Authorized Officer, acting under the delegated authority of the Secretary of the Interior, has discretion to determine which public lands will be offered at a lease sale. The Mineral Leasing Act of 1920 (MLA), as amended, provides that lands subject to disposition under the Act "which are known or believed to contain oil or gas deposits may be leased by the Secretary," (30 U.S.C. § 226(a) (emphasis added)). When evaluating Expressions of Interest (EOIs) to lease particular parcels, pursuant to the Competitive Leases Handbook (H-3120-1), the BLM will plan for leasing and development in accordance with the objectives and provisions in the GRSG Plans.

This IM does not prohibit leasing or development in GHMA or PHMA as the GRSG Plans will allow for leasing and development by applying prioritizing sequencing, stipulations, required design features, and other management measures to achieve the conservation objectives and provisions in the GRSG Plans. If the Authorized Officer determines that the potential environmental impacts could be significant while preparing the NEPA document, then the Authorized Officer will prepare an Environmental Impact Statement.

This guidance is not intended to direct the Authorized Officer to wait for all lands outside GRSG habitat areas to be leased or developed before allowing leasing within GHMAs, and then to wait for all lands within GHMAs to be leased before allowing leasing or development within the next habitat area (PHMA, for example). Rather it is intended to ensure consideration of the lands outside of GHMAs and PHMAs for leasing and development before considering lands within GHMAs and, thereafter, to ensure consideration of lands within GHMAs for leasing and development before considering any lands within PHMAs for leasing and development in an effort to focus future surface disturbance outside of the most important areas for sage-grouse conservation consistent with the conservation objectives and provisions in the GRSG Plans. This guidance is also intended to ensure careful consideration of the factors identified below when making any leasing and development decisions.

The BLM does not manage leasing on Tribal Trust or allotted lands and the GRSG Plans do not apply to such lands. Therefore, the policy in this IM does not apply to leasing on Tribal Trust or allotted lands. However, the BLM does review Applications for Permit to Drill (APDs) and other permitting actions related to development on Tribal Trust and allotted lands. As noted below, to the extent the BLM receives a request for such a permitting action within PHMA, including an SFA, GHMA, or other GRSG habitat area (as described in footnote 2, the BLM will consult with the appropriate tribe(s) on a case-by-case basis as a part of its permitting decision-making process.

This policy applies to leasing of federal mineral estate and development on lands managed by the BLM and other federal surface management agencies.[3] This policy also applies to split estate lands in which the mineral estate is reserved to the United States.

The GRSG Plans include decisions to prioritize geothermal resources; however, due to varying workloads and processes this IM focuses on prioritization of oil and gas leasing and permitting and does not address the prioritization within the geothermal program. State offices will address prioritization and associated factors for geothermal resources on a case-by-case basis.

#### **A. Leasing: Sequential Prioritization of Oil and Gas Leasing in Proximity to PHMAs and GHMAs**

The GRSG Plans include a decision to "prioritize oil and gas leasing and development outside of identified PHMAs and GHMAs." (Rocky Mountain ROD at page 1-25, GB ROD at page 1-23).[4]

Therefore, based on the GRSG Plans' conservation objectives and provisions, the BLM will prioritize the leasing of oil and gas resources in accordance with the following *prioritization sequence*, in order to minimize further fragmentation and impacts to GRSG habitat or populations, and to seek greater certainty that project development can move forward expeditiously. Generally, areas open for leasing in the approved Plans will be prioritized as follows:

#### ***Prioritization Sequence for Leasing in or near GRSG Habitats***

In accordance with the BLM's discretion in offering lands for leasing, BLM State Offices will use the following prioritization sequence for considering leasing in or near GRSG habitat, while also considering the "Factors to Consider While Evaluating EOIs in Each Category" as described on the following page.

1. **Lands outside of GHMAs and PHMAs:** BLM State Offices will first consider leasing EOIs for lands outside of PHMAs and GHMAs. These lands should be the first priority for leasing in any given lease sale.
2. **Lands within GHMAs:** BLM State Offices will consider EOIs for lands within the GHMAs, after considering lands outside of both GHMAs and PHMAs. When considering the GHMA lands for leasing, the BLM State Office will ensure that a decision to lease those lands would conform to the conservation objectives and provisions in the GRSG Plans (e.g., Stipulations).
3. **Lands within PHMAs:** BLM state offices will consider EOIs for lands within PHMAs after lands outside of GHMAs and PHMAs have been considered, and EOIs for lands within GHMA have been considered. When considering the PHMA lands for leasing, the BLM State Offices will ensure that a decision to lease those lands would conform to the conservation objectives and provisions in the GRSG Plans (e.g., Stipulations) including special consideration of any identified SFAs.

#### **Factors to Consider While Evaluating EOIs in Each Category**

In accordance with the BLM's leasing discretion, the BLM will consider individual parcels within each of the categories in accordance with the *Prioritization Sequence* described above, and only thereafter consider, as appropriate, a combination of what applies from the following prioritization factors. These parcel specific factors are not presented in any particular order of importance:

- Parcels immediately adjacent or proximate to existing oil and gas leases and development operations or other land use development should be more appropriate for consideration before parcels that are not near existing operations. This is the most important factor to consider, as the objective is to minimize disturbance footprints and preserve the integrity of habitat for conservation.
- Parcels that are within existing Federal oil and gas units should be more appropriate for consideration than parcels not within existing Federal oil and gas units.
- Parcels in areas with higher potential for development (for example, considering the oil and gas potential maps developed by the BLM for the GRSG Plans) are more appropriate for consideration than parcels with lower potential for development. The Authorized Officer may conclude that an area has "higher potential" based on all pertinent information, and is not limited to the Reasonable Foreseeable Development (RFD) potential maps from Plans analysis.
- Parcels in areas of lower-value sage-grouse habitat or further away from important life-history habitat features (for example, distance from any active sage-grouse leks) are more appropriate for consideration than parcels in higher-value habitat or closer to important life-history habitat features (i.e. lek, nesting, winter range areas). At the time the leasing priority is determined, when leasing within GHMA or PHMA is considered, BLM should consider, first, areas determined to be non-sage-grouse habitat and then consider areas of lower value habitat.
- Parcels within areas having completed field-development Environmental Impact Statements or Master Leasing Plans that allow for adequate site-specific mitigation and are in conformance with the objectives and provisions in the GRSG Plans may be more appropriate for consideration than parcels that have not been evaluated by the BLM in this manner.
- Parcels within areas where law or regulation indicates that offering the lands for leasing is in the government's interest (such as in instances where there is drainage of Federal minerals, 43 CFR § 3162.2-2, or trespass drilling on unleased lands) will generally be considered more appropriate for leasing, but lease terms will include all appropriate conservation objectives and provisions from the GRSG Plans.
- As appropriate<sup>[5]</sup>, use the BLM's Surface Disturbance Analysis and Reclamation Tracking Tool (SDARTT) to check EOI parcels in PHMA, to ensure that existing surface disturbance does not exceed the disturbance and density caps and that development of valid existing rights (Solid Minerals, ROW) for approved-but-not-yet-constructed surface disturbing activities would not exceed the caps.

BLM state offices will use this *Prioritization Sequence*, these parcel-specific factors, and the BLM's workload capacity and other workload priorities as they determine work Plans for the oil and gas leasing program. If the state office does not offer a specific parcel identified in an EOI at the next regularly scheduled sale the BLM should inform the applicant of the reason the parcel was not included in the sale.

#### **Pending EOIs and Leases Sold But Not Issued**

The following addresses the parcels that have been nominated in the past, and leases sold but not yet issued. BLM state offices should consider these parcels, using the *Prioritization Sequence* above, and this additional guidance.

- Deferred Expressions of Interest:

For parcels located within identified PHMAs or GHMAs that were identified via EOIs and were deferred during the development of the GRSG Plans, the BLM State Office may decide if the deferred EOI in a PHMA or GHMA would need to be identified again through a new EOI. The BLM State Office will contact the applicant who submitted the EOI to inform them of the *Prioritization Sequence* and to find out if the applicant is still interested in these previously identified tracts. If the BLM receives a new EOI for the parcel, the BLM will inform the applicant that the BLM will consider the parcel using the prioritization factors above.

- **Leases Sold Prior to GRSG Plans – But Not Issued<sup>[6]</sup>**

This category refers to leases that were sold in previous BLM lease sales, but were not issued. Because all leases issued after the approval of the GRSG Plans must conform to the approved Plans, the BLM will not issue leases sold prior to the approval of the GRSG Plans unless the leases are consistent with the sequential prioritization approach described above and in conformance with the GRSG Plans and with the appropriate stipulations outlined in the GRSG Plans. Consistent with the sequential prioritization approach, the Authorized Officer may issue these leases (in accordance with all laws, regulations, and policies), after a 45-day public notice period declaring the revised stipulations.<sup>[7]</sup> If the successful bidder does not consent to the revised lease stipulations, the Authorized Officer will refund the bonus bid, the first year's rental payment, and the administrative fee to the successful bidder, and close the case. Refer to BLM Handbook H-3120-1 (*Competitive Leases*) for additional guidance.

### **Other Tools for Reducing Impacts to PHMAs and GHMAs**

The following provides a number of other tools to reduce impacts to PHMA, including SFAs, and GHMA habitat:

- **Mitigation:** To encourage leasing and development in the areas with the least GRSG conflicts, and in consideration of the DOI's and the BLM's policies regarding landscape-scale mitigation,<sup>[8]</sup> the Authorized Officer should consider whether the mitigation (avoidance, minimization, rectify, reduce, and compensate) will be sufficient to achieve the net conservation gain mitigation standard for any adverse impacts to GRSG habitat, as identified in the GRSG Plans.<sup>[9]</sup> One compensatory mitigation tool for achieving the net conservation gain mitigation standard, in addition to other restoration and preservation actions, that BLM might consider using is to request the record title owner(s) of existing Federal oil and gas leases located in SFAs, PHMAs, or other sensitive GRSG habitats to relinquish those leases as an offset to the potential impacts to GRSG and their habitats from activities arising from other implementation decisions or activities on valid existing leases located on the public lands. Lease relinquishment as a compensatory mitigation tool is a form of protection and is generally only appropriate for those leases in priority habitat with high-value GRSG habitat that also has a high potential and likelihood for development. The BLM is working on a manual and handbook on mitigation that are expected to address mitigation, including compensatory mitigation, in more detail. The GRSG Plans also provide guidance on appropriate mitigation. (See Mitigation Appendix in your Plans). BLM state offices will work with WO-310 as relinquishments are implemented until additional guidance is finalized.
- **Lease Suspensions:** The BLM is authorized to suspend all operations and production by direction or consent in the interest of conservation of natural resources. Accordingly, the Authorized Officer may consent to or direct lease suspensions where it is determined to be in the interest of the conservation of GRSG populations and habitats.<sup>[10]</sup> For example, a lease suspension might be considered if disturbance and density caps have been exceeded within a lease or to allow for the satisfactory restoration of existing surface disturbances within a PHMA before considering new operations in the PHMA that may meet or exceed a surface disturbance limitation under the approved Plans.
- **Lease Reinstatements:** When deciding whether to approve or deny a request for lease reinstatements, the Authorized Officer will consider the *Prioritization sequence*, whether the land is open to leasing under the approved Plans, whether it is in a PHMA or GHMA, and if the existing lease terms will remain in compliance with the conservation objectives and provisions of the GRSG Plans. If a lease reinstatement is approved, the stipulations of the GRSG Plans must be applied. If a lease reinstatement is denied, those lands may or may not be precluded from later consideration for leasing, in accordance with the authorizing officer's discretion to determine which public lands will be offered at a lease sale, but will be subject to the prioritization sequence policy described above.
- **In GRSG habitat it is especially important to continue to follow the standard operating procedure in H-3101-7 when inspecting wells and verifying drilling diligence on leases potentially eligible for a lease extension<sup>[11]</sup> before the date of potential lease expiration<sup>[12]</sup>.**
- **Where a lease in PHMA or GHMA has expired because the primary term has elapsed and no drilling has occurred (or where the lease is not held by production<sup>[13]</sup>), the BLM will not re-offer these parcels, and may only consider offering such lands if and when an EOI is submitted and the BLM determines it is appropriate to lease the lands if located in areas open to leasing under the approved Plans. Future leasing of the lands will be considered under the sequential prioritization approach described above, including the *Factors to be Considered While Evaluating EOIs* and provided that the new stipulations from the GRSG land use Plans are attached to the lease.**



- In GRSG habitat, when making a decision to cancel a lease for failure to comply with lease terms, the bond must remain in force and effect until all rents and royalties have been paid and final abandonment of all wells, including reclamation, has been approved. (H3108-1, H-3104 pg107, and 43 CFR § 3100).

#### **Configuration of Quarterly Lease Sales from BLM-Identified Lands and EOIs**

BLM state offices will take into account the EOIs, the GRSG plan decisions and goals, this prioritization sequence policy, other resource values, and workload capacity in configuring quarterly lease sales. This approach will allow for quarterly sales consistent with the conservation objectives and provisions in the GRSG Plans.

#### **Required Coordination when Leasing within a PHMA or GHMA is Proposed**

##### **Prior to NEPA Comment Period**

For each lease sale that includes parcels intersecting PHMAs or GHMAs, State Directors will provide a *Preliminary Lease Sale Summary* to WO-300 (cc WO-310) as soon as is feasible and at least 15 days prior to the date the first NEPA documentation for the lease sale is posted or released for public comment. A template with the information necessary for State Directors to include in the *Preliminary Lease Sale Summary* is included in Attachment 1.

##### **Prior to Holding a Lease Sale**

In addition, after any protests are received and as soon as is feasible, but at least 15 days before a lease sale is held, State Directors will provide a briefing memo to the WO-300 (cc WO-310) contact that includes a summary of any lease sale parcel protests related to GRSG (including protests addressing plan conformance and NEPA compliance when related to GRSG decisions, habitats, and populations). A briefing paper template is included in Attachment 2.

#### **B. Development: Sequential Prioritization of Permit Processing for Oil and Gas Development and Operations in Proximity to PHMAs and GHMAs**

As described above, an objective of this policy is to sequentially prioritize the leasing and development of oil and gas resources on public lands outside of GRSG habitat based on the GRSG Plans' conservation goals to avoid or limit new surface disturbance in Priority Habitat Management Areas (PHMAs) and minimize surface disturbance in General Habitat Management Areas (GHMAs). Similar to the way that leasing is handled above, BLM field offices will process Notices of Staking (NOSs)/Applications for Permit to Drill (APDs) or Sundry Notices that involve ground disturbance (referred to collectively as "permits" in this section) for wells that are proposed to be located outside of GHMAs and PHMAs first, then within GHMAs, then within PHMAs, and lastly, within PHMAs that may contain SFAs.

#### **Prioritization Sequence for Permits for Oil and Gas Development and Operations in or near GRSG Habitats**

When processing permits for oil and gas development and operations in or near GRSG habitat, follow this prioritization sequence:

1. Lands outside PHMAs/GHMAs: The BLM will encourage development outside of PHMAs/GHMAs by working with operators to focus their development proposals away from GRSG habitats.
2. Lands in GHMAs: Authorized Officers will use the prioritization sequence to meet the conservation objectives and provisions in the GRSG land use Plans by encouraging development in GHMA before development in PHMA, by taking into consideration the factors and existing prioritizations (as detailed below) GRSG land use Plans when processing permits for well locations.
3. Lands in PHMA: Authorized Officers will use the prioritization sequence to meet the conservation objectives and provisions in the GRSG land use Plans by encouraging development, first outside of GHMA/ PHMA, and then in GHMA, before development in PHMA, while taking into consideration the factors and existing prioritizations (as detailed below) when processing permits for well locations.

#### **Prioritization Factors to Consider (but not limited to and not in any particular order):**

- Well locations in an area with existing production facilities and surface disturbance should be more appropriate for consideration before well locations that are not immediately adjacent or proximate to existing operations.
- Well locations within a Federal oil and gas unit should be more appropriate for consideration than well locations not within existing Federal oil and gas units.
- Well locations within areas having completed field-development Environmental Impact Statements or Master Development Plans that allow for adequate site-specific mitigation and conformance with the GRSG land use Plans may be more appropriate for consideration than well locations that have not been evaluated by the BLM in this manner.



- Well locations in areas of lower-value GRSG habitat or distant from important life-history habitat features (for example, distant from any active GRSG leks) may be more appropriate for consideration than well locations in higher-value habitat or closer to important life-history habitat features.
- Well locations anticipated to result in a net conservation gain may be more appropriate for consideration. Approval of a permit may also occur in response to applicable law or regulations (including drainage cases or to ensure that the BLM honors valid existing rights). Conditions of Approval (COAs) attached to the permit should include all appropriate conservation objectives and mitigation requirements, such as required design features (RDF) from the GRSG land use Plans.<sup>[14]</sup>
- As appropriate, use SDARTT to check "project analysis areas"<sup>[15]</sup> in PHMA and SFA, to ensure that existing surface disturbance does not exceed the disturbance and density caps and that development of valid existing rights (Solid Minerals, Rights-Of-Way, etc.) for approved-but-not-yet-constructed surface disturbing activities would exceed the caps.

#### **Existing Prioritizations:**

BLM field offices should integrate the above prioritization sequence in their processing of pending permits as they consider the overall workload to fairly and objectively address their permitting prioritization. Only insofar as they are consistent with the prioritization approach described in this IM, BLM field offices may also take into consideration other prioritization considerations, such as considering permitting on a first-in/first-out basis to the extent possible, unit obligation wells, the efficiency to be gained in processing the easiest to complete first, the operator's drilling Plans, workload capacities, and other resource values.

#### **Development and Restoration within PHMAs/GHMAs**

Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with appropriate stakeholders, including the U.S. Fish and Wildlife Service, relevant State agencies, lessees, operators, or other project proponents to avoid, minimize, and compensate for unavoidable adverse impacts to sage-grouse or its habitat. The BLM will ensure that the best information about the GRSG and its habitat informs and guides development of such Federal leases to the extent compatible with lessees' rights to drill and produce fluid mineral resource with proper application of stipulations and conditions of approval.

When considering an NOS/APD or Sundry Notice involving ground disturbance activities proposed in PHMA and/or GHMA (even for leases issued prior to finalization of the GRSG land use Plans), the Authorized Officer will consider the BLM's environmental record of review. See 43 CFR § 3162.5-1(a). The environmental record of review includes appropriate documentation of NEPA compliance, alternatives that would implement the conservation measures described in the GRSG land use Plans, and applicable Best Management Practices (BMP) and Required Design Features (RDF); consistent with applicable regulations. If the Authorized Officer determines that the potential environmental impacts could be significant, the Authorized Officer will prepare an Environmental Impact Statement. In all cases, as the GRSG Plans decisions acknowledge (see RM ROD at page 2-2, GB ROD at page 2-2), the BLM must honor valid existing rights, such as in cases where the BLM issued a lease prior to the GRSG land use plan with terms and stipulations that may be different from those provided for in the GRSG land use plan. In addition, the BLM also has the authority to apply reasonable conditions of approval. 43 CFR § 3101.1-2.

The Authorized Officer will continue to work with all operators to plug idle wells, timely restore well sites with appropriate GRGS habitat seed mixes, reclaim roads, and enhance habitat (e.g., reduce fragmentation), with a restoration emphasis in GRSG habitat areas to support conservation goals. In addition, the Authorized Officer will be cognizant of sundry notices of operations that may be considered disruptive activities within GRSG habitats.

When the BLM receives an APD involving a well that is within a GRSG habitat area, but on Tribal Trust or allotted lands under BIA jurisdiction, the BLM will coordinate with the BIA and affected tribe(s).

**Timeframe:** This IM is effective immediately.

**Budget Impact:** Given the conservation challenges and the land management responsibilities, this policy will result in additional costs for increased planning, coordination, NEPA review, GIS, responding to administrative challenges, and associated program costs. It is anticipated that performance targets/units of accomplishment for the resource programs will adjust to reflect the added complexities and responsibilities. Timelines for wells within GRSG habitat may take longer to permit; however wells outside of habitat will be prioritized for processing.

**Background:** On September 21, 2015, the Department of the Interior and the BLM approved the GRSG RODs. Concurrently, the BLM amended or revised the Plans in GRSG habitat to provide conservation measures protective of GRSG and their habitats.

Along with other guidance being issued and prepared by the BLM, this IM serves to provide policy direction for the implementation of the GRSG land use Plans. This IM also satisfies the BLM's commitment in the GRSG ROD's to provide policy direction based on the objective of prioritizing oil and gas leasing and development outside of PHMAs and GHMAs. (See, e.g., Rocky Mountain ROD at page 1-40, GB ROD at page 1-41, "...additional guidance will be provided to clarify how the BLM will implement the objective of prioritizing future oil and gas leasing and development outside of GRSG habitat.") The final Approved Plans also included a decision that provided:

Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMAs and GHMAs, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).<sup>[16]</sup>

This IM and its attachments provide guidance to BLM Authorized Officers and field personnel to facilitate consistent implementation of these Plans decisions.

**Manual/Handbook Sections Affected:** None.

**Coordination:** This IM was coordinated with the U.S. Department of the Interior, Office of the Solicitor; BLM State Offices; the Renewable Resources and Planning Directorate; and the Energy, Minerals and Realty Management Directorate.

**Contact:** If there are any questions concerning this IM, please contact Michael D. Nedd, Assistant Director, Energy, Minerals and Realty Management (WO-300), at 202-208-4201. Your staff may also contact Steven Wells, Division Chief, Division of Fluid Minerals (WO-310), at 202-912-7143 or [s1wells@blm.gov](mailto:s1wells@blm.gov) (<mailto:s1wells@blm.gov>).

Signed by:

Steven A. Ellis

Deputy Director

Authenticated by:

Robert M. Williams

Division of IT Policy and Planning, WO-870

2 Attachments

1- Preliminary Lease Sale Summary Template (1 p)

2- Lease Sale in Greater Sage-Grouse Habitats Briefing Paper Template (1 p)

<sup>[1]</sup> These Records of Decision are accessible through links on the BLM webpage for Sage-Grouse and Sagebrush Conservation, at <http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html> ([/wo/st/en/prog/more/sagegrouse.html](http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html)).

<sup>[2]</sup> In addition to PHMAs, SFAs (a subset of PHMA), and GHMAs, other designations were made in the GRSG Plans. These include: "Important Habitat Management Areas" (IHMA – only applicable to the State of Idaho), "Linkage Connectivity Habitat Management Areas" (LCHMA – applicable only in Colorado), "Restoration Habitat Management Areas" (RHMA – applicable only in the Billings and Miles City Field Offices), and "Other Habitat Management Areas" (OHMA – only applicable to Nevada and Northeastern California, which contain no GRSG habitat). The BLM State Offices will consider leasing in these areas as is appropriate in accordance with the applicable RMP. Wyoming's "Core Areas" are generally designated PHMAs. IHMA are a level of protection in-between PHMA and GHMA; therefore, prioritization for processing development proposals will be implemented in this sequence: outside of GRSG habitat, then in GHMA, next in IHMA, and lastly in PHMA. Refer to the approved RMP, as revised or amended.

<sup>[3]</sup> For National Forest System Lands, this IM adheres to Section 226 (h) of the MLA, under which "The Secretary of the Interior may not issue any lease on National Forest System

Lands reserved from the public domain over the objection of the Secretary of Agriculture, and the 2006 Memorandum of Understanding (MOU) Between US Dept. of Interior BLM and US Dept. of Agriculture Forest Service Concerning Oil and Gas Leasing and Operations, "to insure coordination and consistency of lease stipulations and that the responsible agency heed the development process per the MOU."

[4] Although the Lander (Wyoming) ROD and Approved RMP do not include this objective, the procedures in this IM will be followed in the areas covered by that RMP in order to ensure consistency in the BLM's oil and gas leasing and development activities throughout the GRSG range. The prioritization of leasing and development is an administrative function, not an allocation decision, and so the Lander RMP does not need to be maintained or amended to adopt this approach to leasing and development.

[5] All new leases issued under the GRSG land use plans will have the stipulation for no surface occupancy (NSO) in PHMA (except WY); therefore, this exercise may not be necessary. In WY, leases issued within the PHMA Core habitat will have the controlled surface use (CSU) stipulation WL-4024, but BLM WY may want to use SDARTT to calculate existing and approved disturbance in parcels before they are offered.

[6] For example, Wyoming has approximately 170,000 acres in this status. Colorado has a few leases that were "sold but not issued." Most states do not have any leases that were "sold but not issued."

[7] 30 U.S.C. § 226 (A) ("Leases shall be issued within 60 days following payment by the successful bidder of the remainder of the bonus bid, if any, and the annual rental for the first lease year.")

[8] See Department Manual 600 DM 6, "Implementing Mitigation at the Landscape-scale" (October 23, 2015). See also Presidential Memorandum entitled "Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment" (November 3, 2015).

[9] *.....the BLM will require and ensure mitigation that provides a net conservation gain (the actual benefit or gain above baseline conditions) to the species. This would include accounting for any uncertainty associated with the effectiveness of such mitigation in PHMAs and GHMAs (except for the Wyoming, where this requirement only applies in PHMAs). (Rocky Mountain Region ROD, page 1-27; and as described in Wyoming ARMPA, MD GMD 2, page 26). Furthermore, the Wyoming RMP requires a net conservation gain for sage-grouse populations and habitats, consistent with the State of Wyoming Core Area Strategy. (see Wyoming ARMP, page 20.)*

[10] See 30 U.S.C. § 209 ("In the event the Secretary of the Interior, in the interest of conservation, shall direct or shall assent to the suspension of operations and production under any lease granted under the terms of this Act . . . ."); see also 43 CFR § 3103.4-4(a) ("A suspension of all operations and production may be directed or consented to by the Authorized Officer only in the interest of conservation of natural resources."). Federal courts have recognized that the phrase "in the interest of conservation," as used in Section 39 of the Mineral Leasing Act (30 U.S.C. § 209), includes the prevention of environmental harm. See *Copper Valley Machine Works, Inc. v. Andrus*, 653 F.2d 595, 602 (D.C. Cir. 1981); see also *Hoyl v. Babbitt*, 129 F.3d 1377, 1380 (10th Cir. 1997).

[11] Lease extension by drilling is only authorized for actual drilling operations that were commenced prior to and being **diligently** conducted over the expiration date of the primary term of the lease. See 43 CFR § 3107.1.

[12] (1) review the well drilling program to confirm it is designed to test and produce from at least one potentially productive oil and/or gas formation, (2) conduct a field inspection of the drilling location before the lease expiration date to verify actual drilling, and (3) ensure the well meets the criteria established in H 3107-1.

[13] Includes primary term leases, as well as, suspension of operations and production on leases with wells capable of production. See 43 CFR § 3103.4-4.

[14] Refer to footnote #9.

[15] Methodologies may vary from state to state. For example, Colorado uses Management Zones and Oregon uses Priority Areas for Conservation

[16] For example, see the BLM-Utah's Approved RMP Amendment – Attachment 4 to the GB ROD at page 2-25, Objectives MR-1 and MR-2. Similar language can be found in each of the RMPs.

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# IMPLEMENTATION OF GREATER SAGE-GROUSE RESOURCE MANAGEMENT PLAN REVISIONS OR AMENDMENTS – OIL & GAS LEASING AND DEVELOPMENT PRIORITIZATION OBJECTIVE

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*IM 2018-026*

Instruction Memorandum

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240

<http://www.blm.gov>

December 27, 2017

In Reply Refer To:  
3100(310) P

EMS Transmission: December 27, 2017  
Instruction Memorandum No. 2018-26  
Expires: 09/30/2021

To: Washington Office, State Offices and Field Office in Greater Sage-Grouse Habitat

From: Assistant Director, Energy, Minerals and Realty Management

Subject: Implementation of Greater Sage-Grouse Resource Management Plan Revisions or Amendments – Oil & Gas Leasing and Development Prioritization Objective

**Program Areas:** Fluid Minerals Leasing and Operations, Resource Management Planning, and Wildlife Management.

**Purpose:** This Instruction Memorandum (IM) replaces IM 2016-143. The purpose of this IM is to ensure consistency, certainty, and clarity when implementing an objective in the 2015 Greater Sage-Grouse (GRSG) Approved Resource Management Plan Revisions and Amendments (GRSG Plans) to prioritize oil and gas leasing outside of GRSG habitat,<sup>[1]</sup> while continuing to move forward expeditiously with oil and gas leasing and development, yet providing protections for GRSG and GRSG-habitat management areas.

**Policy/Action:** The GRSG Plans established an objective to prioritize oil and gas leasing and development outside of GRSG habitat management areas,<sup>[2]</sup> but to allow for leasing with appropriate stipulations on all BLM mineral estate designated in the GRSG Plans as "open" for leasing. In effect, the BLM does not need to lease and develop outside of GRSG habitat management areas before considering any leasing and development within GRSG habitat. This policy should allow for the BLM to efficiently conduct lease sales and permit oil and gas development while still protecting GRSG and GRSG habitat.

**Leasing**



- Where the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA, then SFA).
- Stipulations such as No Surface Occupancy (NSO) and Controlled Surface Use may be used as the BLM implements the GRSG Plans. The BLM can use these stipulations to encourage lessees to acquire leases outside of GRSG PHMA due to fewer restrictions in those areas than in higher priority habitat management areas. In addition, the BLM will continue to work with parties who file expressions of interest and potential lessees to voluntarily prioritize leasing in less-sensitive areas. Consistent with the GRSG Plans, however, parcels may be leased within GRSG habitat management areas without first leasing parcels in non-habitat areas.

### Leasing and Development

- The BLM will continue to work cooperatively with stakeholders, including state agencies, lessees, operators, landowners, and leasing proponents to avoid and minimize impacts to designated GRSG habitats.
- BLM Offices may also take into consideration other prioritization considerations, but only insofar as they are consistent with the governing land use plan. An example would be to prioritize outside of areas where a GRSG adaptive management trigger has been tripped. Other prioritization considerations may include office workload capacity, first-in/first-out, priority for unit obligation wells, processing the easiest applications first, operator drilling plans, operator proposals for units, potential drainage cases, and other resource values that must be considered.

### Development

The BLM must honor valid existing rights, such as in cases where the BLM issued a lease prior to the GRSG Plans, with terms and stipulations that may be different from those provided for in the GRSG Plans.<sup>[3]</sup> When approving permits on these leases, apply reasonable and appropriate site-specific mitigation as conditions of approval,<sup>[4]</sup> such as applicable Best Management Practices (BMP) and Required Design Features (RDF), as described in the GRSG Plans. If proposed development lies within an area that the GRSG Plans designate for an NSO stipulation, but the lease pre-dates the GRSG Plans, work cooperatively with the operator and respective stakeholders to find a location with the least impact to GRSG and other resources, to the greatest extent possible. The BLM will continue to work with stakeholders to use the best available science regarding GRSG and GRSG habitat when analyzing the impacts of leasing and development decisions in NEPA documents and when applying appropriate avoidance and minimization protective measures. If the authorized officer determines through an environmental analysis that the potential environmental impacts of approving a permit could be significant, the authorized officer will prepare an Environmental Impact Statement before taking action.

- 
- The authorized officer will continue to work with operators and stakeholders to timely restore well sites with the appropriate habitat seed mixes.

**Timeframe:** This IM is effective immediately.

**Budget Impact:** This policy will result in nominal costs for increased planning, coordination, National Environmental Policy Act review, GIS, responding to administrative challenges, and associated program costs. It is anticipated that performance targets/units of accomplishment for the resource programs will adjust to reflect the added complexities and responsibilities. Timelines for leasing and permitting activities within GRSG habitat management areas may take longer to process; however, parcels and permits outside of GRSG habitat will be prioritized for processing.

**Background:** The BLM authorized officer, acting under the delegated authority of the Secretary of the Interior, has discretion to determine which public lands will be offered at a lease sale. The Mineral Leasing Act of 1920 (MLA), as amended, provides that lands subject to disposition under the Act "which are known or believed to contain oil or gas deposits may be leased by the Secretary." (30 U.S.C. § 226(a) (emphasis added)).

On September 21, 2015, the Department of the Interior and the BLM approved the GRSG RODs. Concurrently, the BLM amended or revised the Plans in GRSG habitat to provide conservation measures protective of GRSG and their habitats.

The prior IM 2016-143 addressed leases sold, but not yet issued, and deferred parcels prior to the signing of the GRSG plan ROD. These have since been processed and no longer need to be discussed.

**Manual/Handbook Sections Affected:** None.

**Coordination:** This IM was coordinated with the U.S. Department of the Interior, Office of the Solicitor; BLM State Offices; the Renewable Resources and Planning Directorate; and the Energy, Minerals and Realty Management Directorate.

**Contacts:** Any questions regarding this IM may be directed to me at 202-208-4201 or by email at [tspisak@blm.gov](mailto:tspisak@blm.gov). You may also contact Steven Wells, Division Chief, Division of Fluid Minerals (WO-310), at 202-912-7143 or by email at [s1wells@blm.gov](mailto:s1wells@blm.gov).

Signed by:

Robert Jolley

Acting Assistant Director, Energy, Minerals and Realty Management

Authenticated by:

Catherine Emmett

WO-870, IT Policy and Planning

---

<sup>[1]</sup> Although the 2014 Lander (Wyoming) Record of Decision (ROD) and Approved Resource Management Plan (RMP) do not include an objective to prioritize oil and gas leasing outside of GRSG habitat, the procedures in this IM will be followed in the areas covered by that RMP in order to ensure consistency in the BLM's oil and gas leasing and development activities throughout the GRSG range. The prioritization of leasing and development is an administrative function, not an allocation decision, and so the Lander RMP does not need to be updated to adopt this approach to leasing and development.

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In-addition-to-Priority-Habitat-Management-Area-(PHMA), Sagebrush-Focal-Areas-(SFA), and General Habitat Management Areas (GHMA), other designations were made in the GRSG Plans. These include: "Important Habitat Management Areas" (IHMAs – only applicable to Idaho), "Linkage Connectivity Habitat Management Areas" (LCHMA – applicable only in Colorado), "Restoration Habitat Management Areas" (RHMA – applicable only in the Billings and Miles City Field Offices), and "Other Habitat Management Areas" (OHMAs – only applicable to Nevada and Northeastern California). Wyoming's "Core Areas" are generally designated PHMAs. Refer to your approved RMP, as revised or amended.

<sup>[2]</sup> This includes split estate lands.



<sup>[3]</sup> See for example, Rocky Mountain Record of Decision (RM ROD) at page 2-2, Great Basin Record of Decision (GB ROD) at page 2-2.

<sup>[4]</sup> 43 CFR 3101.1-2, 43 CFR 3162.3-1(h)(1), and 43 CFR 3162.5-1(a). In addition, Lease Form 3100-11 says: *to the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures.* Lease Form 3100-11 also discusses ceasing operations to protect species of scientific interest and denying the permit if impacts would be substantially different or greater than those associated with normal drilling operations.

## **Appendix D: Adaptive Management Plan**

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## ATTACHMENTS

Attachment 1 Technical Assistance Agreement

Attachment 2 Cooperative Agreement

## ABBREVIATIONS

<b>AMP</b>	Adaptive Management Plan
<b>ARMPA</b>	Approved Resource Management Plan Amendment
<b>BLM</b>	Bureau of Land Management
<b>BSU</b>	Biologically Significant Unit
<b>CIEA</b>	Consultants in Engineering Acoustics
<b>dB</b>	Decibel
<b>dBA</b>	A-weighted Decibel
<b>EA</b>	Environmental Assessment
<b>EPM</b>	Environmental Protection Measure
<b>GPS</b>	Global Positioning System
<b>MD</b>	Management Decision
<b>mph</b>	Miles Per Hour
<b>NDOW</b>	Nevada Department of Wildlife
<b>NSO</b>	No Surface Occupancy
<b>OP/UP</b>	Operation Plan / Utilization Plan
<b>PMU</b>	Population Management Unit
<b>Project</b>	McGinness Hills Phase III Development Project
<b>SUI</b>	Space Use Index
<b>USFS</b>	United States Forest Service
<b>USFWS</b>	United States Fish and Wildlife Service
<b>USGS</b>	United States Geological Survey
<b>WS</b>	United States Department of Agriculture, Animal and Plant Health Inspection Service Wildlife Services

## D1 Introduction

Adaptive management is a decision process that promotes flexible resource management decision-making (BLM 2015). This Adaptive Management Plan (AMP) is modeled after Appendix J of the Approved Resource Management Plan Amendment (ARMPA) (BLM 2015) and includes hard and soft triggers for population and habitat impacts to greater sage-grouse (*Centrocercus urophasianus*). Appendix J of the ARMPA includes larger-scale reporting and trigger assessment, but this AMP focuses on the project-scale impacts.

This AMP was developed to provide a framework for evaluating and addressing impacts to greater sage-grouse and their habitat from the McGinness Hills Phase III Development Project (Project). This document discusses mitigation measures previously required for Phases I and II of the Project and incorporates updated adaptive management triggers that will be followed for Phase III of the Project, when certain criteria are met to avoid and minimize impacts to greater sage-grouse. As an appendix to the Environmental Assessment for the Project, this AMP also demonstrates ARMPA conformance for the Project.

### 1.1 Scale and Reporting Units

The following scales are applicable to this AMP:

- Lek – Individual breeding display sites where male and female greater sage-grouse congregate, with males performing courtship displays to gain mating opportunities with females.
- Lek cluster – A group of leks in the same vicinity, between which greater sage-grouse may interchange over time and representing a group of closely related individuals.
- Population Management Unit (PMU) – Areas delineated based on aggregations of greater sage-grouse lek locations, where the potential for genetic interchange (short-term) among populations is high.
  - Specific PMU to this AMP is the Toiyabe PMU.

### 1.2 Management Decisions

The following ARMPA Management Decisions (MDs) are applicable to this AMP:

- **MD SSS 19:** If a soft trigger is reached, the Bureau of Land Management (BLM) will identify the causal factor and apply additional project-level adaptive management and/or mitigation measures contained in the authorization to alleviate the specific or presumptive causes in the decline of greater sage-grouse populations or its habitats and include the following:
  - The adjustment in management would be based on the causal factor and would affect only the area being impacted in the lek cluster or other appropriate scale;
  - Greater sage-grouse populations and habitat would continue to be monitored annually; and
  - If the causal factor were not readily discernable, then an interdisciplinary team, including BLM, United States Forest Service (USFS) (if applicable), and Nevada Department of

Wildlife (NDOW), would identify the appropriate mitigation or adjusted management actions in a timely manner.

- Ormat has an agreement with the United States Geological Survey (USGS) to collect data on an annual basis. This agreement is effective from 2012-2022. USGS' data will be used to calculate the necessary information to determine if a population or habitat trigger has been met. The Project's Wildlife Working Group members (i.e., interdisciplinary team) would be responsible for developing the appropriate management adjustment or mitigation if the causal factors are not clearly discernable or attributable to the Project.
- **MD SSS 22:** As determined by BLM in coordination with NDOW, for any surface-disturbing activities involving mineral activities and rights-of-way actions, BLM will require that active and pending leks be monitored annually within four miles of disturbance until the use terminates and all disturbances have been restored. The proponent will fund the services of an independent qualified biologist approved by the BLM, in coordination with NDOW, consistent with applicable law.
- Ormat has an agreement with USGS to collect lek count data on an annual basis. This agreement is effective until 2022. After that date, Ormat will be responsible for contracting a qualified biologist to conduct annual lek monitoring at active and pending leks within four miles of the Project.

## D2 Adaptive Management Triggers

Soft triggers are intermediate thresholds indicating that management changes are needed at the project level to address greater sage-grouse habitat and population losses. If a soft trigger is reached, the BLM would apply additional mitigation measures to alleviate the specific or presumptive causes in the decline with consideration of local knowledge and conditions.

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from greater sage-grouse conservation goals and objectives as set forth in the ARMPA.

### 2.1 Population Triggers

Greater sage-grouse state-space models (Coates et al. 2015) will be used to estimate the rate of greater sage-grouse population growth and the number of males at individual lek, lek cluster, Biologically Significant Unit (BSU), and Management Zone scales.

Modeled growth rates will be calculated at the relevant management levels annually, as lek data are finalized by NDOW. The model will be used to establish population growth rates using lek data in BSUs for the sub-region. When lek cluster data is adequate, the same method can be applied to an individual lek or the local population to provide adaptive management strategies at the appropriate scale. The following triggers are applicable to this AMP:

- Individual Lek:
  - A soft trigger is reached when the following criteria are met:
    - The population rate of change of a lek is less than 0.85 to 0.95 for two consecutive years; **and**

- The population rate of change of the lek in relation to the lek cluster reference is less than 0.85 to 0.95 for both years.
  - A hard trigger is reached when the following criteria are met:
    - The population rate of change of a lek is less than 0.01 to 0.15 for one year; **and**
    - The population rate of change of the lek in relation to the lek cluster reference is less than 0.01 to 0.15 for one year.
  - Three consecutive soft triggers will result in a hard trigger being reached.
  - The causal factor(s) evaluation area is the greater sage-grouse seasonal habitats and use areas associated with the lek. If the seasonal habitats have not been defined, then the space use index (SUI) (Coates et al. 2015) will be used.
  - The trigger response areas are the greater sage-grouse seasonal habitats and use areas associated with the lek that is specifically affected by the causal factor(s). If the seasonal habitats have not been defined, then the SUI will be applied.
- Lek Cluster (Project Level):
  - A soft trigger is reached when the following criteria are met:
    - The population rate of change of the lek cluster is less than 0.90 for two consecutive years; **and**
    - The population rate of change of the lek cluster in relation to the BSU is less than 0.90 for both years.
  - A hard trigger is reached when the following criteria are met:
    - The population rate of change of the lek cluster is less than 0.10 for one year; **and**
    - The population rate of change of the lek cluster in relation to the BSU is less than 0.10 for one year.
  - Three consecutive soft triggers will result in a hard trigger being reached.

## 2.2 Habitat Triggers

Habitat trends would be evaluated by changes in greater sage-grouse habitat characteristics identified in the habitat objectives (Table 2-2 of the ARMPA) and the percent of sagebrush cover. Lek scale trends incorporate the project boundary (e.g., geothermal lease unit boundary) and greater sage-grouse seasonal habitats within four miles of the disturbance boundary. Site-level trends would be based on changes in habitat components using the methods in the Sage-grouse Habitat Assessment Framework (Stiver et al. 2015).

- Lek or lek cluster:
  - A soft trigger is reached when the habitat disturbance exceeds five percent of any individual greater sage-grouse seasonal habitat component used by the local population.
  - A hard trigger would be reached when the habitat disturbance exceeds 10 percent of any individual greater sage-grouse seasonal habitat component used by the local population.



## D3 Trigger Responses

When a soft trigger is reached, the causal factor would be identified, and if determined that the causal factor is directly related to the Project, then management actions would be adjusted to lessen the cause by applying project-level adaptive management. For example, if a soft trigger is reached and vehicle collisions are determined to be the cause, speed reductions on Project roads could be implemented. Any proposed trigger responses would be approved by the Project's Wildlife Working Group.

If a hard trigger is reached and factors associated with the Project area determined to be the cause, Appendix J of the ARMPA requires the area to be managed as no surface occupancy (NSO), because it is within Priority Habitat Management Area. NSO is defined as a fluid mineral leasing stipulation that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. When NSO is applied, it affects any new leases in the area, and lessees may only develop geothermal resource under the NSO boundaries using directional drilling from sites outside the NSO area.

However, NSO is not currently a stipulation of the Project's lease and cannot be applied to Ormat's valid existing right. Therefore, the alternative hard trigger response would be developed by the Wildlife Working Group to apply appropriate mitigation and adaptive management that would not violate Ormat's valid and existing right.

## D4 Mitigation Measures for the Revised OP/UP

This section outlines the mitigation measures applicable to the Revised Operation Plan/Utilization Plan (OP/UP) for the McGinness Hills geothermal facilities. These measures are applicable to all Phases of the Project. Ormat's committed Environmental Protection Measures (EPMs) are discussed in **Section 2.3.10** of the Environmental Assessment (EA).

The Project would require the implementation of the Common Raven Monitoring, Mitigation, and Management Plan (**Section 4.3 of this Appendix**). This plan includes the following mitigation measures:

- During all phases of the Project (i.e., construction and maintenance), all food, waste, and trash will be placed in closed containers.
- Ormat will prohibit employees, contractors and sub-contractors from feeding wildlife or leaving food available for scavenging wildlife.
- Ormat will acquire common raven depredation permits from NDOW or the United States Fish and Wildlife Service (USFWS).
- Ormat will ensure that timing of shift changes and deliveries within the Project Area will be scheduled outside the lekking period (March 1 through May 15, from 6 pm to 4:30 am and 5:30 am to 9 am).
- Venting pressure or steam to the atmosphere (e.g., during well or flow testing) would occur outside the lekking period (March 1-May 15, 6 pm to 9 am).
- Construction or maintenance activities (including helicopter fly-overs) associated with well pads, pipelines, transmission line tie-ins, plant facilities, and roads will not be permitted within four miles of active leks during the lekking period (March 1 through May 15, from 6 pm to 9 am).

- During the period from April 1 to June 30, pre-construction nest surveys will be conducted prior to any proposed surface-disturbing activities. The area to be disturbed and a 0.5-mile radius buffer will be surveyed by BLM-approved specialists to determine if nesting sage-grouse are present. If an active nest is located, a 0.5-mile radius buffer will be placed around the nest and no surface-disturbing activities will occur until the nest is vacated.
- Non-reflective, tinted windows will be utilized in Project buildings to reduce visual disturbance.

## **D5 Monitoring Requirements for the Revised OP/UP**

### **5.1 Sound Pressure Level Monitoring within the Project Area and 2-Mile Buffer**

The main goal for sound pressure level monitoring is to ensure that Project-related sound pressure levels ( $L_{50}$ ) do not exceed 10 dBA (A-weighted decibels) above existing baseline ( $L_{90}$ ) noise values. During the lekking season (March 1 to May 15), when leks are active (two hours before and after sunrise), continuous sound pressure level monitoring will be conducted at four leks closest to the Project, using appropriate acoustic monitoring equipment. To determine seasonal lek locations, and in cooperation with NDOW, at least one lek survey would be completed prior to placement of monitoring equipment. Acoustic monitoring equipment will be placed at the lek edge closest to the Project during the afternoon (12 pm to 4 pm) to avoid disruption to lek activity. During the lekking season, Ormat is required to monitor sound pressure levels daily and report any levels exceeding 10 decibels (dB) above existing baseline values to the BLM immediately. Weekly reports of sound pressure monitoring will also be filed with the BLM.

### **5.2 Sage-Grouse Population Monitoring within the Project Area and 2-Mile Buffer**

Ormat is currently contracted with USGS through 2022 to collect the required greater sage-grouse data (**Attachment 2**).

Annual monitoring of sage-grouse leks will be required. This includes both active leks and leks with unknown status, until those leks with unknown status are determined to be inactive. Conversely, if any unknown status leks are determined to be active, the active leks mitigation would apply. Data sheets or copies of these data sheets will be provided weekly to the BLM, NDOW, and USFS. Lek surveys must be completed by BLM/USFS-approved biologist/s following standard lek survey protocol and ensure the following:

- Surveys must be conducted between March 15 and May 15 of each year. Male lek attendance is typically greatest later in the season; thus, adjustments to lek survey schedules may be needed to collect accurate data.
- Surveys must be conducted at least four times per lek during the lekking season with eight days between lek visits.
- A center point of the lek activity will be recorded during each monitoring visit to document any shift in the lek location over time. The center point location will be recorded with a Global Positioning System (GPS) unit either after lek activity has dispersed or by projecting the location using a rangefinder and compass bearing.

- Surveys must be conducted from one-half (1/2) hour before sunrise until 10:00 AM each survey period.
- Utilizing current roads, transects will need to be completed within the 2-mile project buffer area to look for new leks. This will also need to be completed within the above seasonal and daily time frames.
- To account for and evaluate annual climatic variations that may be influencing male lek attendance, the results from each of the monitored leks should be compared to the closest NDOW trend leks outside the Project influence.

Monitoring movements of sage-grouse at the affected leks will be conducted through radio-telemetry efforts. This monitoring will provide additional information should shifts in lek locations occur after the Project has been initiated. All efforts regarding capture and telemetry will be the responsibility of Ormat through coordination with the BLM, USFS, and NDOW. A minimum of three males and three females per targeted lek will be monitored per season for all affected leks. A minimum of one GPS radio-collar per lek per sex will be utilized. If radio-collars continue to function annually, the same males and females as previous years may be monitored. Monitoring will occur at minimum once per week during the lekking season (March 1-May 15), and once per month outside of the lekking season.

### 5.3 Common Raven Monitoring

A common raven monitoring plan will be implemented to assess changes in raven numbers and identify areas of increased raven use due to Project development and human activities associated with the Project.

- Resumes and experience of potential biological monitors will be submitted to and approved by the BLM before monitoring begins.
- During construction and year one and two of operations, weekly monitoring for raven nests will be completed from March 1–July 31 at the production plants, well pads, and along the transmission line.
- Basic information that will be recorded for each monitoring session will include: 1) date and time of day, 2) observer, 3) location (NAD 83 UTM), 4) activity (i.e., perching/nesting, flying, ground, 5) any other avian mortalities associated with the transmission line (e.g., raptors, sage-grouse); if ravens are located perching or nesting, note what structure is being utilized).
- During weekly monitoring, all unoccupied nests and nesting material will be removed from Project structures as located. If eggs are present in nests, a location and description (as described above) will be recorded, but the nest will be left intact until further mitigation is deemed necessary.
- A monthly report summarizing findings will be submitted to the BLM, USFWS, and NDOW.

#### 5.3.1 Trigger

Through the Common Raven Monitoring plan, the Operator [Ormat] will coordinate with the BLM, USFWS, and NDOW to determine the effectiveness and adequacy of initial mitigation measures as determined by raven trends documented in monthly reports. If initial mitigation measures are deemed adequate over the three-year period, monitoring frequency may be reduced or eliminated as agreed upon by the BLM, USFWS, and NDOW. If initial mitigation measures are deemed inadequate because

sustained increases in raven occurrences are documented during the raven and greater sage-grouse breeding seasons, or if a trend in raptor and greater sage-grouse mortalities is detected in association with the transmission line, the measures in the following section may also need to be implemented.

### 5.3.2 Additional Mitigation Measures

- Additional perch deterrents on Project structures will be required if monitoring identifies areas where raven perching, roosting, or nesting is concentrated or regularly occurring. Specific details on type of deterrent to be used will be determined and coordinated by the BLM, USFWS, and NDOW based on the Project structure.
- Hazing using auditory and visual deterrents may be useful if areas of concentrated raven presence are identified. Methods may include visual deterrents, such as streamers or flagging, and auditory deterrents, such as gas cannons. A variety of methods would need to be implemented and frequently changed to increase efficacy of deterrents.
- Lethal measures to reduce raven numbers in the Project area may also be needed to reduce raven presence around the Project. This would require the Operator [Ormat] to acquire a common raven depredation permit through United States Department of Wildlife Services (WS)<sup>1</sup> and USFWS. Primary depredation activities would focus on removal of active raven nests (those with eggs or chicks) and raven management using chicken egg baits treated with CPTH (3-chloro-p-toluidine hydrochloride) or another approved compound. Details regarding this depredation permit would be finalized during the permitting process by the United States Department of Agriculture, Animal and Plant Health Inspection Service Wildlife Services and USFWS.

## D6 Previously Committed Mitigation and Monitoring and Ormat's Compliance

This section describes the mitigation and monitoring that was required for Phases I and II of the Project. Also outlined in this section is Ormat's compliance, to date, or each measure.

### 6.1 Required Mitigation

The monitoring and mitigation measures outlined in this section are taken from Appendix C of the Development EA (BLM 2011).

#### 6.1.1 C1.1 Mitigation of Direct Effects Associated with the Geothermal Components and Transmission Line

*Mitigation Requirement:*

Ormat will complete, at a 4:1 ratio (NGSCT 2010), terrestrial habitat restoration/enhancement, and improvements to compensate for disturbance in sage-grouse habitat in the vicinity of the Project. Ormat will fund all restoration and enhancement projects to BLM and/or USFS specifications, following all BLM/USFS requirements.

At a 4:1 ratio, this equates to 868 acres (4 x 217 acres) of habitat restoration/enhancement. The potential or likely treatment areas to be restored/enhanced include BLM/USFS managed lands within the vicinity of

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<sup>1</sup> This department refers to the United States Department of Agriculture, Animal and Plant Health Inspection Service Wildlife Services.

the Project area, as shown on Figure 1 (from BLM 2011). These potential treatment areas will be identified on a case-by-case basis, based on field inventory of habitats, conditions, and potential value to sage-grouse as well as indications of effects to sage-grouse based on monitoring results. A preference will be given to areas in close proximity to the Project, but outside a 2-mile buffer around the project, thus minimizing any conflicting indirect effects of Project operation, testing, or maintenance. Preference for habitat restoration/enhancement treatment areas will also be given to locating restoration/enhancement in NDOW-designated sage-grouse core-breeding habitat (Figure 14 in the EA as denoted in light blue). While the project will directly and indirectly impact core-breeding habitat, the goal of the restoration/enhancement efforts will focus on entire habitat throughout the life cycle of sage-grouse. Habitat enhancement/restoration treatments will be prescribed for specific sites based on the probability of successful restoration/enhancement and the greatest benefit to local sage-grouse metapopulations (i.e., a group of spatially separated populations of the same species, which interact at some level). The determination of where a specific restoration/improvement/enhancement project is located and when work would be conducted would rest with the BLM/USFS to allow for incorporation of applicable study or monitoring data and identification of areas with the best habitat potential. Prior to implementation of these various or potential treatment options (and after an area is designated for treatment) cultural surveys and Native American Consultation/Coordination will be completed per BLM/USFS protocols.

Goals of these restoration/enhancement projects will be established based on habitat requirements for sage-grouse. Examples of these requirements include breeding habitats with 15-25 percent sagebrush canopy cover, grass cover greater than or equal to 15 percent and a diverse forb cover greater than or equal to 10 percent. Breeding habitats should also have a perennial herbaceous cover that is greater than or equal to 18-centimeter in height. In winter habitat areas, the sagebrush canopy cover should be 10 to 30 percent with heights of 25-35 centimeters (Connelly et al. 2000). Additional guidelines from the Western Association of Fish and Wildlife Agencies (Connelly et al. 2000) may be used in conjunction to those outlined above.

Restoration/enhancement projects could be completed in R-1, R-2, R-3, or R-4 value habitats (NGSCT 2010). These R-values are restoration habitats defined from the *Energy and Infrastructure Development Standards to Conserve Greater Sage-Grouse Populations and Their Habitats in Nevada* (NGSCT 2010). Below are the descriptions for the associated R-values:

- R-1 – Habitat areas that currently lack sufficient sagebrush and are currently dominated by perennial grasses and forbs, yet have the potential to produce sagebrush plant communities with a good understory composition of desired grasses and forbs.
- R-2 – Existing sagebrush habitat areas with insufficient desired grasses and forbs in the understory to meet seasonal needs of sage-grouse.
- R-3 – Sagebrush habitat areas where pinyon-juniper encroachment has affected the potential to produce sagebrush plant communities that provide adequate cover and forage to meet the seasonal needs of sage-grouse.
- R-4 – Habitat areas that have the potential to produce sagebrush plant communities, but are currently dominated by annual grasses, annual forbs, or bare ground.

Treatments may include the following:

- Burn restoration (historic burns) including: seedings (sagebrush and understory vegetation via broadcast, broadcast and harrow, drill or hand planting of seedlings), noxious and invasive plant treatment (Plateau® for cheatgrass and other herbicides as needed for other invasive and/or noxious weed species), and possible temporary fencing to protect areas of restoration;
- Brush thinning via mechanical methods, herbicide or hand thinning followed by seeding (seeding to be done via broadcast or drill methods) to increase the diversity in monotypic sagebrush habitats;
- Mechanical or hand shrub thinning or green stripping to reduce fuels and fire risk to sage-grouse habitats followed with successful seeding (seeding to be done via broadcast or drill methods);
- Weed treatment followed with successful seeding (seeding to be done via broadcast or drill methods);
- Pinyon-juniper reduction by hand thinning areas in which shrubs are still the dominant form (phase I pinyon-juniper woodland) or are co-dominant (early phase II pinyon-juniper woodland).

Implementation of the above 4:1 land treatment options would be a requirement of the BLM/USFS approval of Ormat's various applications for the McGinness Hills Geothermal Development Project.

*Ormat Compliance:*

Through the McGinness Hills Geothermal Project Cooperative Agreement for Sage-Grouse Conservation and Mitigation (**Attachment 2**), Ormat funded the previously authorized monitoring and mitigation plan in the amount of \$602,400. This amount is based on the 217 acres of authorized disturbance, 34 acres of brood-rearing habitat, and a 4:1 ratio at \$600 per acre. The funds are managed by NDOW, in cooperation with BLM, for the sole purpose of funding conservation, monitoring, and mitigation actions to offset impacts associated with Phase I and II of the Project. As of late 2017, approximately \$106,066.25 in funds have been expended from this account, with \$155,000 under contract and to be completed by April 2018. NDOW, BLM, and USFS have also provided matching funds in conjunction with project completion.

### **6.1.2 C.1.2 Mitigation of Predation Effects Associated with the Transmission Line**

*Mitigation Requirement:*

The Project would require the implementation of the Common Raven Monitoring, Mitigation, and Management Plan (Appendix D of BLM 2015). This plan includes the following mitigation measures:

- During all phases of the Project (i.e., construction and maintenance), all food, waste, and trash will be placed in closed containers.
- Ormat will prohibit employees, contractors and sub-contractors from feeding wildlife or leaving food available for scavenging wildlife.
- Road-killed animals on the Project site and associated travel routes will be promptly removed and disposed of in closed containers to eliminate access to ravens.
- Presence of road-killed animals will also be minimized by Ormat's environmental protection measure of a maximum 25 miles per hour (mph) speed limit within the Project area.

- Ormat has committed to implement the following environmental protection measures: perch and nest deterrents on all power poles; single-pole transmission line design (APLIC 2006).
- Ormat will acquire common raven depredation permits from NDOW or USFWS.

This mitigation is required; there are no trigger points.

*Ormat Compliance:*

Ormat staff promptly remove and properly dispose of road-killed animals and staff adhere to a 25 mph speed limit on all Project roads. Perch and nest deterrents were included on all power poles during the construction phase. Up to this point, NDOW has indicated that raven control mechanisms (i.e., deterrents or depredation) should not be conducted at the Project site because it would skew the raven monitoring data being collected by USGS.

### **6.1.3 C.1.3 Mitigation of Indirect Effects to Sage-Grouse Leks from Geothermal Project Construction, Testing, and Maintenance**

*Mitigation Requirement:*

- Ormat will ensure that timing of shift changes and deliveries will be scheduled outside the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).
- Venting pressure or steam to the atmosphere (e.g., during well or flow testing) would occur outside the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).
- Construction or maintenance activities (including helicopter fly-overs) associated with well pads, pipelines, transmission lines, plant facilities, and roads will not be permitted within two miles of active leks during the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).
- Noise generated by the Project will be managed so that sound pressure levels will be below 49 dBA (MTSGWG 2005; NDGFD 2005; WYSGWG 2006) at active leks during the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).

This mitigation is required; there are no trigger points.

*Ormat Compliance:*

Ormat has been in compliance with these mitigation requirements and restrictions applied during lekking period. Noise monitoring reports concluded that the 49 dBA threshold has not been exceeded at any measured leks from 2012 to 2017 (CIEA 2012, 2013, 2014, 2015, 2016, and 2017).

### **6.1.4 C.1.4 Mitigation of Indirect Effects of the Project to Sage-Grouse Brood-Rearing Habitat**

*Mitigation Requirement:*

During the period from March 15 to June 30, nest “clearance” surveys will be conducted prior to any proposed surface-disturbing activities. The area to be disturbed and a 0.5-mile radius buffer will be surveyed by BLM/USFS-approved specialists to determine if nesting sage-grouse are present. If an active nest is located, a 0.5-mile radius buffer will be placed around the nest and no surface-disturbing activities will occur until the nest is vacated.

This mitigation is required; there are no trigger points.

*Ormat Compliance:*

Surface disturbance was necessary during the construction phase of Phases I and II. Ormat completed nest clearance surveys for surface disturbance activities during the specified time period (March 15 to June 30).

### **6.1.5 C.1.5 Mitigation of Indirect Effects to Nesting Sage-Grouse from the Geothermal Project**

*Mitigation Requirement:*

Ormat will complete treatments at a 4:1 ratio (NGSCT 2010) to protect, enhance and/or restore brood-rearing habitat in targeted locations on BLM- or USFS-managed land near the Project; this equates to 136 acres (4 x 34 acres). The specific areas to be treated will be identified on a case-by-case basis, determined by field inventory of habitats, conditions, and potential value to sage-grouse. Treatments will be prescribed for specific sites based on the probability of successful restoration/enhancement and the greatest benefit to local sage-grouse metapopulations. The design for these projects will allow access to water for beneficial use through the use of water gaps. Placement and construction of exclosures will also need general concurrence from the appropriate permittee/s. Ormat will fund all such restoration/enhancement/protection projects to BLM or USFS specifications.

- Treatments may include fencing of riparian areas and meadows for protection, plantings or seedings of desired native riparian species to increase biodiversity and habitat condition, stream restoration to improve riparian areas where there are currently incised channels or nick points, and treatment of invasive and noxious weeds (e.g., salt cedar). Stream restoration may include check dams, rip/rap fortification of damaged banks and nicks, and large boulder placement within stream channels to decrease water velocity during peak flows.
- Riparian exclosures may be grazed if the BLM or USFS determine that it would be beneficial to riparian health. Specifics of this grazing will be based on a return to a healthy riparian condition based on current sage-grouse guidelines and working with the local grazing permittee/s.

This mitigation is required; there are no trigger points.

*Ormat Compliance:*

Through the McGinness Hills Geothermal Project Cooperative Agreement for Sage-Grouse Conservation and Mitigation (**Attachment 1**), Ormat funded the previously authorized monitoring and mitigation plan in the amount of \$602,400. This amount is based on the 217 acres of authorized disturbance, 34 acres of brood-rearing habitat, and a 4:1 ratio at \$600 per acre. The funds are managed by NDOW, in cooperation with BLM, for the sole purpose of funding conservation, monitoring, and mitigation actions to offset impacts associated with Phase I and II of the Project. As of late 2017, approximately \$80,000 in funds have been expended from this account.



### **6.1.6 C.1.6 Mitigation of Indirect Effects Associated with the Visual Presence of Project Components**

#### *Mitigation Requirement:*

Where Project lighting is required, low output, motion sensor lights will be installed at facilities and must be shielded and directed to focus light only on the area requiring illumination. In addition to limiting human activity impacts to sage-grouse, such lighting will assist Ormat in meeting the National Dark Skies initiative where ambient nighttime lighting has been identified as causing potential impacts to many wildlife species including volant species such as bats.

Non-reflective, tinted windows will be utilized in Project buildings to reduce visual disturbance.

This mitigation is required; there are no trigger points.

#### *Ormat Compliance:*

Low output, shielded lights were installed at both Phase I and II facilities and the well field. Motion sensors were also installed, but have not been utilized to their full potential due to safety concerns within the plant facilities. However, Ormat will be utilizing the motion sensors to their intended extent from this time forward (Ormat 2017).

## **6.2 Monitoring of Mitigation Effectiveness**

All mitigation measures outlined above (Section 4.1) are effective for the life of the Project unless subsequent monitoring deems them inadequate and modification is necessary. Subsequent monitoring will include sound pressure level monitoring, greater sage-grouse population monitoring, and common raven population monitoring (Appendix D of BLM 2015). Because time lags in greater sage-grouse response to development have been documented (Walker et al. 2007; Harju et al. 2010), all monitoring will be conducted for a minimum of 10 years, commencing with construction of permitted activities.

The monitoring and mitigation outlined in this section are taken from Appendix C of the Development EA (BLM 2011).

### **6.2.1 C.2.1 Sound Pressure Level Monitoring within the Project Area and 2-Mile Buffer**

The main goal for sound pressure level monitoring is to ensure sound pressure levels are below 49 dBA (MTSGWG 2005; NDGFD 2005; WYSGWG 2006). By recording daily sound pressure levels and monitoring sage-grouse activity at lek locations, a determination can be made as to the adequacy of the 49 dBA level to protect sage-grouse leks. During the lekking season (March 15-May 15), when leks are active (one hour before sunrise –10:00 AM), continuous sound pressure level monitoring will be conducted at the four leks closest to the Project using appropriate acoustic monitoring equipment. To determine seasonal lek locations, at least one lek survey would be completed prior to placement of monitoring equipment. Acoustic monitoring equipment will be placed at the lek edge closest to the Project during the afternoon (12:00 –16:00) to avoid disruption to lek activity. During the lekking season, Ormat is required to monitor sound pressure levels daily and report any levels of 49 dBA and above to the BLM immediately. Weekly reports of monitoring will also be filed with the BLM.

*Ormat Compliance:*

Ormat has contracted with Consultants in Engineering Acoustics (CIEA) to conduct noise monitoring at leks in the vicinity of the Project since 2012.

**6.2.1.1 Trigger**

If through daily monitoring, sound pressure levels are documented that exceed 49 dBA at any lek, Ormat must implement additional mitigation measures to reduce sound pressure levels below 49 dBA immediately. Sound pressure level monitoring data documenting successful reduction in dBA levels must be demonstrated and reported to the BLM within one week of the occurrence.

*Ormat Compliance:*

Reports from CIEA state that no exceedances of the 49 dBA threshold occurred in 2012, 2013, 2014, 2015, 2016, and 2017 at measured leks (CIEA 2012, 2103, 2014, 2015, 2016, and 2017).

*Changes and Application for Phase III:*

This trigger has been modified for Phase III to account for best available science and ARPMA conformance as follows:

If through daily monitoring, Project-related sound pressure levels are documented that exceed 10 dBA above existing baseline values at any lek, Ormat must implement additional mitigation measures to reduce sound pressure levels below the 10 dBA threshold immediately. Sound pressure level monitoring data documenting successful reduction in dBA levels must be demonstrated and reported to the BLM within one week of the occurrence.

**6.2.1.2 Additional Mitigation Measures**

Future mitigation measures to reach appropriate sound pressure levels include the following:

- Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing Project equipment during lekking hours (one hour before sunrise–10:00 AM) during the lekking season (March 15-May 15);
- Employment of an acoustic engineer to identify and assess options to further reduce noise from Project components;
- Installation of sound damping shelters, walls, enclosures, or other barriers for pumps or other noise-producing equipment to reduce noise emitting from geothermal facilities (e.g., power plant, wellheads, etc.);
- Reducing the amount or changing the timing of project related vehicular traffic;
- Installing poly-slats on chain link fences or other barriers around geothermal facilities to further attenuate noise emitted from those facilities.

*Ormat Compliance:*

Poly-slats have already been installed in the chain link fence that surrounds both Phase I and Phase II power plants.

*Changes and Application for Phase III:*

These additional mitigation measures would be applicable to Phase III, if the revised trigger is met. Poly slats will be installed on chain link fence that surrounds the Phase III power plant. Additionally, Ormat has committed to the following EPM:

- Installation of sound dampening shelters, walls, enclosures, or other barriers around existing and proposed production wells to reduce noise emissions.

One measure has been updated as follows to conform with the ARMPA noise restrictions:

- Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing Project equipment during from two hours before and after sunrise during the breeding season (March 1 to June 30).

### **6.2.2 C.2.2 Sage-Grouse Population Monitoring within the Project Area and 2-Mile Buffer**

Annual monitoring of sage-grouse leks will be required. This includes both active leks and leks with unknown status, until those leks with unknown status are determined to be inactive. Conversely, if any unknown status leks are determined to be active, the active leks mitigation would apply. Data sheets or copies of these data sheets will be provided weekly to the BLM, NDOW, and USFS. Lek surveys must be completed by BLM/USFS-approved biologist/s following standard lek survey protocol and ensure the following:

- Surveys must be conducted between March 15 and May 15 of each year. Male lek attendance is typically greatest later in the season; thus, adjustments to lek survey schedules may be needed to collect accurate data.
- Surveys must be conducted at least four times per lek during the lekking season with eight days between lek visits.
- A center point of the lek activity will be recorded during each monitoring visit to document any shift in the lek location over time. The center point location will be recorded with a GPS unit either after lek activity has dispersed or by projecting the location using a rangefinder and compass bearing.
- Surveys must be conducted from one-half (1/2) hour before sunrise until 10:00 AM each survey period.
- Utilizing current roads, transects will need to be completed within the 2-mile project buffer area to look for new leks. This will also need to be completed within the above seasonal and daily time frames.
- To account for and evaluate annual climatic variations that may be influencing male lek attendance, the results from each of the monitored leks should be compared to the closest NDOW trend leks outside the Project influence.

Monitoring movements of sage-grouse at the affected leks will be conducted through radio-telemetry efforts. This monitoring will provide additional information should shifts in lek locations occur after the Project has been initiated. All efforts regarding capture and telemetry will be the responsibility of Ormat through coordination with the BLM, USFS, and NDOW. A minimum of three males and three females per targeted lek will be monitored per season for all affected leks. A minimum of one GPS radio-collar per lek per sex will be utilized. If radio-collars continue to function annually, the same males and females as

previous years may be monitored. Monitoring will occur at minimum once per week during the lekking season (March 15-May 15), and once per month outside of the lekking season.

*Ormat Compliance:*

Ormat entered into an agreement with USGS in March 2012 to collect greater sage-grouse data for the Project (**Attachment 2**). This data is being used to inform the space-use modeling. This agreement included data collection for a period of 10 years, starting in 2012. USGS data collection includes lek monitoring, raven and raptor monitoring, monitoring movement of greater sage-grouse, greater sage-grouse nest monitoring, monitoring brood-rearing, survival, and habitat measurements during breeding season.

#### **6.2.2.1 Trigger**

If population monitoring detects any of the following conditions, and they are determined to be a result of the Project, Ormat must take measures to mitigate these impacts.

- Greater than 50 percent decrease in the average three-year lek attendance compared to the long-term average.
- Greater than 50 percent decrease in male lek attendance in two consecutive years of monitoring.

*Ormat Compliance:*

Several leks have had a 50 percent or greater decrease in male lek attendance when compared to the long-term average (2011 to 2016). Those leks include Grass Valley 3, Lower Ox Corral, New Lek 2, New Lek 6, and Ridge Lek, which is described in Table 4.3-2 of the Draft Environmental Assessment (BLM 2017). However, the causal factors for these declines have not yet been determined.

*Changes and Application for Phase III:*

This trigger is superseded by the trigger described in **Section 2.1** of this Appendix.

#### **6.2.2.2 Mitigation**

Mitigation measures to eliminate decreased male lek attendance:

- Reduction in sound pressure level to 40 dBA (Crompton 2005) at greater sage-grouse leks must be demonstrated during the next lekking season. This may be accomplished by adjusting to stricter levels of the previously identified measures:
  - Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing Project equipment during lekking hours (one hour before sunrise–10:00 AM), during the lekking season (March 15-May 15);
  - Employment of an acoustic engineer to identify and assess options to further reduce noise from Project components;
  - Installation of sound damping shelters, walls, enclosures, or other barriers for pumps or other noise-producing equipment to reduce noise emitting from geothermal facilities (e.g., power plant, wellheads, etc.);
  - Reducing or changing the timing of vehicular traffic;

- Installing poly-slats on chain link fences or other barriers around geothermal facilities to further attenuate noise emitted from those facilities.

*Ormat Compliance:*

Poly-slats have already been installed in the chain link fence that surrounds both Phase I and Phase II power plants.

The above mitigation assumes that noise is the causal factor for decline in male lek attendance, with the measures aimed at reducing noise levels to 40 dBA. Existing baseline noise levels for active and pending leks within four miles of the Project range from 15.5 to 24.1 dBA (Saxelby 2017); therefore, it is assumed that no further mitigation would occur until the casual factors can be determined.

*Changes and Application for Phase III:*

Because the triggers identified in **Section F2** supersede those described above, the trigger responses described in **Section F3** of this document would also supersede those described above.

## **6.3 Common Raven Monitoring, Mitigation, and Management Plan**

The monitoring and mitigation measures outlined in this section are taken from Appendix D of the Development EA (BLM 2011).

### **6.3.1 Immediate Mitigation Measures**

- During all phases of the Project (i.e., construction and maintenance), all food, waste, and trash will be placed in closed containers.
- Ormat will prohibit employees, contractors and sub-contractors from feeding wildlife or leaving food available for scavenging wildlife.
- Road-killed animals on the Project site and associated travel routes will be promptly removed and disposed of in closed containers to eliminate access to ravens.
- Presence of road-killed animals will also be minimized by Ormat's environmental protection measure of a maximum 25 mph speed limit within the Project area.
- Ormat has committed to implement the following environmental protection measures: perch and nest deterrents on all power poles; single-pole transmission line design (APLIC 2006).
- Ormat will acquire common raven depredation permits from NDOW or USFWS.

*Ormat Compliance:*

Ormat has complied with all of the above mitigation measures, except for acquiring a common raven depredation permit. Up to this point, NDOW has indicated that raven control mechanisms (i.e., deterrents or depredation) should not be conducted at the Project site because it would skew the raven monitoring being conducted by USGS.

### **6.3.2 Monitoring**

A common raven monitoring plan will be implemented to assess changes in raven numbers and identify areas of increased raven use due to Project development and human activities associated with the Project.

- Resumes and experience of potential biological monitors will be submitted to and approved by the BLM before monitoring begins.
- During construction and year one and two of operations, weekly monitoring for raven nests will be completed from March 1–July 31 at the production plants, well pads, and along the transmission line.
- Basic information that will be recorded for each monitoring session will include: 1) date and time of day, 2) observer, 3) location (NAD 83 UTM), 4) activity (i.e., perching/nesting, flying, ground, 5) any other avian mortalities associated with the transmission line (e.g., raptors, sage-grouse); if ravens are located perching or nesting, note what structure is being utilized).
- During weekly monitoring, all unoccupied nests and nesting material will be removed from Project structures as located. If eggs are present in nests, a location and description (as described above) will be recorded, but the nest will be left intact until further mitigation is deemed necessary.
- A monthly report summarizing findings will be submitted to the BLM, USFWS, and NDOW.

*Ormat Compliance:*

Ormat has contracted with USGS to collect raven data in the vicinity of the Project. Data has been provided in annual summaries, though no trend analysis has been provided to date. Therefore, it is unknown if additional mitigation measures are needed to address predation impacts from ravens.

### **6.3.3 Trigger**

Through the monitoring plan, the Operator [Ormat] will coordinate with the BLM, USFWS, and NDOW to determine the effectiveness and adequacy of initial mitigation measures as determined by raven trends documented in monthly reports. If initial mitigation measures are deemed adequate over the three-year period, monitoring frequency may be reduced or eliminated as agreed upon by the BLM, USFWS, and NDOW. If initial mitigation measures are deemed inadequate because sustained increases in raven occurrences are documented during the raven and greater sage-grouse breeding seasons, or if a trend in raptor and greater sage-grouse mortalities is detected in association with the transmission line, the measures in the following section may also need to be implemented.

*Ormat Compliance:*

To date, this trigger has not been met.

### **6.3.4 Additional Mitigation Measures**

- Additional perch deterrents on Project structures will be required if monitoring identifies areas where raven perching, roosting, or nesting is concentrated or regularly occurring. Specific details on type of deterrent to be used will be determined and coordinated by the BLM, USFWS, and NDOW based on the Project structure.
- Hazing using auditory and visual deterrents may be useful if areas of concentrated raven presence are identified. Methods may include visual deterrents, such as streamers or flagging, and auditory deterrents, such as gas cannons. A variety of methods would need to be implemented and frequently changed to increase efficacy of deterrents.
- Lethal measures to reduce raven numbers in the Project area may also be needed to reduce raven presence around the Project. This would require the Operator [Ormat] to acquire a common

raven depredation permit through United States Department of Wildlife Services (WS)<sup>2</sup> and USFWS. Primary depredation activities would focus on removal of active raven nests (those with eggs or chicks) and raven management using chicken egg baits treated with CPTH (3-chloro-p-toluidine hydrochloride) or another approved compound. Details regarding this depredation permit would be finalized during the permitting process by WS<sup>1</sup> and USFWS.

- Retroactive installation of flight diverters along the transmission line to reduce the likelihood of avian collisions.

*Ormat Compliance:*

To date, the trigger has not been met so these additional mitigation measures have not been applied.

## D7 References

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# **ATTACHMENT 1**

## **Technical Assistance Agreement**

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## TECHNICAL ASSISTANCE AGREEMENT

This Technical Assistance Agreement is entered into by and between U.S. Geological Survey, a Bureau of the Department of the Interior, through the offices of its Western Ecological Research Center, Sacramento, CA, hereinafter referred to as the "USGS" and Ormat Nevada, Inc., hereinafter referred to as "Collaborator."

Whereas, the USGS is authorized to perform technical assistance with other Federal agencies, units of State or local government, industrial organizations, private corporations, public and private foundations, and nonprofit organizations (including universities) under the Stevenson-Wydler Act (15 U.S.C. § 3710a, as amended);

Whereas, the USGS is charged with providing science and decision-support tools for policy-makers, resource managers and the public and to enable these stakeholders to better anticipate and predict the outcomes of their decisions. The USGS conducts basic, place-based research which details the vulnerabilities of the Nation's species and natural communities to stressors, including land-use practices, climate change, contaminants and invasive pests, diseases and competing species. In addition, the USGS conducts research which enhances renewable energy opportunities while minimizing risks to our Nation's natural resources. The data collected in this project regarding the greater sage-grouse will provide critical information for the continued management of the species as well as provide land managers with the information they need to make informed decisions regarding renewable energy development in sagebrush ecosystems.

Whereas, Collaborators have the need for USGS expertise in monitoring Greater Sage-Grouse vital rates and movement patterns in relation to the development of the McGinness Geothermal Facility and associated infrastructure.

Whereas, the project is intended by the parties to be mutually beneficial and to benefit the people of the United States;

Now, therefore, the parties hereto agree as follows:

**1. Statement of Work.** See attached Statement of Work (SOW) (Attachment A), incorporated by reference herein.

**2. Principal Investigator.** The USGS principal investigator (PI) for this project is **Michael Casazza, (530) 669-5075, [mike\\_casazza@usgs.gov](mailto:mike_casazza@usgs.gov). 6924 Tremont Road, Dixon, CA 95620.** The PI for the Collaborator is **Scott Kessler, (775) 336-0114, [skessler@ormat.com](mailto:skessler@ormat.com). 6225 Neil Rd., Reno, NV 89511.** In the event that a PI is unable to continue in this project, his sponsoring agency will make every effort to substitute a replacement acceptable to the other party.

3. **Title to Equipment.** There will be no joint property purchased as a result of the work outlined in the SOW. Each party will provide its own equipment necessary to support its participation in the technical evaluation.

4. **Term.** The technical assistance contemplated by this agreement will commence on the effective date of this agreement. The effective date of this agreement shall be the later date of (1) **[March 19, 2012]** or (2) the date of the last signature by the parties. The expiration date of this agreement shall be **March 19, 2017**. The agreement may be extended by mutual written agreement of the parties as the monitoring period is expected to continue for up to ten years.

5. **Funding/Cost Share.**

(a) The Collaborator will provide an estimated \_\_\_\_\_ n funds for the first five years of this expected ten year project. The Collaborator is providing in-kind services valued at \_\_\_\_\_ (see Attachment B and C for full description).

(b) The USGS requires an advance of \_\_\_\_\_ The USGS will invoice ORMAT for \_\_\_\_\_ annually from the Period of Performance start date and for the length of the agreement, but not to exceed \_\_\_\_\_. USGS will submit expenditure reports on a quarterly basis.

(c) The USGS will submit invoices to the Collaborator's administrative contact, identified in Article 9, on an annual basis. Invoices not paid within 60 days of receipt, will bear interest at the annual rate established by the U.S. Treasury pursuant to 31 USC § 3717. In the event that project costs are projected to exceed budgeted amounts, USGS will provide the Collaborator with 90 days written notice and both USGS and the Collaborator would need to agree to modification of this agreement before any excess expenditures are incurred.

(d) The USGS is providing in-kind services valued at \_\_\_\_\_ o the collaboration which includes time and travel by research scientist as well as telemetry equipment such as radio-receivers, antennas, animal capture equipment and supplies.

6. **Termination.** This agreement may be terminated by either party on 120 days written notice to the other. In the event of an early termination, the USGS shall be reimbursed for any completed work or work in progress on the Effective Date of Termination (i.e., when the agreement actually terminates following the receipt of written notice from the other party). Any unspent advanced funds will be returned to Collaborator. The USGS shall also supply a copy of the evaluations completed as of the Effective Date of Termination in the event of an early termination of the project. This provision shall survive the termination of the agreement.

7. **Publications/Reports.**

(a) USGS will be free to publish any non-proprietary results of the research.

(b) Under the authority of 15 USC § 3710a (c)(7)(B), as amended, the parties will have the opportunity, as part of the technical assistance, to identify protected research and development

information, which is defined as information generated by the research which would have been proprietary information had it been obtained from a non-Federal entity. Each party may designate as protected research and development information, any information generated by its own employees, and with the agreement of the other party, mark any information produced by the other party's employees. Such protected research and development information shall be exempt from disclosure under Subchapter II of Chapter 5 of Title 5. After the protected research and development information period has expired, the USGS may publish the results of the research as part of open literature (journal and proceeding articles) or as USGS open file reports.

(c) Generated information and results which have been created and marked as protected research and development information may be protected from release or disclosure for a period of **2** years, unless an earlier date is agreed upon by the parties.

**8. Intellectual Property and Background Intellectual Property.** No intellectual property is expected as a result of the technical effort.

**9. Notices.** Any notice required to be given or which shall be given under this agreement shall be in writing and delivered by first-class mail to the parties as follows:

**USGS:**

**Technical:**

Michael Casazza  
U.S. Geological Survey  
Dixon Field Station  
6924 Tremont Road  
Dixon, CA 95620  
mike\_casazza@usgs.gov  
530-669-5075

**Administrative:**

Cindy C. Lu  
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3020 State University Dr. East,  
Modoc Hall, Suite 3006  
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Clu@usgs.gov  
(916) 278-9480

DUNS No. 025304002  
Tax ID No. 530196958

**Collaborator:**

**Technical:**

Scott Kessler  
Ormat Nevada, Inc.  
6225 Neil Rd.  
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skessler@ormat.com  
775-336-0114

**Administrative:**

Angie Dykema  
Ormat Nevada, Inc.  
6225 Neil Rd.  
Reno, NV 89511  
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775-336-0108

**Financial Contact Information for Collaborator:**

Connie Stechman  
6225 Neil Rd., Reno, NV 89511  
775-336-0103  
775-356-9039  
DUNS No. 965558229  
Tax ID No. 27-3935185

**10. Independent Entity.** For purposes of this agreement and all research and services to be provided hereunder, each party shall be, and shall be deemed to be, an independent party and not an agent or employee of the other party. Each party shall have exclusive control over its employees in the performance of the work. While in field locations, a party's employees shall adhere to the safety and technical requirements imposed by the party controlling the work site.

Neither party shall have authority to make any statements, representations, or commitments of any kind, or take any action, which shall be binding on the other party, except as may be explicitly provided for herein or authorized in writing. Neither party may use the name of the other in advertising or other forms of publicity without the written permission of the other.

**11. Governing Law.**

(a) The validity and interpretation of this agreement are subject to interpretation under Federal law. Each party agrees to be responsible for the activities, including the negligence, of their employees. The USGS responsibility for the payment of claims for loss of property, personal injury, or death caused by the negligence or wrongful act or omission of a USGS employee, while acting within the scope of their employment, is limited to provisions of the Federal Tort Claims Act, 28 USC §§ 2671-80.

(b) The USGS and the Collaborator make no express or implied warranty as to the conditions of the research, merchantability or fitness for a particular purpose of the research, data, or resulting product incorporating data developed and exchanged under the SOW. These provisions shall survive the termination of the agreement.

**12. Force Majeure.** Neither party shall be liable for any unforeseeable event beyond its control, not caused by the fault or negligence of such party, which causes such party to be unable to perform its obligations under this agreement, and which it is unable to overcome by the exercise of due diligence including, **but** not limited to, flood, drought, earthquake, storm, fire, pestilence, lightning, and other natural catastrophes; epidemic, war, riot, civil disturbance, or disobedience; strikes, labor disputes, or failure, threat of failure, or sabotage; or any order or injunction made by a court or public agency. In the event of the occurrence of such a force majeure event, the party unable to perform shall promptly notify the other party. It shall further use its best efforts to resume performance as quickly as possible and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

13. **Entire Agreement.** This agreement contains all of the terms of the parties and supersedes all prior agreements and understandings related thereto. This agreement can be changed or amended only by a written instrument signed by the parties. Due to the specialized nature of the work, this contract is non-assignable by both parties.

14. **Disputes.** The signatories to this agreement shall expend their best efforts to amicably resolve any dispute that may arise under this agreement. Any dispute that the signatories are unable to resolve shall be submitted to the Director of the USGS or his/her designee and the [insert title] of the Collaborator or his/her designee for resolution.

15. **Miscellaneous Provisions.** Pursuant to the Anti-Deficiency Act, 31 U.S.C. §1341 (a)(1), nothing herein contained shall be construed as binding the USGS to expend in any one fiscal year any sum in excess of its appropriations or funding in excess of what it has received for the collaborative work outlined in the SOW.

16. **Survivability.** The following provisions shall survive the termination of this Agreement: 1, 3, 5-8, 10-16.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed on the last date listed below.


U.S. GEOLOGICAL SURVEY

By: 

Name: Steven E. Schwarzbach

Title: WERC Center Director

Date: 1 March 2012

By: 

Digitally signed by Mark K Sogge  
DN: cn=Mark K Sogge, o=  
ou=Associate Regional Executive,  
email=mark\_sogge@usgs.gov,  
c=US  
Date: 2012.03.05 18:47:47 -07'00'

Name: Jeffrey A. Keay

Title: Acting PSWA Regional Executive

Date: 3-5-12

COLLABORATOR

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_



## Attachment A. Statement of Work (SOW)

*SAGE-GROUSE MONITORING AND RESEARCH PROPOSAL*

**TITLE:** EVALUATING GREATER SAGE-GROUSE POPULATIONS IN RELATION TO MCGINNESS GEOTHERMAL POWER PLANT AND ASSOCIATED INFRASTRUCTURE

**BACKGROUND INFORMATION:**

*Geothermal Energy and Nevada.* A growing demand for domestic energy production coupled with a shift in the nation's energy policy has resulted in important developments in utility-scale renewable energy sources. Ten percent of this nation's energy is expected to be generated by renewable resources by 2012 and 25% by 2025. Geothermal power has the potential to provide a significant contribution to our base load electricity generation in the U. S., now making geothermal a fast growing sector of the renewable energy industry.

Nevada was ranked the highest among the western states in the number corridors issued to promote renewable energy development. This high ranking was largely because of Nevada's favorable hydrothermal reservoirs and relatively high percentage of public land (87%). The Nevada Renewable Energy Portfolio Standard is currently set at 20% energy generated from renewable sources by 2015, with a significant portion from geothermal sources. Within the next 10 years, it is thought that Nevada will produce more energy from geothermal sources than any other state within the U. S., increasing geothermal production by more than 10 times its current level. Geothermal reservoirs in Nevada include large portions of sagebrush steppe, the largest arid ecosystem in the U. S. While geothermal power has substantial benefits of low greenhouse gas emissions and air pollution, there is an imminent need to consider the potential positive and negative impacts to wildlife populations and their habitat. With careful evaluation and planning, potential negative effects could be eliminated during all phases of geothermal exploration and production.

*Sage-grouse and Energy Development.* Understanding impacts to sage-grouse populations are of particular concern. Sage-grouse (*Centrocercus urophasianus*), one of many species of prairie grouse nationwide, are highly sensitive to environmental stressors within a sagebrush steppe ecosystem (Connelly et al. 2004). Since Euro-American settlement, sage-grouse range has declined substantially (Schroeder et al. 2004) and population numbers have been reduced in many states (Connelly et al. 2004), including Nevada. Sage-grouse are thought to be an indicator species for the health of the sagebrush steppe ecosystem based on habitat requirements at different life-stages (Patterson 1952). Also, sage-grouse are referred to as an umbrella species (Rowland et al. 2006), mainly because they function at relatively large spatial scales and the management practices benefit numerous imperiled species that often function at smaller spatial scales, such as pygmy rabbits (*Brachylagus idahoensis*). Sage-grouse were recently designated a candidate (category 8) "Warranted but Precluded" status under Endangered Species Act of 1973 administered by the USFWS.

Development of geothermal energy and the associated infrastructure may have direct and indirect effects on sage-grouse populations. Direct effects can result when sage-grouse avoid development areas and collide into infrastructure causing fatality. The most likely cause of avoidance is anthropogenic noise pollution, which is thought to be an important detrimental factor that limits bird distributions and reduces

reproductive success (Francis et al. 2009). In studies of oil and gas drilling, male sage-grouse attendance was reduced substantially more at leks with increased noise than that of control leks (Blickley and Patricelli, In Press). Namely, drilling was associated with a 38% decline and vehicle noise was associated with a 75% decline. The current noise stipulation for geothermal sites in relation to lek sites is 49 dBA, which is 10 dBA over ambient (39 dBA). This standard is not well-supported by studies and requires further study. Although information of geothermal energy development for sage-grouse is lacking, population-level impacts and avoidance by sage-grouse in relation to non-renewable energy development has been documented (Braun et al. 2002, Lyon and Anderson 2003, Kaiser 2006, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008).

Infrastructure related to energy development (e.g., transmission lines) is thought to influence movement patterns, fatality rates (i.e., collision; Connelly et al. 2000), and the location of nests and leks (traditional breeding grounds). The infrastructure that is associated with geothermal energy is likely more influential than the geothermal power plants themselves. For example, transmission lines often intersect more habitats and, thus, have greater potential to adversely affect sage-grouse. Research on greater prairie chickens (*Tympanuchus cupido*), a species related to sage-grouse, demonstrated that placement of transmission lines from renewable energy sources in Kansas disrupted their daily movement patterns, which was thought to reduce population connectivity (Pruett et al. 2009). Furthermore, transmission lines coupled with other forms of anthropogenic factors (e.g., agriculture, roads, etc.) may lead to cumulative effects on sage-grouse populations.

Information on indirect effects of development of energy facilities and infrastructure is limited. These effects are potentially the most detrimental to sage-grouse populations over longer periods of time. Indirect effects are defined as effects in which the cause-effect relationship (e.g., between energy development and the ultimate effect on sage-grouse) has intermediary effects, meaning that the path that one variable influences another is through an intervening variable (mediator). For example, anthropogenic structures are thought to contribute indirectly to elevated predation rates on sage-grouse nests. This occurs when development influences changes in predator composition. Numbers of common raven (*Corvus corax*), an important predator of sage-grouse nests (Coates et al. 2008), have increased concomitantly with availability of tall structures (used for nesting) and road development (provide roadkill) that contribute to greater survival and reproduction rates of these predators (Knight and Kawashima 1993, Boarman and Heinrich 1999, Boarman et al. 2006). Increased numbers of ravens result in high predation rates on sage-grouse nests (Coates et al., In Press), which can negatively impact population growth (Schroeder and Baydack 2001). Therefore, these anthropogenic subsidies may indirectly influence population persistence (see Figure 1). Similarly, changes in raptor communities caused by increased infrastructure may affect vital rates of juvenile and adult grouse.

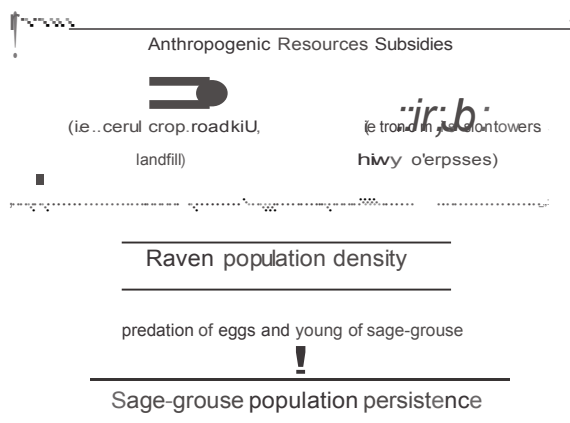


Figure 1. Conceptual framework of the hypothesized indirect effect of anthropogenic resource subsidies on sage-grouse populations.

**STUDY PROBLEM:**

Current increased initiatives for geothermal energy production in sagebrush ecosystems, coupled with conservation concerns of sage-grouse populations, have created an imminent need to monitor and research populations of sage-grouse adjacent to a newly developed geothermal facility and their infrastructure. Geothermal companies and land managers share a common goal, which is the ability to derive energy from Nevada's hydrothermal reservoirs while preventing the decline of sage-grouse and other sagebrush obligate species. Accomplishing this goal will require rigorous scientific information.

**STUDY RATIONALE:**

Geothermal is an important source of renewable energy within the Great Basin. Sage-grouse is of high public interest and is a candidate species for listing under the Endangered Species Act of 1973. A well-designed study will provide biologically sound and scientifically defensible information on the responses of sage-grouse populations to development and functioning of geothermal power plants. This proposed research will be focused on estimating positive and negative effects at the McGinness geothermal site in northern Nevada using advanced telemetry (Global Positioning System and radio-transmitters), extensive surveying, statistical models, and spatial analyses in Geographical Information Systems. Empirical findings of this research are needed and will be available for geothermal developers and state and federal agencies for successful mitigation strategies. Multiple peer-reviewed articles, reports, maps and a guidance document as a result will inform guideline standards for siting, permitting, and construction of geothermal and associated infrastructure as they relate to sage-grouse and sagebrush steppe ecosystems at state and national levels. These findings will also help to avoid unnecessary mitigation measures where perceived effects are benign. Furthermore, because sage-grouse populations function at relatively large scales and use different habitat types within a sagebrush steppe ecosystem based on their life-stages, the management practices that result from these research findings will often apply to numerous other species. Furthermore, findings from this study will help contribute to our overall understanding of how to continue to support our nation's energy demands while conserving our natural resources.

**STUDY OBJECTIVES AND METHODS**

Scientists from WERC plan to enter into a partnership with NDOW, BLM, USFWS, universities, and ORMAT to conduct monitoring and research at geothermal and control sites. The study objectives were designed to answer research questions regarding sage-grouse response to geothermal development in sagebrush ecosystems and meet monitoring obligations for ORMAT described in Greater Sage-Grouse Conservation Measures Implementation Plan for McGinness geothermal site. Specific mitigation obligations within the plan consist of lek counts and telemetry monitoring of sage-grouse populations. Additional monitoring to meet research objectives includes raven and vegetation surveys at nest, brood, and general telemetry locations. Details of the monitoring and analyses are listed below. The three primary purposes of this effort are to:

- 1) Develop an effective collaboration between ORMAT and management and research agencies to better our knowledge of actions that meet energy demands while conserving sage-grouse populations.
- 2) Identify and estimate the positive and negative effect of geothermal related factors on sage-grouse movement, vital rates, and lek attendance using a well-designed study.
- 3) Develop multiple publishable products, based on these findings, which could be used in guideline standards at the national and state level for geothermal energy development.

- 4) Develop a spatially-explicit map of sage-grouse habitat in relation to the geothermal site to better-inform upcoming decisions by land managers and developers.

### Short-Term Objectives

These findings will provide relevant information for developers and state and federal agencies for immediate decisions regarding exploration and siting of geothermal energy resource facilities. The primary short-term objectives include:

- 1) Estimate probability of lek persistence and identify changes in grouse lek attendance and visitation rates in relation to variation in noise associated with geothermal activity.
- 2) Estimate probability of lek persistence and identify changes in grouse lek attendance and visitation rates in relation transmission lines, roads, and facilities associated with geothermal activity.
- 3) Estimate raven densities by habitat type and in relation to distance to transmission lines and facilities.
- 4) Identify seasonal use areas, movement corridors, and identify patterns in movement between seasonal habitat in relation to power lines and facilities.

### Methods and Analyses for Short-Term Objectives

- *Lek Monitoring.* We will conduct lek counts following the detailed protocol in Connelly et al. (1993) at all active leks as identified in the mitigation measures documents for both geothermal sites. Inactive leks will also be monitored for activity. Leks at the greatest distance from a geothermal facility are thought to have no impact by the activities and will represent controls while those in close proximity may have the greatest impact and will represent experimental units. Effects will be identified by estimating interactions between distance and time. Thus, distance (measurement using GIS) will be incorporated into the model to represent the continuum of potential effects, which often confounds categorical-based approaches. We plan to conduct surveys at each lek at least 4 times through the breeding period 15 March – 15 May. We will evaluate generalized additive models to estimate lek trends and evaluate the effect of noise and other anthropogenic factors on grouse lek counts and persistence. These values will provide information to guide standards for geothermal development that aim to reduce adverse effects on sage-grouse populations. We will capture a subsample of males from each lek and place leg bands. During lek visitations lek bands will be read to estimate visitation rates. We will use robust models to estimate detection rates and population growth based on mark and resightings at chosen lek sites.
- *Raven and Raptor Monitoring.* We will conduct point surveys for ravens and raptors throughout study sites from 15 April – 01 August each year. We will use binoculars to count the numbers of avian predators, flying or perched, at each point. Rangefinders and compasses will be used to calculate a projected UTM coordinate of each avian predator. We will also assign a sample of points to areas designated for development and survey them before and after development at various distances. We will use generalized linear models to estimate the effect of factors associated with geothermal activities on the probability of occurrence of ravens, raptors, and smaller avifauna from point surveys. To understand factors that influence raven and raptor populations we will investigate metrics related to various anthropogenic factors (e.g., distance to transmission line) in the probability of occurrence models. We will further calculate density estimates for each species by habitat type. Raven and raptor densities will be estimated in relation to anthropogenic structures, roads, and landscape characteristics.

- *Monitoring movement of sage-grouse.* We will evaluate movement patterns and seasonal core use areas using GPS- and radio-telemetry techniques. Sage-grouse will be captured and marked following bird-handling procedures outlined in Appendix A. Sage-grouse will be captured using spotlighting techniques (Wakkinen et al. 1992, Giesen et al. 1982) during the fall and spring of each year. Captured grouse will be aged, weighed, sexed, banded, and measured including total tarsus, culmen, wing chord and primary 1,9,10. Measurements will be used to calculate body condition indices and age birds. A subsample 25 grouse across both geothermal sites will be fitted with rump-mounted GPS transmitters. This GPS transmitter technology has multiple benefits over conventional radio-telemetry. For example, GPS are necessary to reliably identify year-round locations and obtain fine-scale movement patterns. Transmitters with GPS technology are not limited to access or weather conditions and provide reliable relocations, allowing data to be collected without a year-round field technician. A relatively small (8-g) radio-transmitter will be placed on the GPS to relocate the transmitter following fatality or GPS signal failure. Data from the GPS transmitters will be downloaded from the ARGOS website and post-processed using various computer software and quality control measures. A subsample of grouse will also be fitted with conventional necklace-mounted radio transmitter to increase samples sizes during the breeding period. Sage-grouse will be released at the point of capture. Radio-transmitted grouse will be relocated every 2 -3 days and locations will be recorded using hand-held GPS (Appendix B). Please see section *Capture and Radio-Telemetry* for further detail. In addition, Brownian bridge and kernel-based models will be computed to generate utilization distributions for individual grouse based on their telemetry relocation. We will compare the probability of use in relation to facilities or linear right-of-ways.

### Long-term Objectives

For the long-term objectives, we will continue data collection at local levels for a 10-year period at the same study sites. Long-term research objectives are to:

- 1) Develop and assess nest and brood survival inference models.
  - a. Investigate interactions between habitat selection, geothermal-related anthropogenic factors, and fitness (e.g., nest survival).
  - b. Investigate covariates of distance to right-of-way, raven abundance, and sign of badger activity, as well as individual covariates (e.g., grouse age).
  - c. Evaluate covariates at multiple spatial scales.
- 2) Identify changes in composition of predators that depredate sage-grouse nests in relation to power lines and facilities.
- 3) Measure changes in numbers of ravens nests and nesting substrate (anthropogenic versus natural) in relation to power lines and facilities.

### Methods and Analyses for Long-Term Objectives

- *Monitor nesting.* We will measure breeding success with specific protocols described in Appendix B. Monitoring will begin in March and continue through August (Schroeder 1997). Locations of female sage-grouse will be determined to within approximately 30 m every two days throughout the nesting season using a portable receiver and hand-held antenna (Schroeder 1997). Care will be taken to not disturb the females. Transmitters will be equipped with an activity sensor and we will assume females are nesting when movements become localized (Connelly et al. 1993) and/or activity sensors indicate long periods of inactivity. By locating the female and her nest site, data can be collected on timing of incubation, nest failure, and nest success. Variation in transmitter signal frequency will help indicate female behavior (Schroeder 1997). Nest locations will be mapped using a GIS. When monitoring indicates that a female has



terminated the nesting effort, nest fate will be determined by examining the chorioallantoic membrane, allantoic sac, and broken eggshells (Connelly et al. 1993). A membrane that is detached from the eggshell will be classified as a successful hatch (Klebenow 1969, Gregg et al. 1994). We will determine clutch size when possible by counting eggshells following a successful hatch or the destruction of the nest within five days of the females' departure from the nest site (Schroeder 1997).

- *Monitoring brood-rearing.* We will locate radio-marked females with broods four times each week to help evaluate brood rearing habitat (Gregg et al. 1994). Weekly locations will be divided into three time periods: morning (within 4 hr after sunrise), mid-day (>4 hours after sunrise to >4 hours before sunset), and evening (within 4 hr before sunset) (Dunn and Braun 1986). We will estimate fledging success as the percent of females that produces 1 chick 50 days old (Schroeder 1997). Areas important to brood-rearing will be identified.
- *Habitat measurements during breeding season.* Vegetation and site characteristics will be recorded for all nests and a subsample of identified bird brood locations. Habitats will be classified based on general characteristics of the sagebrush habitat present. Microhabitat selection will be determined by comparing habitat use to availability, with emphasis on nest sites and brood rearing sites. Species composition and vegetation characteristics will be measured at use sites to determine habitat use as described below. Habitat availability will be estimated by measuring the same variables at randomly sampled sites stratified within similar habitats (Drut et al. 1994). We will measure shrub canopy cover using three 20-m transects (Canfield 1941, Drut et al. 1994) and understory and grasses using five uniformly spaced rectangular plots of 20 by 50-cm along each transect (Daubenmire 1959). We will record canopy cover, shrub height, percentage cover for perennial/annual grasses and forbs, maximum perennial grass/forb height, grass droop height, residual grass height (Wak.kinen 1990, Gregg et al. 1994). We will also measure vertical vegetation cover at the nest site using a Robel pole and two additional readings along each 20-m transect (Robel et al. 1970, Sveum et al. 1998). Nest shrub species, maximum height and width, percent dead/bare, and distance to different covertype/water source will also be recorded. Multiple GIS land cover products will be used to investigate vegetation factors at greater spatial scales. Resource selection functions (RSF) for sage-grouse nesting and brood rearing periods will be computed using use and availability data (Manly et al. 2002). We will develop multiple *a priori* nest survival and brood survival models that consist of microhabitat, GIS-level factors, distances to anthropogenic structures, and raven densities. We will also develop habitat selection covariates for nest and brood survival models based on individual RSF indices. An information theoretic approach (Anderson 2008), using Akaike's information criteria (Akaike 1973), will be employed to compare *a priori* models for all analyses in the study.
- *Survival.* Radio-transmitters will be equipped with mortality sensors that will double the pulse rate of the transmitter after eight hours of no movement. During the non-breeding season, flights will be conducted once per month to relocate grouse with VHF and determine status (i.e., alive or mortality). Please see section *Capture and Radio-Telemetry* for further detail.
- *Data collection and storage.* We will maintain a database of all morphological, telemetry, and vegetation information collected within the study area. Data will be collected in the field using personal digital assistants (PDA's).

**Final Project Objective:** Following data collection, our final long-term objective is to use these findings to develop a more comprehensive spatially-explicit risk map. By estimating direct and indirect effects, WERC could use model parameters to create a ranking of potential risks (leveled 1-10). Because sage-

grouse require specific habitat types during each life-stage within a sagebrush steppe ecosystem, this map would have broad applicability by extending to other species within the ecosystem.

## PRODUCTS

*Reports.* Annual reports documenting results of all conservation measures described in this proposal will be provided to ORMAT, BLM, USFS, and NDOW no later than August 31 each year. Preliminary findings of research will also be reported to these companies and agencies. Data summaries and preliminary findings will be presented to every two years.

*Professional Paper Presentation.* Preliminary and final results of this study will be presented at professional conferences and meetings as oral or poster presentations. We anticipate at least 5 presentations.

*Spatially-explicit map.* WERC will use research findings to develop a comprehensive spatially explicit map of probability of occurrence of sage-grouse populations. Because sage-grouse require specific habitat types during each life-stage within a sagebrush steppe ecosystem, this map would have broad applicability by extending to other species within the sagebrush ecosystem.

*Scientific Articles.* We will publish a minimum of six peer-reviewed scientific journal articles.

*USGS Open File Report (OFR) Guidance Document.* WERC will develop a guidance document from findings of these study findings for energy companies, USFWS, BLM and other agencies. This report will help inform guideline standards for state and federal agencies. The report will include a series of recommendations based on scientific findings regarding the effects of geothermal energy development and infrastructure on sage-grouse and their habitat.

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## Appendix A. Trapping and Handling Protocol for Greater Sage-Grouse

Greater sage-grouse (*Centrocercus urophasianus*) populations have declined throughout their range. This has brought about increased interest in conducting research on sage-grouse. For management purposes within Nevada, sage-grouse are categorized as a resident game bird and are managed by the State of Nevada. The Nevada Department of Wildlife encourages research on sage-grouse to better understand their ecology and implications for conservation. Research methods involving the capture, marking, and radio-telemetry are commonly employed throughout their range, providing valuable data for various agencies charged with the management of the bird and its habitats.

This document provides guidance to scientists conducting research on sage-grouse. This document contains approved methods for the capture and handling of sage-grouse, and instructions for collection of additional genetic and morphological data. The techniques outlined in this document come from those outlined by Connelly et al. (2003), which were approved by the Western Association of Fish and Wildlife Agencies in October, 2003; and other scientific literature as cited.

### Capture

A number of techniques have been used to capture sage-grouse throughout their range. The most effective and least invasive method is spotlighting roosting birds at night, resulting in an injury/mortality rate of <1% in Colorado (Giesen et al. 1982, Wakkinen et al. 1992). Other techniques have also been used to capture sage-grouse, including walk-in traps on leks (Schroeder and Braun 1991), drop nets, and net launching devices. However, these methods tend to be more invasive and have a higher risk of injury to the birds. Therefore, spotlighting will be the primary method for capturing sage-grouse. Other techniques may be employed under special circumstances, but such methods must be clearly defined in a study plan.

These capture guidelines primarily pertain to fully-grown grouse (>10 weeks of age), including juvenile, yearling, and adult birds. Capture and handling protocols for birds less than 10 weeks of age will be developed specifically for that age class. Sage-grouse are typically captured during spring and/or fall. Spring trapping is conducted during the breeding season when birds roost close to leks. Fall trapping is conducted when it is dry and birds are concentrated on roosts often near water sources. Trapping at either time of year has its advantages and disadvantages, and both offer unique opportunities to gather data during different life stages of the bird. The majority of captures range-wide have been conducted historically in the spring, which does not appear to have a significant effect on their mating behavior. Researchers should attempt to catch grouse while they are roosting and avoid disturbance prior to dawn, to allow them to move to leks sites undisturbed. Spring trapping should be terminated before females have begun incubating clutches, to avoid nest abandonment, and no trapping should be conducted again until fall except in emergency situations, such as the need to refit or remove a radio transmitter (see below). Fall trapping should not be conducted until birds reach a minimum of ten weeks of age. Juvenile birds are difficult to sex early in the season, making it difficult to properly fit radio-transmitters considering sexually-dimorphic growth. Fall trapping typically is terminated when access to the study area is limited. Year-round studies probably should consider a combination of two trapping seasons. In either case, researchers should use good judgment not to over-disturb any particular population or individual bird.

Field capture crews typically consist of at least three people, including one individual operating the spotlight and leading the capture effort, a primary netter, and a secondary netter. Most grouse are caught by technicians working on foot, using a battery powered spotlight. Occasionally, it may be possible to

capture grouse with the use of a truck. Nets of about 2.5-3 ft diameter and 10-12 ft handles are most effective. Netting should be about **1.5** inch mesh with enough room to comfortably hold grouse against the ground but not excessive to minimize struggling by the bird when caught. Additional personnel may observe trapping operations for training persons.

Once a bird is spotted and the decision is made to attempt a capture (birds already marked should not be captured again), the crew should move deliberately to capture the bird(s). Netters should attempt to capture birds primarily while they are on the ground, birds that have flushed should be allowed to fly to avoid injury. Sometimes it may be necessary to attempt to capture a bird more than once if it flushes. After capturing birds in the net, netters should use their hands to hold the grouse relatively firmly around the wings and body until the grouse ceases to struggle. The spot-lighter or additional crew member will help the netter remove the birds from the net for handling. When multiple birds are captured, birds that are not processed immediately should be placed in breathable fabric sacks tied at the top. Velcro straps attached to soft but sturdy material, such as soft canvas, may also be used to wrap around their wings for restraint.

### **Handling and Marking**

Once captured, sage-grouse will usually settle down if handled carefully and calmly. Handling time should be minimized to avoid undue stress; however, the quality of the handling is also important. Therefore, experienced personnel should handle grouse. On the job training in grouse handling for prospective handlers is acceptable and encouraged, under the guidance of experienced personnel.

Leg bands are commonly placed on sage-grouse to provide information regarding harvest, movements, survival, and recaptures. All captured sage-grouse will be fitted with a leg band, regardless of whether the bird is marked in any additional way. Any other proposed marking devices, such as color coded leg bands and wing markers, should be clearly indicated **in** a study plan.

Radio-transmitters are commonly used to mark birds. Transmitter design should consist of battery-powered transmitters attached by a necklace consisting of a steel cable inside a pvc sleeve. Transmitter weight is typically < 3% of the bird's body weight. Transmitters should be placed around the bird's neck such that food items may easily pass into the bird's crop, but tight enough that they can not physically pass over the skull of the bird. Particular attention must be paid to attachment of the transmitter, because mortality has resulted from radio-transmitters fitted too tightly around the bird's neck (CDFG/USGS unpublished data). Fitting transmitters in the fall is particularly concerning, because transmitters must be fitted to account for further sexually dimorphic growth. When trapping in the fall, transmitters should not be attached to any birds where sex determination is in question.

GPS transmitters will be placed on a subsample of birds. Transmitters will be rump-mounted with elastic around legs and antennae laying across tail feathers. Transmitters will not exceed weight of 32 g for females and 40 g for males.

Re-check transmitter for proper fit before release. Birds will be released in the immediate area of trapping, by placing them by hand under a shrub or in dense cover. Birds will not be released by dumping them out of the sack or throwing them into the air. Personnel should back away slowly and low to the ground to avoid the bird flushing into them, and attempts should be made to observe condition as

the bird leaves the area. Any concerns about improper fit of marking devices, injury to the birds, or any other unusual circumstances should be reported to the appropriate Department contacts listed below as soon as possible.

### **Morphological Data Collection**

Basic morphological data will be collected to compare with other sage-grouse populations for potential phenotype differences. Hupp and Braun (1991) and Young et al. (2000) collected such data for sage-grouse in Colorado to compare birds that were later determined to be a unique species, the Gunnison sage-grouse (*Centrocercus minimus*). The following measures should be collected on all birds captured in Mono County. Photographs illustrating these techniques are attached in Appendix B.

- 1) Live body mass. Sage-grouse should be carefully placed in a breathable sack and weighed with a Pesola scale (2.5 kg scale for females and five kg scale for males). If birds are handled carefully, they will usually settle down shortly after being placed in the sack, and weight should be taken when the scale is stabilized. Researchers should note whether the crops contain significant ingesta, and mass may be adjusted to account for it by estimation based on known masses.
- 2) Culmen (straight line from tip of upper mandible to the insertion of feathers above the mandible). Bill length should be measured from the tip of the bill to the skin/bill interface under the feathers using digital calipers.
- 3) Wing chord (wrist to tip of longest primary with no flattening). The wing is placed on a wing board and the shoulder placed in contact with the guide at the end of the board. The measurement is then taken to the tip of the longest primary feather.
- 4) Wing length (wrist to tip of longest primary with flattening). The wing is placed on a wing board and the shoulder placed in contact with the guide at the end of the board. The measurement is then taken to the tip of the longest primary feather. The wing is flattened against the board.
- 5) Tarsus (base of middle toe to the proximal end of the tarsus). Length as described measured with calipers (see slides for description).
- 6) Primaries (length of primaries number 10, 9, and 1). Length of fully replaced primaries should be measured with a flexible ruler from the point of feather insertion to the tip of each primary.
- 7) Body condition. Calipers are used to measure the amount of skin/fat tissue in the abdominal region of the sage-grouse. Feathers are removed or pushed aside in a three centimeter area. Measurements are taken within three centimeters from the cloaca using a skin pinch.

### **Capture data collection and reporting**

Researchers will record data for all captured sage-grouse. Researchers will also monitor grouse closely for the first few days following release to assess possible capture related mortalities, which should be reported immediately to help improve these methodologies. All radio-marked individuals should be monitored on a regular basis as environmental conditions allow. All radio-marked individuals recovered should be examined to try and determine causes of mortality. Whole or partial carcasses should be preserved (fresh and whole carcasses refrigerated when recovered and can be frozen for later analysis) The transmitter should remain on the bird to help determine mortality causes. Details of the recovery should be included with the carcass to aid in determination of cause for mortality. Pictures and detailed notes should also be maintained.

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## Appendix B.

## Conventional Telemetry Tracking Protocol for Greater Sage-Grouse

Bird locations will be categorized as either direct visual location (resighting) or triangulation location. A direct visual location is not required but is an option in case the opportunity presents itself to see a bird or if the bird is accidentally flushed. The performance of a "direct" location via telemetry requires the person performing the telemetry to come within 25-50 m of the bird being tracked and obtaining one GPS and azimuth readings as well as an estimation of how far away the bird is from the location the data is taken at. Azimuths will be determined by using the RF gain and signal strength to pinpoint a bird's direction with the antenna. A compass will then be used to take a bearing on the anteUla. By using the RF gain and signal strength as well as sound of the signal, a person can come to within 50 to 25 meters of a bird. The RF gain is like a fine tuner, where as one gets closer to the signal origin, the gain can be turned down to fine tune and pinpoint direction. Once a person is close to the bird, one can begin to circle the bird at a safe distance and observe the changing angle of the signal with their antenna to pinpoint the exact area holding the bird. Obtaining a location via "triangulation" requires obtaining data at a goal maximum distance of 1000 m. 1000 m is good but a greater distance may be satisfactory if there is an angle of approximately 90 degrees between the two bearings. A closer triangulation is better if specific habitat assessment is to be done. When using triangulation in order to determine the location of a bird, two GPS coordinates and azimuths should be determined. Two line coordinates are adequate and is efficient in terms of time per bird and getting bearings on a bird in a short time in case the bird is moving. Depending on time and distance, three line coordinates can be used to get a more accurate location. These GPS coordinates and azimuths should be taken at an angle between 60 to 120 degrees from each other, with the bird location acting as the central point. When tracking with a truck-mounted antenna the azimuth from the compass as well as the azimuth of the truck must be recorded each time. All GPS recordings will be in UTM's. Other data to be recorded are listed below.

- Frequency
- Date
- Time in 24-hour units (the time should be recorded for each GPS and azimuth readings).
- Observer(s) taking the data
- Weather (options to be listed on palm pilot or data sheet)
- Wind {options to be listed on palm pilot or data sheet)
- Plant community (options to be listed on palm pilot or data sheet)
- Location type (lek, nesting, brood rearing, or general)
- Location method (options to be listed on palm pilot or data sheet)
- Bird status (alive, mortality, radio failure, unknown)
- Transmitter activity, to be taken before disturbance, if any has occurred (number of beeps during a Thirty second interval)
- Accuracy/Distance estimation (options to be listed on palm pilot or data sheet)
- Slope using a clinometer for direct locations only. While standing on a slope, turn compass sideways and aim the long edge above crest of hill approximately 1.5 meters. Using outer ring set of numbers, set compass to west at 270°. Look at small black arrow inside compass and read the degrees.
- Aspect of the slope bird located on for direct locations only.
- Elevation in meters (using GPS device)
- A weekly spreadsheet will be updated daily to keep tracked of birds that have been located and those that still need to be tracked.
- Notes (notes should include any unusual observations and the distance of the bird location from any distinctly different type of plant community or water source. Seasonal and pennanent water sources should be recorded (UTM) and entered into GIS, also noting presence or absence of surface water.

### Telemetry on female sage-grouse

Tracking of female sage-grouse is dependent upon their nesting and brood rearing status. To determine when a female is in the process of nesting the following characteristics can be used.

- Movements have become localized within an area, (Connelly et. al 1993).
- Activity sensors indicate long periods of inactivity in the same location after a couple days of tracking and observation. This will help identify potential nesting sites versus resting or foraging sites.
- When confident that the female has been in the same place for about a week (i.e., incubating), slowly walk in a close (about 5M) circle to pinpoint nest location to within 2-3 shrubs, thus to be able to find the nest again.

If a female has been found in the same spot for a couple of days then there will be a "visual nest check" after laying is thought to be completed and when the female is off the nest early in the morning or evening and immediately after it has been determined that a female is no longer incubating (Petersen, 1980). The female must be away from the nest foraging order for anyone to closely approach the nest. Frequent nest checks are necessary to collect data for nesting ecology (Petersen 1980).

### Nesting

During the nesting period researchers will record a location every 2-3 days at approximately 30 m from the female using handheld telemetry equipment. Researchers will use caution to avoid disturbing any nesting sage-grouse. The location will be recorded using a GPS in UTM's and inconspicuous visual marker can be used for reference, i.e., a pile of rocks or a dead shrub placed on another shrub (Popham 2000). A digital picture of the area may also be used. These are a few methods that can be used to help people remember where to relocate a nest if the GPS locations are not enough.

### Brood Rearing

During the brood rearing period a female will be tracked four times each week. Locations will be split into four time periods; morning (less than four hours after sunrise), mid-day (four hours after sunrise and four hours before sunset), evening (less than four hours before sunset), and night (one hour after sunset to one hour before sunrise). At least one location per week will be obtained from each of the four time periods. Ideally, two locations will be direct and two locations will be triangulations each week. It is important to avoid getting close enough to disturb during brood rearing.

### General telemetry

During the time period when a female sage-grouse is no longer nesting or rearing a brood the female is required to be tracked a minimum of twice per week.

### Visual Nest Check

A visual nest check is required in order to determine the outcome of a female's nesting effort. Items to be recorded are:

- Clutch size (i.e. how many eggs in the nest?)
- Successful nest
- Unsuccessful nest



When monitoring indicates that a female has terminated the nesting effort, nest fate will be determined by examining the chorioallantoic membrane, allantoic sac, and broken eggshells (Connelly et al. 1993).

A nest will be considered unsuccessful if the inner membrane is still attached to the hard outer shell (Klebenow 1969, Gregg et. al. 1994). Sometimes, successfully hatched eggs will be broken neatly around the middle if they haven't been disturbed post-hatching. Digital photos will be taken to aid in any further analysis.

### **Flushing**

Although precautions should be taken to prevent the flushing of a bird it cannot always be prevented. In the case of a bird flushing due to human presence while tracking then precautions will be taken in order to not put a bird under unnecessary stress or alter their natural behaviors. For a period of two days after a disturbance has occurred, only general bird locations will be obtained. The closest that anyone should be .. to a bird being tracked is 25 m except when first locating a nest.

### **Literature Cited**

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- Popham, Gail P. 2000. Sage Grouse Nesting Habitat in Northeastern California. Master's Thesis, Humboldt State University, Arcata, California.

## Attachment B. Budget for Year 1 (2012)

**First Year Sage-Grouse Monitoring and Research at McGinness Geothermal Site**

SOURCE	BUDGET ITEM	DESCRIPTION	Year 2012
Requested Funding*	Field Technicians	USGS Biological Field Technicians (2 for 6 months)	
	Internships	Student internships through USGS/ISU (1 for 6 months)	
	GPS Data Acquisition (ARGOS) and Processing	Acquire data from ARGOS system	
	Field Housing	Housing rental ( month for 6 months/year)	
	Vehicles - 4 wheel drive pick-up truck (GSA Leased) and ATVs	Four-wheel drive truck - d fuel (2 @ per 6-month season), 1ATV ( ach)	
	Flight telemetry	Flights (10 er flight)	
	Data Analyses and Writing (USGS, 0.2 FTE for Research Wildlife Biologist)	Compile and manage data, write reports and guidelines, inference models, create maps, publish articles	
Subtotal of First Year Requested Funds			
USGS Overhead Charge			
USGS In-Kind Contributions	Personnel	Supervisory Research Biologist (Project Management)	
	Travel	Travel	
	Equipment	Additional Equipment (radio-recievers, antennas, capture and banding supplies, etc.)	
NDOW In-Kind Contribution	Flight telemetry	Match funds in ferry-time to field sites	
ORMAT	Purchased Equipment	GPS transmitters ( unit, 12 units) and VHF transmitters nit, 10 units) (discounted price)	
Total First Year Project Costs			
<b>TOTAL FIRST YEAR REQUESTED FUNDS**</b>			

\*Indirect costs for WERC are included in the amounts unless otherwise specified.

\*\*Costs of GPS and VHF transmitters are not included in total requested funds because equipment will be purchased by ORMAT

## Attachment C. Budget for Additional Years 2 – 10 (2013-2022)

## Annual Budget (2013 - 2022) Sage-Grouse Monitoring and Research at McGinness Geothermal Site

SOURCE	BUDGET ITEM	DESCRIPTION	Additional Year
Requested Funding*	Field Technicians	USGS Biological Field Technicians (2 for 6 months)	
	Internships	Student internships through USGS/ISU (1 for 6 months)	
	GPS Data Acquisition (ARGOS) and Processing	Acquire data from ARGOS system	
	Field Housing	Housing rental (\$ month for 6 months/year)	
	Vehicles - 4 wheel drive pick-up truck (GSA Leased) and ATVs	Four-wheel drive truck - lease and fuel (2 @ \$ er 6-month season), 1 ATV ( each)	
	Flight telemetry	Flights (10 @ per flight)	
	Data Analyses and Writing (USGS, 0.2 FTE for Research Wildlife Biologist)	Compile and manage data, write reports and guidelines, inference models, create maps, publish articles	
Subtotal of Annual Requested Funds			
USGS Overhead Charge			
USGS In-Kind Contributions	Personnel	Supervisory Research Biologist (Project Management)	
	Travel	Travel	
	Equipment	Additional Equipment (radio-receivers, antennas, capture and banding supplies, etc.)	
NDOW In-Kind Contribution	Flight telemetry	Match funds in ferry-time to field sites	
ORMAT	Purchased Equipment	GPS transmitters ( unit, 6 units) and VHF transmitters (\$ unit, 10 units) (discounted price)	
Total Annual Project Costs			
TOTAL ANNUAL (2013 - 2022) REQUESTED FUNDS**			

\*In-direct costs for WERC are included in the amounts unless otherwise specified.

\*\*Costs of GPS and VHF transmitters are not included in total requested funds because equipment will be purchased by ORMAT

# **ATTACHMENT 2**

## **Cooperative Agreement**

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**McGinness Hills Geothermal Project Cooperative Agreement for  
Sage-Grouse Conservation and Mitigation**

Between  
**Bureau of Land Management**  
And  
**Nevada Department of Wildlife**  
And  
**United States Forest Service**  
And  
**ORNI 39, LLC.**

**July 18, 2011**

**I. Introduction**

The purpose of this cooperative conservation agreement (Agreement) is to describe measures for minimizing potential impacts to the greater sage-grouse of ORNI 39, LLC's construction and operation of the McGinness Hills Geothermal Powerplant Project. The Project includes the construction and operation of two power generating facilities; geothermal production and injection well pads and wells; access roads; geothermal production and injection pipelines; a microwave communication tower at each power plant; a domestic water well located at each of the power plants; an electrical transmission line and co-located Optical Ground Wire (OPGW)/fiber optic line; and ancillary support facilities. A majority of the Project is located on land managed by the Bureau of Land Management (BLM). ORNI 39, LLC has applied to BLM for two Right-of-Ways (ROW) (N-88978 and N-88979) and authorization for a geothermal Utilization Plan (N-88831).

ORNI 39, LLC, has entered into this Agreement to coordinate and collaborate with the Nevada Department of Wildlife (NDOW), Bureau of Land Management (BLM) and United States Forest Service (USFS) for the implementation of effective minimization and mitigation measures for the greater sage-grouse within and in the vicinity of its proposed Project. Under this Agreement, ORNI 39 will provide \$602,400.00 to be placed in a mitigation fund held by NDOW, and administered by NDOW in coordination with BLM. All funds will be used for the sole purpose of mitigating impacts to sage-grouse associated with ORNI 39's construction and operation of the Project in accordance with the Greater Sage-Grouse Monitoring and Mitigation Plan in Appendix C of Environmental Assessment DOI-BLM-NV-B010-2011-0015-EA.

**II. Cooperators and Immediate Points of Contact**

Timothy Coward  
Bureau of Land Management  
Battle Mountain District  
1553 S. Main Street, Tonopah, Nevada 89049

Alan Jenne  
Habitat Supervisory Biologist

Nevada Department of Wildlife  
60 Youth Center Road, Elko, Nevada 89901

Rachel Mazur  
Forest Service Wildlife Biologist  
1200 Franklin Way, Sparks, Nevada 89341

Scott Kessler  
ORNI 39, LLC  
6226 Neil Road, Reno, Nevada 89511-1136

### **III. Purpose of the Conservation Agreement**

This voluntary agreement is for the conservation of greater sage-grouse. Given that construction and operation of the McGinness Hills Geothermal Powerplant Project is likely to affect sage-grouse, a BLM sensitive species and a candidate for listing under the federal Endangered Species Act, it is ORNI 39's intent to create a conservation benefit to these species by funding conservation efforts beyond the avoidance, minimization, and restoration measures ORNI 39, LLC has committed to implement during construction. This Agreement is designed to fund and mitigation measures that will provide a conservation benefit to the species.

### **IV. Authority**

The Federal Land Policy and Management Act (43 U.S.C. § 1737), which provides overall direction to BLM for management of public lands, allows BLM to participate in conservation agreements. BLM Manual, Section 6840 (Special Status Species Management), provides overall policy direction to BLM managers to conserve listed threatened or endangered species on BLM administered lands, and to ensure that actions authorized on BLM-administered lands do not contribute to the need to list species deemed by BLM to be "sensitive."

NDOW has the authority to enter into this Agreement pursuant to Nev. Rev. Stat. § 501.351, which permits the agency to "enter into cooperative or reciprocal agreements with the Federal Government or any agency thereof, any other state or any agency thereof, any other agency of this state, any county or other political subdivision of this state, to the extent permitted by the provisions of chapter 277 of NRS, any public or private corporation, or any person, in accordance with and for the purpose of carrying out the policy of the Commission."

Upon approval of the Nevada Interim Finance Committee (IFC), NDOW will have authority to receive from ORNI 39, LLC, hold in trust, and manage funds for the special purpose of implementing conservation and mitigation actions to offset impacts associated with the Project. *See* 1997 Nev. Op. Att'y Gen.16, 1997 WL 289253 (May 9, 1997) (citing Nev. Rev. Stat. §§ 353.335(2)(c), 353.220(5)) (approving NDOW's receipt and management of \$500,000 to offset mule deer habitat impacts of the Independence Mining Company's gold mining operations). It is the cooperators' intent that funds received under this Agreement will be placed in a special Habitat Mitigation Account established by the Nevada State Budget Office and the

IFC, to be managed by NDOW, in consultation with BLM, for conservation and mitigation actions described in this Agreement.

## **V. Greater Sage-Grouse Mitigation Fund**

A Wildlife Working Group (WWG) made up of representatives from ORNI 39, BLM, USFS and NDOW will be established, with other pertinent parties such as USFWS being invited as needed. This oversight will evaluate monitoring, confirm thresholds, develop and prioritize enhancement projects and evaluate any adaptive management that may be necessary in the implementation of this conservation plan.

The WWG will utilize the Greater Sage-Grouse Monitoring and Mitigation Plan (see Environmental Assessment DOI-BLM-NV-B010-2011-0015-EA Appendix C) for the evaluation of the monitoring and to confirm thresholds.

BLM's approval of the McGinness Hills Geothermal Powerplant Project includes a number of greater-sage grouse monitoring and mitigation measures, including the requirement that ORNI 39 fund off-site habitat mitigation measures. The following outlines the cooperators' responsibilities with respect to the sage-grouse mitigation fund.

### **A. ORNI 39, LLC's Responsibilities**

ORNI 39, LLC will commit to support additional greater sage-grouse mitigation and conservation efforts to offset impacts of the Project. These efforts are to be funded by ORNI 39, LLC for a total amount of \$602,400.00. This amount was developed based in part on the following:

1. two hundred and seventeen acres of disturbed land for construction and operation
2. thirty-four acres of brood-rearing habitat
3. four to one acre ratio at the cost of \$600.00 per acre
4. Environmental Assessment DOI-BLM-NV-B010-2011-0015-EA

Funds for these conservation and mitigation efforts will be remitted by ORNI 39, LLC to NDOW to be held for conservation and mitigation actions under this Agreement. Prior to accepting funds, NDOW will obtain authorization from the Nevada Interim Finance Committee to set up a special Habitat Mitigation Account into which the funds will be received. *See Nev. Rev. Stat. §§ 353.335(2)(c), 353.220(5).* As described more fully in the subsequent fund administration agreement, NDOW will manage the funds, in cooperation with BLM, for the sole purpose of funding conservation, monitoring and mitigation actions to offset impacts associated with the Project. Conservation, monitoring or mitigation actions funded under this Agreement must benefit the greater sage-grouse and will be determined through existing protocols defined by NDOW, in consultation with BLM. ORNI 39, LLC will be notified of the specific actions funded and cost of such actions as they are determined.

### **B. BLM Responsibilities**



BLM will continue to coordinate with ORNI 39, LLC in an effort to provide for the conservation of greater sage-grouse by providing technical assistance and guidance regarding reasonable measures to be taken by ORNI 39, LLC to minimize impacts to greater sage-grouse, or otherwise conserve the species, during the construction, operation, and maintenance of the Project. BLM will consult with NDOW in determining appropriate conservation and mitigation actions to be funded by ORNI 39, LLC under this Agreement.

#### **C. NDOW Responsibilities**

NDOW will continue to coordinate with ORNI 39, LLC in an effort to provide for the conservation of greater sage-grouse by providing technical assistance and guidance regarding reasonable measures to be taken by ORNI 39, LLC to minimize impacts to greater sage-grouse during the construction, operation, and maintenance of the Project. In addition, NDOW will be responsible for consulting with BLM and distributing funds for conservation and mitigation actions contemplated by this Agreement, and reporting to ORNI 39, LLC the actions that were funded as a result of this Agreement.

#### **D. USFS Responsibilities**

USFS will continue to coordinate with BLM in an effort to provide for the conservation of greater sage-grouse by providing technical assistance and guidance regarding reasonable measures to be taken by ORNI 39, LLC to minimize impacts to greater sage-grouse, or otherwise conserve the species, during the construction, operation, and maintenance of the Project. USFS will consult with NDOW and coordinate with BLM in determining appropriate conservation and mitigation actions to be funded by ORNI 39, LLC under this Agreement.

### **VI. Monitoring and Mitigation Fund Administration**

Before any funds are withdrawn for conservation, monitoring or mitigation actions under this Agreement, NDOW, BLM, and ORNI 39, LLC will execute a fund administration agreement that gives NDOW and BLM sole discretion to decide which projects to fund, and details the accounting and reporting requirements. ORNI 39, LLC will be notified of the specific actions funded and cost of such actions as they are determined.

### **VII. Duration of Agreement**

This Agreement will be in effect for ten years following its effective date. The Agreement may be extended beyond the specified terms prior to expiration with agreement of the cooperators.

### **VIII. Modification of the Agreement**

Any cooperator may modify this Agreement by providing written notice to, and obtaining the written concurrence of, the other cooperators. Such notice shall include a statement of the proposed modification, the reason for it, and its expected results. The cooperators will use their best efforts to respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications will become effective upon the other cooperators' written concurrence.

## **IX. Termination of the Agreement**

This Agreement will be incorporated into and made a condition of BLM's decision record for the utilization plan and ROW grants. Thus, ORNI 39, LLC may not terminate its participation in this Agreement, in whole or in part, at any time before the date of expiration, without the concurrence of BLM and revision of BLM's decisions.

## **X. Dispute Resolution**

The cooperators agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by all cooperators at the time a dispute arises.

## **XI. Succession and Transfer**

This Agreement shall be binding on and shall inure to the benefit of the cooperators and their respective successors and transferees.

## **XII. No Third-Party Beneficiaries**

This Agreement does not create any new right or interest in any member of the public or any State as a third-party beneficiary, nor shall it authorize anyone not a party to this Agreement to maintain a suit for injuries or damages pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the cooperators to this Agreement with respect to third parties shall remain as imposed under existing law.

## **XIII. Notices and Reports**

Any notices and reports, including monitoring and annual reports, required by this Agreement shall be delivered to the persons listed in Section II above.

## **XIV. Availability of Funds**

Implementation of this Agreement is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the cooperators to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The cooperators acknowledge that BLM, USFS and NDOW will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

## **XV. Duplicate Originals**

This Agreement may be executed by facsimile signatures and in counterparts, each of which when so executed, shall constitute an original, and all of which taken together shall constitute one and the same document. This Agreement may also be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each of the cooperators.

## **XVI. Relationship To Authorities**

The terms of this Agreement shall be governed by and construed in accordance with applicable federal law. Nothing in this Agreement is intended to limit the authority of the BLM or USFS to fulfill their responsibilities under federal laws or the authority of NDOW to fulfill its responsibilities under state law. All activities undertaken pursuant to this Agreement must be in compliance with all applicable state and federal laws and regulations.

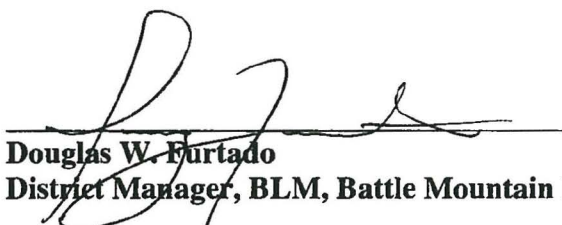
IN WITNESS WHEREOF, THE PARTIES HERETO have, as of the last signature date below, executed this Conservation Agreement.



**ORNI 39, LLC**

8-4-11

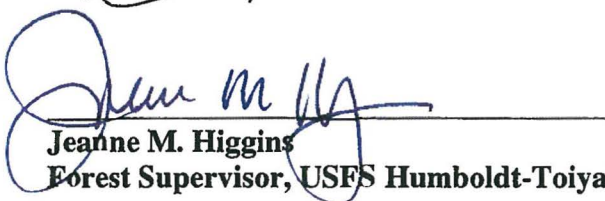
**Date**



**Douglas W. Furtado  
District Manager, BLM, Battle Mountain District**

8/8/11

**Date**



**Jeanne M. Higgins  
Forest Supervisor, USFS Humboldt-Toiyabe National Forest**

7/20/11

**Date**



**Richard L. Haskins  
Deputy Director, Nevada Department of Wildlife**

8/1/11

**Date**

## **Appendix E: Required Design Features**

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.

Greater Sage-Grouse Required Design Features

Table 1 General Required Design Features

RDF #	Description	Project Application
Gen 1	Locate new roads outside of greater sage-grouse habitat to the extent practical.	Project area is located entirely within greater sage-grouse habitat. The power plant access road is necessary for operation of the Project. Access roads are being limited to the absolute minimum needed for the Project. Existing roads and pads will be used when possible.
Gen 2	Avoid constructing roads within riparian areas and ephemeral drainages. Construct low-water crossings at right angles to ephemeral drainages and stream crossings (note that such construction may require permitting under Sections 401 and 404 of the Clean Water Act).	No road construction is proposed in riparian areas or ephemeral drainages.
Gen 3	Limit construction of new roads where roads are already in existence and could be used or upgraded to meet the needs of the project or operation. Design roads to an appropriate standard, no higher than necessary, to accommodate intended purpose and level of use.	Project has been designed to limit the amount of new road necessary for Project operation and maintenance. Roads will be co-located where possible, and existing roads will be used to the extent practical.
Gen 4	Coordinate road construction and use with ROW holders to minimize disturbance to the extent possible.	Access road would not impact other ROW holders.
Gen 5	During project construction and operation, establish and post speed limits in greater sage-grouse habitat to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	Speed limits of 20 to 25 miles per hour (mph) would be maintained for Project-related travel through the Project Area. Ormat will post speed limit signs, and all contractors/employees will be trained on the speed limits within the Project Area.
Gen 6	Newly constructed project roads that access valid existing rights would not be managed as public access roads. Proponents will restrict access by employing traffic control devices such as signage, gates, and fencing.	Access road will be signed to indicate limited access/entry to the power plant.
Gen 7	Require dust abatement practices when authorizing use on roads.	Water would be applied to the ground during the construction and utilization of the drill pads, access roads, and other disturbed areas as necessary to control dust.
Gen 8	There is no Gen 8 RDF.	N/A
Gen 9	Upon project completion, reclaim roads developed for project access on public lands unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.	All Project disturbance would be reclaimed et the end of Project life. Access roads deemed unnecessary will be reclaimed as soon as practicable.
Gen 10	Design or site permanent structures that create movement (e.g., pump jack/ windmill) to minimize impacts on GRSG habitat.	Project facilities do not have many structures that create movement. The cooling fans used in the power plant would have horizontal movement that would be minimally visible to greater sage-grouse.
Gen 11	Equip temporary and permanent aboveground facilities with structures or devices that discourage nesting and perching of raptors, corvids, and other predators.	Power poles and vertical expansion loops would have anti-perch device installed to deter use by predators.
Gen 12	Control the spread and effects of nonnative, invasive plant species (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance; Evangelista et al. 2011). All projects would be required to have a noxious weed management plan in place prior to construction and operations.	An Integrated Weed Management Plan has been developed for the Project.
Gen 13	Implement project site-cleaning practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of greater sage-grouse.	Site clearing will be conducted in a manner that minimizes accumulation of debris.
Gen 14	Locate project related temporary housing sites outside of greater sage-grouse habitat.	No temporary housing is proposed.
Gen 15	When interim reclamation is required, irrigate site to establish seedlings more quickly if the site requires it.	Irrigation is not necessary to establish vegetation in interim reclamation areas.
Gen 16	Utilize mulching techniques to expedite reclamation and to protect soils if the site requires it.	Project could utilize mulching techniques during reclamation.
Gen 17	Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.	Project will follow BLM-approved Reclamation Plan.
Gen 18	When authorizing ground-disturbing activities, require the use of vegetation and soil reclamation standards suitable for the site type prior to construction.	Project will follow BLM-approved Reclamation Plan.
Gen 19	Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during the greater sage-grouse breeding (e.g., courtship and nesting) season. In addition, pets shall not be permitted on site during construction (BLM 2005b).	Ormat will provide construction employees and contractors with appropriate training and prohibiting pets during the construction phase.
Gen 20	To reduce predator perching in greater sage-grouse habitat, limit the construction of vertical facilities and fences to the minimum number and amount needed and install anti-perch devices where applicable.	Minimizing the use of vertical structures and fences was considered during Project facility design. Anti-perch devices will be placed on pipeline vertical expansion loops and power poles.
Gen 21	Outfit all reservoirs, pits, tanks, troughs or similar features with appropriate type and number of wildlife escape ramps (BLM 1990; Taylor and Tuttle 2007).	Project related reservoirs, pits, tanks, or similar features will be equipped with wildlife escape ramps or constructed to allow wildlife to escape (i.e., sloped instead of vertical sides).
Gen 22	Load and unload all equipment on existing roads to minimize disturbance to vegetation and soil.	All equipment will be loaded or unloaded on roads or in already disturbed areas.

Table 2      Fluid Minerals Required Design Features

RDF #	Description	Project Application
Lease FM 1	Co-locate power lines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010) in order to minimize or avoid disturbance.	Project layout has been designed to co-locate as many facilities as practicable. Pipeline layout is adjacent to the existing pipelines to the extent possible. The transmission line tie-in length is minimized to tie in to the existing power line in close proximity to the power plant location.
Lease FM 2	Cover, create barriers, or implement other effective deterrents (e.g., netting, fencing, birdballs, and sound cannons) for all ponds and tanks containing potentially toxic materials to reduce greater sage-grouse mortality.	No ponds are proposed as part of this Project. Any toxic materials would be contained in covered tanks/barrels/etc.
Lease FM 3	Require installation of noise shields to comply with noise restrictions (see Action SSS 7) when drilling during the breeding, nesting, brood-rearing and/or wintering season. Require applicable greater sage-grouse seasonal timing restrictions when noise restrictions cannot be met.	No noise threshold exceedances are anticipated ( <b>Section 3.15</b> ).
Lease FM 4	Ensure habitat restoration meets greater sage-grouse habitat objectives (Table 2-2 [BLM 2015]) for reclamation and restoration practices sites (Pyke 2011).	Funded habitat restoration projects are subject to review and approval by the Wildlife Working Group, per the existing charter.
Lease FM 5	Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoil management, and revegetating cut-and-fill slopes.	Reclamation would be conducted in accordance with the Reclamation Plan ( <b>Section 2.3.9</b> ).
Lease FM 6	Restore disturbed areas at final reclamation to the pre-disturbance landforms and meets the greater sage-grouse habitat objectives (Table 2-2 [BLM 2015]).	Reclamation would be conducted in accordance with the Reclamation Plan ( <b>Section 2.3.9</b> ).
Lease FM 7	Use only closed-loop systems for drilling operations and no reserve pits within greater sage-grouse habitat.	Closed loop drilling is not feasible for the drilling of full size wells. Reserve pits will be fenced on three sides during drilling, with the fourth side being blocked by the rig. Once the well is drilled, the pit will be fenced on all four sides and the drilling fluid will be allowed to evaporate.
Lease FM 8	Place liquid gathering facilities outside of greater sage-grouse habitat. Have no tanks at well locations within greater sage-grouse habitat to minimize vehicle traffic and perching and nesting sites for aerial predators of greater sage-grouse.	The geothermal lease unit occurs entirely within greater sage-grouse habitat. Therefore, there is no option to place liquid gathering (e.g., reserve pits) outside of greater sage-grouse habitat. Drilling is conducted in accordance with the Geothermal Drilling Permit’s Conditions of Approval.
Lease FM 9	In greater sage-grouse habitat, use remote monitoring techniques for production facilities and develop a plan to reduce vehicular traffic frequency of vehicle use (Lyon and Anderson 2003).	The three facilities will be run from the Phase I control room, which reduces the number of employees needed as well as vehicular traffic at the site.
Lease FM 10	Use dust abatement practices on well pads.	Dust control during construction is an environmental protection measure ( <b>Section 2.2.1</b> ). “Water would be applied to the ground during the construction and utilization of the drill pads, access roads, and other disturbed areas as necessary to control dust.”
Lease FM 11	Cluster disturbances associated with operations and facilities as close as possible, unless site-specific conditions indicate that disturbance to greater sage-grouse habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.	Project layout has been designed to co-locate as many facilities as practicable.
Lease FM 12	Apply a phased development approach with concurrent reclamation.	The Project is proposed as Phase III. Phases I and II have already been developed and reclaimed to the extent practicable for operation.
Lease FM 13	Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile Virus (Doherty 2007).	The minimum amount of reserve pits will be constructed needed for drilling operations. Multiple wells will be drilled from pads to utilize the same reserve pits for drilling.
Lease FM 14	<p>In greater sage-grouse habitat, remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile Virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat (Doherty 2007):</p> <ul style="list-style-type: none"><li>• Overbuild size of ponds for muddy and non-vegetated shorelines</li><li>• Build steep shorelines to decrease vegetation and increase wave actions</li><li>• Avoid flooding terrestrial vegetation in flat terrain or low lying areas</li><li>• Construct dams or impoundments that restrict down slopes seepage or overflow</li><li>• Line the channel where discharge water flows into the pond with crushed rock</li><li>• Construct spillway with steep sides and line it with crushed rock</li><li>• Treat waters with larvicides to reduce mosquito production where water occurs on the surface</li></ul>	Pits are constructed with steep walls that limit the growth of vegetation. Once the well is drilled, the drilling fluid will be allowed to evaporate and the pits will remain dry unless needed for flow tests and/or well cleanouts.
Lease FM 15	Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.	Soil compaction is needed on full size well pads to ensure a stable base for the large drilling rig to sit.

**Table 3      Lands and Realty Required Design Features**

RDF #	Description	Project Application
LR-LUA 1	Where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes impacts in greater sage-grouse habitat. Use existing roads or realignments of existing roads to access valid existing rights that are not yet developed.	Does not apply to this Project.
LR-LUA 2	Do not issue ROWs to counties on newly constructed energy/mining development roads, unless for a temporary use consistent with all other terms and conditions included in this document.	Does not apply to this Project.
GEN 3	Where necessary, fit transmission towers with anti-perch devices (Lammers and Collopy 2007) in greater sage-grouse habitat.	Ormat has committed to installing anti-perch devices on power poles for the transmission lie tie-in ( <b>Section 2.2.1</b> ).



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## **Appendix F: Interim and Final Reclamation Plan**

Bureau of Land Management  
McGinness Hills Geothermal Development Project EA  
Environmental Assessment: DOI-BLM-NV-B010-2011-0015-EA  
Appendix F: Interim and Final Reclamation Plan

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**Reclamation Plan**  
**Ormat Nevada, Inc. McGinness Hills Geothermal Project**  
Lander County, Nevada  
May 2011

The McGinness Hills Geothermal Development Project and associated Transmission line will be constructed, operated, and maintained by ORNI 39 and ORNI 49 as subsidiary of Ormat Nevada, Inc. (Ormat). Intermediate and final reclamation is required for two geothermal power plants, 9.01 miles of power transmission line, geothermal wells, geothermal pipelines, and ancillary facilities located on private lands, Bureau of Land Management (BLM)-, and United States Forest Service (USFS)-managed properties. All disturbed areas resulting from the project will be reclaimed in accordance with the requirements of 43 Code of Federal Regulation (CFR) 3200. Interim reclamation of the project to the extent practicable will occur throughout the project life. Final reclamation will involve removal of the utilization facility and all associated equipment and will occur at the time of facility decommissioning.

**Reclamation Objectives**

The objective of interim reclamation is to restore vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil; control erosion; and minimize habitat, visual, and forage loss during the life of the project. Individual well sites and other facilities may be partially restored by interim reclamation.

The objective of final reclamation is long-term and is designed to return the land to a condition approximating that which existed prior to disturbance created by the project. This includes restoration of the landform and natural vegetative community, hydrologic systems, visual resources, and wildlife habitats. To ensure that the long-term objective will be reached through human and natural processes, actions will be taken to ensure standards are met for site stability, visual quality, hydrological functioning, and vegetative productivity.

**General Reclamation**

The BLM Mount Lewis Field Office and/or USFS Authorized Officer will be notified 24 hours prior to the commencement or undertaking of any interim or final reclamation operations.

Housekeeping:

1. Immediately upon well completion, all well locations and surrounding areas will be cleared and maintained free of: debris, materials, trash, and equipment not required for production or injection.
2. No hazardous substances, trash, or litter will be buried or placed in reserve pits. Upon well completion, any hydrocarbons in the reserve pit will be remediated or removed, for proper disposal at an approved facility.
3. Vegetation removal and surface disturbance will be minimized wherever possible.

Topsoil Management:

1. Operations will disturb the minimum amount of surface area necessary to conduct safe and efficient operations. When possible, equipment will be stored and operated on vegetated ground to minimize surface disturbance.
2. In areas to be heavily disturbed, the top eight inches of soil material, will be stripped and stockpiled around the perimeter of the well location and along the perimeter of the access road to control run-on and run-off, and to make redistribution of topsoil more efficient during interim reclamation. Stockpiled topsoil may include vegetative material. Topsoil will be clearly segregated and stored separately from subsoils. If additional topsoil is needed to reclaim the site, topsoil will be imported from a location approved by the BLM Mount Lewis Field Office and/or USFS Authorized Officer.
3. Earthwork for interim and final reclamation will be completed within 12 months of well completion or plugging unless a delay is approved in writing by the BLM Mount Lewis Field Office and/or USFS Authorized Officer.
4. Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment. If such equipment creates ruts in excess of four inches deep, the soil will be deemed too wet.
5. No major depressions will be left that would trap water and cause ponding unless the purpose is to trap runoff and sediment.
6. Areas able to be reclaimed will be ripped, tilled, or disked on contour, as necessary, to restore to approximate original contour and minimize erosion. Deep ripping to relieve compaction will be performed. All compacted areas to be seeded will be ripped to a minimum depth of 18 inches with a minimum furrow spacing of two feet.
7. Wherever possible, cut slopes, fill slopes, and borrow ditches will be covered with topsoil and revegetated. Final reclamation includes recontouring of roads back to original contour.

8. Salvaged topsoil will be replaced at the approximate original thickness prior to seedbed preparation.

### **Seeding**

#### **Seedbed Preparation:**

1. Initial seedbed preparation will consist of recontouring to the appropriate interim or final reclamation land surface. All compacted areas to be seeded will be ripped to a minimum depth of 18 inches with a minimum furrow spacing of two feet, followed by recontouring the surface. Topsoil that has been stockpiled shall be replaced by spreading in an evenly distributed manner. Prior to seeding, the seedbed will be scarified, pitted, or barricaded as necessary and left with a rough surface.
2. Appropriate planting instructions will be followed for each seed mix provided. If broadcast seeding is to be used and is delayed, final seedbed preparation will consist of contour cultivating to a depth of four to six inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to loosen the soil and create seed germination micro-sites.

#### **Seed Application:**

1. Seeding will be conducted no more than 24 hours following completion of final seedbed preparation.
2. Revegetation will include site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious weeds, invasive weeds, and non-native species seeds listed in the Nevada Designated Noxious Weed List (Nevada Administrative Code [NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM.
3. For the McGinness Hills Geothermal Project, the following seed mix and rates will be used on all disturbed surfaces, including pipelines and road cut & fill slopes:

Disturbed areas would be treated with a pre-emergent herbicide for the control of cheatgrass following the application of the seed mix and prior to plant emergence. Treatment would be by application of PLATEAU, or an equivalent herbicide (Imazipic is the active ingredient) following the reseeding, at an application rate of two to 12 ounces per acre.

**Seeding of disturbed areas within the Unit Area (Lake Ranch Pasture/Use Area) would be completed using the following BLM-approved native seed mixture and application rate:**

Common Name	Scientific Name	Pounds per Acre (bulk)
<b>Grass</b>		
Indian ricegrass	<i>Achnatherum hymenoides</i>	5.5
Needle and thread	<i>Hesperostipa comata</i>	6
Squirreltail	<i>Elymus elymoides</i>	2.5
<b>Forb</b>		
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	1
Western yarrow	<i>Achillea millefolium</i>	1
<b>Total</b>		16.0

**Seeding of disturbed areas associated with the transmission line (Rye Patch Pasture/Use Area and Lake Ranch Pasture/Use Area) would be completed using the following BLM-approved native seed mixture and application rate:**

Common Name	Scientific Name	Pounds/acre (bulk)
<b>Grass</b>		
Indian ricegrass	<i>Achnatherum hymenoides</i>	4
Needle and thread	<i>Hesperostipa comata</i>	5
Bluebunch wheatgrass*	<i>Pseudoroegneria spicata</i>	4.5
<b>Forb</b>		
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	1
Sulfur flower	<i>Eriogonum umbellatum</i>	1
<b>Total</b>		15.5

\*The cultivar of bluebunch wheatgrass used to seed disturbed areas would not be the Snake River bluebunch wheatgrass (*Elymus wawawaiensis*).

**All seeding on public lands managed by the BLM would be reviewed and approved by the Mount Lewis Field Manager prior to implementation, to include seed mixtures, seeding rates, methods, and timing. All seeding on USFS managed lands will be reviewed and approved by the USFS prior to implementation, to include seed mixtures, seeding rates, methods, and timing.**

The application of seed is prohibited from May 15 to September 15. Fall seeding is preferred and recommended. Seeding will be conducted after September 15 and prior to ground freezing. Shrub species will be seeded separately and will be seeded during the winter.

Erosion Control and Mulching:

1. Mulch, silt fencing, waddles, certified weed-free hay bales, and other erosion control devices will be used on areas at risk of soil movement from wind and water erosion.
2. Water bars, detention basins, silt fencing or other erosion control devices shall be installed as necessary.
3. Mulch will be used if necessary to control erosion, create vegetation micro-sites, and retain soil moisture and may include hay, small-grain straw, wood fiber, live mulch, cotton, jute, or synthetic netting. Mulch will be free from mold, fungi, and certified free of noxious weed or invasive weed seeds.
4. If straw mulch is used, it will contain fibers long enough to facilitate crimping and provide the greatest cover.

Reserve Pit Closure:

1. Reserve pits will be closed and backfilled within 12 months of release of the drill rig. All reserve pits remaining open after 12 months will require written authorization of the BLM Mount Lewis Field Office Authorized Officer. Immediately upon well completion, any hydrocarbons or trash in the pit will be removed. Pits will be allowed to dry, pumped dry, or allowed to solidify in-situ prior to backfilling.
2. Following completion activities, pit liners will be completely removed or removed down to the solids level and disposed of at an approved landfill, or treated to prevent their reemergence to the surface and interference with long-term successful revegetation. If it was necessary to line the pit with a synthetic liner, the pit will not be trenched (cut) or filled (squeezed) while containing fluids. When dry, the pit will be backfilled with a minimum of five feet of soil material. In relatively flat areas the pit area will be slightly mounded above the surrounding grade to allow for settling and to promote surface drainage away from the backfilled pit.
3. All refuse; junk, trash, tools, residual material, or personal property shall be removed from the drill pad and reserve pit prior to restoration work.

Control of Noxious Weeds, Invasive Weeds, and Non-Native Species:

1. All reclamation equipment will be cleaned prior to use to reduce the potential for introduction of noxious weeds or other undesirable non-native species.
2. A weed monitoring and control program will be implemented prior to site preparation for planting and will continue until interim or final reclamation is approved by the BLM Mount Lewis Field Office and/or USFS Authorized Officer.
3. Monitoring will be conducted at least annually during the growing season to determine the presence of noxious weeds, invasive weeds, and non-native species. Noxious weeds, invasive weeds, and non-native species that have been identified during monitoring will be promptly treated and controlled. A Pesticide Use Proposal



will be submitted to the BLM Mount Lewis Field Office and/or USFS Authorized Officer for approval prior to the use of herbicides.

### **Interim Reclamation**

#### **A. Transmission Line**

##### **Procedures:**

1. Temporary areas of disturbance would be recontoured to match the surrounding terrain. Areas to be reclaimed will be ripped, tilled, or disked on contour, as necessary. Construction sites, material storage yards, and access roads would be kept in an orderly condition and free of trash.
2. Refuse, junk, trash, tools, residual material, or personal property shall be removed from the transmission line right-of-way prior to restoration work. Refuse and trash would be collected at temporary staging areas in a closed container until removed from the transmission line right-of-way and disposed of in an approved manner. Oils and fuels would not be discharged to the ground surface. Waste oils or chemicals would be collected and hauled to an approved site (approved disposal site refers to a "permitted TSD facility" as identified on the Nevada Division of Environmental Protection, Bureau of Waste Management website) for disposal.
3. Interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation. This may involve construction and maintenance of temporary detention basins, silt fences, berms, ditches, and mulching.

#### **B. Geothermal Pads, Plant, and Pipeline**

##### **Procedures:**

1. Liquids from the reserve pits would either naturally evaporate or be removed as may be necessary (i.e. pumped into another well), or allowed to solidify in-situ prior to backfilling.
2. Reserve pits will be closed and backfilled within 12 months of release of the drill rig. All reserve pits remaining open after 12 months will require written authorization of the BLM Mount Lewis Field Office Authorized Officer. Immediately upon well completion, any hydrocarbons or trash in the pit will be removed.
3. The solid contents remaining in each of the reserve pits, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings would be tested to confirm that they are not hazardous. Typical tests may include the Toxicity Characteristic Leaching Procedure (Method 1311 [EPA 1992]), tested for heavy metals; pH (EPA method 9045D); Total Petroleum Hydrocarbons/Diesel (EPA Method 8015B); and Oil and Grease (EPA Method 413.1). If the test results indicate that these solids are non-hazardous, the solids would then be mixed with the excavated rock and soil and buried by backfilling the reserve pit. Hazardous materials, if any, would be taken to a

“permitted TSD facility” as identified on the Nevada Division of Environmental Protection, Bureau of Waste Management website.

4. Following completion activities, pit liners will be completely removed or removed down to the solids level and disposed of at an approved landfill, or treated to prevent their reemergence to the surface and interference with long-term successful revegetation. If it was necessary to line the pit with a synthetic liner, the pit will not be trenched (cut) or filled (squeezed) while containing fluids. When dry, the pit will be backfilled with a minimum of five feet of soil material. In relatively flat areas the pit area will be slightly mounded above the surrounding grade to allow for settling and to promote surface drainage away from the backfilled pit.
5. All refuse; junk, trash, tools, residual material, or personal property shall be removed from the drill pad and reserve pit prior to restoration work.
6. A well with no commercial potential may continue to be monitored, but will eventually be plugged and abandoned in conformance with the well abandonment requirements of the BLM and the Nevada Division of Minerals (NDOM). Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids will not move across these barriers into different aquifers. The wellhead (and any other equipment) will then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.
7. Portions of cleared well sites not needed for operational and safety purposes (i.e. the “shoulders” of the pad) would be recontoured to a final or intermediate contour that would blend with the surrounding topography as much as possible. Stockpiled topsoil will be spread on the area to aid in revegetation. Areas to be reclaimed will be ripped, tilled, or disked on contour, as necessary.
8. Revegetation will include site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious, invasive, and non-native seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM.
9. Interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation. This may involve construction and maintenance of temporary detention basins, silt fences, berms, ditches, and mulching.
10. When well drilling and completion has occurred, some portions of the well location will undergo interim reclamation and some portions of the well pad may not be restored. Most well locations will have limited areas of bare ground, such as a small

area around production facilities or the surface of a rocked road. Interim reclamation may not take place where work-over rigs and fracturing tanks need a level area to set up in the future. Some areas will undergo final reclamation where portions of the well pad will no longer be needed for production operations and can be recontoured to restore the original landform.

### **Interim Reclamation Procedures – Additional**

#### Recontouring:

1. Interim reclamation actions will be completed no later than 12 months from the time that the final well on the location has been completed, season and weather permitting. Portions of cleared well sites not needed for active operational and safety purposes will be recontoured to the original contour if feasible, or to an interim contour that blends with the surrounding topography as much as possible. Sufficient semi-level areas may remain for setup of a workover rig or for equipment storage. In some cases, rig anchors may need to be pulled and reset after recontouring to allow for maximum interim reclamation.
2. For production or injection wells, the interim cut and fill slopes prior to reseeding will not be steeper than a 3:1 ratio, unless the adjacent native topography is steeper. Constructed slopes may be much steeper during drilling, but will be recontoured to the above ratios during interim reclamation.
3. Roads and well production equipment, such as tanks, treaters, separators, vents, electrical boxes, and equipment associated with pipeline operation, will be placed on location to permit maximum interim reclamation of disturbed areas. If equipment is found to interfere with proper interim reclamation of disturbed areas, the equipment will be moved so proper recontouring and revegetation can occur.

#### Application of Topsoil & Revegetation:

1. Topsoil will be evenly spread and revegetated over the entire disturbed area not needed for all-weather operations including road cuts and fills and to within a few feet of the production facilities, unless an all-weather, surfaced, access route or small “teardrop” turnaround is needed on the well pad.
2. In order to inspect and operate the well or complete workover operations, it may be necessary to drive, park, and operate equipment on restored, interim vegetation within the previously disturbed area.
3. Damage to soils and interim vegetation will be repaired and reclaimed following use. To prevent soil compaction, under some situations, such as the presence of moist, clay soils, the vegetation and topsoil will be removed prior to workover operations and restored and reclaimed following workover operations.

#### Visual Resources Mitigation:

1. Trees (if present) and tall vegetation will be left undisturbed along the edges of the pads whenever feasible to provide screening.

2. To help mitigate the contrast of recontoured slopes, reclamation will include measures to feather cleared lines of vegetation and redistribute in-situ vegetation, woody debris, and large rocks over recontoured cut and fill slopes.
3. Production facilities will be clustered and placed away from cut slopes and fill slopes to allow the maximum recontouring of the cut and fill slopes.

### **Final Reclamation**

#### **Procedures:**

The following minimum reclamation actions will be taken to ensure that the reclamation objectives and standards are met. It may be necessary to take additional reclamation actions beyond the minimum in order to achieve the Reclamation Standards.

#### **Transmission Line**

1. Poles, conductors, and hardware associated with the 230-kilovolt transmission line would be totally removed. The remaining holes would be filled with soil gathered from the immediate vicinity within the approved permanent right-of-way. Areas so disturbed will be treated by contouring and revegetation.
2. Areas to be reclaimed will be ripped, tilled, or disked on contour, as necessary and revegetated during final reclamation. Revegetation will include site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious weeds, invasive weeds, and non-native species seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM and USFS.
3. The areas where the poles were removed would be raked to match the surrounding topography. Bladed areas would be recontoured and revegetated with site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious weeds, invasive weeds, and non-native species seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM and USFS.
4. Refuse, junk, trash, tools, residual material, or personal property shall be removed from the transmission line right-of-way prior to restoration work.

#### **Geothermal Plant, Well Pads, and Geothermal Pipeline**

1. At the end of Project operations, the wells would be plugged and abandoned as required by NDOM regulations and BLM. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cemented at specific intervals to ensure that fluids would not move into different zones or aquifers. The top interval of

the well bore is cemented to ground level to eliminate surface contamination to ground waters. The wellhead (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

2. Areas to be reclaimed will be ripped, tilled, or disked on contour, as necessary. Pipeline reclamation would include placing fill in the trench, fill compaction, regrading cut-and-fill slopes to restore the original contour, replacing topsoil and revegetation.
3. Revegetation will include site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious weeds, invasive weeds, and non-native species seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM.
4. Disposition of waste, residual material, junk trash, personal property.
5. All other above-ground facilities and areas of surface disturbance associated with geothermal development would be removed and reclaimed.

#### **Final Reclamation Procedures – Additional**

1. Final reclamation actions will be completed within six months of well plugging, season and weather permitting.
2. Final reclamation plans shall include the reclamation of roads, drill pads and sumps back to original contour. Demolition and removal of facilities, pipelines, culverts, transmission lines, substation, and total site reclamation.
3. All disturbed areas, including roads, pipelines, pads, production facilities, and interim reclaimed areas will be regraded to match the contour that existed prior to initial construction; or a contour that blends indistinguishably with the surrounding landscape. Salvaged topsoil will be spread evenly over the entire disturbed site to ensure successful revegetation. To help mitigate the contrast of recontoured slopes, reclamation will include measures to ‘feather’ cleared lines of vegetation and redistribute in-situ vegetation, woody debris, and large rocks over recontoured cut and fill slopes.
4. Water breaks and terracing will only be installed when absolutely necessary to prevent erosion of fill material. Water breaks and terracing are not permanent features and will be removed and reseeded when the rest of the site is successfully revegetated and stabilized.
5. If necessary to ensure timely revegetation, well pads and other areas will be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until the intended plant communities become firmly established, whichever comes

later. Fencing will meet standards found on page 18 of the Gold Book, 4<sup>th</sup> Edition, or will be fenced with operational electric fencing.

6. Final abandonment of pipelines and flowlines will involve flushing and properly disposing of any fluids in the lines. All surface lines and any lines that are buried close to the surface that may become exposed in the foreseeable future due to water or wind erosion, soil movement, or anticipated subsequent use, must be removed. Deeply buried lines may remain in place unless otherwise directed by the BLM Mount Lewis Field Office Authorized Officer.
7. Refuse, junk, trash, tools, residual material, or personal property will be removed from the project area prior to restoration work.

**Reclamation Performance Standards:**

The following reclamation performance standards will be met:

1. Interim reclamation includes disturbed areas that may be re-disturbed during operations and will be re-disturbed at final reclamation to achieve restoration of the original land form and natural vegetative community.
2. Interim reclamation will be judged successful when the BLM Mount Lewis Field Office Authorized Officer determines that:
3. Disturbed areas not needed for active, long-term production operations or vehicle travel have been recontoured.
4. Areas to be reclaimed will be ripped, tilled, or disked on contour, as necessary; protected from erosion; and revegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved) plant community sufficient to minimize visual impacts; provide forage; stabilize soils; and impede the invasion of noxious, invasive, and non-native weeds.
5. Revegetation will include site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious weeds, invasive weeds, and non-native species seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM.
6. Final reclamation includes disturbed areas where the original landform and a natural vegetative community have been restored.
7. Final reclamation will be judged successful when the BLM Mount Lewis Field Office Authorized Officer and/or the USFS Authorized Officer determines that:
8. The original landform has been restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors.

9. Reclaimed areas are ripped, tilled, or disked on contour, as necessary.

**General Performance Standards:**

A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community is established on the site, with a density sufficient to control erosion and invasion by nonnative plants and to reestablish wildlife habitat or forage production. At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species occurring in the surrounding natural vegetation. Revegetation will include site appropriate seed mixtures for various ecological site types encountered. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious weeds, invasive weeds, and non-native species seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded.

**Specific Performance Standards:**

1. No single species will account for more than 30% total vegetative composition unless it is evident at higher levels in the adjacent landscape. Permanent vegetative cover will be determined successful when the basal cover of desirable perennial species is at least 80% of the basal cover on adjacent or nearby undisturbed areas where vegetation is in a healthy condition; or 80% of the potential basal cover as defined in the National Resource Conservation Service Ecological Site(s) for the area. Plants must be resilient as evidenced by well-developed root systems and flowers.
2. Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gullying, head-cutting, slumping, and deep or excessive rills (greater than 3 inches) are not observed.
3. The site is free of Noxious, invasive, and non-native seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201), field debris, equipment, and contaminated soil.
4. Invasive and non-native weeds are controlled.
5. Refuse, junk, trash, tools, residual material, or personal property is removed from the project area.

**Reclamation Monitoring and Final Abandonment Approval**

1. Reclaimed areas will be monitored annually. Actions will be taken to ensure that reclamation standards are met as quickly as reasonably practical and are maintained during the life of the project.
2. Reclamation monitoring will be documented in an annual reclamation report submitted to the BLM Mount Lewis Field Office and/or USFS Authorized Officer by

March 1 of each calendar year. The report will document compliance with all aspects of the reclamation objectives and standards, identify whether the reclamation objectives and standards are likely to be achieved in the near future without additional actions, and identify actions that have been or will be taken to meet the objectives and standards. The report will also include acreage figures for: Initial Disturbed Acres; Successful Interim Reclaimed Acres; Successful Final Reclaimed Acres.

3. Annual reports will not be submitted for the project or portions thereof when approval by the BLM Mount Lewis Field Office and/or USFS Authorized Officer was obtained in writing as having achieved interim or final reclamation standards. Monitoring and reporting shall continue annually until interim or final reclamation is approved. Whenever 30% or more of a reclaimed area is re-disturbed, monitoring will be reinitiated.
4. The BLM Mount Lewis Field Office and/or USFS Authorized Officer shall be informed when reclamation has been completed, appears to be successful, and the site is ready for final inspection.



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## **Appendix G: Bird and Bat Conservation Strategy**

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# **BIRD AND BAT CONSERVATION STRATEGY MCGINNESS HILLS GEOTHERMAL DEVELOPMENT PROJECT LANDER COUNTY, NEVADA**

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## ABBREVIATIONS

<b>APLIC</b>	Avian Power Line Interaction Committee
<b>BBCS</b>	Bird and Bat Conservation Strategy
<b>BFD</b>	Bird-Flight™ Diverter
<b>BGEPA</b>	Bald and Golden Eagle Protection Act
<b>BLM</b>	Bureau of Land Management
<b>EA</b>	Environmental Assessment
<b>ESA</b>	Endangered Species Act
<b>FONSI</b>	Finding of No Significant Impact
<b>IM</b>	Instruction Memorandum
<b>kV</b>	Kilovolt
<b>MBTA</b>	Migratory Bird Treaty Act
<b>MOU</b>	Memorandum of Understanding
<b>NDOW</b>	Nevada Department of Wildlife
<b>NMFS</b>	National Marine Fisheries Service
<b>NRS</b>	Nevada Revised Statutes
<b>Ormat</b>	Ormat Nevada Inc.
<b>project</b>	McGinness Hills Geothermal Development Project
<b>RDF</b>	Required Design Feature
<b>ROW</b>	Right-of-Way
<b>SPUT</b>	Special Purpose Utility
<b>Stantec</b>	Stantec Consulting Services Inc.
<b>SVD</b>	Spiral Vibration Damper
<b>U.S.C.</b>	United States Code
<b>USFWS</b>	United States Fish and Wildlife Service



## 1.0 INTRODUCTION

A Bird and Bat Conservation Strategy (BBCS) is a project-specific document that outlines a program designed to reduce the potential risks of bird and bat mortality that may result from the interaction with a project's facilities and personnel.

This BBCS has been developed based on recommendations from the Avian Protection Plan Guidelines prepared by the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and the United States Fish and Wildlife Service (USFWS) in 2005 (APLIC and USFWS, 2005). The Avian Protection Plan Guidelines provide guiding principles to be utilized in the development of a BBCS, thus reducing avian mortality.

Ormat Nevada, Inc. (Ormat) is proposing the McGinness Hills Geothermal Development Phase III Project at the McGinness Hills Geothermal Development Project (project). This BBCS is being prepared as a project-wide plan to be implemented for all ongoing and immediately foreseeable future projects, and for this BBCS, the disturbance footprint for existing and future facilities within the McGinness Hills Geothermal Lease Unit, and that portion of the transmission line outside the lease unit, will be combined and referred to as the project area (**Figure 1**).

### 1.1 PURPOSE AND IMPLEMENTATION

Bird and bat species are perhaps the most obvious groups to benefit when the goals of this BBCS are accomplished. The practical effect of such a plan may also translate to advantages for Ormat. As the BBCS reduces bird and bat disturbance or mortality resulting from bird and bat interactions with project facilities, costs associated with such interactions could be avoided or held to a minimum. These costs may include monetary losses such as the payment of fines and penalties, repair costs for equipment damaged by bird and bat interaction, or administration and managerial time directed toward alleviating bird and bat conflicts. The BBCS reduces other costs that extend beyond monetary value, such as those attributed to negative public perception.

The voluntary implementation of this BBCS fulfills several goals simultaneously, and fulfillment of each of these goals contributes to the satisfaction of the ultimate goal to reduce bird and bat mortality. The goals specific to this BBCS are to:

- Reduce the potential for bird and bat injury or mortality by implementing specific actions;
- Identify and isolate where bird and bat mortality has the potential to occur to minimize incidents;
- Establish a bird and bat reporting system to document incidents of injury and mortality caused by electrocution, collision, and other project-related features;
- Assist Ormat in compliance with state and federal laws regarding bird and bat species to avoid the threat of penalties and fines; and





- Increase Ormat's reliability and power production by reducing outages from bird and bat interactions with project facilities.

The implementation of a BBCS also supports compliance with the state and federal regulations described in the following section.

## 1.2 FEDERAL AND STATE AVIAN AND BAT PROTECTION LAWS, REGULATIONS, AND POLICY

### 1.2.1 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 United States Code [U.S.C.] 703-712), which is administered by the USFWS, is the cornerstone of migratory bird conservation and protection in the United States. It implements four treaties that provide international protection of migratory birds. The MBTA states: "... it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or eggs of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof..." The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." In 1972, an amendment to the MBTA resulted in bald eagles (*Haliaeetus leucocephalus*) and other birds of prey being included in the definition of a migratory bird. The MBTA currently protects more than 1,000 migratory bird species, including waterfowl, shorebirds, seabirds, wading birds, raptors, and songbirds (USFWS, 2013).

### 1.2.2 Bald and Golden Eagle Protection Act

Under the authority of the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d), bald eagles and golden eagles (*Aquila chrysaetos*) are provided additional legal protection. The BGEPA makes it unlawful to import, export, sell, purchase, barter, or take any bald eagle or golden eagle, their parts, products, nests, or eggs. As used in the BGEPA, "take" includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing an eagle.

### 1.2.3 Endangered Species Act

The Endangered Species Act (ESA) (16 U.S.C. 1531-1544) is administered by USFWS and the Commerce Department's National Marine Fisheries Service (NMFS). USFWS has primary responsibility for terrestrial and freshwater organisms, while NMFS has responsibility for marine species. These two agencies work with other agencies to plan or modify federal projects so that they would have minimal impact on listed species and their habitats. Protection of species is also achieved through partnerships with the states, with federal financial assistance and a system of incentives available to encourage state participation.



Section 9 of the ESA makes it unlawful for a person to “take” a listed species. Under the ESA, “take” is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Through regulation, the word “harm” has been defined by the Secretary of the Interior as “an act which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.” However, permits for “incidental take” can be obtained from USFWS for take of endangered species which would occur as a result of an otherwise legal activity.

#### **1.2.4 Bureau of Land Management**

Executive Order 13786, signed on January 11, 2001, directs each federal agency taking actions that are likely to have a measurable effect on migratory bird populations to develop and implement a Memorandum of Understanding (MOU) with the USFWS that promotes the conservation of migratory bird populations. In 2010, the Bureau of Land Management (BLM) signed an MOU with the USFWS (BLM MOU 230-2010-4) to promote the conservation of migratory birds. The mission of the MOU is to manage habitat suitable to a variety of migratory birds, manage lands in a manner as to minimize activities that may negatively affect populations of migratory birds, and promote conservation measures that avoid impacts to nesting birds through a variety of actions, particularly for birds of conservation concern, as identified by the USFWS. Additionally, several Instructional Memorandums (IM's) issued by the BLM also guide the agency on the management of specific bird species. For example, the greater sage-grouse (*Centrocercus urophasianus*) has several IM's which dictate management of habitat by the BLM.

#### **1.2.5 State of Nevada**

The State of Nevada has identified wildlife species that are declining in their range throughout Nevada or are otherwise rare. Sensitive and protected animal species are protected in Title 45 of the Nevada Revised Statutes (NRS) (NRS 501.100 through 503.104). Classification of wildlife species and related regulations are detailed in Chapter 503 of Nevada Administrative Code.



## 2.0 MCGINNESS HILLS GEOTHERMAL DEVELOPMENT PROJECT BACKGROUND

### 2.1 PROJECT LOCATION

The project is located approximately 11 miles northeast of Austin, Nevada in the southern portion of Lander County, Nevada (**Figure 1**). The project is accessed by traveling approximately four miles east on U.S. Highway 50 from Austin, Nevada, then approximately six miles northeast on Grass Valley Road to the project facilities. The McGinness Hills Geothermal Lease Unit encompasses approximately 7,680 acres of public lands managed by the BLM and approximately 218 acres of private lands in Township 20 North, Range 45 East, Sections 9-16 and 21-24, Mount Diablo Baseline and Meridian.

### 2.2 PROJECT DESCRIPTION

Ormat obtained federal geothermal leases in 2007 in the McGinness Hills area of Lander County, Nevada. These leases were obtained and lease stipulations applied. In 2008, the federal geothermal leases were unitized, creating the McGinness Hills Geothermal Unit (NVN-84268X).

In April 2009, Ormat received approval to construct, operate, and maintain the McGinness Hills Geothermal Exploration Project (Phase I) within the McGinness Hills Geothermal Unit. In July 2011, Ormat received approval to construct, operate, and maintain the McGinness Hills Geothermal Development Project (Phase II) within the McGinness Hills Geothermal Unit. Based on results from the development and exploration projects, including well drilling and testing activities, Ormat gained a better understanding of the geothermal resource, and determined that the resource could support an additional power plant and associated infrastructure (Phase III) (**Figure 2**).

Ormat is currently authorized to construct facilities on approximately 270 acres. To date, facilities have been constructed on approximately 105 acres (90 acres BLM-administered land and 15-acres private land). The addition of the proposed Phase III power plant and associated facilities would result in an acreage disturbance of approximately 42 acres (41 acres BLM-administered land and one acre private land). The proposed Phase III disturbance would be recategorized from the previously authorized disturbance; therefore, the total disturbance acreage from the authorized Phase I and Phase II facilities and the proposed Phase III facilities would total approximately 146 acres, which is 124 acres less than the currently authorized disturbance acreage (**Table 1**).



**Table 1 McGinness Hills Project Area Disturbance**

Component	Surface Disturbance Acreage				
	Constructed to Date		Proposed		Total (Phases I, II, & III)
	BLM	Private	BLM	Private	
Thermal Gradient Holes (TGH)	1.5	0.0	0.0	0.0	1.5
Observation Well Pad	2.1	0.0	0.0	0.0	2.1
Well Pads	26.5	10.8	14.7	0.0	52
Power Plant	29.8	0.0	15.0	0.0	44.8
Pipeline	24.8	3.9	7.9	0.8	37.4
Access Road	4.3	0.1	1.9	0.0	6.3
Transmission Line Tie-In	0.6	0.0	1.3	0.0	1.9
<b>Total</b>	<b>89.6</b>	<b>14.8</b>	<b>40.8</b>	<b>0.8</b>	<b>146</b>

### 2.2.1 Geothermal Energy Plants

Ormat has constructed two 48 megawatt (net), 60 megawatt (gross) binary, air-cooled geothermal power generation plants (power plants) at the project, and is proposing to build a third power plant approximately 650 feet south of the existing Phase II power plant. Current surface disturbance for the constructed power plants is 29.8 acres. Surface disturbance associated with construction of the third power plant would be 15 acres.

Power plant site preparation activities would begin with clearing, earthwork, drainage, fencing, and other improvements necessary for commencement of construction. Clearing would include removal of organic material, brush, and slash, which would be stockpiled on site for interim reclamation purposes throughout the project area. Fencing of the power plant site would be required for security and safety during construction, and would be permanent throughout the life of the project. Fencing would be six-foot tall chain link with plastic vertical slats, topped by three strands of barbed wire.

A portion of the power plant site would be devoted to equipment and materials laydown, storage, construction equipment parking, small fabrication areas, office trailers and parking. Equipment and materials laydown space is required for large turbine parts, structural steel, piping spools, electrical components, substation equipment, and building parts.

Mobile trailers or similar suitable facilities (e.g., modular offices) would be brought to the site to be used as construction offices for owner, contractor, and subcontractor personnel, and would be located within the disturbed areas associated with power plant construction areas. Parking would be provided for construction workers and visitors within the power plant area.

Temporary utilities would be provided for the construction offices, the laydown area, and the power plant site. Temporary construction power would be supplied by utilizing power from the adjacent facilities; however, a portable generator may be used temporarily. Area lighting would



be provided for safety and security. Drinking water would be imported and distributed daily. Portable chemical toilets would also be provided at the site during construction.

A substation, used to transform generated low voltage to the higher voltage required for a transmission line, would be constructed within the power plant boundary.

Unless precluded by safety requirements, the power plant building, structures, pipe, etc. would be painted covert green to blend with the area and minimize visibility, pursuant to BLM IM 2007-021.

Once constructed, the geothermal fluids for the binary power plants would be produced from the proposed production wells by pumping. Once delivered to the power plants by the geothermal fluid production pipelines, the heat in the geothermal fluid would be transferred to the “binary” (“secondary” or “working”) fluid in multiple-stage, non-contact heat exchangers (“vaporizers”). The binary turbine units would use pentane (C<sub>5</sub>H<sub>12</sub>) or butane (C<sub>4</sub>H<sub>10</sub>), both flammable but non-toxic hydrocarbons, as the binary fluid, which would circulate through the power plant in a closed loop. The heat from the geothermal fluid would vaporize the binary fluid, which would turn the binary turbine and electrical generator to make electricity.

The vaporized binary fluid would exit the turbine and be condensed back into a liquid in an air-cooled condenser. The condensed binary fluid would then be pumped back to the vaporizers for re-heating and vaporization, completing the closed cycle (BLM, 2017).

The geothermal fluid exiting from the vaporizers would be pumped under pressure out to the geothermal injection wells through the injection pipeline and injected back into the geothermal reservoir. The geothermal fluid would flow through the binary power plant in a closed system, with minimal emissions of non-condensable gases to the atmosphere (BLM, 2017).

Air-cooled condensers are large, open structure air-cooled heat exchangers, and would be the most prominent features of the power plant, both with respect to height and mass. They range between 28 and 35 feet in height and are about two-thirds the length of the boundary. Large finned tube radiators lie horizontal, approximately 20 feet above the ground, on steel beams. Large horizontal fans (about thirteen feet in diameter) on top of the tube assemblies draw ambient air at the dry bulb temperature up through the tubes, cooling and condensing the binary vapor flowing through the inside of the tubes (BLM, 2017).

### 2.2.2 Wells

Ormat has constructed 18 well pads at the Project (not all the same size), and is proposing to construct three additional well pads and expand a previously constructed well pad (BLM, 2017). The number of geothermal production wells required for the project is principally dependent on the productivity of the wells and the temperature and pressure of the produced geothermal fluid.

Each well is located on a well pad in the shape of a rectangle and approximately 4.2 acres in size. Some well pads may have multiple wells. Reserve pits are constructed on each pad for the containment and temporary storage of water, drill cuttings and waste drilling mud during drilling



operations. Each reserve pit measures approximately 75 feet by 200 feet by 10 feet deep (a two-foot freeboard would be maintained).

During well drilling, “blow-out” prevention equipment would be utilized while drilling below the surface casing. During active drilling operations, a minimum of 10,000 gallons of cool water and 12,000 pounds of inert, non-toxic, non-hazardous barite (barium sulfate) would be stored at each well site for use in preventing uncontrolled well flow (i.e., “killing the well”). Following completion of well drilling, unused water would be evaporated, used for dust suppression, or pumped down the well (BLM, 2017).

Once a well is drilled it will undergo short-term (three to five days) and long-term (seven to 30 days) testing to accurately determine the geothermal reservoir productivity. Completed wells with wellheads will have an industrial grate placed over the hole to prevent humans and wildlife from falling into the cellar.

Each of the production wells would be equipped with a line shaft pump to bring the geothermal fluid to the surface under pressure. The electricity to power the wellhead pump motors would be supplied via an insulated electric conductor installed from the power plant to the wellheads along the connecting pipelines (BLM, 2017).

Wellhead dimensions for the production wells are not expected to exceed a height of 15 feet above the ground surface or four feet in diameter. Wellhead dimensions for the injection wells would be much smaller (approximately four feet in height) since they would not have wellhead pump motors (BLM, 2017).

An approximately 15-foot by 15-foot by 10-foot high motor control building may be located on production well pads within approximately 50 feet of each production well. The well control systems, data transmitters, and geothermal fluid treatment systems used for the injection wells would be placed inside a smaller structure on the injection well pads (BLM, 2017).

### **2.2.3 Pipelines**

Ormat has constructed approximately nine miles of geothermal production and injection pipeline at the project, and is proposing to construct approximately 3.6 miles of production and injection pipeline. Geothermal production pipeline delivers the geothermal fluid from the production wells to the power plants. Injection pipeline delivers the cooled geothermal fluid from the power plant to the previously authorized injection wells. The proposed geothermal pipeline would be required to move geothermal fluid from the proposed production wells. The new pipeline would occur adjacent to the existing pipeline from Phases I and II. Surface disturbance associated with construction of this pipeline would be 8.7 acres.

The geothermal fluid pipelines would be constructed from seamless, welded-steel pipe. Pipes are expected to range in diameter from 12 to 30 inches. Two to three inches of insulation and a protective aluminum sheath would jacket the steel production pipes, increasing the diameter of the finished production pipelines by up to six inches. Unless precluded by safety requirements,



pipelines and power trays would be painted covert green to blend with the area and minimize visibility, pursuant to BLM IM 2007-021 (BLM, 2017).

Horizontal and/or vertical expansion loops (a square bend in the pipeline approximately 30 feet in length by 40 feet in width) would be constructed about every 300 to 600 feet along the production pipelines. Expansion loops allow the pipeline to flex as it lengthens and shortens due to heating and cooling. Fewer expansion loops would be needed along the injection pipelines, as the injection pipelines are subject to less heating and cooling (BLM, 2017).

The pipelines would be constructed near ground level (averaging about one foot of ground clearance) on steel supports called "sleepers." Sleepers support the pipeline and would be constructed approximately every 30 feet. When completed, the top of the new geothermal pipelines would average three feet above the ground surface. However, a number of pipeline lengths could be up to six feet in height to accommodate terrain undulations and to facilitate movement of wildlife, livestock, and wild horses through the wellfield. Additionally, to further facilitate wildlife, wild horse, and livestock movement and access to water, the pipelines would be buried at select locations (BLM, 2017).

To allow continued vehicle access, the pipelines would be constructed across roads, either by trenching under the road, or running the roadbed up and over the pipeline. Electrical power and instrumentation cables for the wells would then be installed in steel conduit constructed along the same pipe sleepers (BLM, 2017).

The production and injection pipeline routes generally follow the shortest distance from each well pad to the next well pad or the power plant, to minimize the amount of pipe required, reduce heat losses, reduce the energy required to move the fluids, and to minimize the amount of surface disturbance associated with the pipeline. Additionally, the proposed pipeline routes and expansion loops are generally located adjacent to existing pipeline to facilitate ongoing monitoring and future maintenance. Construction, operation, and maintenance of this new production pipeline is the same as the Phase I and Phase II pipeline. Long-term disturbance associated with pipeline operation assumes a 20-foot width along the length of the pipeline.

## **2.2.4 Access Roads**

Ormat has constructed access roads at the project, which resulted in approximately 4.4 acres of surface disturbance, and is proposing to construct additional access roads, which would result in approximately 1.9 acres of surface disturbance (BLM, 2017).

Access roads were constructed to be 25-feet wide by using a dozer and/or grader (BLM, 2008). Vehicle turnouts (300-foot long and approximately 25-foot wide) were constructed every one-quarter mile (BLM, 2008).

Maintenance activities could include blading, surface replacement, dust abatement, spot repairs, slide removal, ditch cleaning (if ditches are needed), culvert cleaning (if culverts are necessary), litter cleanup, noxious weed control and snow removal (BLM, 2017).





### 2.2.5 Transmission Line Tie-In

Ormat has constructed a transmission line to the project under a right-of-way (ROW) application and included 97.7 acres of disturbance (90-foot ROW), with 34.7 acres on United States Forest Service-managed land and 63.0 acres on BLM-managed land. Ormat is proposing to construct a transmission line tie-in, that would be approximately 0.3-mile long, resulting in approximately 1.3 acres of surface disturbance (BLM, 2017).

The previously constructed transmission line consisted of steel mono-poles, three-pole steel structures used at angle points, two-pole steel switch structures, and wood H-frame structures (BLM, 2011). Equipment used to construct the transmission line included: cranes, augers, bulldozers, bucket trucks, backhoes, air compressors, electric generators, pickup trucks, and other vehicles, machinery, and field equipment (BLM, 2011).

Construction of the proposed transmission line tie-in would be needed to deliver generated power to the existing transmission line. Surface disturbance associated with construction of this tie-in would be approximately 1.3 acres. The tie-in line would require two to three wood monopole structures, similar to what was previously constructed. This tie-in would be built in accordance with the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC, 2006) and *Reducing Avian Collisions with Power Lines* (APLIC, 2012).

## 2.3 EXISTING BACKGROUND DOCUMENTS

The following documents were utilized during the development of this BBCS:

- 2008 McGinness Hills Geothermal Exploration Project, Environmental Assessment (EA) (BLM, 2008);
- 2010 McGinness Hills Geothermal Development Project – Baseline Report for Plants and Wildlife (GBE, 2010);
- 2011 McGinness Hills Geothermal Development Project, EA (BLM, 2011);
- 2017 Biological Baseline Survey Report, McGinness Hills Phase III Project (Stantec, 2017); and
- 2017 McGinness Hills Geothermal Development Phase III Project, Draft EA (BLM, 2017).

## 2.4 EXISTING ENVIRONMENTAL CONDITIONS

A basic understanding of vegetation communities is essential to understand which avian and bat species have the potential to occur within the project area. Vegetation community mapping and field verification was conducted by Stantec Consulting Services Inc. (Stantec) in 2017, using the Natural Resource Conservation Service ecological sites.

Vegetation within the Phase III disturbance area and the McGinness Hills Geothermal Lease Unit was categorized into nine ecological sites types, which are presented in **Table 2** and shown on





**Figure 3.** Vegetation communities and the species which use them are dependent on numerous factors including elevation, soil type and depth, slope, aspect, precipitation, and anthropogenic influence.

**Table 2 Ecological Sites and Dominant Vegetation within the Project Area**

Ecological Site Name	Ecological Site ID	Phase III Disturbance Acreage	McGinness Hills Geothermal Lease Unit Acreage
Claypan 10-12" P.Z.	R024XY018NV	4.3	4.3
Claypan 12-16" P.Z.	R024XY027NV	0.0	211.5
Loamy Bottom 10-14" P.Z.	R028BY003NV	0.1	519.3
Loamy 8-10" P.Z.	R024XY005NV R028BY010NV	35.6	3,299.9
Loamy Slope 14+" P.Z.	R024XY016NV	0.0	51.1
Wet Meadow 10-14" P.Z.	R028BY001NV	0.5	0.5
Shallow Calcareous Loam 8-10" P.Z.	R028BY011NV	0.0	1,748.6
Shallow Calcareous Slope 8-10" P.Z.	R028BY016NV	0.0	1,675.1
Disturbed <sup>1</sup>	N/A	0.8	111.3
<b>Total</b>		<b>41.3</b>	<b>7,621.6</b>

Source: BLM, 2017

<sup>1</sup>"Disturbed" is not considered an ecological site, but was used as the category for mapped existing disturbance during the 2017 field survey and has been used for the existing facility footprint.

## 3.1 BIRD AND BAT RESOURCES

Regardless of whether a bat or bird species is protected by regulation, law, or agency directive, the ultimate goal of this BBCS is to provide protection to all bird and bat species that may interact with the project facilities and personnel.

In this BBCS, the term “sensitive species” encompasses all bird and bat species that are protected by any one or more of the laws, policies, or regulations described in **Section 1.2** of this document. Specifically, this includes:

- All bird and bat species that are listed as threatened or endangered species or are proposed or candidates for listing under the ESA of 1973 as amended;
- All avian species extended protection under the MBTA;
- Bald and golden eagles extended protection under the BGEPA;
- All bird or bat species that the state of Nevada extends protection to through NRS 501.100–503.104, NRS 527.050, and/or NRS 527.60–527.300; and
- All species identified as BLM sensitive species in Nevada.

Most bird species that occur or have potential to occur within the project area would be considered protected species under the MBTA, as the act protects all native birds commonly found within the BLM Battle Mountain District, with the exception of gallinaceous species (upland game birds) and introduced, non-native species. Other birds, such as the golden eagle or loggerhead shrike (*Lanius ludovicianus*), are protected by the MBTA in addition to other listings, such as the BGEPA or Nevada BLM Sensitive Species list. The greater sage-grouse is not protected under the MBTA.

## 3.1 SPECIES OCCURRING WITHIN AND NEAR THE PROJECT AREA

Species that have been observed during baseline surveys within or near the project area have been documented in the *McGinness Hills Geothermal Development Project – Baseline Report for Plants and Wildlife* (GBE, 2010) and the *Biological Baseline Report, McGinness Hills Phase III Project* (Stantec, 2017), and are provided in **Table 3**.

**Table 3 Avian and Bat Species Known to Occur Within or Near the Project Area**

Scientific Name	Common Name
Bird Species	
<i>Agelaius phoeniceus</i>	Red-winged blackbird
<i>Alectoris chukar</i>	Chukar partridge
<i>Amphispiza belli</i>	Sage sparrow
<i>Amphispiza bilineata</i>	Black-throated sparrow



Scientific Name	Common Name
<i>Anthus rubescens</i>	American pipit
<b><i>Aquila chrysaetos</i></b>	<b>Golden eagle</b>
<i>Artemisiospiza nevadensis</i>	Sagebrush sparrow
<b><i>Asio flammeus</i></b>	<b>Short-eared owl</b>
<b><i>Asio otus</i></b>	<b>Long-eared owl</b>
<b><i>Athene cunicularia hypugaea</i></b>	<b>Western burrowing owl</b>
<i>Bubo virginianus</i>	Great horned owl
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Buteo lagopus</i>	Rough-legged hawk
<b><i>Buteo regalis</i></b>	<b>Ferruginous hawk</b>
<i>Callipepla californica</i>	California quail
<i>Carpodacus mexicanus</i>	House finch
<i>Cathartes aura</i>	Turkey vulture
<b><i>Centrocercus urophasianus</i></b>	<b>Greater sage-grouse</b>
<i>Charadrius vociferus</i>	Killdeer
<i>Chondestes grammacus</i>	Lark sparrow
<i>Chordeiles minor</i>	Common nighthawk
<i>Circus cyaneus</i>	Northern harrier
<i>Colaptes auratus</i>	Northern flicker
<i>Corvus corax</i>	Common raven
<i>Eremophila alpestris</i>	Horned lark
<i>Falco columbarius</i>	Merlin
<b><i>Falco mexicanus</i></b>	<b>Prairie falcon</b>
<i>Falco sparverius</i>	American kestrel
<i>Icterus bullockii</i>	Bullock's oriole
<b><i>Lanius ludovicianus</i></b>	<b>Loggerhead shrike</b>
<i>Molothrus ater</i>	Brown-headed cowbird
<b><i>Oreoscoptes montanus</i></b>	<b>Sage thrasher</b>
<i>Pipilo maculatus</i>	Spotted towhee
<i>Salpinctes obsoletus</i>	Rock wren
<b><i>Spizella breweri</i></b>	<b>Brewer's sparrow</b>
<i>Sturnella neglecta</i>	Western meadowlark
<i>Vireo flammeus</i>	Solitary vireo
<i>Zenaidura macroura</i>	Mourning dove

Source: BLM, 2017; Stantec, 2017; GBE, 2010

Note: BLM Statewide and Battle Mountain District Sensitive Species are denoted in **bold** print.



Two aerial golden eagle nesting surveys were conducted by Stantec within a four-mile buffer of the project area in 2017. A total of three golden eagle nest sites were identified during these surveys. One was occupied by a golden eagle and held an eaglet during the second aerial survey, while the other two were unoccupied during both aerial surveys. Additionally, raptor nesting surveys were conducted concurrently with golden eagle surveys by Stantec within a four-mile buffer of the project area in 2017. A total of 27 nest sites were observed during these surveys. Four of these nests were determined to be red-tailed hawk (*Buteo jamaicensis*) nests, of which, three were occupied. Additionally, seven common raven nests (*Corvus corax*) were observed, of which, five were occupied. The remaining 16 nests were unoccupied and the species could not be determined. All raptor and common raven nest locations identified during the surveys are shown on **Figure 4**.

Migratory bird point count surveys were conducted in 2017 by Stantec, with species observed included in **Table 3**. Eight species were observed during the 2017 survey.

Western burrowing owl (*Athene cunicularia hypugaea*) were observed within the McGinness Hills Geothermal Lease Unit during species specific surveys were conducted in 2010 (GBE, 2010). During present based on habitat suitability (Stantec, 2017).

There are 18 known greater sage-grouse lek sites within the four-mile radius of the project area, of which seven are considered active and three are pending active (**Figure 5**) (BLM, 2017). Additionally, the entire project area occurs within the BLM's Habitat Management Area (Coates et al., 2014, December 2015 version) (**Figure 5**).

### 3.2 OTHER SENSITIVE BIRD AND BAT SPECIES WITH POTENTIAL TO OCCUR IN PROJECT AREA

Sensitive bird and bat species that have potential to occur within the project area, but have not been observed, include those species in **Table 4** (Stantec, 2017). Although these species were not observed during the baseline survey, potential foraging or nesting habitat is present within the project area.

**Table 4 BLM Sensitive Avian Species with Potential to Occur in Project Area**

Scientific Name	Common Name
<b>Bird Species</b>	
<i>Accipiter gentilis</i>	Northern goshawk
<i>Buteo swainsoni</i>	Swainson's hawk
<i>Falco peregrinus</i>	Peregrine falcon
<i>Gymnorhinus cyanocephalus</i>	Pinyon jay
<i>Haliaeetus leucocephalus</i>	Bald eagle
<i>Leucosticte atrata</i>	Black rosy-finch
<i>Oreoscoptes montanus</i>	Sage thrasher



Scientific Name	Common Name
Bat Species	
<i>Antrozous pallidus</i>	Pallid bat
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat
<i>Eptesicus fuscus</i>	Big brown bat
<i>Euderma maculatum</i>	Spotted bat
<i>Lasionycteris noctivagans</i>	Silver-haired bat
<i>Lasiurus cinereus</i>	Hoary bat
<i>Myotis californicus</i>	California myotis
<i>Myotis ciliolabrum</i>	Western small-footed myotis
<i>Myotis evotis</i>	Long-eared myotis
<i>Myotis lucifugus</i>	Little brown bat
<i>Myotis thysanodes</i>	Fringed myotis
<i>Myotis volans</i>	Long-legged myotis
<i>Parastrellus hesperus</i>	Western pipistrelle
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat
<i>Euderma maculatum</i>	Spotted bat

A habitat evaluation was conducted by Great Basin Ecology, Inc. (2010), which identified the western small-footed myotis, spotted bat, and Townsend's big-eared bat as having the potential to forage within the project area. No roosting or hibernacula were identified within the project area, but there is potential for this habitat to occur within four miles of the project area. Great Basin Ecology, Inc. did not observe any bat species in the project area during surveys conducted in 2010.

A desktop analysis was conducted in 2017 by Stantec, which showed suitable foraging habitat for special status bat species within the proposed disturbance area. Additionally, review of the Nevada Bat Conservation Plan (Bradley et al., 2006) showed their distribution throughout central Nevada, including within the vicinity of the project area. Accordingly, special status bat species are assumed to be present as foragers within the Project Area (Stantec, 2017). No adits, shafts, hibernacula, or roosting habitat has been identified in the Project Area (Stantec, 2017).

In addition to those species observed in the project area and those listed above in **Table 4**, numerous other bird and bat species, such as Northern goshawk (*Accipiter gentilis*) and Swainson's hawk (*Buteo swainsoni*), have the potential to use the project area as foraging habitat.



## 4.0 RISK ASSESSMENT

### 4.1 SITE COMPONENTS

Many of the components listed below have the potential to create noise (e.g., production wells, cooling fans in the power plant, etc.), which could have indirect impacts on greater sage-grouse populations in the surrounding area. Although Ormat recognizes this risk, the BBCS is focused on reducing injury and mortality of avian species; therefore, no further discussion of noise impacts is presented in this document. Please refer to Appendix D of the 2017 EA for a detailed discussion of the mitigation measures and adaptive management in regard to greater sage-grouse.

#### 4.1.1 Geothermal Energy Plant and Well Pads

##### 4.1.1.1 Fencing

Fences around the energy plant and substations may be utilized for perching or roosting by many bird species. Fences can also create a collision hazard during flight for certain bird species, such as greater sage-grouse. Fences tend to pose the greatest risk for species that are heavy bodied and are not quick to take flight. Although fence strikes are a fairly low risk, the risk potential does exist.

##### 4.1.1.2 Lighting

Facility lighting can attract insects, which in turn attracts foraging birds and bats. This risk is associated with any and all facilities that have nighttime lighting. The lighting itself poses no direct risk to birds and bats, but the increased activity in these areas near anthropogenic activity could pose some amount of risk to these species. Additionally, migrating birds may become attracted to or disoriented by artificial lights, particularly during inclement weather (Rich and Longcore, 2006), which could pose collision risks with facility and transmission line infrastructure.

##### 4.1.1.3 Well Pads

Installation of the geothermal wells includes vegetation clearing on the well pads, use of drill rigs, and pump installation. These activities pose some amount of risk to avian species, although the amount of anthropogenic activity during the construction phase will likely deter most species. The removal of vegetation on the well pad could result in the removal of nests and nest substrate. Depending on the method of well drilling, small pits or sumps may be constructed to contain waste drilling muds and cuttings, which could attract bird and bat species. The drilling activity would likely deter birds and bats from using the sumps. Drill rigs may provide suitable nesting substrate for some species, although the level of human activity would deter bird species use of the rigs.

Operation of the wells would pose very little risks to bird and bat species. Once operational, reserve pits would be fenced to prevent unauthorized access. Fencing risks are discussed in **Section 4.1.1.1**.



#### 4.1.1.4 Substation

Substations may pose a risk of electrocution for birds and bats if perching or nesting on infrastructure. Additionally, the substation would be surrounded by chain link fencing, which may be utilized for perching or roosting, increasing predation risks to prey species.

#### 4.1.2 Transmission Line

Bird and bat species are susceptible to potential collisions with the transmission line and transmission line tie-ins when lines are difficult to see (e.g., small diameter or unmarked). This risk is especially true with shield wires and guy wires, but also with power poles. While bats typically navigate and forage by emitting and receiving high-frequency sound (echolocation), bats not distinguish the lines. If the transmission lines are spotted during flight, heavy-bodied, less agile birds or birds within large flocks may lack the ability to quickly negotiate the lines, making these birds more susceptible to a potential collision. Adverse weather conditions obscuring sunlight and moonlight could also contribute to poor detection of the transmission lines and guy wires.

Raptors that may hunt from perches on the power poles and aerial foraging birds (e.g., swifts and swallows) would be the bird species most susceptible to collision while foraging. The potential for collision with the power poles is also present when avian species are flying to or from a nesting or roosting site on the power pole. Avian species, such as passerines and game birds, may have an increased predation risk due to the improved perching locations of raptors and corvids on the transmission line structures.

Avian electrocutions can occur when a bird simultaneously contacts energized and/or grounded structures, conductors, hardware, or equipment (APLIC, 2006). Birds and bats are susceptible to electrocution risks along transmission and distribution lines, at transformers, and at substation facilities.

Nests on power transmission structures that pose the greatest risk to birds are those that are built in close proximity to energized conductors and hardware. While a nest that is not in close proximity to energized parts may not be an electrocution risk in and of itself, it would tend to cause the parent bird and possibly nest predators or birds to routinely land on other parts of the power pole or surrounding poles that may be unsafe (APLIC, 2006). In the project area, the species most likely to nest on power poles are common ravens and various raptors. Research has shown that raptors and corvids may benefit from the presence of transmission lines because they provide more roosting or nesting opportunities (Steenhof et al., 1993). Steenhof and others (1993) also found that nest success for golden eagles was 10 percent higher for nests on transmission lines than for nests in cliffs. Although these perches can be beneficial to some raptors, an increased predation risk to sensitive species can be realized.



### 4.1.3 Roads

Vehicular traffic can pose a risk to avian species from vehicle collisions. Risk would be increased along the new and existing access roads, as well as along U.S. Highway 50, from traffic accessing the project site. Additional risk may occur for scavenger species (e.g., turkey vulture [*Cathartes aura*], common raven, raptors) foraging along roads for vehicle caused wildlife mortalities. Also, risks may be increased for passerine species like horned larks which have been observed to increase concentrations along newly constructed roads in sagebrush habitats (Inglefinger and Anderson, 2004).

The construction of Phase III at the project is expected to employ approximately 70 persons, with operation having eight to 15 on-site employees per shift. Therefore, risks of vehicle collisions would be increased during the construction phase, but would be greatly reduced during operation.

DRAFT





## 5.0 BIRD AND BAT CONSERVATION MEASURES

### 5.1 EXISTING CONSERVATION MEASURES

Preventative measures include all the initial conservation measures that would be or are constructed into the project components to minimize mortality. These include things such as pre-construction surveys for migratory bird nests and informing employees that harassing wildlife is not permitted. Preventative measures attempt to avert potential bird and bat mortality before injury or mortality occurs. Effective preventative measures can help prevent possible violations of the MBTA, ESA, and BGEPA.

Preventative measures also include measures implemented to minimize or eliminate the potential for bird and bat mortality resulting from non-operational risks associated with the project, such as construction impacts. Preventative measures at the project were first implemented during the Exploration EA (BLM, 2008), and are provided below in **Table 5**. These measures were then updated as better science became available, and additional conservation measures were implemented during the Development EA (BLM, 2011), and are provided below in **Table 6**. During the preparation of the Phase III Draft EA (BLM, 2017), conservation measures were reviewed, and updated/added, as necessary, based on the best available science. These measures are provided below in **Table 7**.



**Table 5 2008 Ormat Committed Conservation Measures**

Conservation Measure	Discussion
<b>Avian and Bat</b>	
Initial ground-disturbing activities would not be conducted during the migratory bird nesting season (April 1 – August 15) unless necessary, and then only after inventories for migratory birds and nests were conducted by a qualified biologist acceptable to the BLM. If active nests are present within the areas to be disturbed, Ormat would coordinate with the BLM or appropriate state officials, as applicable, to develop appropriate protection measures for the active nest sites, which may include avoidance, construction constraints, and/or the establishment of buffers.	Nesting surveys prior to construction would help reduce injury or mortality to nesting birds and young. This conservation measure was also applied in the 2011 EA ( <b>Table 6</b> ) and the 2017 Draft EA ( <b>Table 7</b> ).
The Lake Hills Ranch #2, Grass Valley #3, Lake Hills Ranch #3, and Ox Corral leks shall be avoided by at least 0.5 mile between March 1 and May 15.	Spatial avoidance of leks during the lekking season will potentially reduce stress on individuals and increase their nesting and brooding success. This conservation measure was modified in the 2011 EA ( <b>Table 6</b> ) and the 2017 Draft EA ( <b>Table 7</b> ).
Ormat shall participate with the Nevada Department of Wildlife (NDOW) and BLM in data collection for greater sage-grouse relative to potential impacts associated with drilling activities.	This data collection helps with better understanding of the effects of drilling activities on greater sage-grouse. By participating with NDOW and the BLM, this data can be used in combination with other greater sage-grouse data.
“Riparian meadow complex brood rearing” habitat shall be avoided by 0.6 mile June 1 through November 1 for the drilling of all observation wells and full-size exploration wells.	Avoiding brood rearing habitat will potentially lower stress on individuals, thus potentially increasing chick survival.
The project area shall be surveyed, at the appropriate season, by a qualified biologist to determine if wintering concentrations of greater sage-grouse exist. Any wintering concentrations of birds will be avoided by 0.6 mile.	Spatial avoidance of wintering populations can improve survival of juvenile and adult greater sage-grouse by lowering stress and not causing unnecessary avoidance movement.
<b>General Wildlife</b>	
Disturbed areas would be revegetated using the BLM-approved seed mixes determined to be “weed free.”	“Weed free” seed mixes reduce the potential for establishment of noxious, invasive, and non-native plant species and protecting the resilience of the site.
All vehicles, heavy equipment, and the boots of operators and other persons working in the areas would be cleaned of soil by water before entering public lands to do work.	Cleaning boots removes any seeds, which reduces the likelihood of spreading noxious, invasive, and non-native plant species.

Source: BLM, 2008



**Table 6 2011 Ormat Committed Conservation Measures**

Conservation Measure	Discussion
<b>Avian and Bat</b>	
<p>All ground-disturbing activities will be conducted outside the migratory bird nesting season (March 15 – July 31). If ground-disturbing activities cannot be avoided during this period, pre-construction nest surveys will be conducted by a BLM/USFS approved specialist(s) with the following guidelines:</p> <p>Surveys will cover all potential nesting habitat in and within 250 feet of the area disturbed.</p> <p>Surveys must be conducted between sunrise and 3 hours post-sunrise when birds are most active.</p> <p>Surface-disturbing activity must be conducted within 10 days of surveys or additional surveys may be required to “re-clear” the area.</p> <p>If active nests are detected, a species-specific no-disturbance buffer zone (as determined by the USFWS Reno [Fish and Wildlife Biologist, 775-861-6300]) will be established. Nest locations will be mapped and submitted to the BLM as needed.</p> <p>Surveys for simultaneous construction activities must be undertaken prior to any surface disturbance.</p> <p>Ormat must provide direction to all employees, contractors, and sub-contractors about the necessity of avoiding any man-made disturbance of nesting birds, including identifying nesting sites on maps and on the ground. These identified/marked areas must be fully avoided of any human activity during the identified nesting timeframes.</p>	<p>Nesting surveys prior to construction would help reduce injury or mortality to nesting birds and young. This conservation measure was updated from the 2008 EA (<b>Table 5</b>), and was carried through in the 2017 Draft EA (<b>Table 7</b>).</p>



Conservation Measure	Discussion
<p>All ground-disturbing activities will be conducted outside the raptor nesting season (March 1 – July 31). If ground-disturbing activities cannot be avoided during this time, pre-construction nest surveys will be conducted by a BLM-approved specialist with the following guidelines: Surveys will cover all potential nesting habitat, including previously documented nest sites, for northern goshawks, ferruginous hawks, and short-eared owls in and within 0.5-mile of the area to be disturbed. If active nests are detected, a 0.5-mile no-disturbance buffer zone will be established. Nest locations will be mapped and submitted to the BLM and/or the USFWS as needed.</p> <p>If nests of other species are identified in the EA as special status or sensitive are found, a 0.5-mile no-disturbance buffer will be established. Nest locations will be mapped and submitted to the BLM and/or USFWS as needed.</p>	<p>Nesting surveys prior to construction would help reduce injury or mortality to nesting birds and young. Spatial avoidance of occupied nests would reduce stress to individuals and ensure the likelihood of a successful nest. This conservation measure was also applied in the 2017 Draft EA (<b>Table 7</b>).</p>
<p>During the period from March 15 to June 30, nest “clearance” surveys will be conducted prior to any proposed surface-disturbing activities. The area to be disturbed and a 0.5-mile radius buffer will be surveyed by BLM/USFS-approved specialists to determine if nesting sage-grouse are present. If an active nest is located, a 0.5-mile radius buffer will be placed around the nest and no surface-disturbing activities will occur until the nest is vacated.</p>	
<p>The proposed transmission line would be constructed to <i>Avian Protection on Power Lines: The State of the Art in 2006</i> (APLIC, 2006) (<b>Appendix A</b>).</p>	<p>These guidelines help decrease avian mortalities from electrocution and collision. This conservation measure was updated in the 2017 Draft EA (<b>Table 7</b>).</p>
<p>An anti-perching device (e.g., a cone, Kaddas Enterprises type KE1140, or equal) would be installed on the top of each transmission line pole along the entirety of the transmission line.</p>	<p>These anti-perching devices and raptor deterrents help deter raptors and corvids from perching on transmission lines, which reduces the predation risk to potential avian prey species.</p>
<p>All power poles will utilize BLM-approved raptor deterrents.</p>	

Conservation Measure	Discussion
<p>Ormat will complete, at a 4:1 ratio, terrestrial habitat restoration/enhancement, and improvements to compensate for disturbance in sage-grouse habitat in the vicinity of the project. Ormat will fund all restoration and enhancement projects to BLM and/or USFS <u>specifications, following all BLM/USFS requirements.</u></p> <p>Mitigation measures to reduce effects to greater sage-grouse brood-rearing habitat include:</p> <p>Ormat will complete treatments at a 4:1 ratio to protect, enhance, and/or restore brood-rearing habitat in targeted locations on the BLM- or USFS- managed land near the project; this equates to 136 acres. The specific areas to be treated will be identified on a case-by-case basis, determined by field inventory of habitats, conditions, and potential value to sage-grouse. Treatments will be prescribed for specific conditions, and potential value to sage-grouse. Treatments will be prescribed for specific sites based on the probability of successful restoration/enhancement and the greatest benefit to local sage-grouse metapopulations. The design for these projects will allow access to water for beneficial use through the use of water gaps. Placement and construction of exclosures will also need general concurrence from the appropriate permittee/s. Ormat will fund all such restoration/enhancement/protection projects to BLM and USFS specifications.</p> <p>Treatments may include fencing of riparian areas and meadows for protection, plantings or seedings of desired native riparian species to increase biodiversity and habitat condition, stream restoration to improve riparian areas where there are currently incised channels or nick points, and treatment of invasive and noxious weeds (e.g. salt cedar). Stream restoration may include check dams, rip/rap fortification of damaged banks and nicks, and large boulder placement within stream channels to decrease water velocity during peak flows.</p> <p>Riparian exclosures may be grazed if the BLM or USFS determine that it would be beneficial to riparian health. Specifics of this grazing will be based on a return to a healthy riparian condition based on current sage-grouse guidelines and working with the local grazing permittee/s.</p>	<p>This restoration/enhancement off-sets impacts to greater sage-grouse habitat, and will improve habitat in the surrounding area.</p>

Conservation Measure	Discussion
The project would require the implementation of the Common Raven Monitoring, Mitigation, and Management Plan.	A Common Raven Monitoring, Mitigation, and Management Plan helps give insight to the accumulation of common ravens at the project and how to manage these numbers adequately. There is a strong correlation between increased common raven populations and decreased greater sage-grouse populations, so it is important to understand the populations and implement control measures as needed.
Ormat will ensure the timing of shift changes and deliveries will be scheduled outside the lekking period (March 15 – May 15, one hour before sunrise – 10:00 AM).	These conservation measures reduce impacts to greater sage-grouse during the lekking period in an effort to minimize effects on lek attendance. Timing restrictions were updated in the 2017 Draft EA (Table 7).
Venting pressure or steam to the atmosphere (e.g., during well or flow testing) would occur outside the lekking period (March 15 – May 15, one hour before sunrise – 10:00 AM).	
Construction or maintenance activities (including helicopter fly-overs) associated with well pads, pipelines, transmission lines, plant facilities, and roads will not be permitted within two miles of active leks during the lekking period (March 15 – May 15, one hour before sunrise – 10:00 AM).	
Noise generated by the Project will be managed so that sound pressure levels will be below 49 dBA at active leks during the lekking period (15 March – 15 May, 1 hour before sunrise – 10:00AM).	Studies suggest that noise has a large impact on greater sage-grouse. Therefore, by having a noise threshold greater sage-grouse are less likely to be affected. The 2017 Draft EA also implements noise conservation measures and updates the threshold values to reflect current guidance (Table 7).
<p>Mitigation measures to reach appropriate sound pressure levels include:</p> <p>Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing project equipment during lekking hours (one hour before sunrise – 10:00 AM) during the lekking season (March 15 – May 15);</p> <p>Employment of an acoustic engineer to identify and assess options to further reduce noise from project components;</p> <p>Installation of sound dampening shelters, walls, enclosures, or other barriers for pumps or other noise-producing equipment to reduce noise emitting from geothermal facilities (e.g., power plant, wellheads, etc.);</p> <p>Reducing the amount or changing the timing of project-related vehicular traffic;</p> <p>Installing poly-slats on chain link fences or other barriers around geothermal facilities to further attenuate noise emitted from those facilities.</p>	Studies suggest that noise has a large impact on greater sage-grouse. Therefore, by implementing these mitigation measures sound pressure levels are likely to decline, and not reduce greater sage-grouse lek attendance. More noise mitigation measures were implemented in the 2017 Draft EA (Table 7).



Conservation Measure	Discussion
<p>Mitigation measures to eliminate decreased male lek attendance include:</p> <p>Reduction in sound pressure level to 40 dBA at sage-grouse leks must be demonstrated during the next lekking season. This may be accomplished by adjusting to stricter levels of the previously identified measures;</p> <p>Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing project equipment during lekking hours (one hour before sunrise – 10:00 AM), during the lekking season (March 15 – May 15);</p> <p>Employment of an acoustic engineer to identify and assess options to further reduce noise from Project components;</p> <p>Installation of sound dampening shelters, walls, enclosures, or other barriers for pumps or other noise-producing equipment to reduce noise emitting from geothermal facilities (e.g., power plant, wellheads, etc.);</p> <p>Reducing or changing the timing of vehicular traffic;</p> <p>Installing poly-slats on chain link fences or other barriers around geothermal facilities to further attenuate noise emitted from those facilities.</p>	<p>The implementation of these mitigation measures may reduce stress to individual greater sage-grouse, which would likely increase male lek attendance. An additional noise conservation measure was implemented in the 2017 Draft EA (<b>Table 7</b>).</p>
<p>Additional perch deterrents on project structures will be required if monitoring identifies areas where common ravens perching, roosting, or nesting is concentrated or regularly occurring. Specific details on type of deterrent to be used will be determined and coordinated by the BLM, USFWS, and NDOW based on the project structure.</p>	<p>Perch deterrents would deter common ravens, other corvid species, and raptors from utilizing these structures. Thus, prey species, including greater sage-grouse, would potentially have a higher survival rate near structures with perch deterrents.</p>
<p>Road-killed animals on the project site and associated travel routes will be promptly removed and disposed of in closed containers to eliminate access to ravens.</p>	<p>By removing potential food sources for common ravens and other scavenger species, a supplemental food source is not available to augment these species; thereby reducing predation risk (typically nest and chick predation) to greater sage-grouse and other ground-nesting species. This measure was updated in the 2017 Draft EA.</p>

Conservation Measure	Discussion
Ormat will acquire common raven depredation permits from the NDOW or USFWS.	Common ravens are known to prey on greater sage-grouse eggs and chicks; therefore, if their local population increases to a number that becomes detrimental to greater sage-grouse, depredation permits, auditory hazing, and lethal measures are necessary to decrease the population.
Hazing using auditory and visual deterrents may be useful in areas of concentrated common raven presence are identified. Methods may include visual deterrents, such as streamers or flagging, and auditory deterrents, such as gas cannons. A variety of methods would need to be implemented and frequently changed to increase efficacy or deterrents.	
Lethal measures to reduce common raven numbers in the project area may also be needed to reduce raven presence around the project. This would require the Operator to acquire a common raven depredation permit through the United States Department of Wildlife Services and USFWS. Primary depredation activities would focus on removal or active raven nests (those with chicks or eggs) and raven management using chicken egg baits treated with CPTH (3-chloro-p-toluidine hydrochloride) or another approved compound. Details regarding this depredation permit would be finalized during the permitting process by the United States Department of Wildlife Services and USFWS.	
Retroactive installation of flight diverters along the transmission line to reduce the likelihood of avian collisions.	Avian collisions with transmission lines are known to cause mortality; therefore, the installation of flight diverters would decrease mortalities caused from collisions with transmission lines.
Non-reflective, tinted windows will be utilized in project buildings to reduce visual disturbance.	Tinted windows would reduce avian collisions.
Where project lighting is required, low output, motion sensor lights will be installed at facilities and must be shielded and directed to focus light only on the area requiring illumination. In addition to limiting human activity impacts to sage-grouse, such lighting will assist Ormat in meeting the National Dark Skies initiative where ambient nighttime lighting has been identified as causing potential impacts to many wildlife species including volant species such as bat.	Lights attract insects; thus, by decreasing the illumination of each light and the amount of time the light is on the less insects will be attracted. This will in turn reduce the amount of predatory species, such as bats, attempting to forage on the insect species. If predatory species, such as bats, are to forage on these insects there is a potential to collide with project structures.
General Wildlife	
During well drilling, the reserve pits would be fenced on three sides, per the Gold Book standard (BLM and USFS, 2007). Once drilling has been completed, the fourth side would be fenced. In addition to this fence, Ormat would install a smaller-mesh barrier/wildlife deterrent fence. All fencing would remain in place until reserve pit reclamation begins.	This fencing would deter/prevent wildlife from falling into the reserve pits; thus, reducing the likelihood of mortality.





Conservation Measure	Discussion
Speed limits of 20 to 25 miles per hour would be maintained for project-related travel through the project area.	The low speed limit would give the vehicle operator time to maneuver or stop if there is any wildlife on the road; thus, reducing mortalities at the project.
Presence of road-killed animals will be minimized by the Operator's environmental protection measure of a maximum 25 miles per hour speed limit.	
Noise would be minimized through operational practices using best available control technology. Vinyl fencing slats would be used, and the plant design would be reviewed for opportunities to reduce noise.	Reduced noise at the project would likely decrease displacement of wildlife species.
Cooling fans utilized in the air-cooled power plants would be designed to minimize power plant noise.	
Following construction, areas disturbed and no longer required for operations will be reclaimed.	Once disturbed areas are reclaimed, the area can be utilized by wildlife.
During all phases of the project (i.e., construction and operations), all food, waste, and trash will be placed in closed containers.	Cleaning up all food, waste, and trash, will deter scavenging wildlife species from using the project as a food source and reduce the attraction of additional scavenging wildlife species.
Ormat will prohibit employees, contractors, and sub-contractors from feeding wildlife or leaving food available for scavenging wildlife.	Not feeding wildlife will help reduce the amount of scavenging wildlife species at the project, and keep the scavenging wildlife species from becoming dependent on the project as a food source.
All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available in all vehicles/equipment, and would be available on the active sites. In addition to requirements that water that is used for construction and dust control would be available for firefighting. Personnel would be allowed to smoke only in designated areas, and they would be required to follow applicable BLM regulations.	By limiting sparks and smoking, and providing fire extinguishers, the risk for an accidental fire is reduced. Fire could destroy wildlife habitat and cause mortality to individuals.
On public lands managed by the BLM, revegetation would include site appropriate seed mixtures for various ecological site types encountered. All seed must be certified weed seed free and tested in a certified laboratory per BLM protocols. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious, invasive, and non-native seeds listed in the Nevada Designated Noxious Weed List (Nevada Administrative Code 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to the approval of the BLM.	"Weed free" seed mixes reduce the potential for establishment of noxious, invasive, and non-native plant species and protecting the resilience of the site. This conservation measure was also implemented in the 2008 EA (Table 5).



Conservation Measure	Discussion
To prevent the spread of invasive, nonnative species, all vehicles, heavy earth-moving construction equipment, mobile trailers and RV campers brought to and used on the project site would go through high pressure washing of the entire vehicle/unit at commercial wash station prior to arriving, being used on, and/or departing the project site.	Cleaning vehicles, equipment, mobile trailers, and recreational vehicles would remove any seeds, which reduces the likelihood of spreading noxious, invasive, and non-native plant species.

Source: BLM, 2011

**Table 7 2017 Ormat Committed Conservation Measures**

Conservation Measure	Discussion
<b>Avian and Bat</b>	
The Wildlife Working Group charter would be revised, making Ormat responsible for coordinating the Wildlife Working Group meetings for the project.	By holding more Wildlife Working Group meetings, the remaining funds from the 2011 EA 4:1 conservation measure ( <b>Table 6</b> ) will likely be utilized and have a positive impact on habitat for greater sage-grouse and other avian species.
Develop a Bird and Bat Conservation Strategy (BBCS). A draft BBCS would be submitted to BLM and NDOW prior to construction.	The development of a BBCS will line out an approach of how to reduce avian and bat mortalities, as well as address mitigation measures to species that are likely to occur at the project.
Surface-disturbing activities will not occur within four miles of active and pending active greater sage-grouse leks from 6 pm to 9 am from March 1 through May 15.	These conservation measures have been updated from the 2011 EA conservation measures ( <b>Table 6</b> ), to reduce disruption to greater sage-grouse during the lekking and brood-rearing season.
Project noise during construction, operation, and maintenance will not exceed 10 dB above the existing baseline sound levels at least 0.25 mile from active and pending active leks, from two hours before to two hours after sunrise and sunset during the breeding season (March 1 – June 30).	
Construction of the most southerly portion (approximately 3,000 feet) of the injection pipeline will not occur during the greater sage-grouse brood-rearing season (May 15 – September 15).	
During the greater sage-grouse breeding and brood-rearing seasons (March 1 – September 15), project deliveries and shift changes will be minimized to twice per day, except for emergency situations.	



Conservation Measure	Discussion
Install BLM-approved anti-perch devices to vertical expansion loops on existing and proposed geothermal pipeline.	This conservation measure was applied to structures and transmission lines in the 2011 EA conservation measures (Table 6). However, perch deterrents are now being utilized on the geothermal pipeline to reduce common raven, other corvid species, and raptor perching. The reduced perching opportunity will minimize predation risk to prey species such as greater sage-grouse.
Construct the proposed transmission line tie-in in accordance with APLIC guidelines (APLIC, 2006 and 2012).	All other transmission lines and poles have been constructed to the 2006 APLIC guidelines (Tables 5 and 6) and markers were installed as a conservation measure in the 2011 EA (Table 6). These guidelines will reduce avian perching, avian electrocutions, and avian collisions at the project.
Install markers on guy wires of existing transmission line tie-ins.	
An anti-perching device (e.g., a cone, Kaddas Enterprises type KE1140, or equal) would be installed on the top of each transmission line tie-in pole. These cones help to protect raptors and prevent raptors from preying on sage-grouse and other wildlife which may be in the area.	This conservation measure has been added from the 2011 EA (Table 6), so that anti-perching devices and BLM-approved raptor deterrents will also be installed on the transmission line tie-in and additional power poles. These anti-perching devices help deter raptors and corvids from perching on transmission lines, which reduces the predation risk to potential avian prey species.
All power poles will utilize BLM-approved raptor deterrents.	
General Wildlife	
Utilize weed-free gravel, weed-free straw, and weed-free hay.	By utilizing weed free gravel, straw, and hay, Ormat will reduce the potential for invasive and non-native plant species and noxious weeds to establish in the project area. This would reduce any direct and indirect impacts to wildlife and plant species.
If water is present, Ormat will treat the well-pad reserve pits for mosquito larvae with BLM-approved integrated pest management method.	Mosquitos can be considered a “pest” species; therefore, by treating mosquito larvae Ormat will ensure that the project does not provide breeding areas for mosquitos and reduces risk of transmission of West Nile Virus.
Installation of sound dampening shelters, walls, enclosures, or other barriers around existing and proposed production wells to reduce noise emissions.	This conservation measure will reduce noise which displaces wildlife species around the project (including greater sage-grouse).
Ormat staff will drive the main travel route and project access roads, within a four-mile buffer of the project area and south to U.S. Highway 50, twice per day, seven days a week, to remove carrion and road-killed carcasses. Collected carcasses will be documented, as well as the circumstances surrounding each event (e.g., date, time, species of carcass, wildlife attending/consuming carcasses, etc.) (Appendix B and Diagram 15). Ormat does not hold a Special Purpose Utility permit; therefore, any encountered carcasses that are protected under the MBTA or BGEPA will require coordination with NDOW prior to retrieval.	This conservation measure has been expanded from the 2011 EA conservation measure (Table 6). The removal of carrion and road-killed carcasses will reduce the number of predatory species being attracted to the project. Additionally, recording data surrounding the event can allow for a better understanding of the main cause of fatalities, as well as how to reduce fatalities.



Conservation Measure	Discussion
Pets (e.g., dogs and cats) will be prohibited in the project area during the construction phase.	Pets are known to harass, injure, and cause mortality to wildlife species; therefore, by prohibiting pets in the project area during the construction phase, wildlife species, and especially greater sage-grouse, will not be harassed or harmed by pets.
Ormat will instruct contractors and employees to avoid harassment and disturbance of wildlife, especially during the greater sage-grouse breeding season.	Education of employees will limit potential negative effects to wildlife species from human presence at the project.
To prevent the spread of invasive, non-native species, all vehicles, heavy earth-moving construction equipment, mobile trailers, and recreational vehicle campers brought to and used on the project site would go through high pressure washing of the entire vehicle/unit at a commercial wash station prior to arriving or being used on the project site.	This conservation measure has been expanded from the 2008 EA ( <b>Table 5</b> ) and the 2011 EA ( <b>Table 6</b> ). Cleaning vehicles, equipment, mobile trailers, and recreational vehicles would remove any seeds, which reduces the likelihood of spreading noxious, invasive, and non-native plant species.
On public lands managed by the BLM, revegetation would include site appropriate seed mixtures for various ecological site types encountered. All seed must be certified weed seed free and tested in a certified laboratory per BLM protocols. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious, invasive, and non-native seeds listed in the Nevada Designated Noxious Weed List (Nevada Administrative Code 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to approval by the BLM.	This conservation measure has been expanded from the 2008 EA ( <b>Table 5</b> ) and the 2011 EA ( <b>Table 6</b> ). Certified weed free seed mixes reduce the potential for establishment of noxious, invasive, and non-native plant species and protecting the resilience of the site.
All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available in all vehicles/equipment, and would be available on the active sites. In addition to requirements that water that is used for construction and dust control, water would also be available for firefighting. Personnel would be allowed to smoke only in designated areas, and they would be required to follow all applicable BLM regulations.	This conservation measure has been added from the 2011 EA ( <b>Table 6</b> ). By limiting sparks and smoking, and providing fire extinguishers, the risk for an accidental fire is reduced. Fire could destroy wildlife habitat and cause mortality to individuals.
Following project construction, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of plant and wildlife habitat.	This conservation measure has been expanded from the 2011 EA ( <b>Table 6</b> ). Reclamation of disturbed areas would ensure that any potential direct and indirect effects would be temporary.

Conservation Measure	Discussion
During well drilling, the reserve pits would be fenced on three sides, per the Gold Book standard. Once drilling has been completed, the fourth side would be fenced. Fencing would prevent access by persons, wildlife, or livestock. In addition to this fence, Ormat would install a smaller-mesh barrier/wildlife deterrent fence. This fence helps smaller mammals and also provides a measure of protection to human safety. All fencing would remain in place until reserve pit reclamation begins.	This conservation measure has been expanded from the 2011 EA ( <b>Table 6</b> ). This fencing would deter/prevent wildlife from falling into the reserve pits; thus, reducing the likelihood of mortality.
Speed limits of 25 miles per hour would be maintained for Ormat personnel and its subcontractors for vehicular travel through project area.	This conservation measure has been expanded from the 2011 EA ( <b>Table 6</b> ). The low speed limit would give the vehicle operator time to maneuver or stop if there is any wildlife on the road; thus, reducing mortalities at the project.

Source: BLM, 2017

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In addition, Appendix C of the *Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada, and Northeastern California, Oregon, and Utah* (BLM, 2015) presents Required Design Features (RDFs). These RDFs establish specifications to help mitigate adverse impacts to greater sage-grouse habitat within the project. The RDF's applicable to this project were presented in Appendix E of the 2017 Draft EA, and are provided in **Appendix C** of this document.

## 5.2 ADDITIONAL CONSERVATION MEASURES

The following additional measures are being proposed and will be evaluated and implemented as necessary:

- If mortalities occur, Ormat will complete an annual report to track and summarize all bird and bat mortalities. This report will be provided to NDOW and BLM.
- Ormat will report all bird and bat injuries and mortalities using the USFWS's Bird Fatality/Injury Reporting Program (<https://birdreport.fws.gov>).

## 5.3 BIRD AND BAT ENHANCEMENT OPTIONS

In addition to reducing mortality risks, Ormat may have opportunities to enhance bird and bat populations or habitat. If it is observed during construction or operation that any component of the project is harmful to bird and bat species and requires modification, Ormat will coordinate with the appropriate state and/or federal entities to determine the appropriate site-specific avian protection measures.

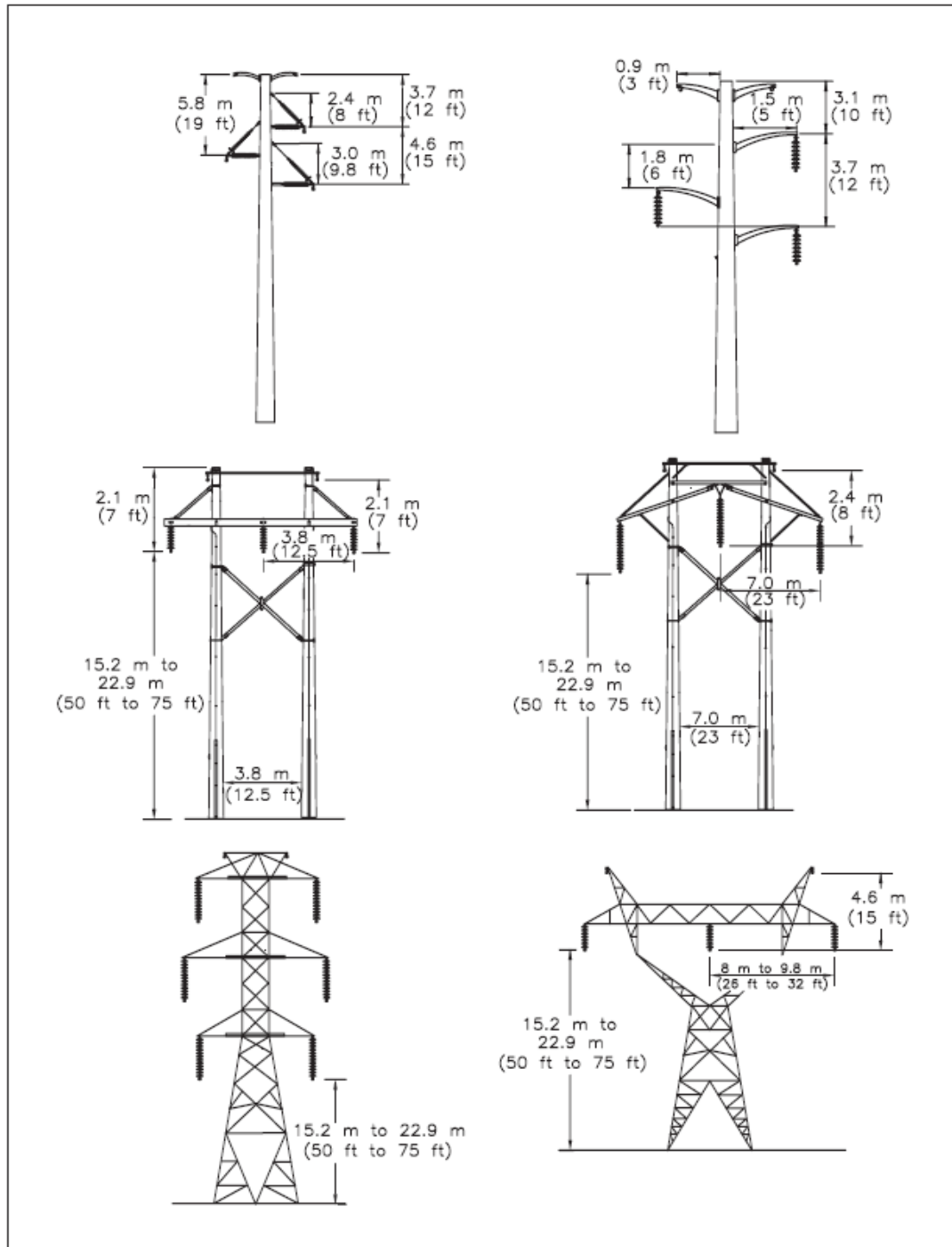
## 5.4 CONSTRUCTION DESIGN STANDARDS

Ormat will be responsible for overseeing construction of the new power facilities to ensure that design standards are met per those outlined in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC, 2006; **Appendix A**) and *Reducing Avian Collisions with Power Lines* (APLIC, 2012; **Appendix D**). These two documents outline methods to be used to reduce risks associated with electrocution and collision. Basic methods to reduce risks can be split into four categories: proper spacing, covers and insulation, perch discouragers and alternate perches, and line marking. The construction design standards described below will reduce collision and electrocution risks to bird and bat species along the transmission line and at substations.

Approximately nine miles of 230 kV transmission were constructed per the authorization in the 2011 EA (BLM, 2011). The project's transmission line tie-ins are constructed of wooden monopoles (BLM, 2017). The previously constructed transmission line includes steel monopoles, three-pole steel structures for angle points, two-pole steel switch structures, and wood H-frame structures. Each structure carries a single overhead optical ground wire for lightning protection and communications. The following diagrams show examples of typical transmission structures (**Diagram 1**) and distribution configurations (**Diagram 2**).



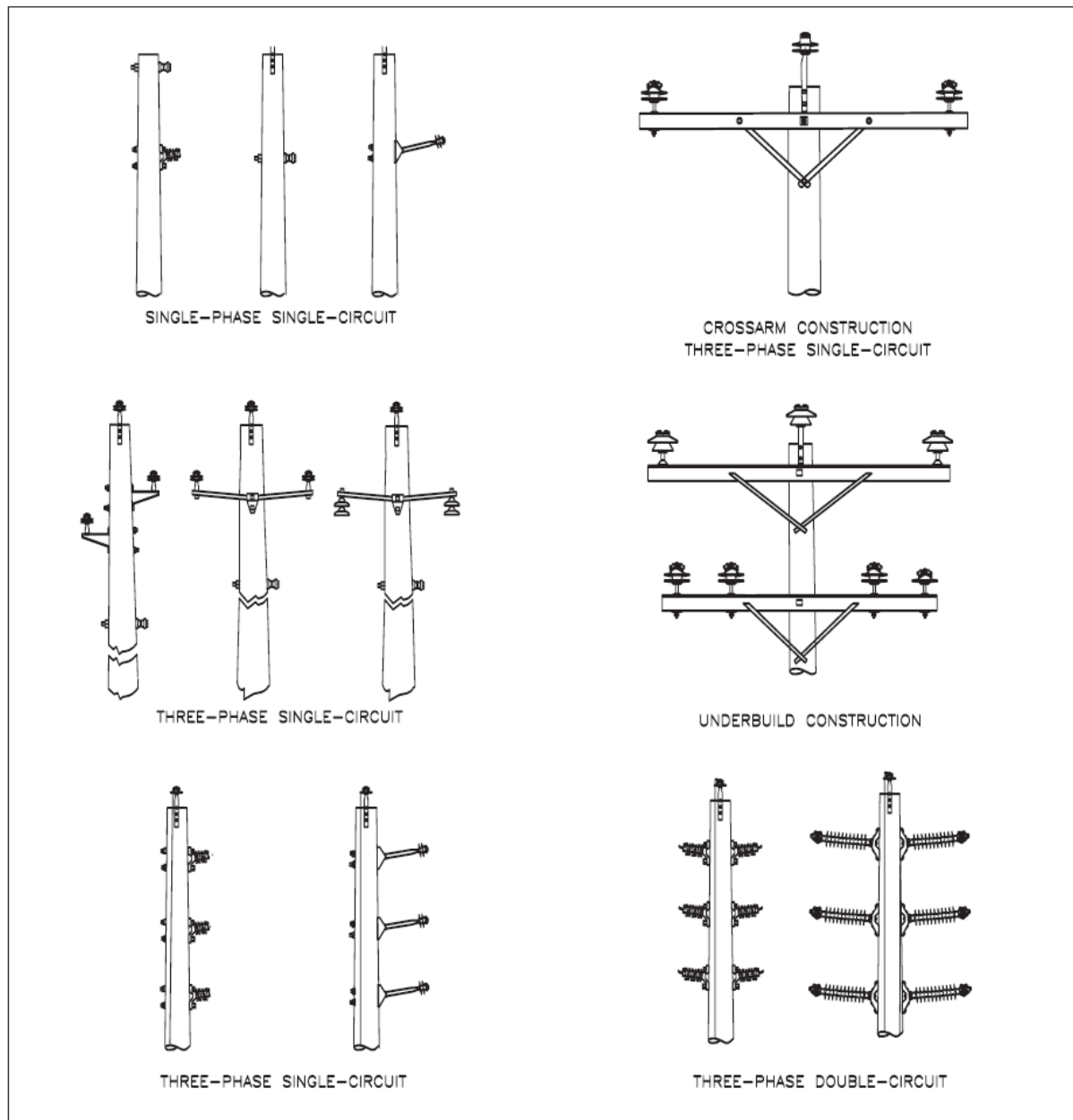
Diagram 1 Examples of Typical Transmission Structures



Source: APLIC, 2006



**Diagram 2**      **Examples of Typical Distribution Configurations**



Source: APLIC, 2006

Although electrocutions of raptors at substations are uncommon (APLIC, 2006), other birds may perch, roost, or nest in the substation structures, posing risks of outages and electrocution. Substations pose risks of electrocution due to the close proximity of energized and grounded structures. Many practices used to deter birds from contact with substations have had limited success (APLIC, 2006). Recommendations for new substations include framing and covering to prevent contact. If contact prevention is not feasible, insulation solutions described below can also be utilized to make substations avian-friendly.

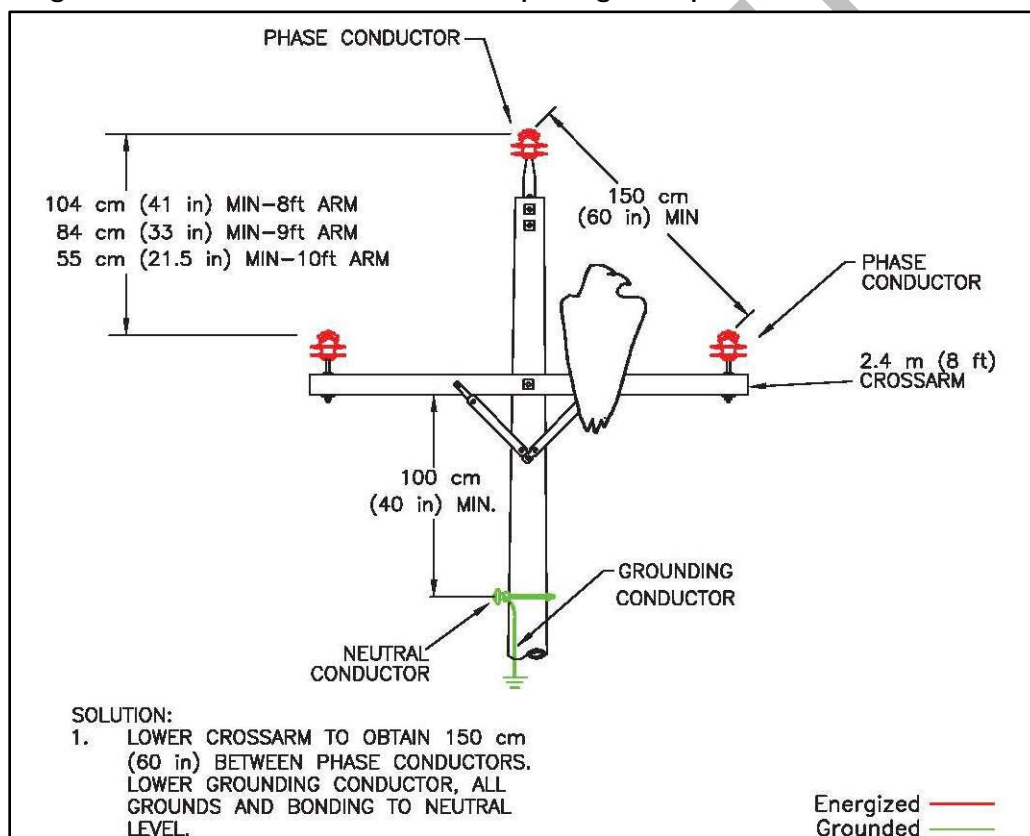




### 5.4.1 Proper Spacing

Proper spacing relates to separation between conductors and/or the grounding features. Phase spacing requirements are generally based on the wing span (wrist to wrist) for the largest species within a given habitat; for this project, eagles would have the largest wing span. For power lines conducting less than 60 kilovolt (kV) (typical of distribution lines), a minimum 60-inch separation between energized hardware and grounded conductors is required to minimize electrocution risk for large birds. See **Diagram 3** for an illustrated example. Transmission lines, like the one built for and the one proposed for the project, may produce arcing, where current jumps from a conductor to a bird on the structure (APLIC, 2006). To prevent bird-induced arcing, phase conductor separation should be increased by 0.2 inches for each kV over 60 kV. The project transmission line tie-in and previously constructed transmission line meets these spacing requirements because the ground clearance of each conductor will be a minimum of eight feet, phase to phase ( $230\text{kV} - 60\text{kV} = 170 \times 0.2 \text{ inches} = 34 \text{ inches} + 60\text{-inch minimum} = 94 \text{ inches} = 7.8 \text{ feet}$ ).

**Diagram 3 Avian-Safe Three-Phase Spacing Example for Lines Less Than 60 kV**



Source: APLIC, 2006

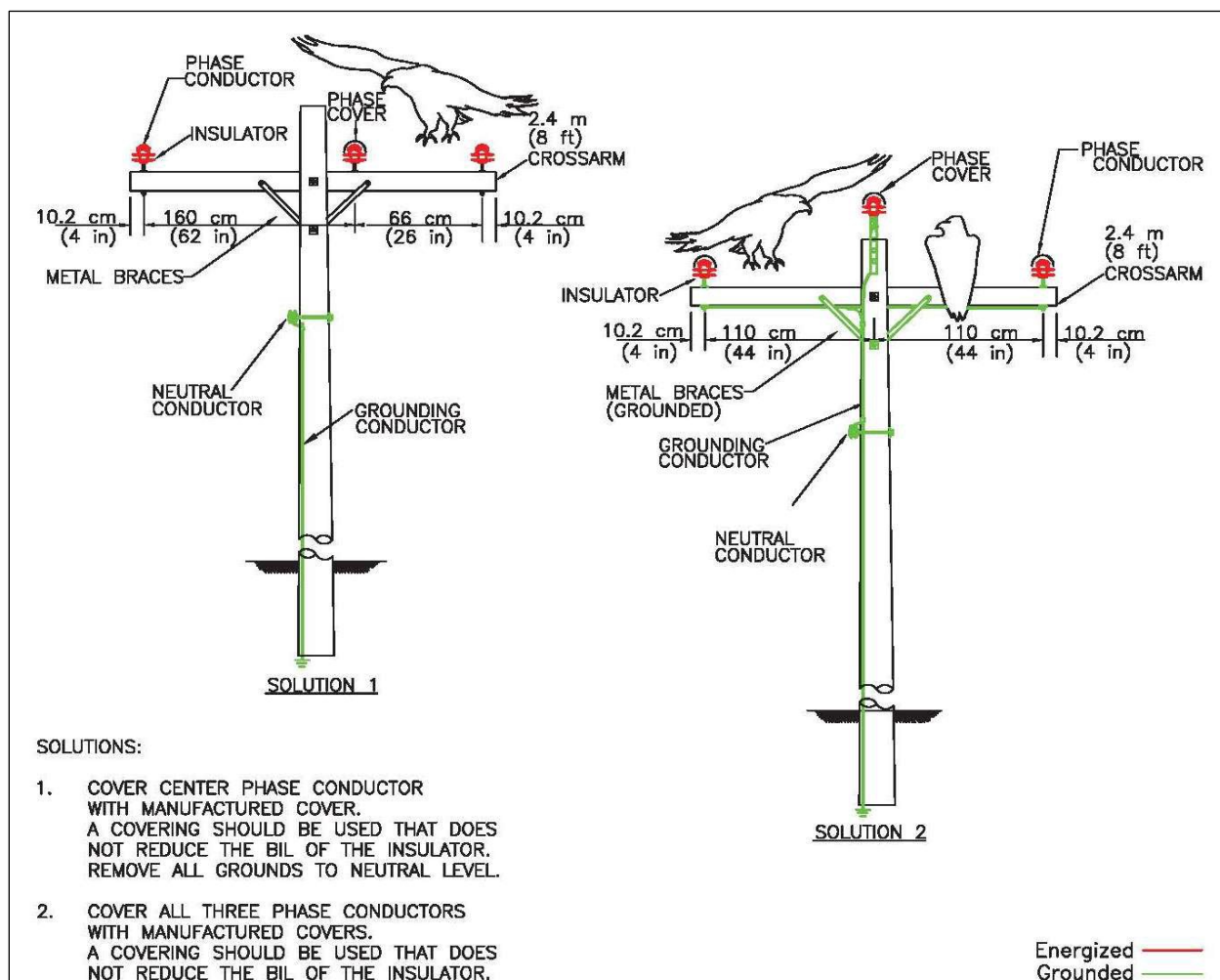
### 5.4.2 Covers and Insulation

When minimum spacing between potential electrocution points is not a viable option, covers and/or insulation can be used. Even when minimum spacing between phase wires and jumper



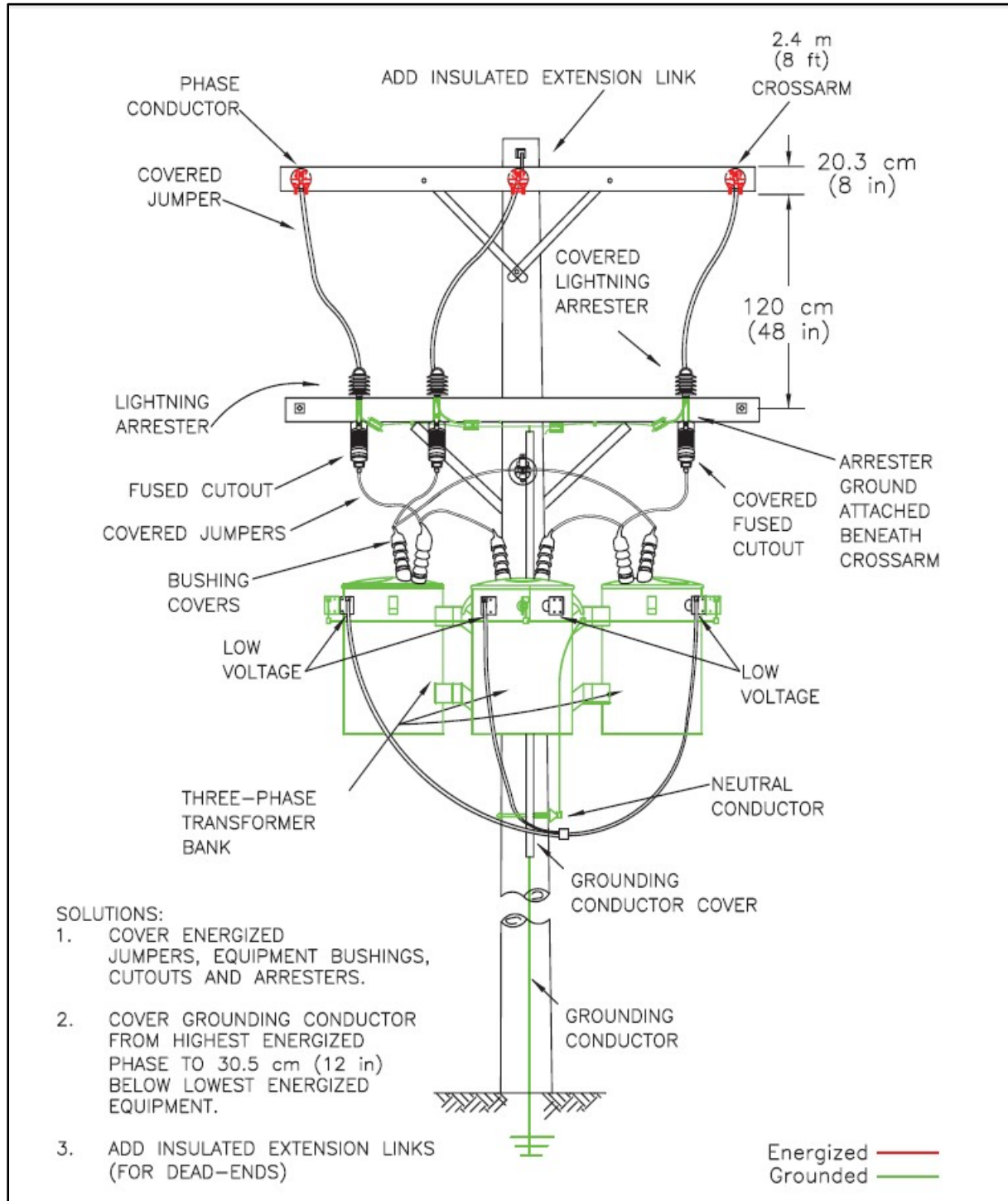
wires can be met, electrocution hazards may persist; particularly when birds are able to touch phase conductors and neutral or grounded hardware simultaneously. As such, phase covers, bushing covers, insulated jumpers, lightning arrestor caps, cutout covers, and switch covers can all be used to reduce these risks, either independently or in combination with spacing (**Diagrams 4 and 5**), regardless of distribution configuration. Covers and insulators can also be used on substation structures to reduce electrocution risks, especially when minimum spacing is not a viable option.

**Diagram 4 Examples of Phase Covers**



Source: APLIC, 2006

**Diagram 5** Examples of Bushing Covers, Lightning Arrestors, Cutout Covers, and Insulated Jumpers

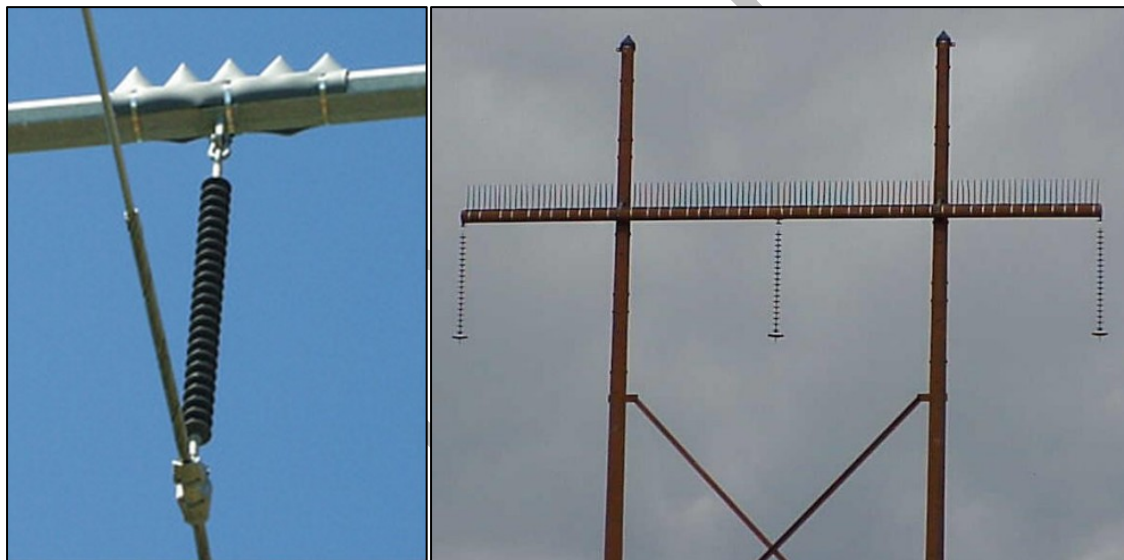


Source: APLIC, 2006

### 5.4.3 Perch Discouragers

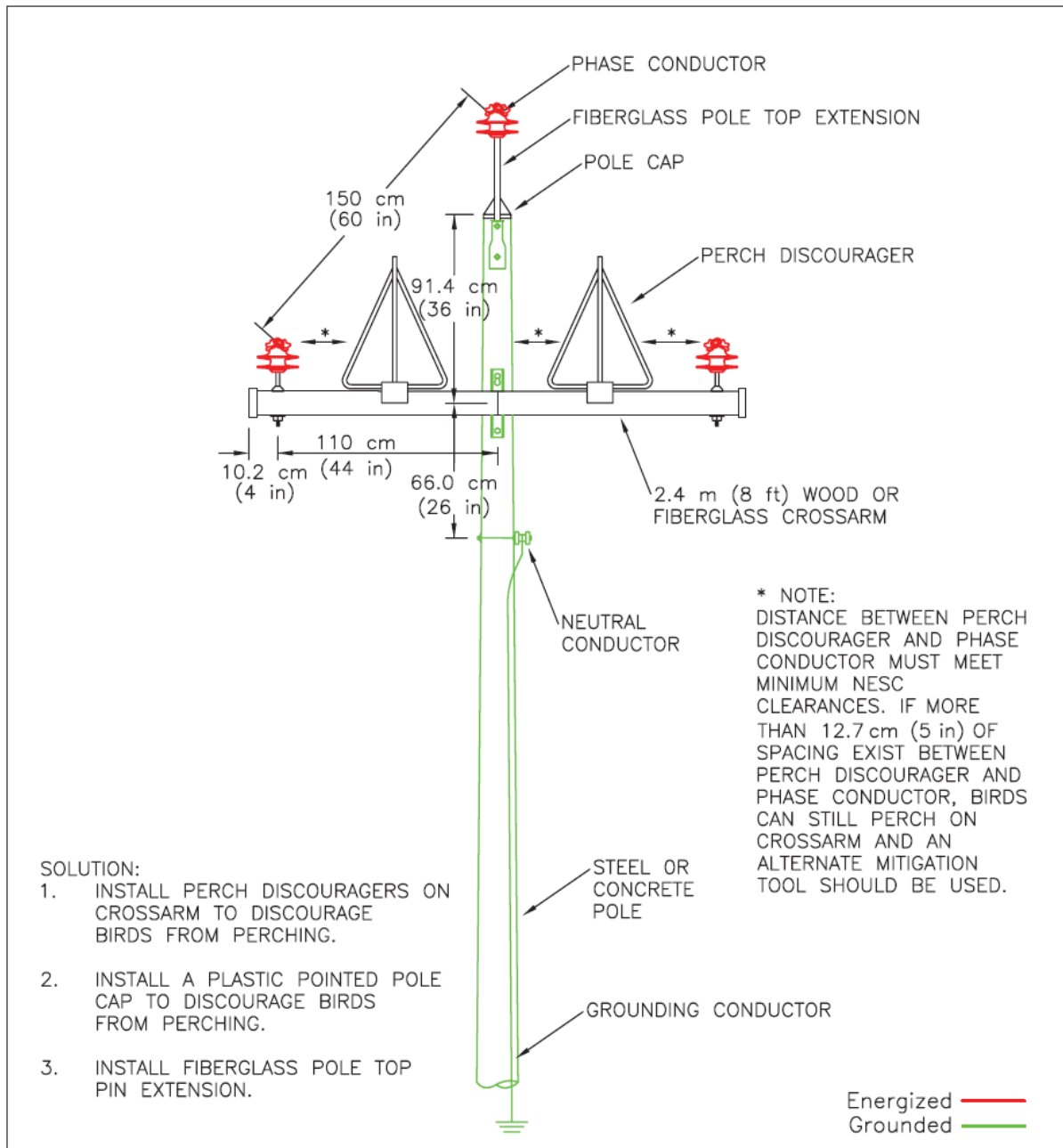
The use of only perch discouragers on or near equipment is not recommended, as perch discouragers may deter birds from landing on the cross-arm, leaving equipment arms or transformers as perching alternatives. Perch discouragers may be used if an alternative perch is provided and exposed equipment is covered with appropriate avian protection devices (APLIC, 2006). Even when phase wires are spaced appropriately to eliminate electrocution risks, perch discouragers can still be used to remove the potential of perching raptors on large transmission lines. Perch discouragers alone should not be the only tool used to eliminate electrocution risks. The maximum distance between perch discouragers and phase conductors is five inches, because larger distances still allow for perching. An example of a perch discouraging devices is provided in **Diagram 6**. Additional devices can be found within **Appendix A** and on the APLIC website ([www.aplic.org](http://www.aplic.org)). One common misconception associated with perch discouragers is that they can always effectively keep bird species from perching on structures. These devices are designed to protect avian species and in many cases control where they perch on an existing structure to keep them from electrocution points. However, they are sometimes applied to structures in efforts to keep avian species from using them entirely. An example of proper perch discourager placement is shown in **Diagram 7**.

**Diagram 6** Examples of Perch Discouragers



Source: Zena Design, Zena Perch Preventer (left) and Mini-Zena Perch Preventer (right) ([www.zenadesign.com](http://www.zenadesign.com))

**Diagram 7 Example of Perch Discourager Placement**



**Note:** Perch discouragers used in this fashion should only be used in conjunction with a middle phase cover.

Source: APLIC, 2006

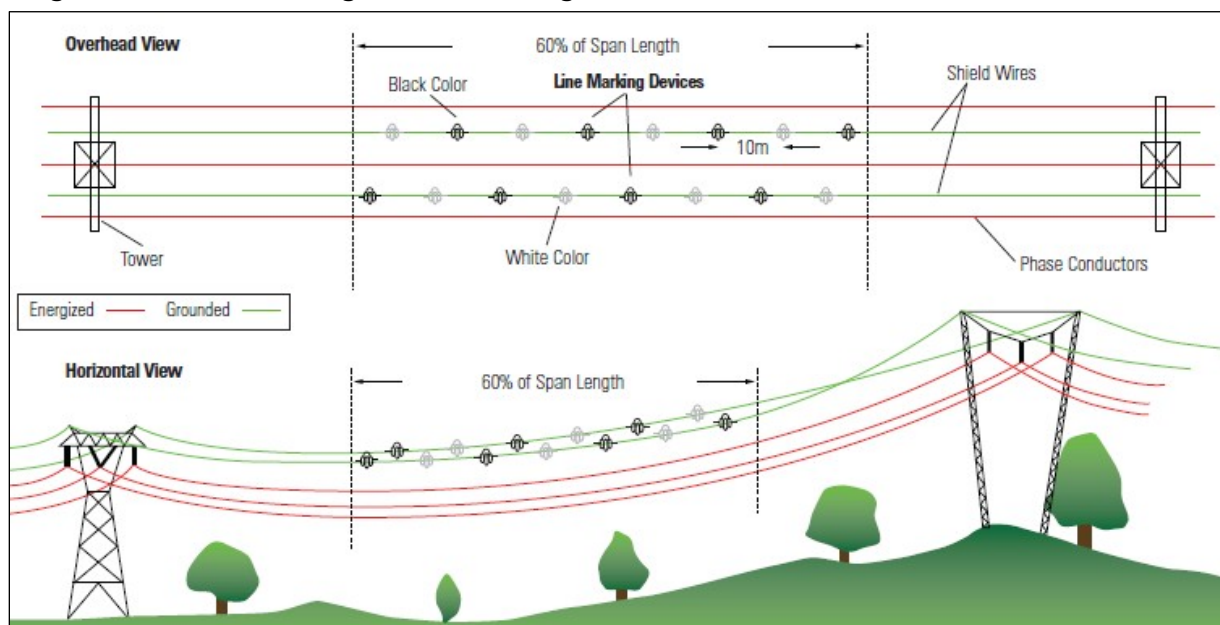
Generally, the larger separation requirements for conductors on transmission structures allow raptors and other birds to nest without risk of electrocution or issues for equipment failure. However, certain structures can have reoccurring issues where raptor and other bird incidents occur or where raptors may try to build their nest on top of a perch deterrent or above insulator strings. Under these circumstances, consideration for installing an alternate perch and/or nesting platforms near, but not adjacent to, the reoccurring problem location should occur.



#### 5.4.4 Line Marking

Line marking can be a very effective means of reducing avian risks of collision with power lines. Primary risks on most power poles are grounded static wires as they are typically overhead (above all other lines) and the smallest in diameter. Static wires (sometimes called “shield wires”) on transmission lines, as shown in **Diagram 8**, and in some cases phase conductor wires on distribution lines should be marked. Coverage typically consists of at least 60 percent of span length (distance between poles). Spacing requirements vary depending upon target species, type of device being used, and size of transmission or distribution line. Manufacturer’s recommendations are the closest spacing that would be required.

**Diagram 8** Line Marking Device Coverage



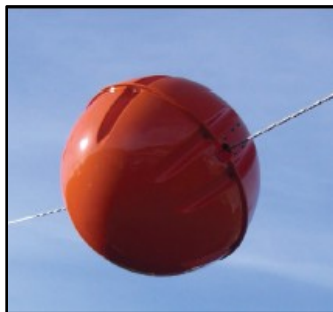
Source: APLIC, 2012

There are three basic types of line marking devices: aerial spheres, spirals, and suspended devices. Relatively few comparative studies have been completed; therefore, no single device is considered the best. Devices range in size, color, and application.

Aerial spheres are typically used for large transmission lines that range from 69 kV to 345 kV, but are sometimes less than desirable if located near an airport, as they can be confused with flight markers. An example of an aerial sphere is included in **Diagram 9**. Recommended spacing between spheres ranges from 100 to 328 feet apart, depending on application. When using aerial spheres on higher voltage conductors, marker balls designed for installation on higher voltage lines should be used to reduce corona damage.



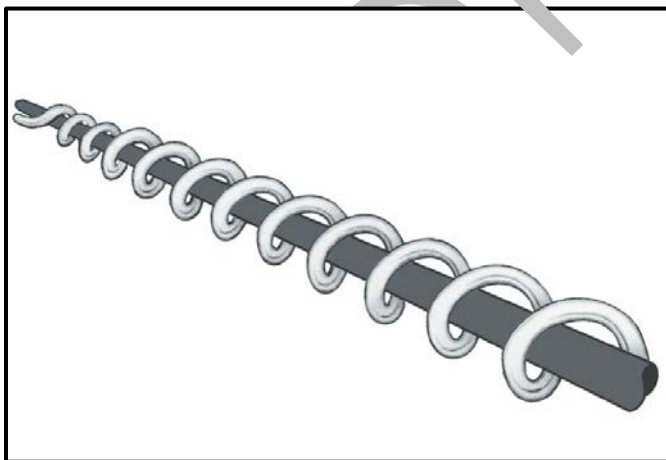
**Diagram 9 Line Marking – Aerial Sphere Example**



Source: APLIC, 2012

Spirals are also an effective means to mark lines to reduce avian collision risks. Spirals available in the United States include spiral vibration dampers (SVDs), Bird-Flight™ Diverters (BFDs), and Swan-Flight™ Diverters. SVDs were originally designed to reduce aeolian line vibration, but were found to increase line visibility and reduce collision risk (**Diagram 10**). SVDs are available in various lengths, and colors. SVDs are generally placed 9.8 feet apart on transmission line shield wires (APLIC, 2012). The BFD is shown in **Diagram 11**. Typical manufacturer spacing for BFDs is 15 feet, but spacing can be adjusted based on species of concern, site-specific conditions, and engineering requirements. It should be noted that spiral devices are not recommended for use on transmission phase conductors greater than or equal to 230 kV because of the risk of corona damage. Electric corona occurs when the voltage of a phase conductor, generally greater than or equal to 115 kV, ionizes the surrounding air, which then also becomes a conductor (Hurst, 2004). Corona can degrade marking device materials. Line marking devices can have varying levels of corona effects, depending on the type of device and voltage of line (refer to Hurst, 2004 for detailed results).

**Diagram 10 Line Marking – Spiral Vibration Damper Example**



Source: AFL ([www.aflglobal.com](http://www.aflglobal.com))

**Diagram 11** Line Marking – Bird-Flight™ Diverter



Source: APLIC, 2012

Suspended devices (swinging, flapping, and fixed) are another type of line marking device that can be effective for reducing avian collision risks. An example of a suspended device is shown in **Diagram 12**. Typically spacing for swinging or fixed suspended devices is 33 to 50 feet apart, but can range by manufacturer's specifications. These devices are typically used on distribution lines; however, they can be used on shield wires (APLIC, 2012). Hurst (2004) reported that suspended devices had the highest corona of all three types of line markers.

**Diagram 12** Line Marking – FireFly™ FF and FireFly™ HW

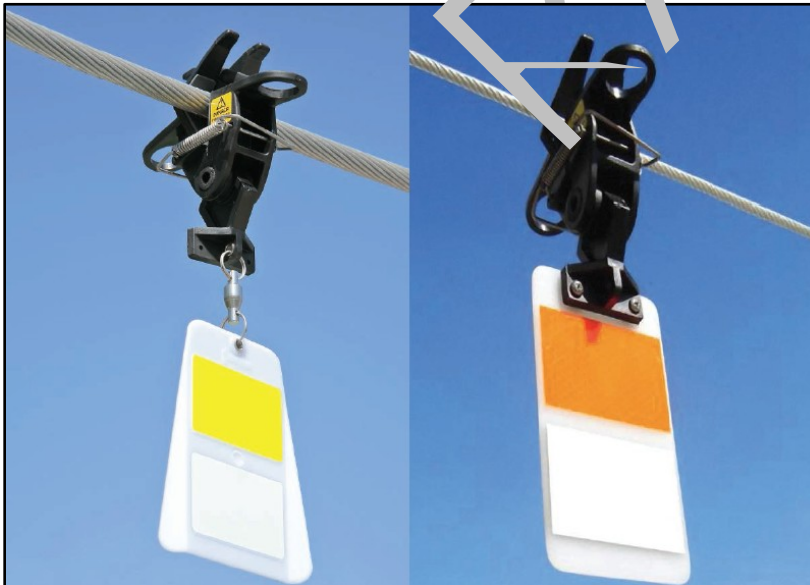


Image source: APLIC, 2012



## 5.5 PERSONNEL TRAINING

In order to effectively implement the BBCS, Ormat will ensure that all appropriate personnel undergo training on the issues and protocols outlined in the BBCS. This training ensures that all appropriate personnel have a thorough understanding of the BBCS and their responsibility to bird and bat protection and regulatory compliance. As part of this training, Ormat personnel will be well versed on what actions need to be taken when nests, injured, or deceased bird and bat species are encountered. Two visual aids, presented below, have been developed to assist in the personnel training program. **Diagram 13** shows the process for employees to follow when a newly identified nest is encountered (also available as **Appendix E**). These procedures are not necessary for previously identified nests. **Diagram 14** shows the process for employees to follow when an injured or deceased bird or bat is encountered (also available as **Appendix F**).

DRAFT

Diagram 13 Nest Management Flow Chart

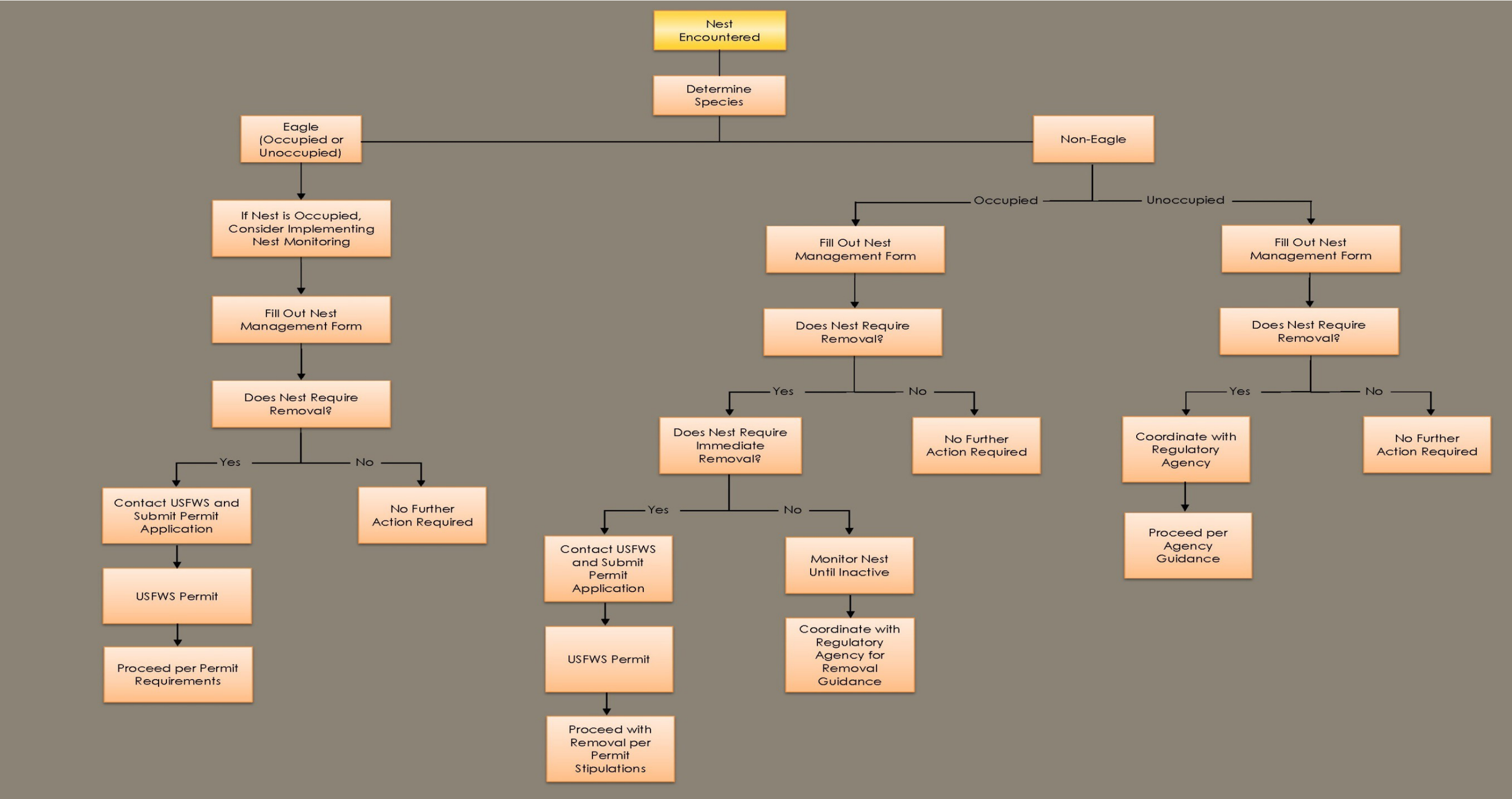
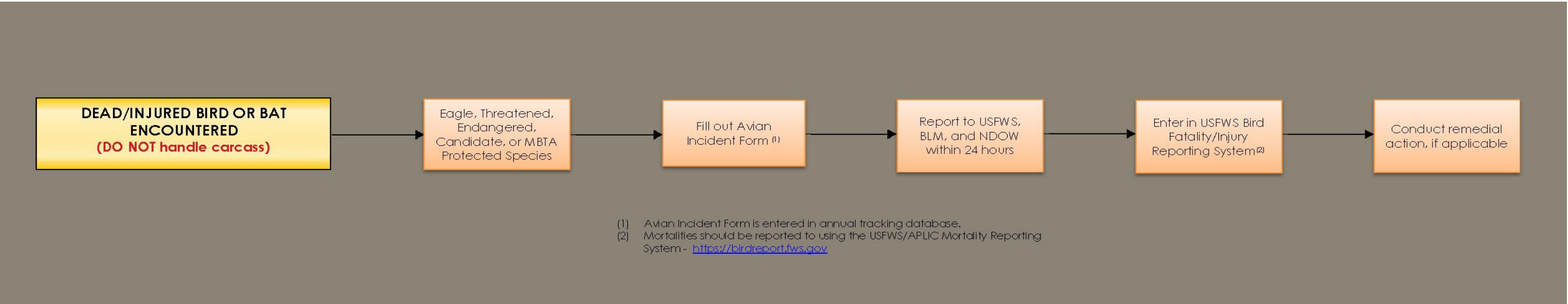


Diagram 14 Avian Incident Action Plan



## 5.6 QUALITY CONTROL

When appropriate, Ormat will consult with USFWS, BLM, and NDOW to assess various parameters and protection measures as described in this BBCS, to ensure that it is effective and efficient. Assessment will take place if substantial impacts to birds or bats have been documented by Ormat. Parameters that Ormat will assess include:

- Bird and bat protection devices to identify preferred products, as well as ease of application and durability;
- Mortality reporting procedures to ensure that discoveries of avian mortalities are properly documented;
- Response to avian mortalities to ensure that appropriate actions are taken in a timely manner;
- Compliance with company procedures to ensure that personnel are consistently following company methods for bird- and bat-safe construction, mortality reporting, nest management, etc.; and
- Public and agency opinions on system reliability and bird and bat protection.

These parameters will be assessed during each review of the BBCS, as necessary. Additional parameters other than those listed above may be assessed during review of the BBCS if determined necessary by Ormat or BLM. Although it is only practical to periodically revise or update the BBCS, the quality control component will be an ongoing process. Daily observations, internal operating procedures, personnel input, and new technologies will be applied to assessments during the periodic reviews of the BBCS. As Ormat discovers action items or other issues that need to be addressed through the quality control procedures, they will apply the appropriate adjustments to this BBCS. These adjustments and revisions will strengthen the BBCS and the measures contained therein. Revisions and updates to the BBCS will be made by Ormat and provided to the USFWS, BLM, and NDOW. Revisions and updates to the BBCS will also be reviewed with appropriate Ormat personnel.

## 5.7 PUBLIC AWARENESS

A public awareness program can be an integral part of a BBCS. This program can be used to enhance general public awareness and support for a project's BBCS. It allows stakeholders such as government agencies, Tribes, non-profit organizations, wildlife rehabilitators, the general public, and other interested parties an opportunity to provide input to the decision-making process, enabling all parties to work openly and collaboratively toward recommendations that can be effectively implemented. This collaboration often leads to improved relationships within the community and to more efficient and positive projects. The relationships developed through this process may also encourage the public to report bird and bat mortalities and encourage them to seek assistance for birds and bats that have been injured in project-related accidents (APLIC and USFWS, 2005).



Ormat will include bird and bat protection in its ongoing public awareness campaign. Ongoing public awareness will include Ormat's cooperative efforts to minimize bird and bat mortalities, periodically reviewing the effectiveness of the BBCS, and reporting of incidents.

## 5.8 KEY RESOURCES

The following key resources may be used by Ormat to assist in providing expertise in permitting, bird and bat populations and behavior, and avian- and bat-safe design features.

- **United States Fish and Wildlife Service**  
Division of Migratory Birds: <http://www.fws.gov/migratorybirds/ContactUs.htm>  
Contacts: <http://www.fws.gov/migratorybirds/ContactUs.html>  
  
USFWS Migratory Bird Biologist, Region 8, Reno: (775) 861-6333  
  
Bird Fatality/Injury Reporting Program – For Use by Electric Utility Industry:  
<https://birdreport.fws.gov/>  
  
USFWS Migratory Bird Permits, 50CFR21:  
[http://access.gpo.gov/nara/cfr/waisidx\\_03/50cfr21\\_03.html](http://access.gpo.gov/nara/cfr/waisidx_03/50cfr21_03.html)  
  
USFWS Eagle Permits, 50CFR22:  
[http://access.gpo.gov/nara/cfr/waisidx\\_03/50cfr22\\_03.html](http://access.gpo.gov/nara/cfr/waisidx_03/50cfr22_03.html)
- **Nevada Department of Wildlife**  
Eastern Region Mining Biologist, Elko: (775) 777-2300
- **Bureau of Land Management**  
Battle Mountain District Office, Mount Lewis Field Office: (775) 635-4000
- **Great Basin Bird Observatory**  
[http://www.gbbo.org/about\\_contact.html](http://www.gbbo.org/about_contact.html)
- **Western Bat Working Group**  
<http://www.wbwg.org/>
- **Avian Power Line Interaction Committee**  
<http://www.aplic.org/mission.php>

These resources will be utilized as necessary and will further ensure that Ormat has a successful and effective BBCS. Resources other than those listed may also be consulted, including consultants, company specialists, and other facilities and entities with proven effective bird and bat protection programs. Additionally, this list is not all-inclusive and as other resources become available or known, they should be added.



## 6.0 REPORTING SYSTEM

### 6.1 DETECTION

Bird and bat injury or mortality will be detected through incidental observations by McGinness Hills Geothermal personnel and contractors. To improve the probability that injuries and mortalities do not go undetected, McGinness Hills Geothermal staff will be directed to remain alert for birds and bats within the project area at all times. The detection of bird nest sites will occur through incidental observations during project construction and operation.

### 6.2 RESPONSE AND DOCUMENTATION OF INJURED, DECEASED, AND NESTING BIRDS AND BATS

In addition to incidental observations, Ormat staff will drive the main travel route and project access roads, within a four-mile buffer of the project area and south to Highway 50, twice per day, seven days a week, to remove carrion and road-killed carcasses. In the event that a carcass, nest, bird or bat injury, or bird or bat mortality is detected, Ormat personnel will record the circumstances and conditions associated with the observation by using the appropriate Carcass Retrieval Form (**Diagram 15** and **Appendix B**), Nest Form (**Diagram 16** and **Appendix G**), and/or Avian Incident Form (**Diagram 17** and **Appendix H**). Among the information recorded will be the date and time of the detection, the Global Positioning System location (North American Datum 83), the status of the nest or the apparent cause of injury or mortality, and if possible, the species. McGinness Hills Geothermal personnel will also be educated on the procedures for encountering nests, injured birds or bats, and mortalities as described in **Section 5.5**.

Within 90 days of the Finding of No Significant Impact (FONSI) and signed Decision Record for the project, Ormat will coordinate with the USFWS to determine if the project requires a Special Purpose Utility (SPUT) permit. A SPUT permit will help define roles and responsibilities, with regards to actual handling of injured or deceased birds, of Ormat and associated agencies if a bird mortality occurs. Implementation of a SPUT permit will improve the speed at which actions can be taken should injured or deceased birds be encountered and will ensure that actions are in compliance with the requirements of the MBTA.



Diagram 15 Carcass Retrieval Form

**McGinness Hills Geothermal Development Project**  
**Carcass Retrieval Form**

<b>Date and Time of Retrieval:</b> _____	
<b>UTM Coordinates of Carcass Location (NAD 83, Zone 11):</b>	
<b>Northing:</b> _____	<b>Easting:</b> _____
<b>Observer:</b> _____	
<b>Photo Number(s):</b> _____	
<b>Deceased Species*</b> (if specifics are unknown, document mammal, avian, reptile, amphibian, etc.):  _____	
<input type="checkbox"/> <b>Contact NDOW</b> (if necessary)	
<b>NDOW Instructions for Carcass:</b>  _____	
<b>Scavenging Species</b> (if specifics are unknown, document mammal, avian, reptile, etc.):  _____	
<b>Cause of Mortality/Condition of Carcass:</b>  _____	
<p><small>*Most avian species are protected under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act and require coordination with NDOW prior to retrieval. Please call Caleb McAdoo (NDOW) at (775) 777-2306 or (775) 388-1914 for instructions.</small></p>	



## McGinness Hills Geothermal Development Project

### Avian Nesting Form

Date and Time: _____	
Observer: _____	Observer(s) Phone # _____
Current Weather: _____	Photo Number(s): _____
UTM Coordinates of Carcass Location (NAD 83, Zone 11):	
Northing: _____	Easting: _____
Description of Nest Location (facility location, substrate, topography, etc.):	
Species of Bird, if known (circle one):	
Crow/Magpie/Raven	Eagle Hawk/Falcon/Osprey
Small bird/Song bird	Unknown Owl
Waterfowl	Other _____
Condition of Nest/History of Previous Nesting at Location/Observation of Any Eggs or Young:	
Other Notes/Comments:	



Diagram 17 Avian Incident Form

**McGinness Hills Geothermal Development Project**  
**Avian/Bat Incident Form**

<b>Date and Time:</b> _____		
<b>Observer:</b> _____	<b>Observer(s) Phone #</b> _____	
<b>Current Weather:</b> _____	<b>Photo Number(s):</b> _____	
<b>UTM Coordinates of Carcass Location (NAD 83, Zone 11):</b>		
<b>Northing:</b> _____	<b>Easting:</b> _____	
<b>Description of Nest Location</b> (facility location, substrate, topography, etc.):   		
<b>Dead Species, if known (circle one):</b>		
Crow/Magpie/Raven	Eagle	Hawk/Falcon/Osprey
Small bird/Song bird	Unknown	Owl
Waterfowl	Other _____	
<b>Cause/Indicators of Mortality/Condition of Carcass:</b>   		
<b>Other Notes/Comments:</b>   		

## 6.3 REPORTING

The Ormat Representative will complete an Avian Incident Form (**Appendix H**) for all bird and bat injuries and mortalities. The form will be used for mortality monitoring at the site and will be available to regulatory agencies should data be requested. The Ormat Representative will also report the incident in the USFWS's online "Bird Fatality/Injury Program," a database of voluntarily submitted incidents of bird mortalities and injuries resulting from electrocutions or collisions with utility structures. The intent of the database is to gain information that can be used to prevent future avian mortality. **If an eagle injury or mortality is detected, Ormat will inform the USFWS, BLM, and NDOW, both verbally and in writing, within 24 hours. The Avian Incident Form will be filled out and included in communications, and the USFWS online reporting system will be used.** As outlined



in **Section 5.5** above, employees will have resources available and be well versed in their use for reporting and documenting nests, injuries, and mortalities.

## **6.4 PERMITS FOR INJURED, DECEASED, OR NESTING BIRDS AND BATS**

The USFWS issues permits to take, possess, or transport bald and golden eagles under the BGEPA. Ormat personnel are strictly prohibited from handling, transporting, or disposing of a golden or bald eagle carcass without a permit issued by the USFWS under the BGEPA. Therefore, in the unlikely event that such mortality does occur, Ormat will contact the USFWS and NDOW immediately to report the incident and arrange for retrieval and receipt of the carcass. The BLM will also be notified of the mortality.

Under the MBTA, it is unlawful to collect, salvage, or otherwise have in possession any raptor or raptor part, including feathers, without a state and federal permit. Most other avian species with potential to occur in the project area, including those that are not raptors, are protected under the MBTA as well. There may be occasion however, for Ormat personnel to collect bird carcasses in order to determine the cause of death, for disposal purposes, or for temporary collection for on-site inspection. If such occasion becomes necessary, Ormat will coordinate with the USFWS, BLM, and NDOW to determine the need for a SPUT permit and, if necessary, will apply for permits to allow the handling of deceased and injured birds. Ormat will not collect any bird (as a whole or part thereof) without written approval from USFWS and NDOW, or without first acquiring the appropriate permits. As outlined above, coordination between the USFWS and Ormat will occur within 90 days of the FONSI and signed Decision Record to determine the applicability of a SPUT permit.

Most of the bat species with potential to occur in the project area are categorized as BLM sensitive species in the state of Nevada. Some of the species are also categorized as protected or sensitive by the State of Nevada (Nevada Administrative Code 503.103-104). In the event that a bat sustains injury or experiences death as a result of the project, Ormat may need to handle, transport, or dispose of bat carcasses. If the need for such actions becomes apparent, Ormat will coordinate with the BLM and NDOW to ensure that any necessary permits are obtained and that all activities are in accordance with applicable regulations and laws.

Any collection of dead or injured birds or bats has the potential for the spread of zoonotic diseases (e.g., rabies). Personal protective equipment will be used before handling any injured or dead species. If handling of bats or their carcasses is unavoidable, handlers will be well trained and up-to-date on the appropriate vaccinations before doing so.



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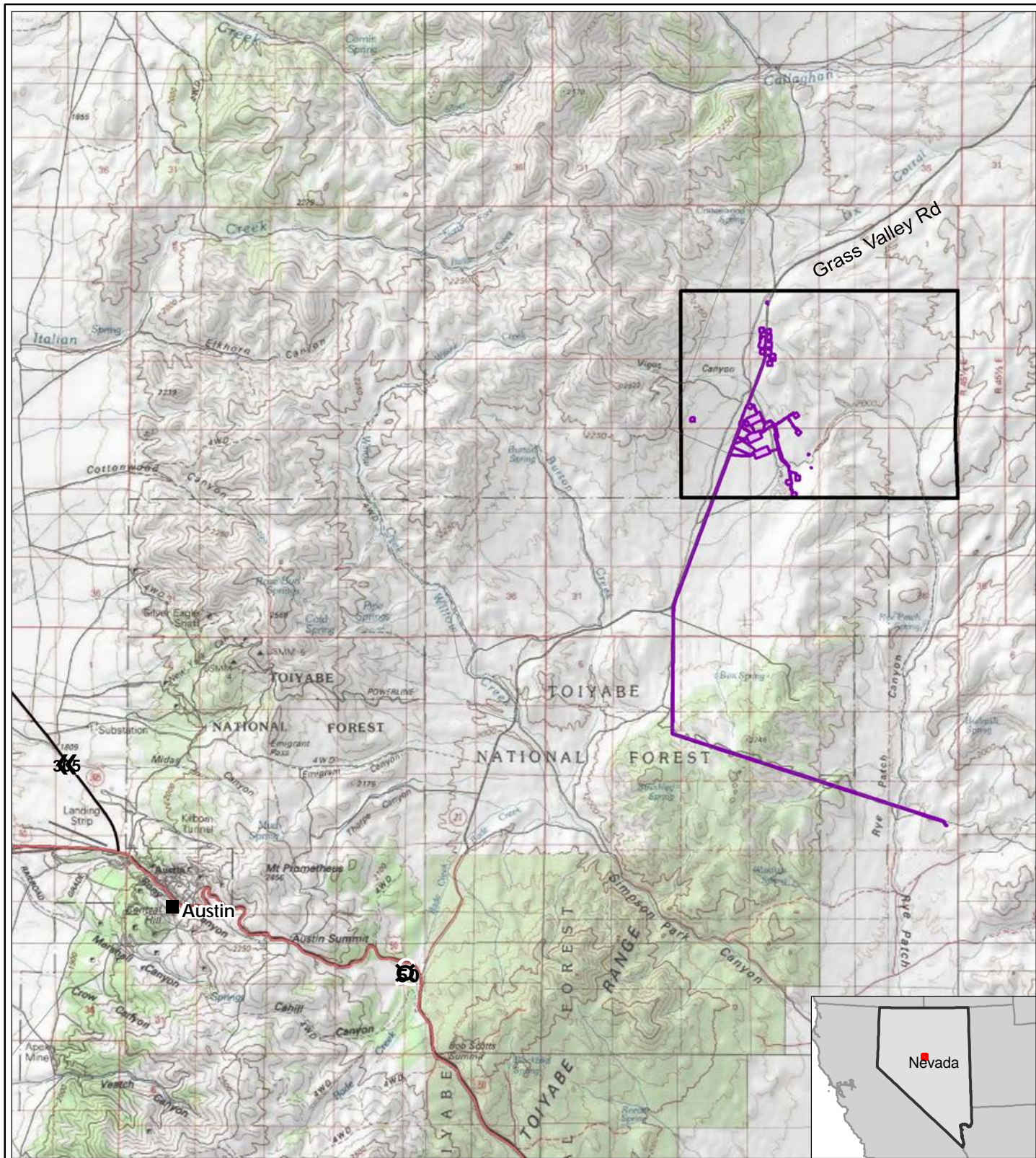
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DRAFT

FIGURES





#### Legend

- McGinness Hills Geothermal Lease Area
- Project Area



Ormat Nevada, Inc.  
Bird and Bat Conservation Strategy  
McGinness Hills Geothermal Development Project

T20N, R45E Lander County, NV  
NAD 1983 UTM Zone 11N

DRAWN BY: JT

1ST REVIEW: CJ

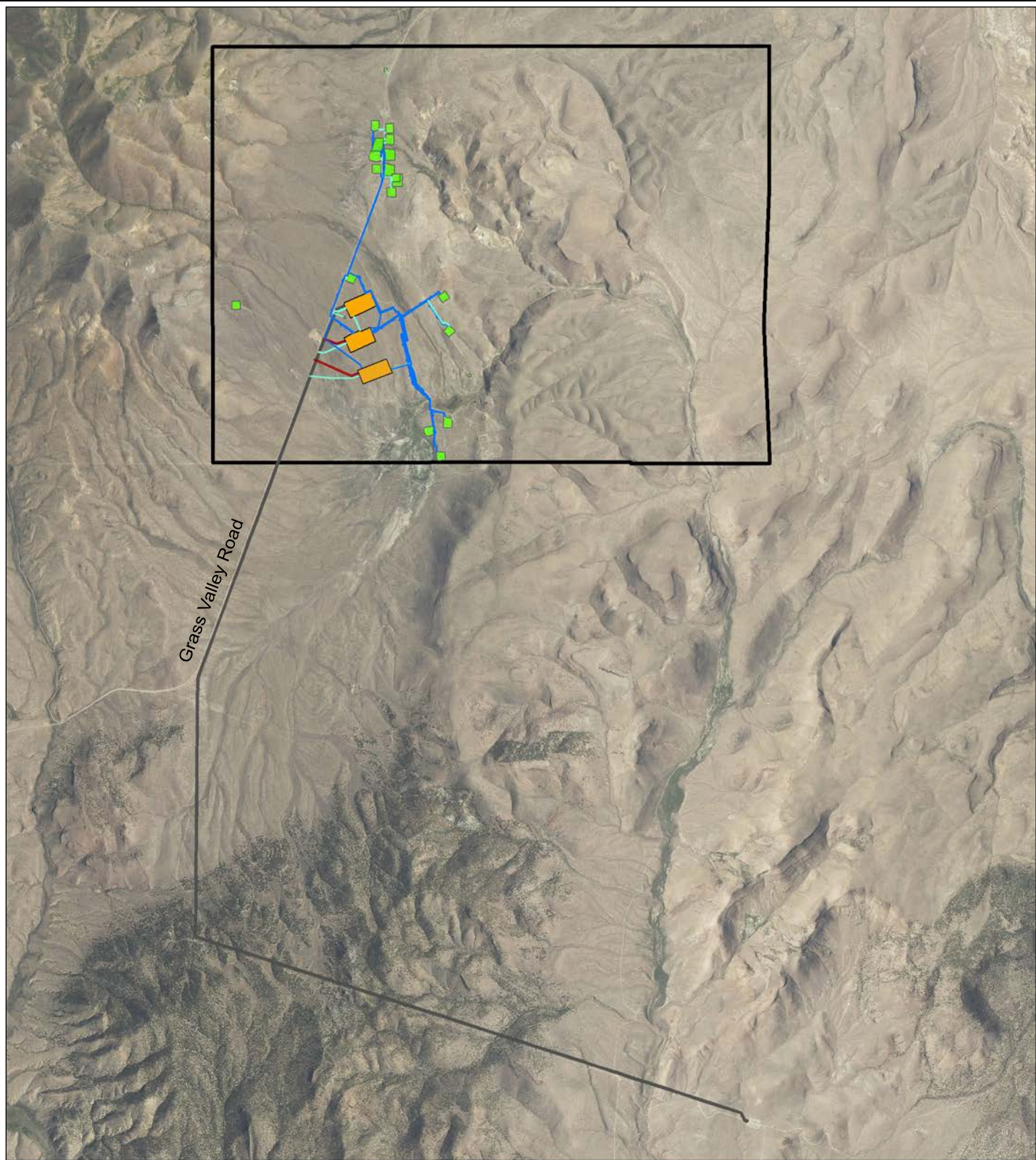
2ND REVIEW: CS

DATE: 12/6/2017

PROJECT NO: 203720325


**Figure 1**  
**Project Location**





Grass Valley Road

- Legend**
- McGinness Hills Geothermal Lease Area
  - Power Plant
  - Pipeline
  - Access Road
  - Well Pads
  - Transmission Line Tie-in
  - Transmission Line 90ft ROW



**Stantec**

0 1

Mile

1 in = 1 mile

T20N, R45E Lander County, NV  
NAD 1983 UTM Zone 11N

DRAWN BY: JT	1ST REVIEW: CJ	2ND REVIEW: CS
DATE: 12/6/2017		PROJECT NO: 203720325

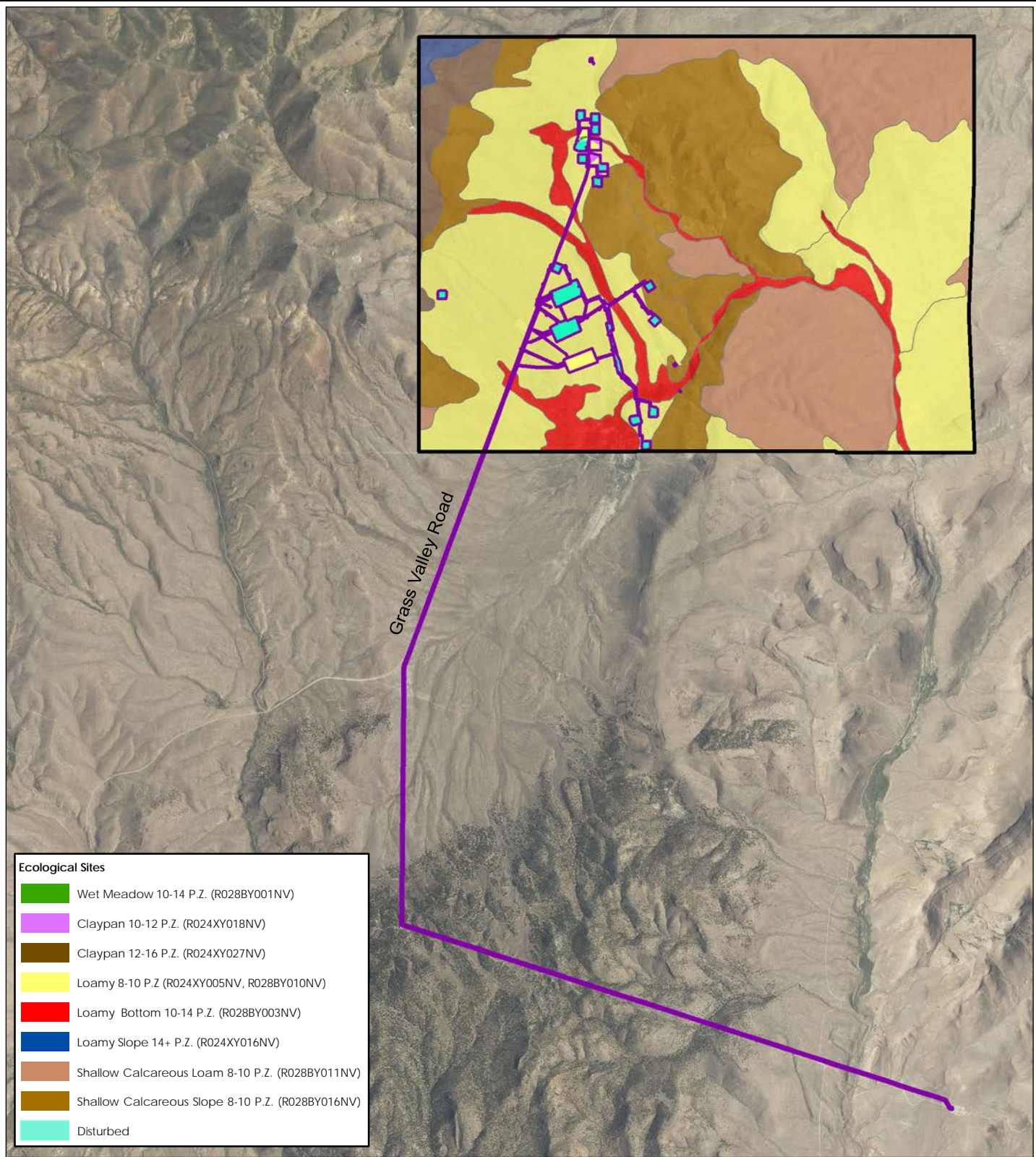
Ormat Nevada, Inc.  
Bird and Bat Conservation Strategy  
McGinness Hills Geothermal  
Development Project

**Figure 2**  
**Project Facilities**

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Reviewed: 2017-12-06 By: Jirock





#### Ecological Sites

- Wet Meadow 10-14 P.Z. (R028BY001NV)
- Claypan 10-12 P.Z. (R024XY018NV)
- Claypan 12-16 P.Z. (R024XY027NV)
- Loamy 8-10 P.Z. (R024XY005NV, R028BY010NV)
- Loamy Bottom 10-14 P.Z. (R028BY003NV)
- Loamy Slope 14+ P.Z. (R024XY016NV)
- Shallow Calcareous Loam 8-10 P.Z. (R028BY011NV)
- Shallow Calcareous Slope 8-10 P.Z. (R028BY016NV)
- Disturbed

#### Legend

- McGinness Hills Geothermal Lease Area
- Project Area



1 in = 1 mile

T20N, R45E Lander County, NV  
NAD 1983 UTM Zone 11N

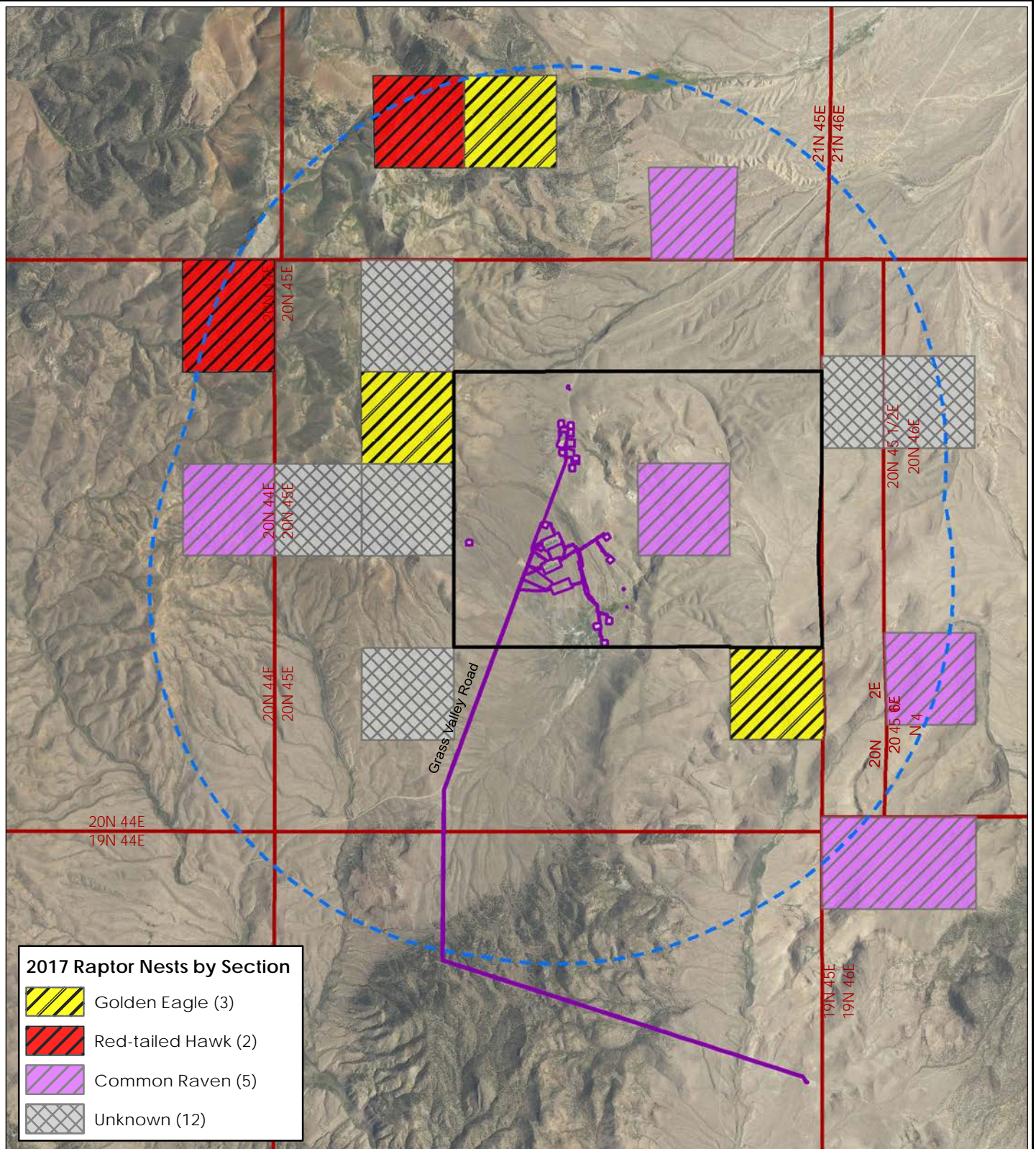
DRAWN BY: JT	1ST REVIEW: CJ	2ND REVIEW: CS
DATE: 12/6/2017		PROJECT NO: 203720325

Ormat Nevada, Inc.  
Bird and Bat Conservation Strategy  
McGinness Hills Geothermal  
Development Project

**Figure 3**  
**Ecological Sites**



V:\2037\Active\203720325\03\_data\Map\_4\_Raptor\_Raven\_Nest\_Sites\_8x11P.mxd  
Revised: 2017-12-06 By: jbrook



- Legend**
- McGinness Hills Geothermal Lease Area
  - Project Area
  - Golden Eagle and Raptor Survey Area

**Stantec**

0 1.5 Miles 1 in = 1.5 miles

T20N, R45E Lander County, NV  
NAD 1983 UTM Zone 11N

DRAWN BY: JT	1ST REVIEW: CJ	2ND REVIEW: CS
DATE: 12/6/2017		PROJECT NO: 203720325

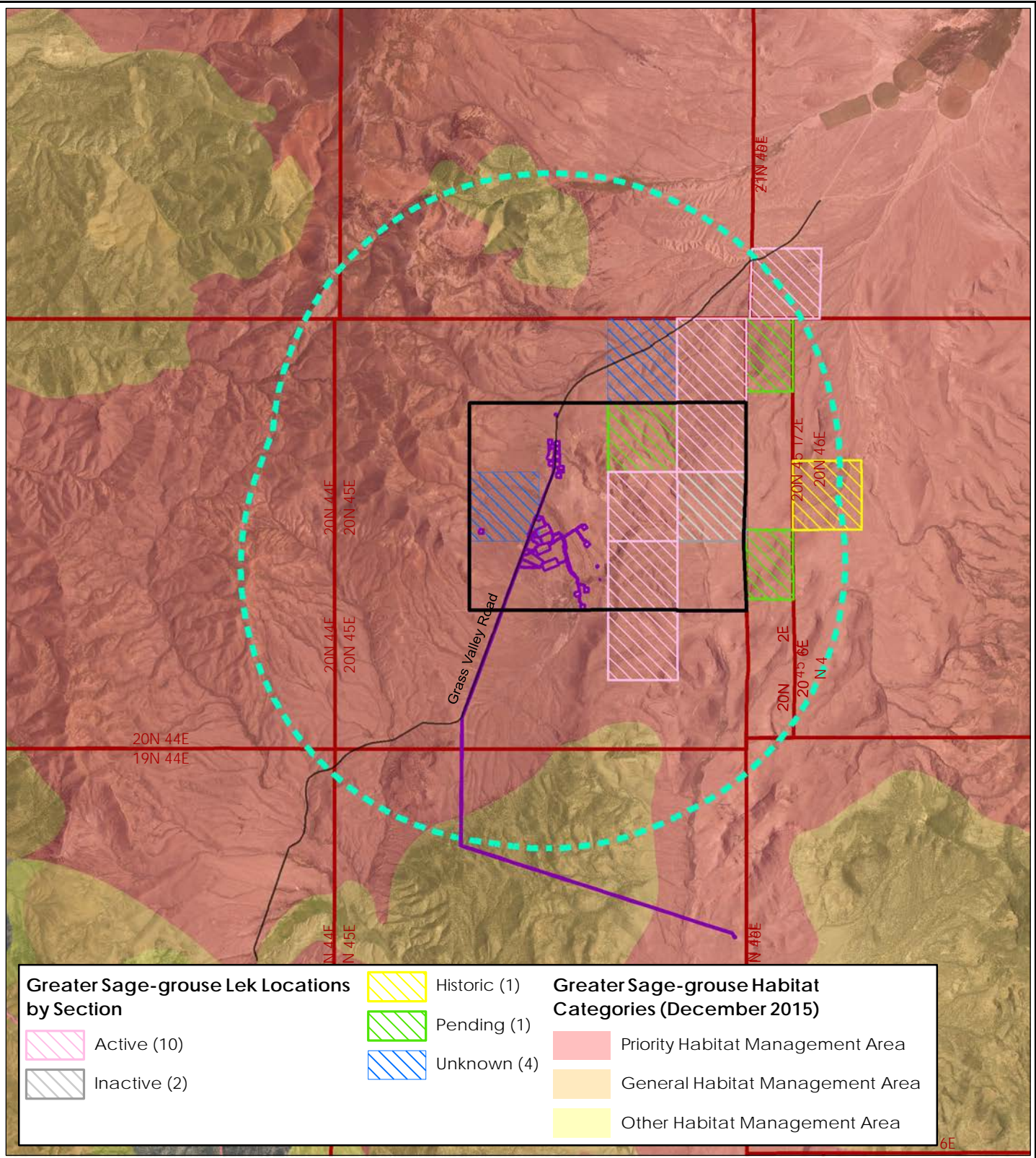
Ormat Nevada, Inc.  
Bird and Bat Conservation Strategy  
McGinness Hills Geothermal Development Project

**Figure 4**  
**Raptor and Raven Nest Sites**

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V:\2037\Active\203720325\03\_data\Map\_5\_Greater\_Sage\_Grouse\_Habitat\_8x11P.mxd Revised: 2017-12-06 By: jbrook



**Greater Sage-grouse Lek Locations by Section**

- Active (10)
- Inactive (2)

- Historic (1)
- Pending (1)
- Unknown (4)

**Greater Sage-grouse Habitat Categories (December 2015)**

- Priority Habitat Management Area
- General Habitat Management Area
- Other Habitat Management Area

**Legend**

- McGinness Hills Geothermal Lease Area
- Project Area
- 4-Mile Radius

Stantec

0 2 Miles 1 in = 2 miles

T20N, R45E Lander County, NV  
NAD 1983 UTM Zone 11N

DRAWN BY: JT	1ST REVIEW: CJ	2ND REVIEW: CS
DATE: 12/6/2017		PROJECT NO: 203720325

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Bird and Bat Conservation Strategy  
McGinness Hills Geothermal Development Project

**Figure 5**  
**Greater Sage-grouse Habitat**

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Service Layer Credits: 2015 National Agriculture Imagery Program (NAIP)

## APPENDIX A

### Suggested Practices for Avian Protection on Power Lines

Due to the large size of this Appendix, it is not included in this copy;  
however, the document is located at:

[HTTPS://WWW.NRC.GOV/DOCS/ML1224/ML12243A391.PDF](https://www.nrc.gov/docs/ml1224/ml12243a391.pdf)

## APPENDIX B

### Carcass Retrieval Form

# McGinness Hills Geothermal Development Project

## Carcass Retrieval Form

**Date and Time of Retrieval:** \_\_\_\_\_

**UTM Coordinates of Carcass Location (NAD 83, Zone 11):**

**Northing:** \_\_\_\_\_ **Easting:** \_\_\_\_\_

**Observer:** \_\_\_\_\_

**Photo Number(s):** \_\_\_\_\_

**Deceased Species\*** (if specifics are unknown, document mammal, avian, reptile, amphibian, etc.):

☐ Contact NDOW (if necessary)

NDOW Instructions for Carcass:

**Scavenging Species** (if specifics are unknown, document mammal, avian, reptile, etc.):

\_\_\_\_\_

**Cause of Mortality/Condition of Carcass:**

\*Most avian species are protected under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act and require coordination with NDOW prior to retrieval.  
Please call Caleb McAdoo (NDOW) at (775) 777-2306 or (775) 388-1914 for instructions.

## APPENDIX C

### Required Design Features for Greater Sage-grouse Habitat

## Greater Sage-Grouse Required Design Features

**Table 1    General Required Design Features**

RDF #	Description	Project Application
Gen 1	Locate new roads outside of greater sage-grouse habitat to the extent practical.	Project area is located entirely within greater sage-grouse habitat. The power plant access road is necessary for operation of the Project. Access roads are being limited to the absolute minimum needed for the Project. Existing roads and pads will be used when possible.
Gen 2	Avoid constructing roads within riparian areas and ephemeral drainages. Construct low-water crossings at right angles to ephemeral drainages and stream crossings (note that such construction may require permitting under Sections 401 and 404 of the Clean Water Act).	No road construction is proposed in riparian areas or ephemeral drainages.
Gen 3	Limit construction of new roads where roads are already in existence and could be used or upgraded to meet the needs of the project or operation. Design roads to an appropriate standard, no higher than necessary, to accommodate intended purpose and level of use.	Project has been designed to limit the amount of new road necessary for Project operation and maintenance. Roads will be co-located where possible, and existing roads will be used to the extent practical.
Gen 4	Coordinate road construction and use with Right-of-Way (ROW) holders to minimize disturbance to the extent possible.	Access road would not impact other ROW holders.
Gen 5	During project construction and operation, establish and post speed limits in greater sage-grouse habitat to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	Speed limits of 20 to 25 miles per hour (mph) would be maintained for Project-related travel through the Project Area. Ormat will post speed limit signs, and all contractors/employees will be trained on the speed limits within the Project Area.
Gen 6	Newly constructed project roads that access valid existing rights would not be managed as public access roads. Proponents will restrict access by employing traffic control devices such as signage, gates, and fencing.	Access road will be signed to indicate limited access/entry to the power plant.
Gen 7	Require dust abatement practices when authorizing use on roads.	Water would be applied to the ground during the construction and utilization of the drill pads, access roads, and other disturbed areas as necessary to control dust.
Gen 8	There is no Gen 8 RDF.	N/A
Gen 9	Upon project completion, reclaim roads developed for project access on public lands unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.	All Project disturbance would be reclaimed at the end of Project life. Access roads deemed unnecessary will be reclaimed as soon as practicable.
Gen 10	Design or site permanent structures that create movement (e.g., pump jack/ windmill) to minimize impacts on GRS habitat.	Project facilities do not have many structures that create movement. The cooling fans used in the power plant would have horizontal movement that would be minimally visible to greater sage-grouse.
Gen 11	Equip temporary and permanent aboveground facilities with structures or devices that discourage nesting and perching of raptors, corvids, and other predators.	Power poles and vertical expansion loops would have anti-perch device installed to deter use by predators.
Gen 12	Control the spread and effects of nonnative, invasive plant species (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance; Evangelista et al. 2011). All projects would be required to have a noxious weed management plan in place prior to construction and operations.	An Integrated Weed Management Plan has been developed for the Project.
Gen 13	Implement project site-cleaning practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of greater sage-grouse.	Site clearing will be conducted in a manner that minimizes accumulation of debris.
Gen 14	Locate project related temporary housing sites outside of greater sage-grouse habitat.	No temporary housing is proposed.
Gen 15	When interim reclamation is required, irrigate site to establish seedlings more quickly if the site requires it.	Irrigation is not necessary to establish vegetation in interim reclamation areas.
Gen 16	Utilize mulching techniques to expedite reclamation and to protect soils if the site requires it.	Project could utilize mulching techniques during reclamation.
Gen 17	Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.	Project will follow BLM-approved Reclamation Plan.
Gen 18	When authorizing ground-disturbing activities, require the use of vegetation and soil reclamation standards suitable for the site type prior to construction.	Project will follow BLM-approved Reclamation Plan.
Gen 19	Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during the greater sage-grouse breeding (e.g., courtship and nesting) season. In addition, pets shall not be permitted on site during construction (BLM 2005b).	Ormat will provide construction employees and contractors with appropriate training and prohibiting pets during the construction phase.
Gen 20	To reduce predator perching in greater sage-grouse habitat, limit the construction of vertical facilities and fences to the minimum number and amount needed and install anti-perch devices where applicable.	Minimizing the use of vertical structures and fences was considered during Project facility design. Anti-perch devices will be placed on pipeline vertical expansion loops and power poles.
Gen 21	Outfit all reservoirs, pits, tanks, troughs or similar features with appropriate type and number of wildlife escape ramps (BLM 1990; Taylor and Tuttle 2007).	Project related reservoirs, pits, tanks, or similar features will be equipped with wildlife escape ramps or constructed to allow wildlife to escape (i.e., sloped instead of vertical sides).
Gen 22	Load and unload all equipment on existing roads to minimize disturbance to vegetation and soil.	All equipment will be loaded or unloaded on roads or in already disturbed areas.

**Table 2 Fluid Minerals Required Design Features**

RDF #	Description	Project Application
Lease FM 1	Co-locate power lines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010) in order to minimize or avoid disturbance.	Project layout has been designed to co-locate as many facilities as practicable. Pipeline layout is adjacent to the existing pipelines to the extent possible. The transmission line tie-in length is minimized to tie in to the existing power line in close proximity to the power plant location.
Lease FM 2	Cover, create barriers, or implement other effective deterrents (e.g., netting, fencing, birdballs, and sound cannons) for all ponds and tanks containing potentially toxic materials to reduce greater sage-grouse mortality.	No ponds are proposed as part of this Project. Any toxic materials would be contained in covered tanks/barrels/etc.
Lease FM 3	Require installation of noise shields to comply with noise restrictions (see Action SSS 7) when drilling during the breeding, nesting, brood-rearing and/or wintering season. Require applicable greater sage-grouse seasonal timing restrictions when noise restrictions cannot be met.	No noise threshold exceedances are anticipated ( <b>Section 3.15</b> ).
Lease FM 4	Ensure habitat restoration meets greater sage-grouse habitat objectives (Table 2-2 [BLM 2015]) for reclamation and restoration practices sites (Pyke 2011).	Funded habitat restoration projects are subject to review and approval by the Wildlife Working Group, per the existing charter.
Lease FM 5	Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoil management, and revegetating cut-and-fill slopes.	Reclamation would be conducted in accordance with the Reclamation Plan ( <b>Section 2.3.9</b> ).
Lease FM 6	Restore disturbed areas at final reclamation to the pre-disturbance landforms and meets the greater sage-grouse habitat objectives (Table 2-2 [BLM 2015]).	Reclamation would be conducted in accordance with the Reclamation Plan ( <b>Section 2.3.9</b> ).
Lease FM 7	Use only closed-loop systems for drilling operations and no reserve pits within greater sage-grouse habitat.	Closed loop drilling is not feasible for the drilling of full size wells. Reserve pits will be fenced on three sides during drilling, with the fourth side being blocked by the rig. Once the well is drilled, the pit will be fenced on all four sides and the drilling fluid will be allowed to evaporate.
Lease FM 8	Place liquid gathering facilities outside of greater sage-grouse habitat. Have no tanks at well locations within greater sage-grouse habitat to minimize vehicle traffic and perching and nesting sites for aerial predators of greater sage-grouse.	The geothermal lease unit occurs entirely within greater sage-grouse habitat. Therefore, there is no option to place liquid gathering (e.g., reserve pits) outside of greater sage-grouse habitat. Drilling is conducted in accordance with the Geothermal Drilling Permit's Conditions of Approval.
Lease FM 9	In greater sage-grouse habitat, use remote monitoring techniques for production facilities and develop a plan to reduce vehicular traffic frequency of vehicle use (Lyon and Anderson 2003).	The three facilities will be run from the Phase I control room, which reduces the number of employees needed as well as vehicular traffic at the site.
Lease FM 10	Use dust abatement practices on well pads.	Dust control during construction is an environmental protection measure ( <b>Section 2.2.1</b> ). "Water would be applied to the ground during the construction and utilization of the drill pads, access roads, and other disturbed areas as necessary to control dust."
Lease FM 11	Cluster disturbances associated with operations and facilities as close as possible, unless site-specific conditions indicate that disturbance to greater sage-grouse habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.	Project layout has been designed to co-locate as many facilities as practicable.
Lease FM 12	Apply a phased development approach with concurrent reclamation.	The Project is proposed as Phase III. Phases I and II have already been developed and reclaimed to the extent practicable for operation.
Lease FM 13	Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile Virus (Dougherty 2007).	The minimum amount of reserve pits will be constructed needed for drilling operations. Multiple wells will be drilled from pads to utilize the same reserve pits for drilling.
Lease FM 14	In greater sage-grouse habitat, remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile Virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat (Doherty 2007): <ul style="list-style-type: none"> <li>• Overbuild size of ponds for muddy and non-vegetated shorelines</li> <li>• Build steep shorelines to decrease vegetation and increase wave actions</li> <li>• Avoid flooding terrestrial vegetation in flat terrain or low lying areas</li> <li>• Construct dams or impoundments that restrict down slopes seepage or overflow</li> <li>• Line the channel where discharge water flows into the pond with crushed rock</li> <li>• Construct spillway with steep sides and line it with crushed rock</li> <li>• Treat waters with larvicides to reduce mosquito production where water occurs on the surface</li> </ul>	Pits are constructed with steep walls that limit the growth of vegetation. Once the well is drilled, the drilling fluid will be allowed to evaporate and the pits will remain dry unless needed for flow tests and/or well cleanouts.
Lease FM 15	Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.	Soil compaction is needed on full size well pads to ensure a stable base for the large drilling rig to sit.



**Table 3    Lands and Realty Required Design Features**

RDF #	Description	Project Application
LR-LUA 1	Where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes impacts in greater sage-grouse habitat. Use existing roads or realignments of existing roads to access valid existing rights that are not yet developed.	Does not apply to this Project.
LR-LUA 2	Do not issue ROWs to counties on newly constructed energy/mining development roads, unless for a temporary use consistent with all other terms and conditions included in this document.	Does not apply to this Project.
GEN 3	Where necessary, fit transmission towers with anti-perch devices (Lammers and Collopy 2007) in greater sage-grouse habitat.	Ormat has committed to installing anti-perch devices on power poles for the transmission lie tie-in ( <b>Section 2.2.1</b> ).

**References**

BLM 1990

BLM 2005b

BLM 2015

Bui et al. 2010 Doherty

2007

Evangelista et al. 2011

Lammers and Collopy 2007

Lyon and Anderson 2003

Pyke 2011

Taylor and Tuttle 2007

## APPENDIX D

### Reducing Avian Collisions with Power Lines

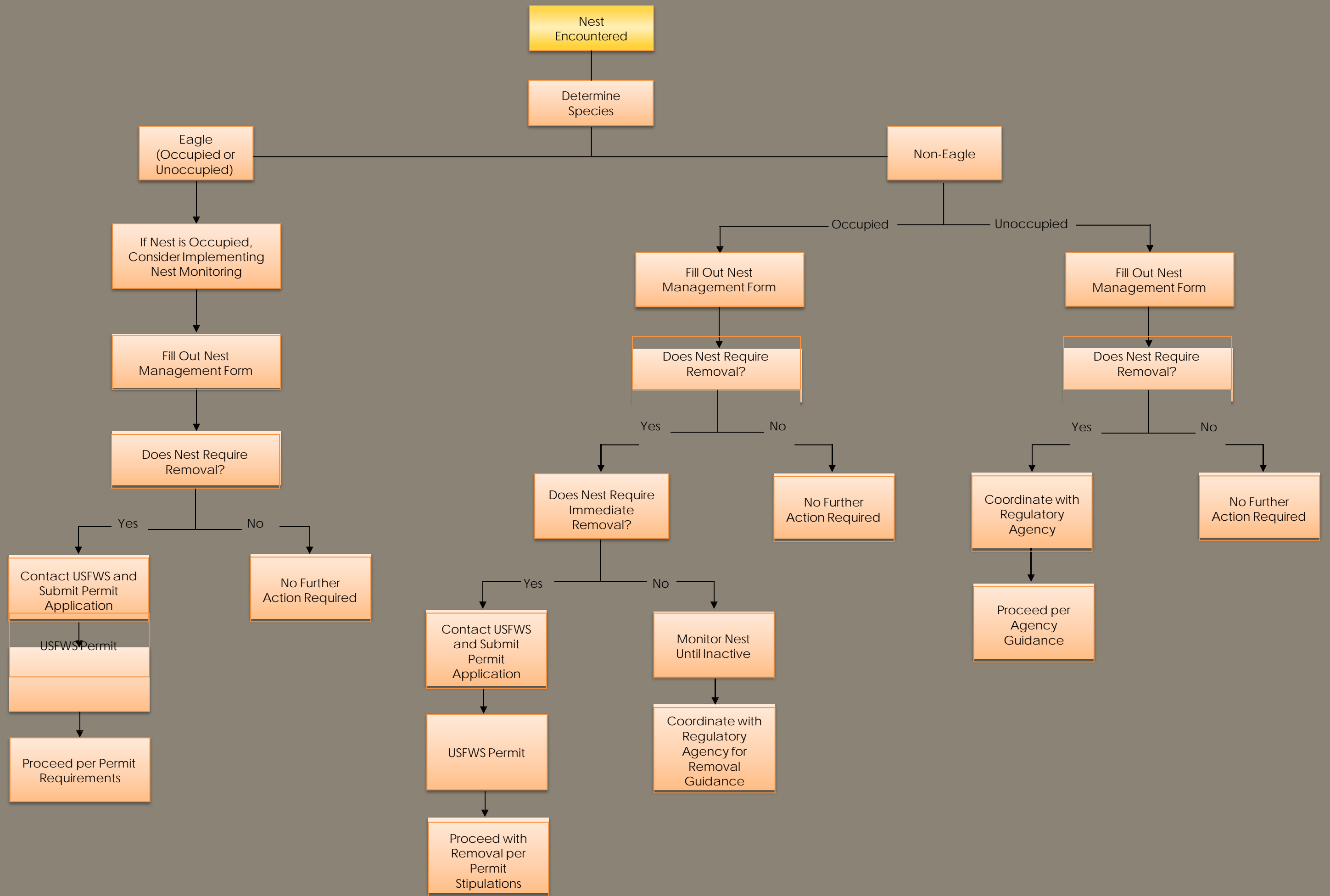
Due to the large size of this Appendix, it is not included in this copy;  
however, the document is located at:

[HTTPS://WWW.APLIC.ORG/UPLOADS/FILES/11218/REDUCING\\_AVIAN\\_COLLISIONS\\_2012WATERMARKLR.PDF](https://www.aplic.org/uploads/files/11218/reducing_avian_collisions_2012watermarklr.pdf)

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## APPENDIX E

### Nest Flow Chart



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## APPENDIX F

### Avian Incident Action Plan

**DEAD/INJURED BIRD OR BAT  
ENCOUNTERED**  
**(DO NOT handle carcass)**

Eagle, Threatened,  
Endangered,  
Candidate, or MBTA  
Protected Species

Fill out Avian  
Incident Form <sup>(1)</sup>

Report to USFWS,  
BLM, and NDOW  
within 24 hours

Enter in USFWS Bird  
Fatality/Injury  
Reporting System <sup>(2)</sup>

Conduct remedial  
action, if applicable

- (1) Avian Incident Form is entered in annual tracking database.  
(2) Mortalities should be reported to using the USFWS/APLIC Mortality Reporting System - <https://birdreport.fws.gov>

## APPENDIX G

### Nest Form

**McGinness Hills Geothermal Development Project**  
**Avian Nesting Form**

**Date and Time:** \_\_\_\_\_

**Observer:** \_\_\_\_\_

**Observer(s) Phone #** \_\_\_\_\_

**Current Weather:** \_\_\_\_\_

**Photo Number(s):** \_\_\_\_\_

**UTM Coordinates of Carcass Location (NAD 83, Zone 11):**

**Northing:** \_\_\_\_\_

**Easting:** \_\_\_\_\_

**Description of Nest Location** (facility location, substrate, topography, etc.):

**Species of Bird, if known (circle one):**

Crow/Magpie/Raven

Eagle

Hawk/Falcon/Osprey

Small bird/Song bird

Unknown

Owl

Waterfowl

Other \_\_\_\_\_

**Condition of Nest/History of Previous Nesting at Location/Observation of Any Eggs or Young:**

**Other Notes/Comments:**



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## APPENDIX H

### Avian Incident Form

**McGinness Hills Geothermal Development Project**  
**Avian/Bat Incident Form**

**Date and Time:** \_\_\_\_\_

**Observer:** \_\_\_\_\_

**Observer(s) Phone #** \_\_\_\_\_

**Current Weather:** \_\_\_\_\_

**Photo Number(s):** \_\_\_\_\_

**UTM Coordinates of Carcass Location (NAD 83, Zone 11):**

**Northing:** \_\_\_\_\_

**Easting:** \_\_\_\_\_

**Description of Nest Location** (facility location, substrate, topography, etc.):

**Dead Species, if known (circle one):**

Crow/Magpie/Raven

Eagle

Hawk/Falcon/Osprey

Small bird/Song bird

Unknown

Owl

Waterfowl

Other \_\_\_\_\_

**Cause/Indicators of Mortality/Condition of Carcass:**

**Other Notes/Comments:**

## **Appendix H: Integrated Weed Management Plan**

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# INTEGRATED WEED MANAGEMENT PLAN MCGINNESS HILLS GEOTHERMAL DEVELOPMENT PROJECT LANDER COUNTY, NEVADA

*Prepared for:*

**Ormat Nevada, Inc.**  
6225 Neil Road  
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*Prepared by:*



**Stantec Consulting Services Inc.**  
6995 Sierra Center Parkway  
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Stantec Project Number 203720325

January 3, 2018

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Appendix D	Biological Control Agent Release Proposal and Record Forms
Appendix E	Treatment and Infestation Forms
Appendix F	BLM-Approved Adjuvants and Herbicides

## ACRONYMS

<b>BCARP</b>	Biological Control Agent Release Proposal
<b>BCARR</b>	Biological Control Agent Release Record
<b>BLM</b>	Bureau of Land Management
<b>BMP</b>	Best Management Practice
<b>EAP</b>	Emergency Action Plan
<b>GPS</b>	Global Positioning System
<b>mph</b>	Miles Per Hour
<b>NAC</b>	Nevada Administrative Code
<b>NDA</b>	Nevada Department of Agriculture
<b>NISIMS</b>	National Invasive Species Information Management System
<b>NRS</b>	Nevada Revised Statute
<b>Ormat</b>	Ormat Nevada, Inc.
<b>Plan</b>	Integrated Weed Management Plan
<b>PPE</b>	Personal Protective Equipment
<b>Project</b>	McGinness Hills Geothermal Development Project
<b>Project Area</b>	Project Disturbance Footprint
<b>U.S.C.</b>	United States Code



## 1.1 INTRODUCTION

Ormat Nevada, Inc. (Ormat) recognizes the economic and environmental impact that can result from the establishment of noxious and invasive non-native plant species and has committed to a proactive approach to weed control. This Integrated Weed Management Plan (Plan) is being prepared as a project-wide plan to be implemented for all ongoing and immediately foreseeable future projects at the McGinness Hills Geothermal Development Project (Project). This Plan was developed to allow for future modifications; addressing changing conditions at the Project. This Plan will be implemented throughout the existing and future facilities disturbance footprint (Project Area) within the McGinness Hills Geothermal Lease Unit, and contains management strategies, provisions for annual monitoring, and treatment evaluations and methods.

### 1.1 Plan Purpose

The purpose of this Plan is to prescribe methods to prevent and control the spread of noxious and invasive non-native plant species during the construction, operation, and post-reclamation phases of the Project. Ormat and its contractors will be responsible for carrying out the methods described in this Plan.

### 1.2 Goals and Objectives

The goal of weed control is to implement early detection, containment, and control leading to eradication of noxious species and minimized establishment of invasive non-native plant species during Project construction, operation, and closure. Monitoring and maintenance during the construction, operation, and closure phases will include identification of any infestation areas within the Project Area (**Figure 1**).

An integrated management approach includes selecting and applying a combination of management techniques and treatments that will aid in controlling noxious and invasive non-native plant species efficiently and effectively, with minimal adverse impacts to non-target species. The objectives of this Plan include the following:

- Prevent the introduction, establishment, and spread of noxious and invasive non-native plant species;
- Reduce the extent and density/cover of established noxious and invasive non-native plant species;
- Protect and maintain desired plant communities from noxious and invasive non-native plant species;
- Implement economical, practical, and effective control methods for target noxious and invasive non-native plant species;
- Rehabilitate areas after weed treatment to reduce the susceptibility of re-invasion;





- Provide education to appropriate Project personnel about weed management and weed identification;
- Discuss methods to control noxious and invasive non-native plant species that may be discovered in the future (e.g., early detection, rapid response);
- Establish a monitoring protocol during exploration, construction, operation, and reclamation; and
- Provide contacts and resources for effective and coordinated weed management.

### 1.3 Authority

#### BLM Manual 9015 – Integrated Weed Management

The Bureau of Land Management (BLM) policy relating to the management and coordination of noxious weed activities is set forth in BLM Manual 9015 – Integrated Weed Management (BLM, 1992). BLM policy requires that all ground-disturbing projects and any projects that alter plant communities be assessed to determine the risk of introducing or spreading noxious weeds. If the risk is moderate or higher, a positive management program needs to be established. Risk is assessed based on the likelihood of a species to establish as a result of the action, which is based on the presence of noxious weeds in the general area of the project (i.e., within the watershed, or other regional area) and the effect of the action on the vegetation and soil in the area. If there are noxious weeds already present in the area, and if the action will create seedbed conditions conducive to these species, then the risk is considered high. Surface-disturbing activities that expose bare mineral soil or create mesic conditions (e.g., infiltration ponds) generally result in a high-risk rating.

#### Nevada Weed Action Committee

The Nevada Coordinated Noxious Weed Strategy (NWAC, 2000) states:

*"The Nevada Legislature has declared that it is the obligation and responsibility of the owners or occupiers of land in Nevada to control all weeds designated as noxious by the Nevada Department of Agriculture (NDA). This applies to private-landowners, cities, counties, ditch companies, railroads, federal and state agencies, etc. If the owner or occupier of land fails or neglects to control noxious weeds, enforcement action can be taken by the NDA.*

*The NDA can contact the owner or occupier and advise them of the actions they must take to address their noxious weed problem. If the owner-occupier fails to take action, the NDA is authorized to notify the county commissioners of the county in which the land is located. The county commissioners shall then perform the control actions required, paying for them out of county funds. The county can then bill the owner or occupier for the cost of performing the work."*

#### Noxious Weed Act of 1974, as amended (7 United States Code [U.S.C.] 2801 et seq.)

The Noxious Weed Act of 1974 requires cooperation between the Secretary of Agriculture with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to the eradication and control of noxious weeds.



Nevada Noxious Weed State Law (Nevada Revised Statute [NRS] 555.005, Nevada Administrative Code [NAC] 555.010)

The State of Nevada has enacted laws requiring control of noxious weeds due to the substantial economic losses caused by noxious weeds. The State of Nevada defines noxious weeds as:

*"Any species of plant which is, or is likely to be, detrimental or destructive and difficult to control or eradicate."*

When Nevada law defines a weed as "noxious," its distribution in commerce is prohibited and its control or management is mandated (NAC 555). State of Nevada noxious weed categories are defined as follows:

- Category A: Weeds not found or limited in distribution throughout the State; actively excluded from the State and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the State in all infestations.
- Category B: Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the State in areas where populations are not well established or previously unknown to occur.
- Category C: Weeds currently established and generally widespread in many counties of the State; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer.

Executive Order 13112: Invasive Species

Federal Executive Order 13112 defines an invasive species as an alien (non-native) species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The order directs all federal agencies to prevent and control introductions of invasive non-native species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts.



## 2.0 PROJECT DESCRIPTION

### 2.1 Project Location

The Project is located approximately 10 miles northeast of Austin, Nevada in the southern portion of Lander County, Nevada (**Figure 1**). The Project is accessed by traveling approximately four miles east on U.S. Highway 50 from Austin, Nevada, then approximately six miles northeast on Grass Valley Road to the Project facilities. The McGinness Hills Geothermal Lease Unit encompasses approximately 7,680 acres of public lands managed by the BLM and approximately 218 acres of private lands in Township 20 North, Range 45 East, Sections 9-16 and 21-24, Mount Diablo Baseline and Meridian.

### 2.2 Project Description

Ormat obtained federal geothermal leases in 2007 in the McGinness Hills area of Lander County, Nevada. These leases were obtained and lease stipulations applied. In 2008, the federal geothermal leases were unitized, creating the McGinness Hills Geothermal Unit (NVN-84268X).

In April 2009, Ormat received approval to construct, operate, and maintain the McGinness Hills Geothermal Exploration Project within the McGinness Hills Geothermal Unit. In July 2011, Ormat received approval to construct, operate, and maintain the McGinness Hills Geothermal Development Project (Phases I and II) within the McGinness Hills Geothermal Unit. Based on results from the development and exploration projects, including well drilling and testing activities, Ormat gained a better understanding of the geothermal resource, and determined that the resource could support an additional power plant and associated infrastructure (Phase III).

Ormat is currently authorized to construct facilities on approximately 270 acres. To date, facilities have been constructed on approximately 105 acres (approximately 90 acres BLM-administered land and approximately 15 acres private land). The addition of the proposed Phase III power plant and associated facilities would result in an acreage disturbance of approximately 42 acres (approximately 41 acres BLM-administered land and approximately one acre private land). The proposed Phase III disturbance would be recategorized from the previously authorized disturbance; therefore, the total disturbance acreage from the authorized Phase I and Phase II facilities and the proposed Phase III facilities would total approximately 146 acres, which is 124 acres less than the current authorized disturbance acreage.



## 3.1 WEED INVENTORY

Observations of noxious and invasive non-native plant species have been recorded in previous baseline reports and in National Environmental Policy Act documents for the Project, which include:

- McGinness Hills Geothermal Development Project – Baseline Report for Plants and Wildlife (GBE, 2010);
- McGinness Hills Geothermal Development Project Environmental Assessment (BLM, 2011);
- Biological Baseline Report for the McGinness Hills Phase III Project (Stantec, 2017); and
- Assessment for Noxious Weeds and/or Invasive Exotic Plants (**Appendix A**) (BLM, 2017a).

The BLM assessed the likelihood of noxious weeds and invasive exotic plants spreading into and around the Project Area using the effected intensity levels in **Table 1**. The BLM rated the Project as Minor (2) (BLM, 2017a); therefore, the Project has a minor likelihood of spreading noxious weeds and/or invasive exotic plants into and around the Project Area.

**Table 1** BLM Effect Intensity Levels

Level	Definition
<b>Negligible (1)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be so small it would not be measurable or perceptible.
<b>Minor (2)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be detectable, measurable, and perceptible but small, localized, and of little consequence. Adverse effects can be minimized or fully mitigated, and would be relatively simple to implement and would have a high probability of success.
<b>Moderate (3)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be readily apparent, measurable, large and of consequence, but localized. Adverse effects would require mitigation and restoration. Mitigation could be extensive, but most likely effective.
<b>Major (4)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be readily apparent and would substantially change the biological value of the native plant community in the context of the Project Area or region. Changes would be widespread, and could have permanent consequences for the resource. Restoration would be necessary to reduce or rectify adverse effects, and its success could not be guaranteed.

Source: BLM, 2017a

The BLM then rated the Project for its long-term consequences utilizing the Battle Mountain BLM's duration and context definitions (**Table 2**). The BLM rated the Project as Long-term and Localized effects within the Project Area (BLM, 2017a).



**Table 2 BLM Duration and Context Definitions**

Context	Definition
Short Term and Localized (1)	One year or less and Affecting the Project Area
Long Term and Localized (2)	Greater than one year and Affecting the Project Area
Short Term and Regional (3)	One year or less and Affecting an area beyond the Project Area
Long Term and Regional (4)	Greater than one year and Affecting an area beyond the Project Area

The BLM then multiplied the effect intensity level (2) and the duration and context effect (2) together to determine the risk rating, which was a 4. This places the Project in the moderate risk rating (BLM, 2017a). Therefore, the Project proceeded as planned and proper mitigation measures were implemented (Table 3).

**Table 3 BLM Risk Rating**

Rating	Measures
None (1)	Proceed as planned.
Low (2-3)	Proceed as planned, initiate control treatments on any noxious weed and/or invasive exotic plant that establishes in the area.
Moderate (4-6)	Develop preventative management measures for the proposed project to reduce the risk of introduction of spread of noxious/invasive weeds into the area. Preventative management measures should include modifying the project to include seeding the area to occupy disturbed sites with desirable species. Monitor the area for at least three consecutive years and provide for control of newly established populations of noxious/invasive weeds and follow-up treatment for previously treated infestations.
High (7-8)	Project must be modified to reduce risk level through preventative management measures, including seeding with desirable species to occupy disturbed site and controlling existing infestations of noxious/invasive weeds prior to project activity. Project must provide at least five consecutive years of monitoring. Projects must also provide for control of newly established populations of noxious/invasive weeds and follow-up treatment for previously treated infestations.

### 3.1 Noxious Weeds

The following noxious weed species have been observed within the Geothermal Lease Unit: perennial pepperweed (aka broadleaved pepperweed; *Lepidium latifolium*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), Russian knapweed (aka hardheads; *Acroptilon repens*), saltcedar (*Tamarix ramosissima*), and whitetop (aka hoary cress; *Cardaria draba*) (GBE, 2010; Stantec, 2017; BLM, 2017b). Locations of weeds identified during the 2010 and 2017 baseline surveys are displayed on Figure 2, along with the BLM weed locations (survey date is unknown). Vegetation and environmental conditions are similar throughout the Project Area; therefore, it is likely that the surrounding areas have the same weed species as were previously identified for the Project. Table 4 presents when each noxious weed was observed within the Project Area.

**Table 4 Noxious Weed Species Observed within or Near the Project Area**

Common Name	Scientific Name	Nevada Noxious Category	Unknown Date	2010	2017
Perennial pepperweed	<i>Lepidium latifolium</i>	C	X		
Canada thistle	<i>Cirsium arvense</i>	C	X		
Musk thistle	<i>Carduus nutans</i>	B			X
Russian knapweed	<i>Acroptilon repens</i>	B	X		
Saltcedar	<i>Tamarix ramosissima</i>	B			X
Whitetop	<i>Cardaria draba</i>	C	X	X	X

Sources: GBE, 2010; Stantec, 2017; and BLM, 2017b

Perennial pepperweed is a Category C noxious weed species, and a member of the mustard family (NDA, 2017). Three occurrences of perennial pepperweed have been reported by the BLM in the disturbed road shoulder along Grass Valley Road (BLM, 2017b); however, this species was not observed during the 2017 baseline survey (Stantec, 2017). The preferred method of treatment is chemical, which may be used in conjunction with additional treatment methods. NDA suggests the following chemical treatments:

- Application of metsulfuron or chlorsulfuron to actively growing plants through early-bloom;
- Application of imazapic from full-bloom until plants become necrotic; and
- Application of 2, 4-D and glyphosate from bud to flower, repeated for several years.

Canada thistle is a Category C noxious weed species, and a member of the sunflower family (NDA, 2017). Five occurrences of Canada thistle have been reported by the BLM in the disturbed road shoulder along Grass Valley Road (BLM, 2017b). The preferred method of treatment is chemical, which may be used in conjunction with additional treatment methods. NDA suggests the following mechanical and chemical treatments:

- Repeated mowing, tilling, or hand removing prior to seed production;
- Application of picloram, aminopyralid, or clopyralid to actively growing plants during flowering; or
- Repeated application of 2,4-D, dicamba, or glyphosate to actively growing plants.

Musk thistle is a Category B noxious weed species, and a member of the sunflower family (NDA, 2017). Two occurrences of musk thistle were observed during the 2017 biological baseline surveys (Stantec, 2017). One plant was observed on a disturbed road shoulder, and a scattered population of approximately 50 plants was observed within a wet meadow (Stantec, 2017). The preferred method of treatment is chemical, which may be used in conjunction with additional treatment methods. NDA suggests the following mechanical and chemical treatments:

- Mowing, tilling, or hand removal after bolting but prior to flowering;



- Removal of top two inches of plant crown by digging before seed production;
- Application of 2,4-D, dicamba, chlorsulfuron, metsulfuron or picloram to actively growing rosettes; or
- Application of aminopyralid or clopyralid between the rosette and late-bolt stages.

Russian knapweed is a Category B noxious weed species, and a member of the sunflower family (NDA, 2017). Three occurrences of Russian knapweed have been reported by the BLM in the disturbed road shoulder along Grass Valley Road (BLM, 2017b). The preferred method of treatment is chemical, which may be used in conjunction with additional treatment methods. NDA suggests the following chemical treatments:

- Application of glyphosate, chlorsulfuron, or clopyralid from the bud to flower stage;
- Application of aminopyralid or picloram from bud through dormancy; or
- Application of imazapic to dormant plants in the fall.

Saltcedar is a Category C noxious weed species, and a member of the tamarisk family (NDA, 2017). One saltcedar plant was observed within an ephemeral drainage in the Project Area (Stantec, 2017). The preferred method of treatment is chemical, which may be used in conjunction with additional treatment methods. NDA suggests the following mechanical and chemical treatments:

- Cutting, digging, or burning **must** be combined with a chemical application to be effective; and
- Application of imazapyr to actively growing foliage during flowering; or
- Application of glyphosate or imazapyr as a cut stump or basal bark treatment.

Whitetop is a Category C noxious weed species, and a member of the mustard family (NDA, 2017). Whitetop was the most abundant noxious weed within the Project Area with populations ranging from a few plants to patches up to 0.1-acre in 2010 (GBE, 2010), with approximately 500 plants observed in 2017 (Stantec, 2017). Whitetop occurrences have also been reported by BLM along Grass Valley Road (BLM, 2017b). Whitetop populations were primarily associated with disturbed ground near roads and existing pipeline (GBE, 2010; Stantec, 2017). The preferred method of treatment is chemical, which may be used in conjunction with additional treatment methods. NDA suggests the following mechanical and chemical treatments:

- Dig or pull individual plants for small infestations, but remaining roots can produce new plants;
- Frequent tillage or mowing for several years can reduce plant density;
- Application of 2,4-D to actively growing plants at bud stage; or
- Application of chlorsulfuron or metsulfuron from the bud to early bloom stage; or



- Application of imazapic from full bloom until necrosis.

### 3.2 Invasive Non-Native Plant Species

Cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola sp.*), and curvseed butterwort (aka bur buttercup) (*Ceratocephala testiculata*) are widespread throughout the entire Project Area (Stantec, 2017). These and other invasive non-native plant species observed in the Project Area are presented in **Table 5**. The preferred method of treatment for invasive non-native plant species is chemical, which may be used in conjunction with additional treatment methods.

**Table 5 Non-Native Invasive Plant Species Observed within the Project Area**

Common Name	Scientific Name	Unknown Date	2010	2017
Bull thistle	<i>Cirsium vulgare</i>		X	X
Cheatgrass	<i>Bromus tectorum</i>	X		X
Curly dock	<i>Rumex crispus</i>			X
Curvseed butterwort	<i>Ceratocephala testiculata</i>			X
Field bindweed	<i>Convolvulus arvensis</i>			X
Russian thistle	<i>Salsola sp.</i>			X
Tansymustard	<i>Descurainia sp.</i>			X



## 4.1 WEED MANAGEMENT

Noxious and invasive non-native plant species can be inadvertently transported by equipment, vehicles, people, and animals. Vegetation and soil disturbance during construction of the geothermal facilities and exploration related activities can also create suitable conditions for the establishment of noxious and invasive non-native plant species. Once noxious and invasive non-native plant species establish populations, these areas can become sources of seeds that facilitate further spread. The management and control of noxious and invasive non-native plant species requires an integrated approach with several components, including:

- Preventive measures;
- Treatment methods;
- Identification of the problem areas; and
- Monitoring.

### 4.1 Preventive Measures

Preventive measures include education, the use of Best Management Practices (BMPs), and the implementation of Environmental Protection Measures (EPMs) to control and prevent the spread of noxious and invasive non-native plant species through early detection and management, before they become a problem.

#### 4.1.1 Education

Awareness and education of Ormat personnel is important. Identification and eradication of the first noxious and invasive non-native plant species to establish in an area translates to major cost savings over treatment of large or multiple patches of weeds. The Environmental Health and Safety Coordinator (EH&S Coordinator) at the power plants should be trained in weed identification. Other Ormat staff will be informed about the species that have been identified in the area so that additional infestations can be reported to the EH&S Coordinator.

#### 4.1.2 Best Management Practices

BMPs are defined as methods or techniques found to be the most effective and practical in achieving an objective, such as preventing or minimizing noxious and invasive non-native plant species spread, while making optimal use of resources. BMPs that can be implemented for weed management are described below:

- **Schedule Activities to Minimize Potential for Introduction or Spread of Noxious and Non-Native Invasive Plant Species**

When possible, schedule land-disturbing activities to occur before noxious and invasive non-native plant species set seed, and avoid areas that have creeping rhizomic perennials. Soil



from areas that are known to contain noxious and invasive non-native plant species should not be used in stockpiles or for any reclamation activities.

- **Coordinate the Timing of Maintenance and Weed Control Activities when Feasible**

Proper timing of weed control activities is important to maximize the effectiveness of treatments. For example, delay blading roads until two weeks, or the necessary time for the herbicide to have an effect, after herbicide application and delay spraying herbicide until vegetative regrowth has occurred.

- **Control Existing Weed Infestations before Ground-Disturbing Activities Begin**

Control of existing noxious and invasive non-native plant species infestations should occur before ground-disturbance activities begin. Treat roads and staging areas before allowing equipment movement in the area. Before removing these weeds from drainage ditches, treat the entire infestation to ensure that no plant parts or seeds will spread to adjacent or downstream areas. In infested areas, avoid piling of plant materials on sides of trenches or roadways, instead stockpile noxious and invasive non-native plant species materials in one area that can be monitored and properly disposed of. Before scraping road shoulders, treat noxious and invasive non-native plant species with the appropriate control measure or herbicide to render plants non-viable. This will help prevent the plants from spreading to adjacent areas by water, wind, equipment, or vehicles.

- **Cleaning of Materials, Clothing, Footwear, and Gear**

Materials, clothing, footwear, and gear suspected of coming in contact with noxious or invasive non-native plant species should be cleaned prior to transport off-site to prevent the spread of noxious and invasive non-native plant species. Cleaning should occur prior to exiting the infested area and in an area located away from waterways, wetlands, and storm water or detention ponds.

- Clothing, Footwear, and Gear Cleaning

Clothing materials, such as brushed cotton, Velcro, and knits of fleece and wool, are especially prone to capturing seed and plant parts. Personnel equipment such as notebooks, Global Positioning System (GPS) units, and sampling tools should be cleaned with compressed air, or wire brushes before transport onto or off-site.

- **Designate Waste Disposal Areas and Implement Proper Disposal Techniques**

Proper disposal techniques are important to stop the spread of noxious and invasive non-native plant species that we attempt to control. If using on-site disposal, render noxious and invasive non-native plant species non-viable through chemical treatment described in **Section 4.2.3**. Do not dispose of viable noxious or invasive non-native plant material that has the ability to re-sprout or spread at a facility that produces mulch, spreadable sewage sludge, or chipped products. Do not dispose of soil, seeds, or plant material down a storm drain. This action may promote the spread of noxious and invasive non-native plant species downstream.



- **Use Only Weed-Free Materials**

Only certified weed-free materials such as straw bales, wattles, seed, mulch, gravel, and fill material will be used in the Project Area.

- **Establish Competing Vegetation**

Revegetate treated and disturbed areas as soon as possible in order to provide competition for noxious and invasive non-native plant species to reduce the likelihood that they will become established. Seeding with a BLM-approved, grass-only mixture is recommended in the event that follow-up treatment is anticipated. Many of the herbicides are selective to broad-leaved plants and any forbs or shrubs in the seed mix would be susceptible to the follow-up treatment, whereas most grasses are not susceptible.

- **Interim Seeding of Long-Term Disturbance**

Road berms, growth media stockpiles, and other sites that will have exposed soil for more than one growing season should be seeded with an interim seed mix. Aggressive species, such as Sandberg bluegrass (*Poa secunda*) and squirreltail (*Elymus elymoides*), are competitive with cheatgrass, an invasive annual species, and are generally suitable for an interim cover. These species may also be used in a permanent seed mix.

#### 4.1.3 Environmental Protection Measures

Ormat has committed to multiple EPMs at the Project that will minimize and prevent the spread of noxious and invasive non-native plant species. EPMs outlined in the *2017 McGinness Hills Geothermal Development Phase III Project Draft Environmental Assessment* (BLM, 2017c) include:

- Develop a Noxious Weed Management Plan for the entire Project Area for BLM review and approval prior to construction of Phase III. This plan would include noxious weed monitoring and management.
- Utilize weed-free gravel, weed-free straw, and weed-free hay.
- Equipment will be loaded and unloaded on existing roads or in already disturbed areas to minimize soil and vegetation disturbance.
- To prevent the spread of invasive, non-native species, all vehicles, heavy earth-moving construction equipment, mobile trailers, and recreational vehicle campers brought to and used on the Project site would go through high pressure washing of the entire vehicle/unit at a commercial wash station prior to arriving or being used on the Project site.
- On public lands managed by the BLM, revegetation would include site appropriate seed mixtures for various ecological site types encountered. All seed must be certified weed seed free and tested in a certified laboratory per BLM protocols. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious, invasive, and non-native seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) will be excluded. Seed mixtures will be subject to approval by the BLM.
- Following Project construction, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of plant and wildlife habitat.



## 4.2 Treatment and Control Methods

Several treatment methods are available for control and eradication of noxious and invasive non-native plant species infestations. The preferred method is chemical treatment; however, additional methods may be used in conjunction depending on the noxious or invasive non-native plant species. These methods include mechanical treatment, such as physically pulling the weeds (including the entire root), tilling or mowing; biological controls; and chemical methods. Treatments may involve two or more methods in order to be effective. Ormat will implement weed control measures that will be in accordance with existing regulations and jurisdictional land management agency or landowner agreements. Ormat will submit an annual report to the BLM, which will include all treatment forms, pesticide application records, daily treatment records, infestation records, and monitoring records. Locations of noxious and invasive non-native species will also be provided in GPS format or in a BLM-approved compatible method with the annual report, so species locations can be uploaded to the National Invasive Species Information Management System (NISIMS) and/or to another BLM database.

Ormat will coordinate with the BLM on all weed control chemical applications. A pesticide use proposal will be submitted to the BLM for approval prior to treatment and will be updated every three years, or when the products used changes, whichever occurs sooner. The pesticide application record will be completed for each day products are applied and will be submitted to the BLM following each application. These forms are both provided in **Appendix B**.

Ormat anticipates spot treatment for noxious weeds in areas of disturbance when areas are reseeded for stabilization and weed control, which includes all disturbance within the Project Area. Herbicide is typically applied for weed control in April through June, once weeds are identifiable to the species level, but before they bloom or go to seed. However, application timing will depend on the species present, the chemical selected and application recommendations.

Ormat will coordinate with the BLM on all biological weed control treatments. A list of BLM-approved biological control agents is provided in **Appendix C**. If biological control treatments are to be implemented, Ormat will provide a biological control agent release proposal (BCARP) and a biological control agent release record (BCARR) to the BLM for approval prior to treatment (**Appendix D**).

Ormat will complete daily treatment records for any treatments administered at the Project, as well as an infestation record for each noxious weed and invasive non-native species infestation at the Project (**Appendix E**).

### 4.2.1 Prioritization of Treatment Areas

Prioritizing the treatment of noxious and invasive non-native plant species helps to decide where to focus immediate and long-term attention. It is important to set realistic goals based on available resources. It is not expected to eliminate weed infestations after one year of treatment, even if the initial results are very effective. The sites will be monitored and inventoried each year following the initial inventory and subsequent treatments.



State-listed noxious weeds are the most aggressive and should be treated before treating invasive non-native plants species that have no regulatory status, unless treatment is occurring at the same time.

Areas that have a small density of plants should always be treated as soon as possible to prevent expansion of the infested area. As the plants establish deeper roots, produce more seed, and displace competing vegetation, the difficulty of control significantly increases, as does the risk of establishment in surrounding lands.

## 4.2.2 Cultural Control

Cultural controls refer to methods that encourage desirable plant growth. Planting appropriate species at optimum densities are methods that help desirable plants out-compete weeds. Common cultural methods include planting appropriate competitive native or non-native species, seeding rate and date of application, water and use of mulch, and tackifier to prevent seeds from being carried away by wind or birds.

Mycorrhizae is a fungus spore that creates a symbiotic association between the mycelium fungus and the root of a vascular plant. The mechanisms of increased transport of water, carbon, and nutrients has been reported to increase root growth and biomass, reduce water use and consumption, increase plant yield and invigorate soil ecology. Mycorrhizae is considered an inoculum when applying seed, and may be considered for use as an additive when seeding, particularly grass, on heavily disturbed or reclaimed sites.

Cultural controls are best used for large project sites that contain few desirable plants (e.g., pipeline, post-Project reclamation, etc.). Cultural controls are not recommended for natural areas because major disruption of established plant communities and where extensive soil disturbance can occur, rendering the area susceptible to noxious and invasive non-native plant species infestation. Prior to cultivating, it is often necessary to reduce the number of weed seeds in the soil before planting desirable plant species. Revegetation of disturbed or depleted areas with desirable plants can prevent or reduce future noxious and invasive non-native plant species infestation. Disturbed areas should be reseeded as soon as practicable and monitored for at least three growing seasons to determine success and any weed establishment.

Considerations and limitations of cultural controls include:

- Treatment cost;
- Cultivation may result in increased establishment of noxious and invasive non-native plant species if not adequately followed with aggressive weed control; and
- Promoting weed growth by adding unneeded nitrogen fertilizers. Native plant communities are often adapted to low-nitrogen conditions, while weed species are adapted to high-nitrogen conditions. Only apply nitrogen fertilizers if tests show that soil nitrogen levels are insufficient to support native communities.

### 4.2.3 Chemical Control

Chemical control is the preferred method for eradicating noxious and invasive non-native plant species. There are many kinds of chemical treatments available for noxious and invasive non-native plant species control, including growth regulators, grass meristem destroyers, cell membrane destroyers, root and shoot inhibitors, and amino acid derivatives, which interfere with plant metabolism in a variety of ways (McAdoo et al., 2005). The choice of what chemical treatment is best for a particular situation depends on the target weed species, the presence of desirable plant species, soil texture, depth and distance to water, and environmental conditions (e.g., wind and/or rain).

In 2007, the BLM prepared the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western United States Final Programmatic Environmental Impact Statement* (BLM, 2007). At the time, 20 different active ingredients were approved to be used as herbicides in fourteen states. The 2007 Environmental Impact Statement allowed the addition of four active ingredients to be used as herbicides; including, imazapic, diquat, diflufenzopyr, and fluridone. In 2016, the BLM again addressed vegetation treatments by preparing the *Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western United States* (BLM, 2016). The 2016 Environmental Impact Statement allowed for three additional active ingredients to be used as herbicides. A complete list of BLM-approved adjuvants and of BLM-approved herbicides has been provided in **Appendix F**.

In Nevada, state and federal laws require that only certified applicators apply or supervise the application of Restricted-Use Pesticides (NDA, 2017). The use of herbicides to control noxious weeds and non-native invasive plants are also regulated under NRS Chapter 555 - Control of Insects, Pests, and Noxious Weeds. Some herbicides may be designated as a restricted-use pesticide. Many of the recommended herbicides are species-specific. A restricted-use pesticide is defined as any pesticide, including any highly toxic pesticide, which:

- The Director has found and determined after a hearing, to be (a) injurious to persons, pollinating insects, bees, animals, crops or land, other than pests or vegetation it is intended to prevent, destroy, control or mitigate; or (b) detrimental to vegetation, except weeds, wildlife, or public health and safety; or
- Has been classified for restricted-use by or under the supervision of a certified applicator in accordance with the Federal Environmental Pesticide Control Act 7 U.S.C. § 136 et seq. (NRS 555.351). Restricted use herbicides are available only at licensed outlets or through reputable distributors, and require proof of certification status to purchase.

Chemical treatments are best used for:

- Pure stands of a single noxious and invasive non-native plant species where non-target plants are scarce or absent;
- Rhizomatous noxious and invasive non-native plant species that are unpalatable to livestock, require repeated pulling or cutting for control, or are located in remote areas where pulling or cutting are not feasible;



- Small patches of noxious and invasive non-native plant species where hand pulling or cutting is not effective or feasible; and
- Use in conjunction with other control methods. For example, Canada thistle can be controlled by repeated cutting during the growing season followed by treatment with clopyralid.

Considerations and limitations of chemical treatments include:

- The applicator must possess the proper equipment, certification, and knowledge to apply the chemicals safely and lawfully;
- The applicator must be extremely careful to not apply herbicides on desirable species that may be interspersed throughout the treatment area. This may be accomplished with the use of a backpack sprayer or by using a wick;
- The applicator must be careful to check weather conditions prior to spraying to prevent over-spray onto desirable plants. If there has been rain within 24 hours of treatment the herbicide function can be affected, so checking the label for specific instructions is necessary. Winds can cause drift spray that could adversely affect desired species or neighboring properties. Wind conditions of less than five miles per hour (mph) are considered good for spraying;
- Herbicides are dangerous and should be treated with extreme care. Personnel conducting the application of chemicals should wear appropriate personal protective equipment (PPE) listed on the container label or Safety Data Sheet and have adequate training. An applicator's license is required for chemical treatment.

#### 4.2.4 Mechanical Control

Mechanical control methods include activities such as hand pulling, tilling, mowing, and cutting. Using mechanical methods in combination with chemical methods has proven to be very effective.

##### Hand-Pulling

Pulling noxious and invasive non-native plant species by hand can normally be implemented without much risk of adverse environmental effects. Hand pulling is best used for:

- Small infestations of noxious and invasive non-native plant species that can be pulled all at one time;
- Annual and biennial plants (although seed banks will remain for some time);
- Shallow-rooted plant species that do not re-sprout from any residual roots or other plant parts;
- Plants growing on sandy or gravelly soils. If possible, focus pulling efforts when the soil is moist and soft (e.g., after a heavy, soaking rain);
- Situations where chemicals and motorized equipment cannot be used or are undesirable; and



- Reducing seed production and preventing seed banks from increasing.

Considerations and limitations of hand pulling include:

- Hand pulling generally does not remove the entire root system, even under the most favorable conditions. Thus, pulling is often ineffective for killing rhizomatous species, even if used in conjunction with other techniques;
- If hand-pulled plant material contains seeds, they should be removed from the site and burned or disposed of in a landfill. This material should not be composted; and
- Soil disturbance may stimulate germination of noxious and invasive non-native plant species seeds.

#### Mowing and Cutting

Mowing and cutting involves the use of mechanical or hand tools to sever the aboveground portion of a plant from its root system. Similar to hand pulling, mowing, and cutting are only suitable for certain situations. Mowing and cutting are best used for:

- Large, relatively flat, and dry areas that can be mowed with few safety or equipment concerns;
- Preventing tall, erect biennial noxious and invasive non-native plant species from setting seed when other control techniques are not feasible; and
- Weakening weed plants by depleting root and rhizome reserves through repeated mowing.

Considerations and limitations of mowing and cutting include:

- Sites that are inaccessible or too rocky cannot be mowed, although weed whips can be effective in such situations;
- Cut plant materials that contain seeds and other plant parts must be removed and disposed of; and
- Spreading noxious and invasive non-native plant species seeds from mowing equipment to areas previously free of infestation.

### **4.3 Identification of Problem Areas**

During the months of April through June, areas of weed infestation will be identified in the field by appropriate Ormat personnel or a qualified contractor/consultant. The areas of weed infestation(s) will be delineated on a map and in a Geographic Information System to be used by a contractor during implementation of weed management control measures. Along with the areas identified in the field, Ormat will control noxious and invasive non-native weeds in designated areas throughout the facilities on an annual basis with pre-emergent sterilant (e.g., Diuron or Imazapyr).





In addition, any areas observed to have invasive weeds observed during the previous year will be evaluated for treatment on an annual basis.

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## 5.0 MONITORING

Monitoring has three objectives: identification of new infestations, evaluation of the effectiveness of treatment programs, and routine spot inspections within the Project Area that are not disturbed.

### 5.1 Operational Monitoring

Qualified Ormat personnel, or a qualified consultant, will conduct annual monitoring, between April and June, of known noxious and invasive non-native plant species infestation areas, and conduct a pedestrian survey of disturbed areas to search for new noxious and/or invasive non-native plant species. Areas with noxious and/or invasive non-native plant species will be evaluated and the appropriate control method(s) applied, depending on the species detected. Ormat will continue to treat these infestation areas multiple times throughout the year and/or annually (depending on the species) on an ongoing basis or until noxious and invasive non-native plant species in the area are eradicated. Infestations treated previously or found after the species growing season would be monitored to determine if the treatment has been effective and to determine if the site(s) would need additional treatments, as necessary per species. Seeds of noxious and invasive non-native plant species can remain viable in the soil for years; therefore, treated areas should be monitored for a minimum of five years after the last individual has been eradicated to ensure new plants do not establish.

Ormat will also conduct annual inspections of disturbed areas to determine if new noxious and invasive non-native plant species infestations have occurred. The annual survey will extend into adjacent undisturbed areas in order to ensure that new populations of noxious and invasive non-native species occurring immediately adjacent to disturbed areas were not overlooked. This includes any new disturbance sites since the last inspection and all previously disturbed areas. In addition, incidental observations of any weed infestations made by Project or contract personnel since the last inspection would be included in the annual monitoring report.

Areas of observed infestations will be recorded in a NISIMS compatible manor or other BLM-approved method, and uploaded into the NISIMS database annually. This information provides a record of the noxious and invasive non-native plant species control that has been conducted and the effectiveness of the treatment program.

Routine inspections will be conducted every three to five years within the Project Area in areas that are not disturbed. Inspections will consist of a one hundred percent visual survey of the Project Area with emphasis on historic disturbance, animal travel routes, fence lines, abandoned roads, and waterways.

### 5.2 Reclamation Monitoring

Monitoring of reclaimed areas will be conducted annually, and an annual reclamation report will be submitted to the BLM Mount Lewis Field Office Authorized Officer by March 1 of each calendar year. The site preparation for reclamation seeding provides a suitable seedbed for noxious and



invasive non-native plant species and many of these species germinate and establish in the fall, as compared to most native species which germinate in the spring. Therefore, noxious and invasive non-native plant species can be present during the first growing season. Seed production by noxious and invasive non-native plant species during the first growing season poses a large risk to increases in the weed populations, as the desired species will require several years to fully establish on the site and provide competition against noxious weed establishment. Monitoring each spring following reclamation seeding is recommended and appropriate treatment should be conducted as needed. The control of noxious and invasive non-native plant species is required prior to bond release of reclaimed and closed facilities; therefore, monitoring reclaimed facilities is a necessary and cost-effective activity.

### 5.3 Post-Treatment Management

Post-treatment seeding is necessary to establish desirable species in the void left by eradicating or reducing the noxious and invasive non-native plant species population. Without seeding, the area becomes a suitable seedbed for other noxious and invasive non-native plant species. Revegetation would include site appropriate seed mixtures for various ecological site types encountered. All seed would be certified weed-seed free and tested in a certified laboratory per BLM protocols. Disturbed areas will be reseeded with a diverse mix of perennial native or introduced plant species. Noxious, invasive, and non-native seeds listed in the Nevada Designated Noxious Weed List (NAC 555.010) or prohibited by the Federal Seed Act (7 CFR Part 201) would be excluded. Seed mixtures would be subject to the approval of the BLM.

Due to the long-term viability of many noxious and invasive non-native plant species seeds, post-treatment management includes continued monitoring of the treated areas for a minimum of five years. This can be extended for species such as musk thistle where the seeds can remain viable for 10 or more years.



## 6.0 PLAN UPDATE

Ormat will conduct an annual review of the Plan, while coordinating annual weed control activities. If substantial changes have occurred to the Project, methods, or monitoring described in this document, an update will be developed by Ormat. Ormat will continue to keep records, including maps, of annual monitoring and weed control activities at the Project. These documents will also be provided to the BLM Battle Mountain District Office.

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## 7.1 HERBICIDE APPLICATION, HANDLING, SPILLS, AND CLEANUP

### 7.1 Herbicide Application, Handling, Spills, and Cleanup

Ormat has an Emergency Action Plan (EAP) to address the potential release of fluids from Project facilities. This plan includes information regarding the application, handling, and spill and cleanup procedures that would be applicable to herbicides used for noxious and invasive non-native plant species eradication. The EAP contains information regarding chemical release procedures for the control and cleanup of leaks or spills. Continued operation in accordance with this plan would assist in keeping spills localized and contained to allow for efficient cleanup. Ormat has the necessary spill containment and cleanup equipment and trained personnel available at the site to quickly respond to minor releases.

### 7.2 Herbicide Application and Handling

Before application, Ormat or its contractor will obtain any required permits from local authorities. Permits may contain additional terms and conditions that go beyond the scope of this Plan. A licensed contractor will perform the application in accordance with applicable laws and regulations and permit stipulations.

All herbicide applications must be applied in compliance with the United States Environmental Protection Agency label instructions. All herbicide applications will be recorded daily on a pesticide application record (**Appendix B**), and the application area will be recorded with a GPS in a NISIMS compatible manner or in another BLM-approved method. Only BLM-approved herbicides and adjuvants will be applied (**Appendix F**). Application of herbicides will be suspended when any of the following conditions exist:

- Wind velocity exceeds 6 mph during application of liquids or 15 mph during application of granular herbicides;
- Snow or ice covers the foliage of noxious weeds; or
- Precipitation is occurring or is imminent.

Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Hand application methods (e.g., backpack spraying, hose and wand spraying) that target individual plants will be used to treat small or scattered noxious and invasive non-native plant species populations in rough terrain. Calibration checks of equipment will be conducted at the beginning of spraying and periodically to ensure that proper application rates are achieved.

Herbicides will be transported to the Project site as needed with the following provisions:



- Only the quantity needed for that day's work will be transported;
- Concentrate will be transported in approved secondary containers in a manner that will prevent tipping or spilling, and be stored in a location that is isolated from the vehicle's driving compartment, food, clothing, and safety equipment;
- Mixing will be done off-site, over a drip catching device and at a distance greater than 200 feet from open or flowing water, wetlands, or other sensitive resources. No herbicides will be applied at these areas unless authorized by appropriate regulatory agencies; and
- All herbicide equipment and containers (primary and secondary) will be inspected for leaks. Disposal of spent containers will be in accordance with the herbicide label.

### 7.3 Herbicide Spills and Cleanup

All reasonable precautions will be taken to avoid herbicide spills. In the event of a spill, cleanup will be immediate. Spill cleanup items will be readily accessible and include:

- PPE, including clothing and gloves recommended on the product label or Safety Data Sheet;
- Absorptive clay (also known as kitty litter) or other commercial adsorbent; and
- Plastic bags and bucket, shovel, fiber brush, dust pan, caution tape, highway flares (use on established roads only), and detergent.

Response to an herbicide spill will vary with the size and location of the spill, but general procedures include:

- BLM and Nevada Division of Environmental Protection notification;
- Traffic control (roadside cleanup);
- Containing the spilled material;
- Cleaning up and removing the spilled herbicide and contaminated adsorptive material and soil; and
- Transporting the spilled herbicide and contaminated material to an authorized disposal site.

### 7.4 Worker Safety and Spill Reporting

All herbicide contractors will be state licensed to apply herbicides (and certified if restricted use herbicides are used) and obtain and have readily available copies of the appropriate Safety Data Sheets for the herbicides used. All herbicide spills will be reported in accordance with applicable laws and requirements.



## 8.1 REFERENCES

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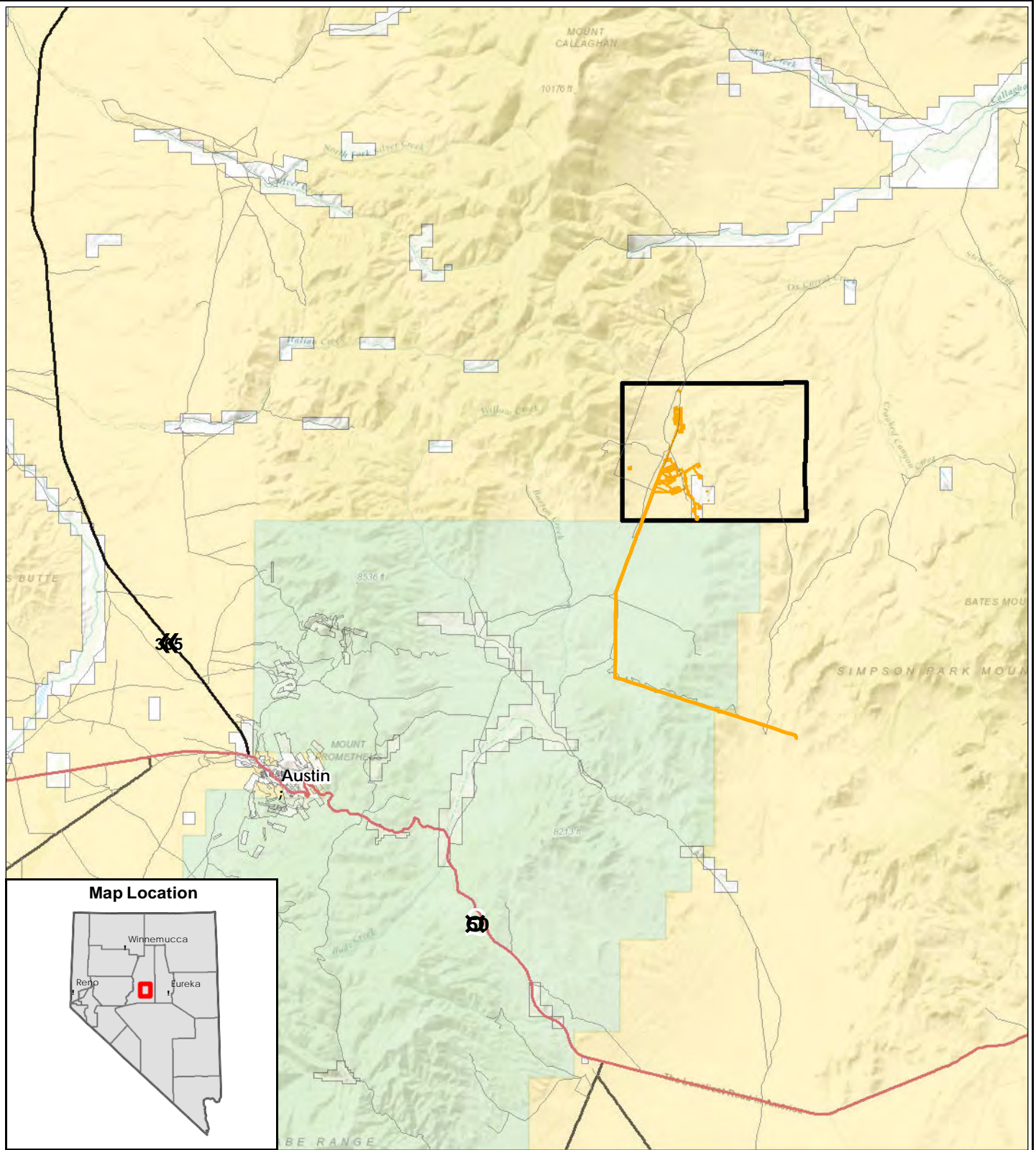


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## FIGURES

Revised: 2017.11.21 By: chjohnson

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 <b>Land Status</b> Bureau of Land Management Forest Service Private			<b>Ormat Nevada, Inc.</b> <b>McGinness Hills Geothermal Development Project</b> <b>Integrated Weed Management Plan</b>
	0 3 Miles 1 in = 3 miles		
	T20N, R45E Lander County, NV NAD 1983 UTM Zone 11N		
	DRAWN BY: CJ 1ST REVIEW: JT 2ND REVIEW: EF		
	DATE: 11/21/2017		PROJECT NO: 203720325

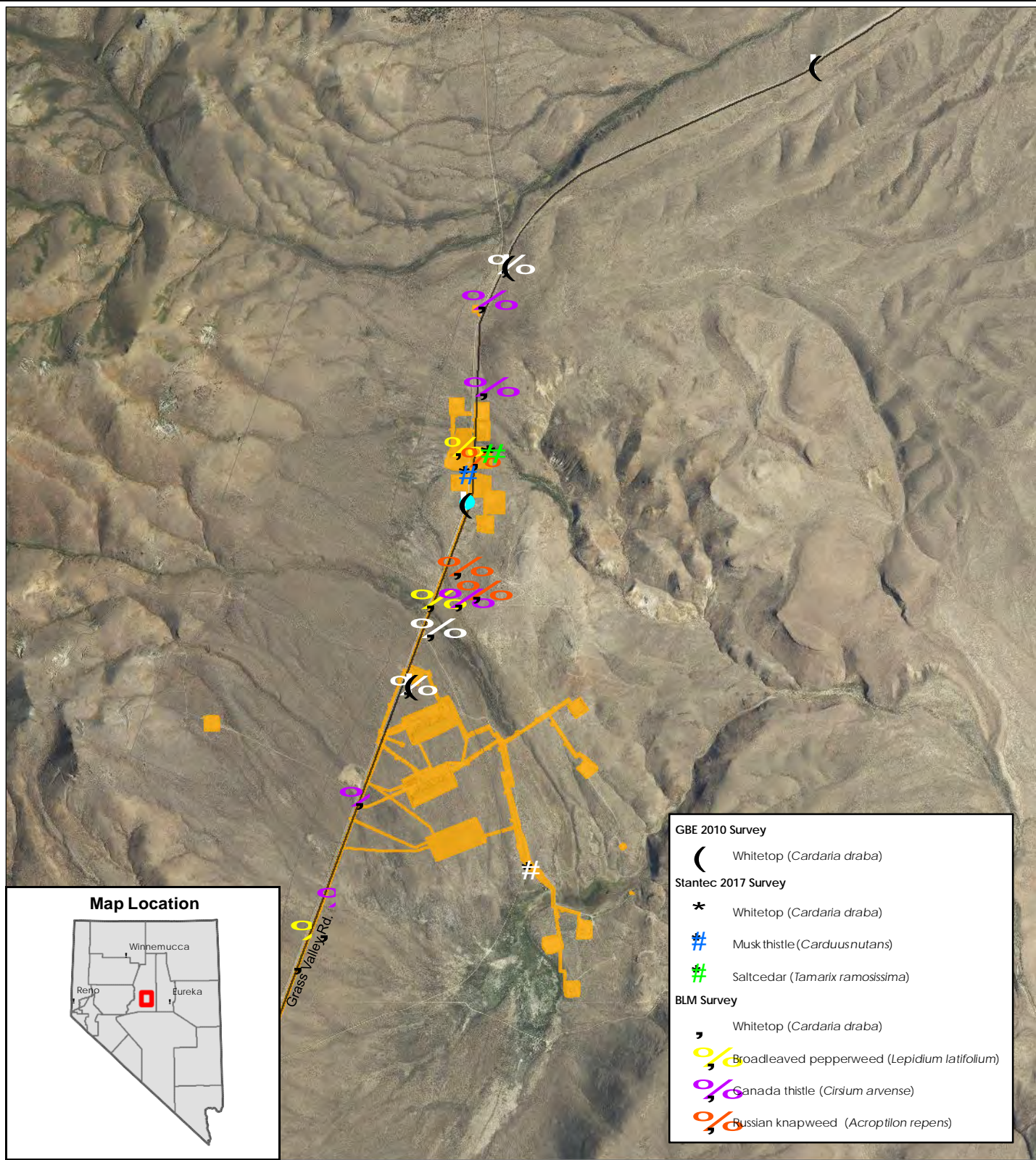
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Reviewed: 2017.11.21 By: chjohnson

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Project Area

Stantec

0 3,000 Feet 1 in = 3,000 feet

T20N, R45E Lander County, NV  
NAD 1983 UTM Zone 11N

DRAWN BY: CJ	1ST REVIEW: JT	2ND REVIEW: EF
DATE: 11/21/2017		PROJECT NO: 203720325

Ormat Nevada, Inc.  
McGinness Hills Geothermal  
Development Project  
Integrated Weed Management Plan

**Figure 2  
Noxious Weed Locations**

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Service Layer Credits: 2015 National Agriculture Imagery Program (NAIP)

## APPENDIX A

# BLM Assessment for Noxious Weeds and/or Invasive Exotic Plants

# **ASSESSMENT FOR NOXIOUS WEEDS AND/OR INVASIVE EXOTIC PLANTS**

McGinness Phase III  
Lander County, Nevada

In October 2017 a Noxious Weeds and/or Invasive Exotic Plants Assessment was completed for the McGinness Hills Ormat project. The Project entails building/expanding on an existing claim. Nevada, Inc. (Ormat) obtained federal geothermal leases in 2007 in the McGinness Hills area of Lander County, Nevada. These leases were obtained and lease stipulations applied. In 2008, the federal geothermal leases were unitized, creating the McGinness Hills Geothermal Unit. This Unit encompasses approximately 7,680 acres of public lands managed by the Bureau of Land Management (BLM) and private lands in Township 20 North (T20N), Range 45 East (R45E), Sections 9-16 and 21-24, Mount Diablo Baseline and Meridian. In April 2009, Ormat received approval to construct, operate, and maintain the McGinness Hills Geothermal Exploration Project within the area. Then in July 2011, Ormat received approval to construct, operate, and maintain the McGinness Hills Geothermal Development. Based on results from the development and exploration projects, including well drilling and testing activities, Ormat has gained a better understanding of the geothermal resource, and determined that the resource can support an additional power plant. As part of this proposed Project, Ormat is proposing to add a Phase III power plant and associated facilities (Project) located on land managed by the BLM Battle Mountain District Office, Mount Lewis Field Office (MLFO). To maximize resource potential, Ormat is proposing a new power plant; five new production wells (which would utilize one previously permitted location expanding one previously built pad, and three new locations that would replace three previously approved well sites); an associated 3,680 feet (0.7 miles) of production pipeline; 3,100 feet of access roads (0.6 miles); and a new power generation tie-in consisting of 1,850 feet (0.3 miles) of transmission line tie-in; and two to three monopoles (similar to what was constructed for the previous two phases to connect the facility to the existing transmission line).

The BLM defines Noxious Weeds as “being designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or diseases; or non-native, new, or not common to the United States.” In addition to Noxious Weeds, the invasive exotic plants also have the potential to alter the site. The BLM identifies exotic species as “species introduced to an area that may have adapted the area and compete with resident native (indigenous) species”. Invasive plants are defined as “plants that 1) are not part of (if exotic), or area a minor component of (if native), the original plant community or communities; 2) have the potential to become a dominate or co-dominate species on the site if their future establishment and growth is not actively controlled by management interventions; or 3) are classified as exotic or noxious plants under state or federal law”. (BLM, 2007)

The Bureau of Land Management (BLM) consulted its inventory data that is stored in the NISIMS (National Invasive Species Information Management System) and based on that data there are six known Invasive Exotic, and/or Noxious Weeds in the area

Common Name	Scientific Name	Code	Type of Weed
Russian Knapweed	<i>Acroptilon repens</i>	ACRE3	Noxious
Cheat Grass	<i>Bromus tectorum</i>	BRTE	Invasive Exotic
Hoary Cress	<i>Cardaria draba</i>	CADR	Noxious

Canada Thistle	<i>Cirsium arvense</i>	CIAR4	Noxious
Bull Thistle	<i>Cirsium vulgare</i>	CIVU	Invasive Exotic
Tall Whitetop	<i>Lepidium latifolium</i>	LELA2	Noxious

Additionally along the access road leading into the site there area there are known infestations of two additional plants.

Common Name	Scientific Name	Code	Type of Weed
Curly Dock	<i>Rumex crispus</i>	RUCR	Invasive Exotic
Musk Thistle	<i>Carduus nutans</i>	CANU4	Noxious

When Stantec did their 2017 inventory, they found four additional plants in the area.

Common Name	Scientific Name	Code	Type of Weed
Salt Cedar	<i>Tamarix ramosissima</i>	TARA	Noxious
Field Bindweed	<i>Convolvulus arvensis</i>	COAR4	Invasive Exotic
Tansy Mustard	<i>Descuainia Sophia</i>	DESO2	Invasive Exotic
Russian Thistle	<i>Salsola spp</i>	SALSO	Invasive Exotic

For assessing the likelihood of Noxious Weeds and/or Invasive Exotic Plants spreading into and around the project area, the Battle Mountain Bureau of Land Management's effected intensity levels are assigned a number (see below chart for levels and definitions). For this project the likelihood is rated as a 2 and as being minor.

Level	Definition
<b>Negligible (1)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be so small it would not be measurable or perceptible.
<b>Minor (2)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be detectable, measurable, and perceptible but small, localized, and of little consequence. Adverse effects can be minimized or fully mitigated, and would be relatively simple to implement and would have a high probability of success.
<b>Moderate (3)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be readily apparent, measurable, large and of consequence, but localized. Adverse effects would require mitigation and restoration. Mitigation could be extensive, but most likely effective.
<b>Major (4)</b>	Effects on noxious weeds and invasive and non-native species, beneficial or adverse, would be readily apparent and would substantially change the biological value of the native plant community in the context of the Project Area or region. Changes would be widespread, and could have permanent consequences for the resource. Restoration would be necessary to reduce or rectify adverse effects, and its success could not be guaranteed.

The project is then rated for its long-term consequences utilizing the Battle Mountain Bureau of Land Management's duration and context definitions (see below chart). For this project, the consequence is rated as a 2 or localized and long term.

Context	Definition
<b>Short Term and Localized (1)</b>	One year or less and Affecting the Project Area
<b>Long Term and Localized (2)</b>	Greater than one year and Affecting the Project Area
<b>Short Term and Regional (3)</b>	One year or less and Affecting an area beyond the Project Area

<b>Long Term and Regional (4)</b>	Greater than one year and Affecting an area beyond the Project Area
-----------------------------------	---

The two number are then multiplied together and the risk rating is obtained for this project the risk rating is a 4 which places it in the moderate risk rating. This means that the project can proceed as planned as long as mitigation measures are implemented.

<b>Rating</b>	<b>Measures</b>
<b>None (1)</b>	Proceed as planned
<b>Low (2-3)</b>	Proceed as planned, initiate control treatments on any Noxious Weed and/or Invasive Exotic Plant that establishes in the area
<b>Moderate (4-6)</b>	Develop preventative management measures for the proposed project to reduce the risk of introduction of spread of noxious/invasive weeds into the area. Preventative management measures should include modifying the project to include seeding the area to occupy disturbed sites with desirable species. Monitor the area for at least 3 consecutive years and provide for control of newly established populations of noxious/invasive weeds and follow-up treatment for previously treated infestations.
<b>High (7-8)</b>	Project must be modified to reduce risk level through preventative management measures, including seeding with desirable species to occupy disturbed site and controlling existing infestations of noxious/invasive weeds prior to project activity. Project must provide at least 5 consecutive years of monitoring. Projects must also provide for control of newly established populations of noxious/invasive weeds and follow-up treatment for previously treated infestations.

- Prior to project approval a site-specific weed survey will occur. Monitoring will be conducted for a period no shorter than the life of the permit or until bond is release and monitoring reports will be provided to the Battle Mountain District Office. If the presence and/or spread of noxious weeds is noted, appropriated weed control procedures will be determined in consultation with Battle Mountain District Office personnel and will comply with the appropriate BLM Handbook sections and applicable laws and regulations. All weed control efforts on BLM-administered lands will comply with BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management. Submission of Pesticide Use Proposals (PUPs), Pesticide Application Records (PARs), Biological Control Agent Release Proposals (BCARPs), Biological Control Release Records (BCARs), Manual Control Records, National Invasive Management Inventory System (NISIMS) compatible data and any other BLM required form and data system is required.
- Continue to use integrated weed management to treat weed infestations and use principles of integrated pest management to meet management objectives and to reestablish resistant and resilient native vegetation communities.
- Develop weed management plans that address weed vectors, minimize the movement of weeds within public lands, consider disturbance regimes, and address existing weed infestations.
- All Herbicides and Adjuvants (including dyes and surfactants) utilized on BLM land must be approved for use by the District and be on the BLM's Approved Adjuvant and Approved Herbicide lists.
- Conduct mixing of herbicides and rinsing of herbicide containers and spray equipment only in areas that are a safe distance from environmentally sensitive areas and points of entry to bodies of water (storm drains, irrigation ditches, streams, lakes, or wells).
- Consider nozzle type, nozzle size, boom pressure, and adjuvant use and take appropriate measures for each herbicide application project to reduce the chance of chemical drift.
- Store all pesticides in areas where access can be controlled to prevent unauthorized/untrained people from gaining access to chemicals.

- Areas treated with pesticides will be adequately posted to notify the public of the activity and of safe re-entry dates, if a public notification requirement is specified on the label of the product applied. The public notice signs will be at least 8 ½" x 11" in size and will contain the date of application and the date of safe re-entry.
- Whenever possible, hand spraying of herbicides is preferred over other application
- When manual weed control is conducted, remove the cut weeds and weed parts and dispose of them in a manner designed to kill seeds and weed parts.
- All straw, hay, straw/hay, or other organic products used for reclamation or stabilization activities, must be certified that all materials are free of plant species listed on the Nevada Noxious Weed List.
- Where appropriate, inspect source sites such as borrow pits, fill sources, or gravel pits used to supply inorganic materials used for construction, maintenance, or reclamation to ensure they are free of plant species listed on the Nevada Noxious Weed List. Inspections will be conducted by a weed scientist or qualified biologist.
- Where appropriate, vehicles and heavy equipment used for the completion, maintenance, inspection, or monitoring of ground disturbing activities; for emergency fire suppression; or for authorized off-road driving will be free of soil and debris capable of transporting weed propagules. Vehicles and equipment will be cleaned with power or high pressure equipment prior to entering and leaving the work site or project area.
- To minimize the transport of soil-borne noxious weed seeds, roots, or rhizomes, infested soils or materials will not be moved and redistributed on weed-free or relatively weed-free areas. In areas where infestations are identified or noted and infested soils, rock, or overburden must be moved, these materials will be salvaged and stockpiled adjacent to the area from which they were stripped. Appropriate measures will be taken to minimize wind and water erosion of these stockpiles. During reclamation, the materials will be returned to the area from which they were stripped.
- Determine seed mixes on a site-specific basis dependent on the probability of successful establishment. Generally, conduct reclamation with native seeds that are representative of the indigenous species present in the adjacent habitat. Ensure seed mixes are approved by the BLM Authorized Officer.
- Removal and disturbance of vegetation would be kept to a minimum through construction site management (e.g. using previously disturbed areas and existing easements, limiting equipment/materials storage and staging area sites, etc.)
- When maintaining unpaved roads on BLM-administered lands, avoid the unnecessary disturbance of adjacent native vegetation and spread of weeds. Grade roads shoulders or barrow ditches only when necessary to provide for adequate drainage. Minimize the width of grading operations, and do them at times to maximize the manual removal of all annual and biannual Noxious Weeds and/or Invasive Exotic Plants, and strive to avoid grading in areas that are infested with creeping perennials.
- No noxious weeds will be allowed on the site at the time of reclamation release. Any noxious weeds that become established will be controlled.
- Prior to entering public lands, the contractor, operator, or permit holder will provide information and training regarding noxious weed management and identification to all personnel who will be affiliated with the implementation of the project. The importance of preventing the spread of weeds to un-infested areas and importance of controlling existing populations of weeds will be explained.



## APPENDIX B

### BLM Pesticide Use Coordination Forms

## Bureau of land Management Pesticide Application Record

1.
  - a. Project Name: \_\_\_\_\_
  - b. Operator: \_\_\_\_\_
  - c. Pesticide Use Proposal Number: \_\_\_\_\_
  - d. Reference Number: \_\_\_\_\_
2. Name of Employee(s) Applying the Pesticide:  
\_\_\_\_\_  
\_\_\_\_\_
3. Date(s) of Application: \_\_\_\_\_
4. Time Frame of Application: \_\_\_\_\_
5. Location of Application: T. \_\_\_\_\_ R. \_\_\_\_\_ Sec. \_\_\_\_\_  
County: \_\_\_\_\_
6. Type of Equipment used: \_\_\_\_\_
7. Pesticide(s) Used:
  - a. Company or Manufacturer's Name: \_\_\_\_\_
  - b. Trade Name: \_\_\_\_\_
  - c. Type of Formulation: liquid [ ☐ ] Granular [ ☐ ]
8. Rate of Application:
  - a. Active Ingredient per Acre: \_\_\_\_\_
  - b. Volume of Formulation per Acre: \_\_\_\_\_
  - c. Total Herbicide Used: \_\_\_\_\_
9. Area Treated:
  - a. Actual Area Treated: \_\_\_\_\_
  - b. Total Project Area: \_\_\_\_\_
  - c. Total Gallons Used: \_\_\_\_\_
10. Primary Pests Involved: \_\_\_\_\_
11. Stage of Pest Development: \_\_\_\_\_
12. Site Treated: [ ☐ ] Native Vegetation [ ☐ ] Seeded Vegetation [ ☐ ] Other \_\_\_\_\_
13. Weather Conditions:
  - a. Wind Direction: \_\_\_\_\_
  - b. Wind Velocity: \_\_\_\_\_
  - c. Temperature: \_\_\_\_\_
14. Monitoring Record (if insufficient space continue on back): \_\_\_\_\_

This record is required and must be completed for monitoring within 24 hours after completion of application of pesticides. This record must be maintained for a minimum of 10 years.

**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**BUREAU OF LAND MANAGEMENT**  
**PESTICIDE USE PROPOSAL**

STATE: \_\_\_\_\_  
COUNTY: \_\_\_\_\_  
DISTRICT: \_\_\_\_\_  
DURATION OF PROPOSAL: \_\_\_\_\_  
LOCATION: \_\_\_\_\_

DATE: \_\_\_\_\_  
PROPOSAL NUMBER: \_\_\_\_\_  
EA REFERENCE NUMBER: \_\_\_\_\_  
DECISION RECORD (DR) NUMBER: \_\_\_\_\_

ORIGINATOR – NAME: \_\_\_\_\_  
ORIGINATOR – COMPANY: \_\_\_\_\_  
ORIGINATOR – CONTACT INFORMATION: \_\_\_\_\_  
PROPOSAL PREPARER - NAME: \_\_\_\_\_  
PROPOSAL PREPARER – COMPANY: \_\_\_\_\_  
PROPOSAL PREPARER – CONTACT INFORMATION: \_\_\_\_\_

-----

**I. APPLICATION INFORMATION** – Including mixtures and adjuvants):

1. TRADE NAME(S): \_\_\_\_\_
2. COMMON NAME(S) \_\_\_\_\_
3. EPA REGISTRATION NUMBER(S): \_\_\_\_\_
4. MANUFACTURER(S): \_\_\_\_\_
5. METHOD OF APPLICATION: \_\_\_\_\_
6. MAXIMUM RATE OF APPLICATION – AS STATED IN THE EIS:
  - a. Pounds Active Ingredient or Acid Equivalent: \_\_\_\_\_
7. MAXIMUM RATE OF APPLICATION – AS STATED ON THE LABEL:
  - a. Formulated Product: \_\_\_\_\_
  - b. Pounds Active Ingredient or Acid Equivalent: \_\_\_\_\_
8. INTENDED RATE OF APPLICATION:
  - a. Formulated Product: \_\_\_\_\_
  - b. Pounds Active Ingredient or Acid Equivalent: \_\_\_\_\_
9. APPLICATION DATE(S): \_\_\_\_\_
10. NUMBER OF APPLICATIONS: \_\_\_\_\_

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[illegible]

1. ESTIMATED NUMBER OF ACRES: \_\_\_\_\_
2. GENERAL DESCRIPTION (Describe land type or use, size, stage of growth of target species, soil characteristics, and any additional information that may be important in describing the area to be treated.)

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



**VI. NON-TARGET VEGETATION** (Describe potential immediate and cumulative impacts to non-target pests in project area as a result of the pesticide application. Identify any planned mitigation measures that will be employed – BE GENERAL, SPECIFICS DISCUSSED IN THE EA):

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**VII. INTEGRATED PEST MANAGEMENT PRACTICES CONSIDERED IN THE OVERALL PROJECT :**

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**VIII. SIGNATURES:**

1. Pesticide Use Proposal's Originator: \_\_\_\_\_ Date: \_\_\_\_\_
  - a. Company: \_\_\_\_\_
2. Certified Pesticide Applicator: \_\_\_\_\_ Date: \_\_\_\_\_
  - a. License Number: \_\_\_\_\_
  - b. Certifying Organization: \_\_\_\_\_
3. Field Office Pesticide/Noxious Weed Coordinator: \_\_\_\_\_ Date: \_\_\_\_\_
4. Field Office Manager: \_\_\_\_\_ Date: \_\_\_\_\_
5. BLM State Pesticide Coordinator: \_\_\_\_\_ Date: \_\_\_\_\_
6. Deputy State Director: \_\_\_\_\_ Date: \_\_\_\_\_
  - ☐ Concur or Approved
  - ☐ Not Concur or Disapproved
  - ☐ Concur or Approved With Modifications
  - ☐ Any changes (modifications) to this proposal by the State Pesticide Coordinator will be listed in an attached memo to the manager requesting approval from the Deputy State Director.

## APPENDIX C

### BLM-Approved Biological Control Agents

Biological Control Agents Available for Use on BLM Administered Lands		
		February 22, 2016
Target Weed Species	Biocontrol Agent Species Name	Biocontrol Agent Common Name
Alligatorweed	<i>Agasicles hygrophila</i>	Alligatorweed flea beetle
	<i>Amynothrips andersoni</i>	Alligatorweed thrips
	<i>Arcola malloi</i>	Alligatorweed stem boring moth
Arundo donax	<i>Rhizaspidiotus donacis</i>	Arundo scale
	<i>Tetramesa romana</i>	Arundo wasp
Bachelors Button	<i>Chaetorellia australis</i>	Bachelors button peacock fly
Broom	<i>Bruchidius villosus</i>	Broom seed beetle
Canada Thistle	<i>Hadroplontus (Ceutorhynchus) litura</i>	Canada thistle stem weevil
	<i>Urophora cardui</i>	Canada thistle gall fly
Dalmation Toadflax	<i>Brachypterolus pulicarius</i>	Toadflax flower-feeding beetle
	<i>Calophasia lunula</i>	Toadflax moth
	<i>Eteobalea intermediella</i>	Toadflax root boring moth
	<i>Eteobalea serratella</i>	Toadflax root boring moth
	<i>Mecinus janthiniformis</i>	Dalmatian toadflax stem weevil
	<i>Rhinusa (Gymnetron) antirrhini</i>	Toadflax seed capsule weevil
	<i>Rhinusa (Gymnetron) linariae</i>	Toadflax root galling weevil
Diffuse knapweed	<i>Agapeta zoegana</i>	Knapweed root boring moth
	<i>Bangasternus fausti</i>	Knapweed seed head weevil
	<i>Chaetorellia acrolophi</i>	Knapweed seed head fly
	<i>Cyphocleonus achates</i>	Knapweed root boring weevil
	<i>Larinus minutus</i>	Knapweedseed head weevil
	<i>Larinus obtusus</i>	Knapweed seed head weevil
	<i>Metzneria paucipunctella</i>	Knapweed seed head moth
	<i>Pelochrista medullana</i>	Knapweed root boring moth
	<i>Pterolonche inspersa</i>	Knapweed root boring moth
	<i>Sphenoptera jugoslavica</i>	Knapweed root boring beetle
	<i>Terellia virens</i>	Knapweed seed head fly
	<i>Urophora affinis</i>	Knapweed seed head gall fly
	<i>Urophora quadrifasciata</i>	Knapweed seed head gall fly
Field bindweed	<i>Aceria malherbae</i>	Bindweed gall mite
	<i>Tyta luctuosa</i>	Bindweed defoliating moth
Giant salvinia	<i>Cyrtobagous salviniae</i>	Salvinia bud weevil



Target Weed Species	Biocontrol Agent Species Name	Biocontrol Agent Common Name
Gorse	<i>Exapion ulicis</i>	Gorse seed weevil
	<i>Tetranychus lintearius</i>	Gorse spider mite
Hydrilla	<i>Bagous affinis</i>	Indian hydrilla tuber weevil
	<i>Bagous hydrillae</i>	Australian hydrilla stem boring weevil
	<i>Hydrellia balciunasi</i>	Australian hydrilla leaf mining fly
	<i>Hydrellia pakistanae</i>	Indian hydrilla leaf mining fly
Leafy Spurge	<i>Aphthona abdominalis</i>	Minute spurge flea beetle
	<i>Aphthona cyparissiae</i>	Brown dot spurge flea beetle
	<i>Aphthona czwalinae</i>	Black spurge flea beetle
	<i>Aphthona flava</i>	Copper spurge flea beetle
	<i>Aphthona lacertosa</i>	Brown-legged spurge flea beetle
	<i>Aphthona nigriscutis</i>	Black dot spurge flea beetle
	<i>Aphthona spp.</i>	Spurge root/defoliating beetle
	<i>Chamaesphecia crassicornis</i>	Spurge clearwing moth
	<i>Chamaesphecia hungarica</i>	Spurge clearwing moth
	<i>Dasineura capsulae</i>	Spurge gall midge
	<i>Hyles euphorbiae</i>	Spurge hawk moth
	<i>Oberea erythrocephala</i>	Red-headed spurge stem borer
	<i>Spurgia esulae</i>	Spurge tip gall midge
Meadow knapweed	<i>Agapeta zoegana</i>	Knapweed root boring moth
	<i>Bangasternus fausti</i>	Knapweed seed head weevil
	<i>Chaetorellia acrolophi</i>	Knapweed seed head fly
	<i>Cyphocleonus achates</i>	Knapweed root boring weevil
	<i>Larinus minutus</i>	Knapweedseed head weevil
	<i>Larinus obtusus</i>	Knapweed seed head weevil
	<i>Metzneria paucipunctella</i>	Knapweed seed head moth
	<i>Pelochrista medullana</i>	Knapweed root boring moth
	<i>Pterolonche inspersa</i>	Knapweed root boring moth
	<i>Sphenoptera jugoslavica</i>	Knapweed root boring beetle
	<i>Terellia virens</i>	Knapweed seed head fly
	<i>Urophora affinis</i>	Knapweed seed head gall fly
	<i>Urophora quadrifasciata</i>	Knapweed seed head gall fly
Mediterranean Sage	<i>Phrydiuchus tau</i>	Mediterranean sage root weevil
Melaleuca	<i>Boreioglycopsis melaleucae</i>	Melaleuca psyllid
	<i>Oxyops vitiosa</i>	Melaleuca snout weevil
Musk Thistle	<i>Urophora solstitialis</i>	Musk thistle seed head fly

Target Weed Species	Biocontrol Agent Species Name	Biocontrol Agent Common Name
Puncturevine	<i>Microlarinus lareynii</i>	Puncturevine seed weevil
	<i>Microlarinus lypriformis</i>	Puncturevine stem weevil
Purple Loosestrife	<i>Galerucella californiensis</i>	Black-margined loosestrife beetle
	<i>Galerucella pusilla</i>	Golden loosestrife beetle
	<i>Hylobius transversovittatus</i>	Loosestrife root weevil
	<i>Nanophyes marmoratus</i>	Loosestrife seed weevil
Rush Skeletonweed	<i>Bradyrrhoa gilveolella</i>	Rush skeletonweed root boring moth
	<i>Cystiphora schmidtii</i>	Rush skeletonweed gall midge
	<i>Eriophyes chondrillae</i>	Rush skeletonweed gall mite
	<i>Puccinia chondrillina</i>	Rush skeletonweed rust
Russian Knapweed	<i>Aulucidea acroptilonica</i>	Russian knapweed gall wasp
	<i>Jaapiella ivannikovi</i>	Russian knapweed gall midge
	<i>Subanguina picridis</i>	Russian knapweed nematode
Russian Thistle	<i>Aceria salsolae</i>	Russian thistle gall mite
	<i>Coleophora klimeschiella</i>	Russian thistle casebearer
	<i>Coleophora parthenica</i>	Russian thistle stem mining moth
Saltcedar	<i>Diorhabda carinulata</i>	Salt cedar defoliating beetle
	<i>Diorhabda elongata</i>	Salt cedar defoliating beetle
	<i>Diorhabda sublineata</i>	Salt cedar defoliating beetle
Scotch Broom	<i>Bruchidius villosus</i>	Broom seed beetle
	<i>Exapion fuscirostre</i>	Scotch broom seed weevil
	<i>Leucoptera spartifoliella</i>	Scotch broom twig miner
Spartina	<i>Prokelisia marginata</i>	Spartina plant hopper
Spotted knapweed	<i>Agapeta zoegana</i>	Knapweed root boring moth
	<i>Bangasternus fausti</i>	Knapweed seed head weevil
	<i>Chaetorellia acrolophi</i>	Knapweed seed head fly
	<i>Cyphocleonus achates</i>	Knapweed root boring weevil
	<i>Larinus minutus</i>	Knapweedseed head weevil
	<i>Larinus obtusus</i>	Knapweed seed head weevil
	<i>Metzneria paucipunctella</i>	Knapweed seed head moth
	<i>Pelochrista medullana</i>	Knapweed root boring moth
	<i>Pterolonche inspersa</i>	Knapweed root boring moth
	<i>Sphenoptera jugoslavica</i>	Knapweed root boring beetle
	<i>Terellia virens</i>	Knapweed seed head fly
	<i>Urophora affinis</i>	Knapweed seed head gall fly
	<i>Urophora quadrifasciata</i>	Knapweed seed head gall fly

Target Weed Species	Biocontrol Agent Species Name	Biocontrol Agent Common Name	
Squarrose knapweed	<i>Agapeta zoegana</i>	Knapweed root boring moth	
	<i>Bangasternus fausti</i>	Knapweed seed head weevil	
	<i>Chaetorellia acrolophi</i>	Knapweed seed head fly	
	<i>Cyphocleonus achates</i>	Knapweed root boring weevil	
	<i>Larinus minutus</i>	Knapweedseed head weevil	
	<i>Larinus obtusus</i>	Knapweed seed head weevil	
	<i>Metzneria paucipunctella</i>	Knapweed seed head moth	
	<i>Pelochrista medullana</i>	Knapweed root boring moth	
	<i>Pterolonche inspersa</i>	Knapweed root boring moth	
	<i>Sphenoptera jugoslavica</i>	Knapweed root boring beetle	
	<i>Terellia virens</i>	Knapweed seed head fly	
	<i>Urophora affinis</i>	Knapweed seed head gall fly	
	<i>Urophora quadrifasciata</i>	Knapweed seed head gall fly	
St Johnswort	<i>Agrilus hyperici</i>	St johnswort root borer	
	<i>Aplocera plagiata</i>	St Johnswort moth	
	<i>Chrysolina hyperici</i>	Klamathweed beetle	
	<i>Chrysolina quadrigemina</i>	Klamathweed beetle	
	<i>Chrysolina varians</i>	Klamathweed beetle	
	<i>Zeuxidiplosis giardi</i>	St Johnswort gall midge	
Tansy ragwort	<i>Botanophila seneciella</i>	Ragwort seed head fly	
	<i>Longitarsus jacobaeae</i>	Tansy ragwort flea beetle	
	<i>Tyria jacobaeae</i>	Tansy ragwort cinnabar moth	
Tropical Soda Apple	<i>Gratiana boliviana</i>	Tropical soda apple leaf beetle	
Water Hyacinth	<i>Neochetina bruchi</i>	Water hyacinth weevil	
	<i>Neochetina eichhorniae</i>	Water hyacinth weevil	
	<i>Niphograptia albiguttalis</i>	Water hyacinth moth	
	<i>Sameodes albiguttalis</i>	Water hyacinth moth	
Waterlettuce	<i>Neohydronomus affinis</i>	Waterlettuce weevil	
	<i>Spodoptera pectinicornis</i>	Asian waterlettuce moth	
Yellow Starthistle	<i>Bangasternus orientalis</i>	Yellow starthistle bud weevil	
	<i>Chaetorellia australis</i>	Yellow starthistle peacock fly	
	<i>Eustenopus villosus</i>	Yellow starthistle hairy weevil	
	<i>Larinus curtus</i>	Yellow starthistle flower weevil	
	<i>Puccinia jacea solstitialis</i>	Yellow starthistle rust	
	<i>Urophora sirunaseva</i>	Yellow starthistle gall fly	

Target Weed Species	Biocontrol Agent Species Name	Biocontrol Agent Common Name
Yellow Toadflax	<i>Brachypterus pulicarius</i>	Toadflax flower-feeding beetle
	<i>Calophasia lunula</i>	Toadflax moth
	<i>Eteobalea intermediella</i>	Toadflax root boring moth
	<i>Eteobalea serratella</i>	Toadflax root boring moth
	<i>Mecinus janthinus</i>	Yellow toadflax stem weevil
	<i>Rhinusa (Gymnetron) antirrhini</i>	Toadflax seed capsule weevil
	<i>Rhinusa (Gymnetron) linariae</i>	Toadflax root galling weevil

## APPENDIX D

# Biological Control Agent Release Proposal and Record

**UNITED STATE DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
BIOLOGICAL CONTROL AGENT RELEASE PROPOSAL**

STATE:

COUNTY:

FIELD OFFICE:

LEGAL DESCRIPTION:

COOPERATORS:

DATE:

PROPOSAL NUMBER:

REFERENCE NUMBER:

**I. BIOLOGICAL CONTROL AGENT:**

Scientific Name	Collection Origin	Life Cycle	Number of Specimen	Host Material	Transfer Permit Num	Transfer Permit Date

1. METHOD OF RELEASE: \_\_\_\_\_

2. RELEASE DATE(S): \_\_\_\_\_

3. NUMBER OF RELEASES: \_\_\_\_\_

**II. PEST SPECIES:**

1. SCIENTIFIC NAME: \_\_\_\_\_

2. COMMON NAME: \_\_\_\_\_

3. ESTIMATED ACRES INFESTED AT RELEASE SITE: \_\_\_\_\_ Acres

4. POTENTIAL ACRES THAT COULD BE INFESTED NEAR RELEASE SITE: \_\_\_\_\_

5. BLM LANDS: \_\_\_\_\_ Acres; OTHER LANDS: \_\_\_\_\_ Acres

**III. MAJOR DESIRED PLANT SPECIES PRESENT: \_\_\_\_\_**

**IV. RELEASE SITE: (DESCRIBE LAND TYPE OR USE, SIZE, STAGE OF GROWTH OF TARGET SPECIES, SLOPE AND SOIL TYPE). \_\_\_\_\_**

ESTIMATED ACRES: \_\_\_\_\_

**V. SENSITIVE ASPECTS AND PRECAUTIONS:** (DESCRIBE SENSITIVE AREAS [E.G., MARSH, ENDANGERED SPECIES HABITAT] AND DISTANCE TO TREATMENT SITE. LIST MEASURES TO BE TAKEN TO AVOID IMPACT TO SENSITIVE AREAS).

\_\_\_\_\_

**VI. STEPS TAKEN TO ENSURE THAT RELEASE SITES ARE PROTECTED FROM THE USE OF PESTICIDE THAT WOULD HARM THE BIOLOGICAL CONTROL AGENTS:** \_\_\_\_\_

**VII. SIGNATURES:**

1. Originator: \_\_\_\_\_ Date: \_\_\_\_\_

a. Company: \_\_\_\_\_

2. Field Office Weed and Pest

Coordinator: \_\_\_\_\_ Date: \_\_\_\_\_

Approval Code: ☐ Approved; ☐ Disapproved; ☐ Approved with Modifications

Comments:

3. Field Office Manager: \_\_\_\_\_ Date: \_\_\_\_\_

Approval Code: ☐ Approved; ☐ Disapproved; ☐ Approved with Modifications

Comments:

4. BLM State Weed and Pest

Coordinator: \_\_\_\_\_ Date: \_\_\_\_\_

Approval Code: ☐ Approved; ☐ Disapproved; ☐ Approved with Modifications

Comments:

5. Deputy State Director: \_\_\_\_\_ Date: \_\_\_\_\_

Approval Code: ☐ Approved; ☐ Disapproved; ☐ Approved with Modifications

Comments:

Any changes (modifications) to this proposal by the state pesticide Coordinator will be listed below or in an attached memo to the manager requesting approval from the Deputy State Director.

**UNITED STATE DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
BIOLOGICAL CONTROL AGENT RELEASE RECORD**

STATE:

COUNTY:

FIELD OFFICE:

PROJECT NAME:

INFESTATION ID:

DATE:

PROPOSAL NUMBER:

REFERENCE NUMBER:

\_\_\_\_\_

- I. Biological Control Agent: \_\_\_\_\_
1. Number Released: \_\_\_\_\_
2. Agent Life Cycle: \_\_\_\_\_
- II. Name of Employee(s) Releasing the Biological Control Agents: \_\_\_\_\_
- III. Date(s) of Release: \_\_\_\_\_(MM/DD/YYYY)
- IV. Location of Release: T. \_\_\_\_\_, R. \_\_\_\_\_, Sec. \_\_\_\_\_, Longitude \_\_\_\_\_, Latitude \_\_\_\_\_
- V. Method used to Protect the Biological Control Agent: \_\_\_\_\_
- VI. Total Project Area: \_\_\_\_\_Acres
- VII. Pest Species the Biocontrol Agent is Released on: \_\_\_\_\_
- VIII. Stage of Pest Development: \_\_\_\_\_
- IX. General Soils Texture: / / Sandy / / Silty / / Clayey / / Loamy
- X. Release Site: / / Native Vegetation / / Seeded Vegetation / / Other
- XI. Weather Conditions:
1. Wind direction: \_\_\_\_\_
2. Wind speed: \_\_\_\_\_
3. Temperature: \_\_\_\_\_
- XII. Monitoring Record: \_\_\_\_\_
- XIII. Site Collection and Record of Dates and Number of Biological Control Agents: \_\_\_\_\_
1. Origin (State and County): \_\_\_\_\_
2. Date of Collection: \_\_\_\_\_(MM/DD/YYYY)

This record must be completed except for monitoring within 24 hours after release of the biological control agent.  
This record must be maintained for a minimum of 10 years (or as required by BLM regulations).



**APPENDIX E**  
**Treatment and Infestation Forms**

# NISIMS Infestation Record

Infestation Record ID \_\_\_\_\_

*\*Indicates Required Fields*

*Note: Only report one species per infestation record*

LOCATION INFORMATION	
<b>Exact Location of Infested Site*:</b> (ex:38.468218, -108.101364)	
<b>State*:</b>	
<b>County*:</b>	
<b>BLM Field Office*:</b>	

INFESTATION INFORMATION				
<b>Date*</b> (ex. 6/1/2014)				
<b>Species Code*</b> (ex: ACRE3)		<b>Species Common Name*</b> (ex: Russian Knapweed)		
<b>Estimated Percent Cover*</b> (circle one)	Trace (Less than 1%) - Low (1-5%) - Medium (5-25%) - High (25-100%)			
<b>Observation Method*</b> (circle one)	DAUBENMIRE – OCCULAR – PHOTO POINT – RANDOM SAMPLE - TRANSECT			
<b>Phenology*</b> (circle one)	BARE GROUND – BOLT – BUD – DORMANT – FLOWER – MATURE – PRE-BUD – ROSETTE – SEED SET – SCENESCENT - VEGETATIVE			
<b>Quantity of Plants/ Unit of Measure (Optional)</b> (ex. 50 PER TOTAL AREA)		PER ACRE PER HECTARE PER SQUARE FEET PER SQUARE METER PER TOTAL AREA	<b>Quantity Method (Optional)</b> (circle one)	ACTUAL ESTIMATE OCCULAR ESTIMATE TRANSECT
<b>Infestation Distribution (Optional)</b> (circle one)	CLUMPED – ISOLATED - PERVASIVE – SCATTERED			
<b>Recorder*</b> (ex: John Doe)				
<b>Role*</b> (Circle one)	APPLICATOR – COOPERATOR – CONTRACTOR EMPLOYEE – MAINTENANCE PROVIDER			
<b>General Text (Optional)</b>				

<b>Land Use Categories (Optional)</b> (circle all that apply)	BOAT LAUNCH – BUILDINGS – BURNED AREA – CHAINED – DIRT ROAD – DOMESTIC GRAZING – DRAINAGE DITCH – FENCE LINE – FLOODPLAIN – IRRIGATION DITCH – LOGGING AREA – OHV AREA – ORV ACTIVITY – PAVED ROAD – RECREATION SITE – RURAL DEVELOPMENT – SENSITIVE SITE – TRAILHEAD – TRANSPORTATION CORRIDOR – URBAN DEVELOPMENT – UTILITY DEVELOPMENT – WATER IMPOUNDMENT – WILDLIFE HABITAT
--	--

LOCATION INFORMATION	
BLM Project Name	
Exact Location of Treatment Site: (ex: 38.468218, -108.101364)	
State:	
County:	
BLM Field Office:	

TREATMENT INFORMATION					
Treatment Date (ex: 6/1/2014)		Treatment Start Time (ex: 0800)		End Time (ex: 1600)	
Temperature (F)		Wind Speed / Direction		Humidity	
BLM PUP # (ex: WYP070-14-003-P)		Equipment Used (circle one)	TRUCK – ATV – UTV - BACKPACK – AIRPLANE - HELICOPTER – HANDHELD SPRAYER – WICK/WIPER – MOWER – TRACTOR – HORSEBACK SPRAYER		
Applicator Name /license #/Role (ex: John Doe/14-001/ Applicator)			Mix Diluent (circle one)	WATER – OIL - NONE	
Sprayer Calibration Rate (ex: 2 GALLONS/ACRE) (circle appropriate Rate)		GALLONS/ACRE OUNCES/ACRE PINTS/ACRE POUNDS/ACRE QUARTS/ACRE	Distance to Water (circle one)	0 TO 10 FEET - 10 TO 25 FEET 25 TO 100 FEET - GT 100 FEET	
Delivery Method (circle one)	AERIAL - GROUND	Spray Pattern (circle one)	BROADCAST - SPOT	Total Acres Treated (ex. 200)	

FOR SPOT APPLICATIONS ONLY	
Mix Amount Applied on Site (ex: 2 GALLONS)	GALLONS

CHEMICAL BRAND(s) APPLIED - In formulated product units			
CHEMICAL TRADE NAME (ex: Roundup Pro, Overdrive)	MANUFACTURER (ex: MONSANTO, BASF)	EPA REG # (ex: 524-475, 7969-150)	CHEMICAL COMMON NAME (ex: Glyphosate, Dicamba + Diflufenzopyr)
RATE OF APPLICATION <u>Liquid ex:</u> 2 QUARTS PER ACRE, , 8 FLUID OUNCES PER ACRE, 1 PERCENT SOLUTION <u>Dry ex:</u> 0.50 POUND PER ACRE, 1 OUNCE PER ACRE			

ADJUVANTS BRAND(s) APPLIED - In formulated product units		
ADJUVANT BRAND NAME (ex: DYNE_AMIC)	MANUF (ex: HELENA CHEMICAL)	RATE OF APPLICATION <u>Liquid ex:</u> 2 QUARTS PER ACRE, , 8 FLUID OUNCES PER ACRE, 1 PERCENT SOLUTION <u>Dry ex:</u> 0.50 POUND PER ACRE, 1 OUNCE PER ACRE

SPECIES INFORMATION			
SPECIES CODE (ex: ACRE3)	SPECIES COMMON NAME (ex. Russian Knapweed)	PLANT PHENOLOGY (circle one)	ESTIMATED PERCENT COVER (circle one)
		BARE GROUND – BOLT – BUD – DORMANT – FLOWER – MATURE – PRE-BUD – ROSETTE – SEED SET – SCENESCENT - VEGETATIVE	Trace (Less than 1%) – Low (1-5%) – Medium (5-25%) - High (25-100%)
		BARE GROUND – BOLT – BUD – DORMANT – FLOWER – MATURE – PRE-BUD – ROSETTE – SEED SET – SCENESCENT - VEGETATIVE	Trace (Less than 1%) – Low (1-5%) – Medium (5-25%) - High (25-100%)
		BARE GROUND – BOLT – BUD – DORMANT – FLOWER – MATURE – PRE-BUD – ROSETTE – SEED SET – SCENESCENT - VEGETATIVE	Trace (Less than 1%) – Low (1-5%) – Medium (5-25%) - High (25-100%)

\*\*\*If more species treated, attach another form and record there.

LOCATION INFORMATION	
BLM Project Name	
Exact Location of Treatment Site: (ex: 38.468218, -108.101364)	
State:	
County:	
BLM Field Office:	

TREATMENT INFORMATION			
Treatment Start Date (ex: 6/1/2014)		Treatment End Date (ex: 6/1/2014)	
Recorder (ex: John Doe)			
Role (Circle one)	APPLICATOR – COOPERATOR – CONTRACTOR EMPLOYEE – MAINTENANCE PROVIDER		
Manual Treatment Type (circle one)	DIGGING – HAND CUTTING – HOEING – LOPPING – PULLING – PUSH MOWER – WRENCHING – PULASKI		
Total Acres Treated:			

SPECIES INFORMATION			
SPECIES CODE (ex: ACRE3)	SPECIES COMMON NAME (ex: Russian Knapweed)	PHENOLOGY (circle one)	ESTIMATED PERCENT COVER (circle one)
		BARE GROUND      PRE-BUD BOLT                ROSETTE BUD                 SEED SET DORMANT        SCENESCENT FLOWER          VEGETATIVE MATURE	Trace (Less than 1%) Low (1-5%) Medium (5-25%) High (25-100%)
		BARE GROUND      PRE-BUD BOLT                ROSETTE BUD                 SEED SET DORMANT        SCENESCENT FLOWER          VEGETATIVE MATURE	Trace (Less than 1%) Low (1-5%) Medium (5-25%) High (25-100%)
		BARE GROUND      PRE-BUD BOLT                ROSETTE BUD                 SEED SET DORMANT        SCENESCENT FLOWER          VEGETATIVE MATURE	Trace (Less than 1%) Low (1-5%) Medium (5-25%) High (25-100%)

\*\*\*If more species treated, attach another form and record there.

LOCATION INFORMATION	
BLM Project Name	
Exact Location of Treatment Site: (ex: 38.468218, -108.101364)	
State:	
County:	
BLM Field Office:	

TREATMENT INFORMATION			
Treatment Start Date (ex: 6/1/2014)		Treatment End Date (ex: 6/1/2014)	
Recorder (ex: John Doe)			
Role (Circle one)	APPLICATOR – COOPERATOR – CONTRACTOR EMPLOYEE – MAINTENANCE PROVIDER		
Mechanical Treatment Type (circle one)	BLADING – BULLDOZER – CHAINING – CHAINSAW – CHIPPING – CULTIVATION – DISKING – PLOWING – ROOT PLOWING - HOT FOAM – MECHANICAL MOWER		
Total Acres Treated:			

SPECIES INFORMATION			
SPECIES CODE (ex: ACRE3)	SPECIES COMMON NAME (ex: Russian Knapweed)	PHENOLOGY (circle one)	ESTIMATED PERCENT COVER (circle one)
		BARE GROUND      PRE-BUD BOLT                ROSETTE BUD                 SEED SET DORMANT        SCENESCENT FLOWER          VEGETATIVE MATURE	Trace (Less than 1%) Low (1-5%) Medium (5-25%) High (25-100%)
		BARE GROUND      PRE-BUD BOLT                ROSETTE BUD                 SEED SET DORMANT        SCENESCENT FLOWER          VEGETATIVE MATURE	Trace (Less than 1%) Low (1-5%) Medium (5-25%) High (25-100%)
		BARE GROUND      PRE-BUD BOLT                ROSETTE BUD                 SEED SET DORMANT        SCENESCENT FLOWER          VEGETATIVE MATURE	Trace (Less than 1%) Low (1-5%) Medium (5-25%) High (25-100%)

\*\*\*If more species treated, attach another form and record there.

## APPENDIX F

### BLM-Approved Adjuvants and Herbicides

<i>Adjuvants Approved for Use on BLM Administered Lands</i>				
				Update: January 12, 2016
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Surfactant				
	Non-ionic Surfactant			
		90-10 Surfactant	Brewer International	
		A-90	Alligare, LLC	
		Activate Plus	Winfield Solutions, LLC	CA Reg. No. 9779-50004-AA
				WA Reg. No. 1381-09001
		Activator 90	Loveland Products, Inc.	CA Reg. No. 34704-50034-AA
		Ad Spray 90	Helena Chemical Company	WA Reg. No. 5905-70020
		Alligare Surface	Alligare, LLC	
		Alligare Surface West	Alligare, LLC	
		Alligare Trace	Alligare, LLC	
		Aquafact	Crop Production Services	
		Aqufact	Aqumix, Inc.	
		Audible 80	Exacto, Inc.	
		Audible 90	Exacto, Inc.	
		Brewer 90-10	Brewer International	
		Chempro S-820	Chemorse, Ltd	WA Reg. No. 46059-15001
		Chempro S-910	Chemorse, Ltd	WA Reg. No. 46059-14001
		Chemsurf 80	Chemorse, Ltd	CA Reg. No. 1050984-50004-AA
				WA Reg. No. 46059-10002
		Chemsurf 90	Chemorse, Ltd	CA Reg. No. 1050984-50005-AA
				WA Reg. No. 46059-10003
		Cornbelt Premier 90	Van Diest Supply Co.	
		Cornbelt Trophy Gold	Van Diest Supply Co.	
		Elite Platinum	Red River Specialties, Inc.	
		EP-90	Eco-Pak, LLC	
		Haf-Pynt	Drexel Chemical Company	CA Reg. No. 19713-50007-AA
				WA Reg. No. 19713-14001
		Hum-AC 820	Drexel Chemical Company	WA Reg. No. 19713-09001
		Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
			Helena Chemical Company	CA Reg. No. 5905-50091-AA
		Induce pH	Helena Chemical Company	
		Inlet	Helena Chemical Company	CA Reg. No. 5905-50099-AA
		LI-700	Loveland Products, Inc.	CA Reg. No. 34704-50035
		Magnify	Monterey AgResources	CA Reg. No. 17545-50018
		NIS 90:10	Precision Laboratories, LLC	CA Reg. No. 9349-50002-AA
				WA Reg. No. 9349-13001
		NIS-EA	Wilbur-Ellis Co.	
		No Foam A	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50015
		Optima	Helena Chemical Company	CA Reg. No. 5905-50075-AA
		PAS-800	Drexel Chemical Company	
		Preference	Winfield Solutions, LLC	WA Reg. No. 1381-50011
		R-900	Wilbur-Ellis Co.	
		Range Master	ORO Agri Inc.	
		Red River 90	Red River Specialties, Inc.	
		Red River NIS	Red River Specialties, Inc.	



Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Surfactant	Non-ionic Surfactant - cont.			
		Scanner	Loveland Products, Inc.	CA Reg. No. 34704-50064
				WA Reg. No. 34704-09003
		Spec 90/10	Helena Chemical Company	
		Spray Activator 85	Van Diest Supply Co.	
		Spreader 90	Loveland Products, Inc.	WA Reg. No. 34704-05002-AA
		Spret	Helena Chemical Company	CA Reg. No. 5905-50098-AA
		Super Spread 90	Wilbur-Ellis Co.	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis Co.	CA Reg. No. 2935-50170
				WA Reg. No. AW-2935-0002
		Surf-Ac 910	Drexel Chemical Company	WA Reg. No. 19713-70003
		Surf-Ac 820	Drexel Chemical Company	WA Reg. No. 19713-70002
		UAP Surfactant 80/20	Loveland Products, Inc.	
		Wetcit	ORO Agri Inc.	
		X-77	Loveland Products, Inc.	CA Reg. No. 34704-50044
	Spreader/Sticker			
		Agri-Trend Spreader	Agri-Trend	
		Attach	Loveland Products, Inc.	CA Reg. No. 34704-50026
		Aqua-King Plus	Winfield Solutions, LLC	
		Bond	Loveland Products, Inc.	CA Reg. No. 36208-50005
		Bond Max	Loveland Products, Inc.	CA Reg. No. 34704-50060
				WA Reg. No. 34704-08003
		Chempro S-196	Chemorse, Ltd	CA Reg. No. 1050984-50006-AA
				WA Reg. No. 46059-11001
		Cohere	Helena Chemical Company	CA Reg. No. 5905-50083-A
		CWC 90	CWC Chemical, Inc.	
		Gulfstream	Winfield Solutions, LLC	
		Insist 90	Wilbur-Ellis Co.	
		Lastick	Setre (Helena)	
		Nu-Film-IR	Miller Chem. & Fert. Corp.	
		Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
		Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
		Onside Kick	Exacto, Inc.	
		Pinene II	Drexel Chemical Company	CA Reg. No. 19713-50003-AA
				WA Reg. No. 19713-00001
		Protyx	Precision Laboratories, LLC	WA Reg. No. 9349-13002
		R-56	Wilbur-Ellis Co.	CA Reg. No. 2935-50144
		Rocket DL	Monterey AgResources	CA Reg. No. 17545-50019
		Tactic	Loveland Products, Inc.	CA Reg. No. 34704-50041-AA
		TopFilm	Biosorb, Inc.	
		Widespread Max	Loveland Products, Inc.	CA Reg. No. 34704-50061
				WA Reg. No. 34704-09001
	Silicone-based			
		Aero Dyne-Amic	Helena Chemical Company	CA Reg. No. 5905-50080-AA
		Aircover	Winfield Solutions, LLC	
		Alligare OSS/NIS	Alligare, LLC	
		Chempro S-172	Chemorse, Ltd	CA Reg. No. 1050984-50008-AA
				WA Reg. No. 46059-15002
		Dyne-Amic	Helena Chemical Company	CA Reg. No. 5095-50071-AA
		Elite Marvel	Red River Specialties, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Surfactant	Silicone-based - cont.			
		Freeway	Loveland Products, Inc.	CA Reg. No. 34704-50031
				WA Reg. No. 34704-04005
		Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
		Phase	Loveland Products, Inc.	CA Reg. No. 34704-50037-AA
		Phase II	Loveland Products, Inc.	
		Scrimmage	Exacto, Inc.	
		SilEnergy	Brewer International	
		Sil-Fact	Drexel Chemical Company	CA Reg. No. 19713-50004-AA
		Sil-MES 100	Drexel Chemical Company	
		Silnet 200	Brewer International	
		Silwet L-77	Loveland Products, Inc.	CA Reg. No. 34704-50043
		Speed	Precision Laboratories, LLC	
		Sun Spreader	Red River Specialties, Inc.	
		Syl-coat	Wilbur-Ellis Co.	CA Reg. No. 2935-50189
				WA Reg. No. 2935-12002
		Sylgard 309	Wilbur-Ellis Co.	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis Co.	CA Reg. No. 2935-50167
Oil-based				
	Crop Oil Concentrate			
		60/40 Crop Oil Concentrate	Chemorse, Ltd	WA Reg. No. 46059-15004
		Agri-Dex	Helena Chemical Company	CA Reg. No. 5905-50094-AA
		Alligare Forestry Oil	Alligare, LLC	
		Brewer 83-17	Brewer International	
		Cornbelt Crop Oil Concentrate	Van Diest Supply Co.	
		Cornbelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
		Crop Oil Concentrate	Helena Chemical Company	CA Reg. No. 5905-50085-AA
		Crop Oil Concentrate	Loveland Products, Inc.	
		CWR Herbicide Activator	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50020-AA
		Exchange	Precision Laboratories, LLC	WA Reg. No. 9349-13008
		Herbimax	Loveland Products, Inc.	CA Reg. No. 34704-50032-AA
				WA Reg. No. 34704-04006
		Maximizer Crop Oil Conc.	Loveland Products, Inc.	CA Reg. No. 34704-50059
				WA Reg. No. 34704-08002
		Monterey M.S.O.	Monterey AgResources	CA Reg. No. 17545-50025
		Mor-Act	Wilbur-Ellis Co.	CA Reg. No. 2935-50098
		Peptoil	Drexel Chemical Company	WA Reg. No. 19713-70001
		Power-Line Crop Oil	Land View Inc.	
		Primary	Drexel Chemical Company	
		Prime Oil	Winfield Solutions, LLC	CA Reg. No. 979-50002-AA
				WA Reg. No. 1381-13004
		R.O.C. Rigo Oil Conc.	Wilbur-Ellis Co.	
		Red River Forestry Oil	Red River Specialties, Inc.	
		Red River Pacer Crop Oil	Red River Specialties, Inc.	
		Superb HC	Winfield Solutions, LLC	WA Reg. No. 1381-06003
	Methylated Seed Oil			
		60/40 MSO	Chemorse, Ltd	WA Reg. No. 46059-15003
		Alligare MSO	Alligare, LLC	
		Alligare MSO West	Alligare, LLC	
		Atmos	Winfield Solutions, LLC	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Oil-based	Methylated Seed Oil - cont.			
		Conquer	Chemorse, Ltd	CA Reg. No. 1050984-50002-AA
				WA Reg. No. 46059-10001
		Cornbelt Base	Van Diest Supply Co.	
		Cornbelt Methylates Soy-Stik	Van Diest Supply Co.	
		Destiny HC	Winfield Solutions, LLC	WA Reg. No. 1381-09002
		Elite Supreme	Red River Specialties, Inc.	
		Hasten	Wilbur-Ellis Co.	CA Reg. No. 2935-50160
				WA Reg. No. 2935-02004
		Hot MES	Drexel Chemical Company	
		Kixyt	Precision Laboratories, LLC.	WA Reg. No. 9349-12001
		MES-100	Drexel Chemical Company	CA Reg. No. 19713-50002-AA
				WA Reg. No. 19713-50002
		Methylated Spray Oil Conc.	Helena Chemical Company	
		MSO Concentrate	Alligare, LLC	
		MSO Concentrate	Loveland Products, Inc.	CA Reg. No. 34704-50029-AA
		Premium MSO	Helena Chemical Company	
		Persist Ultra	Precision Laboratories, LLC.	CA Reg. No. 9349-50005
				WA Reg. No. 9349-13003
		Red River Supreme	Red River Specialties, Inc.	
		Renegade 2.0	Wilbur-Ellis Co.	CA. Reg. No. 2935-50194
				WA Reg. No. 2935-13001
		Sunburn	Red River Specialties, Inc.	
		SunEnergy	Brewer International	
		Sunset	Red River Specialties, Inc.	
		Sun Wet	Brewer International	
		Super Kix	Wilbur-Ellis Co.	
		Super Spread MSO	Wilbur-Ellis Co.	
	Methylated Seed Oil + Organosilicone			
		Alligare MVO Plus	Alligare, LLC	
		Turbulence	Winfield Solutions, LLC	
	Vegetable Oil			
		Amigo	Loveland Products, Inc.	CA Reg. No. 34704-50028-AA
				WA Reg. No. 34704-04002
		BeanOil	Drexel Chemical Company	
		Competitor	Wilbur-Ellis Co.	CA Reg. No. 2935-50173
				WA Reg. No. AW-2935-04001
		Elite Natural	Red River Specialties, Inc.	
		Noble	Winfield Solutions, LLC	
		Vegetoil	Drexel Chemical Company	
Fertilizer-based				
	Nitrogen-based			
		Actamaster Soluble Spray Adjuvant	Loveland Products, Inc.	WA Reg. No. 34704-50001
		Actamaster Spray Adjuvant	Loveland Products, Inc.	WA Reg. No. 34704-50006
		Alliance	Winfield Solutions, LLC	CA Reg. No. 1381-50002-AA
				WA Reg. No.1381-05005
		AMS-All	Drexel Chemical Company	
		AMS-Supreme	Drexel Chemical Company	
		AMS-Xtra	Drexel Chemical Company	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Fertilizer-based				
	Nitrogen-based cont.			
		Bronc	Wilbur-Ellis Co.	
		Bronc Max	Wilbur-Ellis Co.	
		Bronc Max EDT	Wilbur-Ellis Co.	
		Bronc Plus Dry	Wilbur-Ellis Co.	
		Bronc Plus Dry EDT	Wilbur-Ellis Co.	WA Reg. No.2935-03002
		Bronc Total	Wilbur-Ellis Co.	
		Cayuse Plus	Wilbur-Ellis Co.	CA Reg. No. 2935-50171
		Class Act NG	Winfield Solutions, LLC	WA Reg. No. 1381-01004
		Cornbelt Gardian	Van Diest Supply Co.	
		Cornbelt Gardian Plus	Van Diest Supply Co.	
		Corral AMS Liquid	Winfield Solutions, LLC	WA Reg. No. 1381-01006
		Dispatch	Loveland Products, Inc.	
		Dispatch 111	Loveland Products, Inc.	
		Dispatch 2N	Loveland Products, Inc.	
		Dispatch AMS	Loveland Products, Inc.	
		Flame	Loveland Products, Inc.	
		Holzit	Drexel Chemical Company	
		Nitro-Surf	Drexel Chemical Company	
		Quest	Helena Chemical Company	CA Reg. No. 5905-50076-AA
		TransActive HC	Helena Chemical Company	
Special Purpose or Utility				
	Buffering Agent			
		Brimstone	Wilbur-Ellis Co.	
		BS-500	Drexel Chemical Company	
		Buffers P.S.	Helena Chemical Company	CA Reg. No. 5905-50062-ZA
		Oblique	Red River Specialties, Inc.	
		Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
		Tri-Fol	Wilbur-Ellis Co.	CA Reg. No. 2935-50152
		Yardage	Exacto, Inc.	
	Colorants/Dyes			
		BullsEye	Milliken Chemical	
		Elite Ruby	Red River Specialties, Inc.	
		Elite Sapphire	Red River Specialties, Inc.	
		Elite Sapphire WSB	Red River Specialties, Inc.	
		Elite Splendor	Red River Specialties, Inc.	
		Hash Mark Blue Liquid	Exacto, Inc.	
		Hash Mark Blue Liquid HC	Exacto, Inc.	
		Hash Mark Blue Powder	Exacto, Inc.	
		Hash Mark Green Liquid	Exacto, Inc.	
		Hash Mark Green Powder	Exacto, Inc.	
		Hi-Light	Becker-Underwood	
		Hi-Light WSP	Becker-Underwood	
		Marker Dye	Loveland Products, Inc.	
		Mark-It Blue	Monterey AgResources	
		Mark-It Red	Monterey AgResources	
		Mystic HC	Winfield Solutions, LLC	
		Signal	Precision Laboratories, LLC	
		SPI-Max Blue Spray Marker	PROKoZ	

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Special Purpose or Utility				
	Colorants/Dyes - cont.			
		Spray Indicator XL	Helena Chemical Company	
		TurfTrax	Loveland Products, Inc.	
		TurfTrax Blue Spray Indicator	Loveland Products, Inc.	
	Compatibility/Suspension Agent			
		Blendex VHC	Setre (Helena)	
		Convert	Precision Laboratories, LLC	WA Reg. No. 9349-13007
		E Z MIX	Loveland Products, Inc.	CA Reg. No. 36208-50006
		Mix	Drexel Chemical Company	
		Support	Loveland Products, Inc.	WA Reg. No. 34704-04011
	Deposition Aid			
		Agripharm Drift Control	Walco International	
		Alligare Pattern	Alligare, LLC	
		Bivert	Wilbur-Ellis Co.	CA Reg. No. 2935-50163
		Border AQ	Precision Laboratories, LLC	WA Reg. No. 9349-13009
		Chem-Trol	Chemorse, Ltd	CA Reg. No. 1050984-50001-AA
				WA Reg. No. 1050984-50001
		Clasp	Helena Chemical Company	WA Reg. No. 5905-13002
		Compadre	Loveland Products, Inc.	CA Reg. No. 34704-50050
				WA Reg. No. 34704-06004
		Coverage G-20	Wilbur-Ellis Co.	
		Crosshair	Wilbur-Ellis Co.	
		CWC Sharpshooter	CWC Chemical, Inc.	
		Cygnat Plus	Brewer International	CA Reg. No. 1051114-50001
		Direct	Precision Laboratories, LLC	
		Droplex	Winfield Solutions, LLC	
		EDT Concentrate	Wilbur-Ellis Co.	
		Elite Secure Ultra	Red River Specialties, Inc.	
		Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
		Grounded	Helena Chemical Company	
		Grounded - CA	Helena Chemical Company	CA Reg. No. 5905-50096-AA
		Infuse	Loveland Products, Inc.	
		Intac Plus	Loveland Products, Inc.	
		Interlock	Winfield Solutions, LLC	
		Liberate	Loveland Products, Inc.	CA Reg. No. 34704-50030-AA
				WA Reg. No. 34704-04008
		LOX	Drexel Chemical Company	
		LOX PLUS	Drexel Chemical Company	
		Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
		Offside	Exacto, Inc.	
		Pointblank	Helena Chemical Company	CA Reg. No. 52467-50008-AA-5905
		Poly Control 2	Brewer International	
		ProMate Impel	Helena Chemical Company	
		Reign	Loveland Products, Inc.	CA Reg. No. 34704-50045
				WA Reg. No. 34704-05010
		Reign LC	Loveland Products, Inc.	CA Reg. No. 34704-50048
		Secure Ultra	Red River Specialties, Inc.	
		Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA

Adjuvant Class	Adjuvant Type	Trade Name	Munufacturer	Comments
Special Purpose or Utility				
	Deposition Aid - cont.			
		Strike Zone DF	Helena Chemical Company	CA Reg. No. 5905-50084-AA
		Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA
		Syndetic	Chemorse, Ltd	CA Reg. No. 1050984-50003-ZA
		Volare DC	Precision Laboratories, LLC	CA Reg. No. 9349-50004-AA
				WA Reg. No. 9349-13006
		Weather Gard	Loveland Products, Inc.	CA Reg. No. 34704-50042-AA
	Defoaming Agent			
		Alligare Anti-Foamer	Alligare, LLC	
		Cornbelt Defoamer	Van Diest Supply Co.	
		Defoamer	Brewer International	
		Fast Break	Winfield Solutions, LLC	
		Fighter-F 10	Loveland Products, Inc.	
		Fighter-F Dry	Loveland Products, Inc.	
		Foam Buster	Setre (Helena)	CA Reg. No. 5905-50072-AA
		Foambuster Max	Helena Chemical Company	
		Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
		Fome-Kil	Drexel Chemical Company	
		FTF Defoamer	Wilbur-Ellis Co.	WA Reg. No. 2935-13002
		Gundown Max	Precision Laboratories, LLC	WA Reg. No. 9349-13013
		No Foam	Wilbur-Ellis Co.	CA Reg. No. 2935-50136
		Red River Defoamer	Red River Specialties, Inc.	
		Reverse	Exacto, Inc.	
		Suppression	Chemorse, Ltd	CA Reg. No. 1050984-50007
				WA Reg. No. 46059-12001
		Tripleline	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50023-AA
		Unfoamer	Loveland Products, Inc.	CA Reg. No. 34704-50062
				WA Reg. No. 34704-09002
	Diluent/Deposition Agent			
		Bark Oil	Crop Production Services	
		Bark Oil EC	Crop Production Services	
		Elite Premier	Red River Specialties, Inc.	
		Elite Premier Blue	Red River Specialties, Inc.	
		Hy-Grade EC	CWC Chemical, Inc.	
		Hy-Grade I	CWC Chemical, Inc.	
		Improved JLB Oil Plus	Brewer International	
		In-Place	Wilbur-Ellis Co.	CA Reg. No. 2935-50169
		JLB Oil Plus	Brewer International	
		Red River Basal Oil	Red River Specialties, Inc.	
		Thinvert TRU	Waldrum Specialties, Inc.	
		Thinvert Concentrate	Waldrum Specialties, Inc.	
		W.E.B. Oil	Wilbur-Ellis Co.	CA Reg. No. 2935-50166
				WA Reg. No. AW 2935-70023
	Foam Marker			
		Align	Helena Chemical Company	
		F.M.-160	Drexel Chemical Company	
		R-160	Wilbur-Ellis Co.	
		Red River Foam Marker	Red River Specialties, Inc.	
		Trekker Trax	Loveland Products, Inc.	

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	<b><i>Herbicides Formulations Approved for Use on Lands The BLM Administers in the 17 Western States</i></b>		
			<b>Update: January 12, 2016</b>
Restrictions associated with existing Environmental Impact Statements and individual Environmental Assessments (EA), particularly in Oregon, at the present time, may restrict the use of individual herbicide active ingredients allowed for a particular project within that state. Refer to current EAs prior to selecting the active ingredient(s) and subsequent formulation(s).			
Refer to the complete label prior to considering the use of any herbicide formulation. Just because it has a Federal registration, it may not be registered in a particular State, for example California. Label changes can also impact the intended use through, such things as, creation or elimination of Special Local Need (SLN) or 24 (C) registrations, changes in application sites, rates and timing of application, county restrictions, etc.			
<b>ACTIVE</b>			<b>EPA REG.</b>
<b>INGREDIENT</b>	<b>TRADE NAME</b>	<b>MANUFACTURER</b>	<b>NUMBER</b>
<b>Bromacil</b>	Bromacil 80DF	Alligare, LLC	81927-4
	Bromacil 80WG	Alligare, LLC	81927-4
	Ceannard Bromacil 80DF	Ceannard, Inc.	58035-19
	Hyvar X	Bayer Environmental Science	432-1546
	Hyvar X	DuPont Crop Protection	352-287
	Hyvar X-L	Bayer Environmental Science	432-1548
	Hyvar X-L	DuPont Crop Protection	352-346
<b>Bromacil + Diuron</b>	Bromacil/Diuron 40/40	Alligare, LLC	81927-3
	Ceannard Diuron/Bromacil 80DF	Ceannard, Inc.	58035-18
	DiBro 2+2	Nufarm Americas Inc.	228-227
	DiBro 4+2	Nufarm Americas Inc.	228-386
	DiBro 4+4	Nufarm Americas Inc.	228-235
	Krovar I DF	Bayer Environmental Science	432-1551
	Krovar I DF	DuPont Crop Protection	352-505
	Weed Blast 4G	SSI Maxim Co., Inc.	34913-19
	Weed Blast Res. Weed Cont.	Loveland Products, Inc.	34704-576
<b>Chlorsulfuron</b>	Alligare Chlorsulfuron	Alligare, LLC	81927-43
	Chlorsulfuron 75	Alligare, LLC	81927-43
	Chlorsulfuron E-Pro 75 WDG	Nufarm Americas Inc.	79676-72
	Nufarm Chlorsulf SPC 75 WDG Herbicide	Nufarm Americas Inc.	228-672
	Telar DF	DuPont Crop Protection	352-522
	Telar XP	Bayer Environmental Science	432-1561
	Telar XP	DuPont Crop Protection	352-654
<b>Clopyralid</b>	CleanSlate	Nufarm Americas Inc.	228-491
	Clopyralid 3	Alligare, LLC	42750-94-81927



ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>Clopyralid - cont.</b>	Clopyralid 3	Alligare, LLC	81927-14
	Pyramid R&P	Albaugh, Inc.	42750-94
	Reclaim	Dow AgroSciences	62719-83
	Spur	Albaugh, Inc.	42750-89
	Stinger	Dow AgroSciences	62719-73
	Transline	Dow AgroSciences	62719-259
<b>Clopyralid + 2,4-D</b>	Cody Herbicide	Alligare, LLC	81927-28
	Commando	Albaugh, Inc.	42750-92
	Curtail	Dow AgroSciences	62719-48
	Cutback	Nufarm Americas Inc.	71368-72
<b>2,4-D</b>	2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
	2,4-D Amine	Helena Chemical Company	5905-72
	2,4-D Amine	Setre (Helena)	5905-72
	2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19
	2,4-D Amine 4	Helena Chemical Company	42750-19-5905
	2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15
	2,4-D LV4	Setre (Helena)	5905-90
	2,4-D LV 6	Albaugh, Inc./Agri Star	42750-20
	2,4-D LV6	Helena Chemical Company	4275-20-5905
	2,4-D LV6	Setre (Helena)	5905-93
	2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95
	Agrisolution 2,4-D Amine 4	Agriliance, LLC	1381-103
	Agrisolution 2,4-D LV4	Agriliance, LLC	1381-102
	Agrisolution 2,4-D LV6	Agriliance, LLC	1381-101
	Agrisolution 2,4-D LV6	Winflid Solutions, LLC	1381-101
	Alligare 2,4-D Amine	Alligare, LLC	81927-38
	Alligare 2,4-D LV 6	Alligare, LLC	81927-39
	Amine 4	Wilbur-Ellis Co.	2935-512
	Aqua-Kleen	Nufarm Americas Inc.	228-378
	Aqua-Kleen	Nufarm Americas Inc.	71368-4
	Barrage HF	Helena Chemical Company	5905-529
	Barrage LV Ester	Setre (Helena)	5905-504
	Base Camp Amine 4	Wilbur-Ellis Co.	71368-1-2935
	Base Camp LV6	Wilbur-Ellis Co.	2935-553
	Broadrange 55	Wilbur-Ellis Co.	2217-813-2935
	Clean Amine	Loveland Products, Inc.	34704-120
	Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
	Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
	Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
	Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>2,4-D - cont.</b>	Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
	Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
	D-638	Albaugh, Inc./Agri Star	42750-36
	De-Amine 4	Drexel Chemical Company	19713-650
	De-Amine 6	Drexel Chemical Company	19713-651
	De-Ester LV4	Drexel Chemical Company	19713-345
	De-Ester LV6	Drexel Chemical Company	19713-655
	Esteron 99C	Nufarm Americas Inc.	62719-9-71368
	Five Star	Albaugh, Inc./Agri Star	42750-49
	Formula 40	Nufarm Americas Inc.	228-357
	HardBall	Helena Chemical Company	5905-549
	Hi-Dep	PBI/Gordon Corporation	2217-703
	Lo Vol-4	Wilbur-Ellis Co.	228-139-2935
	Low Vol 4 Ester Weed Killer	Loveland Products, Inc.	34704-124
	Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935
	Low Vol 6 Ester Weed Killer	Loveland Products, Inc.	34704-125
	Opti-Amine	Helena Chemical Company	5905-501
	Phenoxy 088	Winfield Solutions, LLC	42750-36-9779
	Platoon	Nufarm Americas Inc.	228-145
	Rugged	Winfield Solutions, LLC	1381-247
	Saber	Loveland Products, Inc.	34704-803
	Salvo	Loveland Products, Inc.	34704-609
	Salvo LV Ester	UAP-Platte Chem. Co.	34704-609
	Savage DS	Loveland Products, Inc.	34704-606
	Savage DS	UAP-Platte Chem. Co.	34704-606
	Shredder 2,4-D LV4	Winfield Solutions, LLC	1381-102
	Shredder Amine 4	Winfield Solutions, LLC	1381-103
	Shredder E-99	Winfield Solutions, LLC	1381-195
	Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22
	Unison	Helena Chemical Company	5905-542
	Weedar 64	Nufarm Americas Inc.	71368-1
	WEEDestroy AM-40	Nufarm Americas Inc.	228-145
	Weedone LV-4	Nufarm Americas Inc.	228-139-71368
	Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
	Weedone LV-6	Nufarm Americas Inc.	71368-11
	Whiteout 2,4-D	Loveland Products, Inc.	34704-1032
<b>Dicamba</b>	Banvel	Arysta LifeScience N.A. Corp.	66330-276
	Banvel	Micro Flo Company	51036-289
	Clarity	BASF Corporation	7969-137
	Cruise Control	Alligare, LLC	42750-40-81927
	Diablo	Nufarm Americas Inc.	228-379

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>Dicamba - cont.</b>	Dicamba DMA	Albaugh, Inc./Agri Star	42750-40
	Kam-Ba	Drexel Chemical Company	19713-624
	Rifle	Loveland Products, Inc.	34704-861
	Sterling Blue	Winfield Solutions, LLC	7969-137-1381
	Vanquish	Syngenta Professional Products	100-884
	Vanquish Herbicide	Nufarm Americas Inc.	228-397
	Vision	Albaugh, Inc.	42750-98
	Vision	Helena Chemical Company	5905-576
<b>Dicamba + 2,4-D</b>	Brash	Winfield Solutions, LLC	1381-202
	Brush-Rhap	Helena Chemical Company	5905-568
	Dicamba + 2,4-D DMA	Alligare, LLC	81927-42
	KambaMaster	Nufarm Americas Inc.	71368-34
	Latigo	Helena Chemical Company	5905-564
	Outlaw	Helena Chemical Company	5905-574
	Range Star	Albaugh, Inc./Agri Star	42750-55
	Rifle-D	Loveland Products, Inc.	34704-869
	Weedmaster	BASF Ag. Products	7969-133
	Weedmaster	Nufarm Americas Inc.	71368-34
	Veteran 720	Nufarm Americas Inc.	228-295
<b>Dicamba +</b>	Distinct	BASF Corporation	7969-150
<b>Diflufenzopyr</b>	Overdrive	BASF Corporation	7969-150
<b>NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.</b>			
<b>Diquat</b>	Alligare Diquat	Alligare, LLC	81927-35
	Diquat E-Ag 2L	Nufarm Americas Inc.	79676-75
	Diquat SPC 2 L Herbicide	Nufarm Americas Inc.	79676-75
	NuFarm Diquat SPC 2 L Herbicide	Nufarm Americas Inc.	228-675
	Reward	Syngenta Professional Products	100-1091
<b>Diuron</b>	Ceannard Diuron 80DF	Ceannard, Inc.	58035-16
	Direx 4L	DuPont Crop Protection	352-678
	Direx 4L	Griffin Company	1812-257
	Direx 4L	Makhteshim Agan of N. A.	66222-54
	Direx 80DF	Griffin Company	1812-362
	Diuron 4L	Alligare, LLC	81927-44
	Diuron 4L	Drexel Chemical Company	19713-36
	Diuron 4L	Loveland Products, Inc.	34704-854

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>Diuron - cont.</b>	Diuron 4L	Makhteshim Agan of N.A.	66222-54
	Diuron 80	Drexel Chemical Company	19713-274
	Diuron 80DF	Agriliance, LLC	9779-318
	Diuron 80DF	Alligare, LLC	81927-12
	Diuron 80DF	Winfield Solutions, LLC	9779-318
	Diuron 80 WDG	Loveland Products, Inc.	34704-648
	Diuron 80WDG	UAP-Platte Chem. Co.	34704-648
	Diuron-DF	Wilbur-Ellis Co.	00352-00-508-02935
	Karmex DF	DuPont Crop Protection	352-692
	Karmex DF	Makhteshim Agan of N. A.	66222-51
	Karmex IWC	DuPont Crop Protection	352-692
	Karmex XP	DuPont Crop Protection	352-692
	Parrot DF	Makhteshim Agan of N. A.	66222-51
	Parrot 4L	Makhteshim Agan of N. A.	66222-54
	Vegetation Man. Diuron 80 DF	Vegetation Man., LLC	66222-51-74477
<b>Fluridone</b>	Avast!	SePRO Corporation	67690-30
	Fluridone 4L	Albaugh, LLC	42750-280
	Sonar AS	SePRO Corporation	67690-4
	Sonar Precision Release	SePRO Corporation	67690-12
	Sonar Q	SePRO Corporation	67690-3
	Sonar SRP	SePRO Corporation	67690-3
<b>Glyphosate</b>	Accord Concentrate	Dow AgroSciences	62719-324
	Accord SP	Dow AgroSciences	62719-322
	Accord XRT	Dow AgroSciences	62719-517
	Accord XRT II	Dow AgroSciences	62719-556
	Agrisolutions Cornerstone	Winfield Solutions, LLC	1381-191
	Agrisolutions Cornerstone Plus	Winfield Solutions, LLC	1381-192
	Agrisolutions Rascal	Winfield Solutions, LLC	1381-191
	Agrisolutions Rascal Plus	Winfield Solutions, LLC	1381-192
	Aqua Neat	Nufarm Americas Inc.	228-365
	Aqua Star	Albaugh, Inc./Agri Star	42750-59
	Aquamaster	Monsanto	524-343
	AquaPro Aquatic Herbicide	SePRO Corporation	62719-324-67690
	Buccaneer	Tenkoz	55467-10
	Buccaneer Plus	Tenkoz	55467-9
	ClearOut 41 Plus	Chem. Prod. Tech., LLC	70829-3
	Cornerstone 5 Plus	Winfield Solutions, LLC	1381-241
	Credit Xtreme	Nufarm Americas Inc.	71368-81
	Foresters	Nufarm Americas Inc.	228-381
	Forest Star	Albaugh, Inc./Agri Star	42570-61

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>Glyphosate - cont.</b>	Four Power Plus	Loveland Products, Inc.	34704-890
	Gly Star Gold	Albaugh, Inc./Agri Star	42750-61
	Gly Star Original	Albaugh, Inc./Agri Star	42750-60
	Gly Star Plus	Albaugh, Inc./Agri Star	42750-61
	Gly Star Pro	Albaugh, Inc./Agri Star	42750-61
	Gly-4	Universal Crop Protection Alliance, LLC	42750-60-72693
	Gly-4 Plus	Universal Crop Protection Alliance, LLC	72693-1
	Gly-4 Plus	Universal Crop Protection Alliance, LLC	42750-61-72693
	Glyfos	Cheminova	4787-31
	Glyfos Aquatic	Cheminova	4787-34
	Glyfos PRO	Cheminova	67760-57
	GlyphoMate 41	PBI/Gordon Corporation	2217-847
	Glyphosate 4	Vegetation Man., LLC	73220-6-74477
	Glyphosate 4 +	Alligare, LLC	81927-9
	Glyphosate 4 PLUS	Alligare, LLC	81927-9
	Glyphosate 5.4	Alligare, LLC	81927-8
	Glypro	Dow AgroSciences	62719-324
	Glypro Plus	Dow AgroSciences	62719-322
	Honcho	Monsanto	524-445
	Honcho Plus	Monsanto	524-454
	Imitator 25% Concentration	Drexel Chemical Company	19713-628
	Imitator Aquatic	Drexel Chemical Company	19713-623
	Imitator DA	Drexel Chemical Company	19713-586
	Imitator Plus	Drexel Chemical Company	19713-526
	Imitator RTU	Drexel Chemical Company	19713-607
	KleenUp Pro	Loveland Products, Inc.	34704-890
	Mad Dog Plus	Loveland Products, Inc.	34704-890
	Makaze	Loveland Products, Inc.	34704-890
	Mirage	Loveland Products, Inc.	34704-889
	Mirage Herbicide	UAP-Platte Chem. Co.	524-445-34704
	Mirage Plus	Loveland Products, Inc.	34704-890
	Mirage Plus Herbicide	UAP-Platte Chem. Co.	524-454-34704
	Rattler	Setre (Helena)	524-445-5905
	Razor	Nufarm Americas Inc.	228-366
	Razor Pro	Nufarm Americas Inc.	228-366
	Rodeo	Dow AgroSciences	62719-324
	Roundup Custom	Monsanto	524-343
	Roundup Original	Monsanto	524-445
	Roundup Original II	Monsanto	524-454
	Roundup Original II CA	Monsanto	524-475
	Roundup PRO	Monsanto	524-475
	Roundup PRO Concentrate	Monsanto	524-529

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
Glyphosate - cont.	Roundup PRO Dry	Monsanto	524-505
	Roundup PROMAX	Monsanto	524-579
	Showdown	Helena Chemical Company	71368-25-5905
Glyphosate + 2,4-D	Campaign	Monsanto	524-351
	Imitator Plus D	Drexel Chemical Company	19713-635
	Landmaster BW	Albaugh, Inc./Agri Star	42570-62
	Landmaster BW	Monsanto	524-351
Hexazinone	Pronone 10G	Pro-Serve	33560-21
	Pronone 25G	Pro-Serve	33560-45
	Pronone MG	Pro-Serve	33560-21
	Velossa	Helena Chemical Company	5905-579
	Velpar DF	DuPont Crop Protection	352-581
	Velpar DF VU	Bayer Environmental Science	432-1576
	Velpar L	DuPont Crop Protection	352-392
	Velpar L VU	Bayer Environmental Science	432-1573
	Velpar ULW	DuPont Crop Protection	352-450
Hexazinone +	Oustar	Bayer Environmental Science	432-1553
Sulfometuron methyl	Oustar	DuPont Crop Protection	352-603
	Westar	Bayer Environmental Science	432-1558
	Westar	DuPont Crop Protection	352-626
<b>NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.</b>			
Imazapic	Nufarm Imazapic 2SL	Nufarm Americas Inc.	71368-99
	Panoramic 2SL	Alligare, LLC	66222-141-81927
	Plateau	BASF	241-365
Imazapic + Glyphosate	Journey	BASF	241-417
Imazapyr	Arsenal	BASF	241-346
	Arsenal Applicators Conc.	BASF	241-299
	Arsenal PowerLine	BASF	241-431
	Arsenal Railroad Herbicide	BASF	241-273
	Chopper	BASF	241-296
	Ecomazapyr 2SL	Alligare, LLC	81927-22

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>Imazapyr - cont.</b>	Ecomazapyr 2 SL	Vegetation Man., LLC	74477-6
	Habitat	BASF	241-426
	Habitat Herbicide	SePRO Corporation	241-426-67690
	Imazapyr 2 SL	Vegetation Man., LLC	74477-4
	Imazapyr 2SL	Alligare, LLC	81927-23
	Imazapyr 4 SL	Vegetation Man., LLC	74477-5
	Imazapyr 4SL	Alligare, LLC	81927-24
	Polaris	Nufarm Americas Inc.	228-534
	Polaris AC	Nufarm Americas Inc.	241-299-228
	Polaris AC	Nufarm Americas Inc.	228-480
	Polaris AC Complete	Nufarm Americas Inc.	228-570
	Polaris AQ	Nufarm Americas Inc.	241-426-228
	Polaris Herbicide	Nufarm Americas Inc.	241-346-228
	Polaris RR	Nufarm Americas Inc.	241-273-228
	Polaris SP	Nufarm Americas Inc.	228-536
	Polaris SP	Nufarm Americas Inc.	241-296-228
	Rotary 2 SL	Alligare, LLC	81927-6
	SSI Maxim Arsenal 0.5G	SSI Maxim Co., Inc.	34913-23
	SSI Maxim Arsenal 5.0G	SSI Maxim Co., Inc.	34913-24
	Stalker	BASF	241-398
<b>Imazapyr + Diuron</b>	Imazuron E-Pro	Etigra, LLC	79676-54
	Mojave 70 EG	Alligare, LLC	74477-9-81927
	Mojave 70 EG	Alligare, LLC	81927-25
	Sahara DG	BASF	241-372
	SSI Maxim Topside 2.5G	SSI Maxim Co., Inc.	34913-22
<b>Imazapyr +</b>	Lineage Clearstand	Bayer Environmental Science	432-1578
<b>Metsulfuron methyl</b>	Lineage Clearstand	DuPont Crop Protection	352-766
<b>Imazapyr +</b>	Lineage HWC	Bayer Environmental Science	432-1577
<b>Sulfometuron methyl +</b>	Lineage HWC	DuPont Crop Protection	352-765
<b>Metsulfuron methyl</b>	Lineage Prep	Bayer Environmental Science	432-1579
	Lineage Prep	DuPont Crop Protection	352-767
<b>NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.</b>			

ACTIVE			EPA REG.
INGREDIENT	TRADE NAME	MANUFACTURER	NUMBER
<b>Metsulfuron methyl</b>	AmTide MSM 60DF Herbicide	AmTide, LLC	83851-3
	Escort DF	DuPont Crop Protection	352-439
	Escort XP	Bayer Environmental Science	432-1549
	Escort XP	DuPont Crop Protection	352-439
	Metsulfuron Methyl DF	Vegetation Man., LLC	74477-2
	MSM 60	Alligare, LLC	81927-7
	MSM E-AG 60 EG Herbicide	Etigra, LLC	81959-14
	MSM E-Pro 60 EG Herbicide	Etigra, LLC	81959-14
	Patriot	Nufarm Americas Inc.	228-391
	PureStand	Nufarm Americas Inc.	71368-38
<b>Metsulfuron methyl +</b>	Cimarron Plus	Bayer Environmental Science	432-1572
<b>Chlorsulfuron</b>	Cimarron Plus	DuPont Crop Protection	352-670
	Cimarron X-tra	DuPont Crop Protection	352-669
<b>Metsulfuron methyl +</b>	Cimarron MAX	Bayer Environmental Science	432-1555
<b>Dicamba + 2,4-D</b>	Cimarron MAX	DuPont Crop Protection	352-615
<b>Picloram</b>	Grazon PC	Dow AgroSciences	62719-181
	OutPost 22K	Dow AgroSciences	62719-6
	Picloram 22K	Alligare, LLC	81927-18
	Picloram K	Alligare, LLC	81927-17
	Tordon 22K	Dow AgroSciences	62719-6
	Tordon K	Dow AgroSciences	62719-17
	Triumph 22K	Albaugh, Inc.	42750-79
	Triumph K	Albaugh, Inc.	42750-81
	Trooper 22K	Nufarm Americas Inc.	228-535
<b>Picloram + 2,4-D</b>	Graslan L	Dow AgroSciences	62719-655
	Grazon P+D	Dow AgroSciences	62719-182
	GunSlinger	Albaugh, Inc.	42750-80
	HiredHand P+D	Dow AgroSciences	62719-182
	Pathway	Dow AgroSciences	62719-31
	Picloram + D	Alligare, LLC	81927-16
	Tordon 101 R Forestry	Dow AgroSciences	62719-31
	Tordon 101M	Dow AgroSciences	62719-5
	Tordon RTU	Dow AgroSciences	62719-31
	Trooper 101	Nufarm Americas Inc.	228-561
	Trooper P + D	Nufarm Americas Inc.	228-530



<b>ACTIVE</b>			<b>EPA REG.</b>
<b>INGREDIENT</b>	<b>TRADE NAME</b>	<b>MANUFACTURER</b>	<b>NUMBER</b>
<b>Picloram +</b>	Trooper Extra	Nufarm Americas Inc.	228-586
<b>2,4-D +</b>			
<b>Dicamba</b>			
<b>Sulfometuron methyl</b>	Oust DF	DuPont Crop Protection	352-401
	Oust XP	Bayer Environmenatl Science	432-1552
	Oust XP	DuPont Crop Protection	352-601
	SFM 75	Alligare, LLC	81927-26
	SFM 75	Vegetation Man., LLC	72167-11-74477
	SFM E-Pro 75EG	Etigra, LLC	79676-16
	Spyder	Nufarm Americas Inc.	228-408
<b>NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.</b>			
<b>Sulfometuron methyl +</b>	Landmark XP	Bayer Environmental Science	432-1560
<b>Chlorsulfuron</b>	Landmark XP	DuPont Crop Protection	352-645
<b>NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.</b>			
<b>Sulfometuron methyl +</b>	Oust Extra	Bayer Environmental Science	432-1557
<b>Metsulfuron methyl</b>	Oust Extra	DuPont Crop Protection	352-622
	SFM Extra	Alligare, LLC	81927-5
<b>NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.</b>			
<b>Tebuthiuron</b>	Alligare Tebuthiuron 80 WG	Alligare, LLC	81927-37
	Alligare Tebuthiuron 20 P	Alligare, LLC	81927-41
	Spike 20P	Dow AgroSciences	62719-121
	Spike 80DF	Dow AgroSciences	62719-107
	SpraKil S-5 Granules	SSI Maxim Co., Inc.	34913-10
<b>Tebuthiuron +</b>	SpraKil SK-13 Granular	SSI Maxim Co., Inc.	34913-15
<b>Diuron</b>	SpraKil SK-26 Granular	SSI Maxim Co., Inc.	34913-16



## **Appendix I: Spill or Discharge Contingency Plan**

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## **Spill or Discharge Contingency Plan**

### **McGinness Hills**

#### 1. Potential Sources of Accidental Spills or Discharges

##### 1. Geothermal Fluid

Accidental geothermal fluid spills or discharges are unlikely because the wells are cased, blowout prevention equipment is utilized during drilling, and the production and injection pipelines are insulated and protected, and the pressure are consistently monitored. However, accidental discharges or spills could result from any of the following:

- (1) Loss of well control (blowout).
- (2) Rupture of production or injection pipeline.

##### 2. Drilling Muds

Muds are a mixture of water, non-toxic chemicals and solid particles used in the drilling operations to lubricate and cool the bit in the hole, to carry cuttings out of the hole, to maintain the hole condition and to control formation pressure. Drilling muds are prepared and stored in metal tanks at the drilling site. Waste drilling mud and cuttings are discharged into the reserve pit, which is open and is adequately sized to hold the volume necessary for the operation. Accidental discharges of drilling mud are unlikely, but could occur by:

- (1) overflow of the reserve pit.
- (2) reserve pit wall seepage or wall failure.
- (3) discharge from equipment failure on location.
- (4) shallow lost circulation channeling to the surface.

##### 3. Lubricating or Fuel Oils and Petroleum Products

A discharge of this type would probably be very small and be from equipment used in the field. Potential locations for accidental spills are:

- (1) Equipment and machinery at and around the plant and drilling locations.
- (2) Other miscellaneous equipment and machinery at plants, well sites and roads.

4. Construction/Maintenance Debris

Typically a minor consideration, one which is usually able to be cleaned up on the job. Potential locations are the same as for lubricating or oils listed in Item 3, above.

2. Plan for Cleanup and Abatement

In the event of discharge of formation fluids, drilling muds, petroleum products or construction debris, the person responsible for the operation will make an immediate investigation, then contact the Environmental Health and Safety Coordinator (EH&SC) and advise him of the spill. The EH&SC will in turn call out equipment, regulate field operations, or do other work as applicable for control and clean-up of the spill, as follows:

1. Action - Small, Containable Spill

If the spill is small (i.e., less than 250 gallons) and easily containable without endangering the watershed, the EH&SC will direct and supervise complete cleanup and return to normal operations.

2. Action - Large or Uncontainable Spill

If the spill is larger than 250 gallons, or is not easily contained, or endangers, or has entered the watershed, the EH&SC will proceed to take necessary action to curtail, contain and clean up the spill, as above, and notify personnel as listed below.

3. Notification

(1) The Drilling Supervisor will, as quickly as practicable:

- Call out contractor(s), as required.
- Notify the Ormat Plant Manager.
- Notify the local law enforcement agencies if the public safety is threatened.

(2) The Ormat Plant Manager will notify the following as soon as practical and work closely with them in all phases of the curtailment, containment and cleanup operations:

Division of Minerals  
State of Nevada  
Lowell Price

NDEP/BWPC  
Russ Land  
901 S. Stewart Street,

400 W. King  
Carson City, NV 89703  
(775) 684-7040

Ste. 4001  
Carson City, NV 89701  
(775) 687-9428

BLM Battle Mountain  
William Coyle  
(775) 482-7830

The Drilling Supervisor will also advise local population and affected property owners if spill affects residents or property.

4. Specific Procedures

1 For geothermal fluid spills:

- Contain spillage with dikes if possible and haul to disposal site by vacuum or water trucks or dispose of in a manner acceptable to the NDEP.

2 For drilling mud:

- Repair sump or contain with dikes. Haul liquid to another sump, available tanks or approved disposal site.

3 For petroleum products:

- Contain spill with available manpower. Use absorbents and dispose of same in approved disposal area.

For (1) through (3) above, Ormat will have the source of spill repaired at the earliest practical time, and continue working crews and equipment on cleanup until all concerned agencies are satisfied.

5. Confirm telephone notification to agencies and regulatory bodies. Telephone notification shall be confirmed by the Ormat Plant Manager in writing within two weeks of telephone notification.

Written confirmation will contain:

Reason for the discharge or spillage.

Duration and volume of discharge or spillage.

Steps taken to correct problem.

Steps taken to prevent recurrence of problem.

## **Emergency Personnel and Telephone Numbers**

### **Fire**

BLM Fire Department

Ty Petersen—Fire Management Officer

[tpeterse@blm.gov](mailto:tpeterse@blm.gov)

**911**

775-623-1500

775-289-1835 (Office)

Austin Fire Department

775-964-1063

### **Law Enforcement**

Lander County Sheriff

Nevada Highway Patrol

Nevada Department of Public Safety

**911**

775-635-5161

775-687-5300

775-684-4808

### **Hospital**

Battle Mountain General Hospital (Battle Mtn.)

Banner Churchill Community Hospital (Fallon)

**911**

775-635-2550

775-423-3151

### **Agency Representatives**

Nevada Division of Minerals

Lowell Price

[lprice@govmail.state.nv.us](mailto:lprice@govmail.state.nv.us)

775-864-7040 (Office)

775-721-1774 (cell)

Nevada Division of Environmental Protection: Bureau of Water Pollution Control

Russ Land

[rland@ndep.nv.gov](mailto:rland@ndep.nv.gov)

775-687-9428 (Office)

Bureau of Land Management

William Coyle - Battle Mountain Office

[tcoward@blm.gov](mailto:tcoward@blm.gov)

775-635-4000

775-482-7830 (Office)

John Menghini - State Office

[jmenghin@blm.gov](mailto:jmenghin@blm.gov)

775-861-6573 (Office)

775-223-1359 (cell)

### **Ormat McGinness Hills Representatives**

Ormat Nevada (Reno)

775-356-9029 (Office)

Nathan Garner (Environmental)

775-560-7829 (Cell)

John Christiansen (Plant Manager)

760-457-5823 (Cell)

Brad Peters (Drilling)

[bpeters@ormat.com](mailto:bpeters@ormat.com)

775-356-9029 (Office)

775-225-2288 (Cell)



## **Appendix J: Hazardous Gas Contingency Plan**

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## **Hazardous Gas Contingency Plan**

### **McGinness Hills**

1. There is a very limited possibility of encountering hazardous non-condensable gases while drilling and testing. Although noxious or dangerous amounts of gases have not been associated with other geothermal wells drilled in the area, it is prudent to be prepared. The three main gases expected in this area are steam, hydrogen sulfide (H<sub>2</sub>S), and carbon dioxide (CO<sub>2</sub>).
1. The effectiveness of this plan is dependent upon the cooperation and effort of each person who enters the site during drilling or testing operations. Each person must know their responsibilities under stressful emergency operating conditions. All personnel must see that their safety equipment is stored and functional in addition to the location and operation of safety equipment.
2. All personnel will be trained in warning signs, signals, first aid, and responsibilities in case of hazard gases. The site will have two briefing areas so that one is upwind from the well and containment basin at all times. Before drilling or testing commences, all personnel will be advised of escape routes. Weekly drills will be conducted.
3. All vehicles will be parked with the front towards the exit road. A normal size first aid kit, stokes litter, wind direction apparatus, portable hand-held H<sub>2</sub>S and CO<sub>2</sub> detectors will be available on the location. There will also be H<sub>2</sub>S scavenger chemicals on the location for treating the mud. Warning signs will be posted on the access road to the location.
4. Steam is hot water in the gas form. It causes burns to the skin. It is possible that steam temperatures may exceed 300°F during flow tests. All personnel must stay away and up wind from venting steam. Note water as hot as 220°F may be present in the testing tanks. If a person is burnt, remove them from the site and cool the burnt area. Transport to the hospital.
5. H<sub>2</sub>S is a colorless gas with a rotten egg odor in concentrations under 100 ppm. Above a concentration of 100 ppm, H<sub>2</sub>S will cause health problems including death (Table 1). Above a H<sub>2</sub>S concentration of 1000 ppm, death is instantaneous. H<sub>2</sub>S is heavier than air and will accumulate in low spots. At high concentrations, H<sub>2</sub>S is combustible. Automatic H<sub>2</sub>S detectors are stationed around the rig. At a 5 ppm concentration, a red light will flash. At this concentration, workers can continue their jobs for 8 hours. At a concentration above 10 ppm, a red light will flash and a warning horn sound. All personnel will immediately assemble at the upwind briefing area except for the driller who will shut the well in. He will then travel to the briefing area. Remember at concentrations above 100 ppm, personnel cannot smell H<sub>2</sub>S. Hand held detectors will be utilized to determine the H<sub>2</sub>S concentration. Depending on the measured concentration, the Company Drilling Supervisor will assign duties.

6. CO<sub>2</sub> is a colorless odorless gas. At concentrations above 50,000 ppm (5%) personnel risk affliction. At concentrations above 80,000 ppm (8%), CO<sub>2</sub> causes loss of consciousness. The same procedure should be utilized as the H<sub>2</sub>S procedure.
7. If a person becomes unconsciousness due to a hazardous gas, do not attempt to remove him without proper protective equipment. **You May Also Become A Victim.** Do not attempt a rescue without proper protective equipment. If the proper protective equipment, move the victim to a safe area. If the victim has been affected by H<sub>2</sub>S or CO<sub>2</sub>, apply artificial respiration until the paramedics arrive. Even if the symptoms pass, transport the victim to a hospital and place him under the care of a doctor.
8. After a hazardous gas has been detected, operations will proceed as follows:

A. Condition – **POTENTIAL DANGER**

**H<sub>2</sub>S concentration <10 ppm**

**CO<sub>2</sub> concentration <5000 ppm**

**STEAM >150°F**

All personnel will be immediately notified of the potential danger. Routine checking of the drilling fluid and monitoring equipment will alert mud loggers of possible danger. The mud loggers will immediately notify the Company Drilling Supervisor, Tool Pusher, Driller, Test Supervisor, and Mud Engineer. These personnel will immediately notify their crew members. All safety equipment, monitors, and alarms will be checked for correct operating conditions. A review of the emergency program and drills will be conducted before drilling continues.

B. Condition – **MODERATE DANGER**

**H<sub>2</sub>S concentration 10 ppm TO 20 ppm**

**CO<sub>2</sub> concentration 5000 ppm TO 50000 ppm**

**STEAM >190°F**

All personnel will be immediately notified of the danger. The mud loggers will immediately notify the Company Drilling Supervisor, Tool Pusher, Driller, Test Supervisor, and Mud Engineer. These personnel will immediately notify their crew members. The Driller will shut in the well if H<sub>2</sub>S concentration exceeds 10 ppm. All personnel will meet at the briefing site. Selected personnel will take steps to locate the source of the hazardous gas. Drilling will not proceed until the gas is controlled. All nonessential personnel will be sent upwind and out of the potential danger zone. Gas concentrations around the well will be verified with hand held gas detectors. Access to the site will be limited to authorize personnel only. Warning signs will be posted.

C. Condition – **EXTREME DANGER**

**H<sub>2</sub>S concentration >20 ppm**

**CO<sub>2</sub> concentration >50000 ppm**  
**STEAM >200°F**

All personnel will be immediately notified of the extreme danger by a honking horn. All personnel will immediately put on their protective gear. The mud loggers will immediately notify the Company Drilling Supervisor, Tool Pusher, Driller, Test Supervisor, and Mud Engineer. These personnel will immediately notify their crew members. The Driller will shut in the well. All personnel will meet at the upwind briefing site for evacuation. The Drilling Supervisor will assess the situation, outline a control program, and assign duties to control the situation. The proper agencies will be notified. Drilling will not proceed until the gas is controlled. All nonessential personnel will be sent upwind and out of the potential danger zone. Access to the site will be limited to authorized personnel wearing protective equipment. Warning signs will be posted to limit access to the site. If the gas cannot be controlled, the Emergency Plan will be initialized.

TABLE 1  
PHYSICAL EFFECTS OF HYDROGEN SULFIDE

Concentration (ppm)	0-2 MINUTES	15-30 MINUTES	30-60 MINUTES
10-20	Rotten egg smell	Detectable	Maximum 8-hour exposure with protective mask
100	Coughing, loss of smell	Eye pain, sleepiness	Throat and eye irritation
450	Eye irritation	Respiration difficult	Serious respiratory disturbance
1000	Unconsciousness	Death	Death

## **Emergency Personnel and Telephone Numbers**

### **Fire**

BLM Fire Department

Ty Petersen—Fire Management Officer

[tpeterse@blm.gov](mailto:tpeterse@blm.gov)

**911**

775-623-1500

775-289-1835 (Office)

Austin Fire Department

775-964-1063

### **Law Enforcement**

Lander County Sheriff

Nevada Highway Patrol

Nevada Department of Public Safety

**911**

775-635-5161

775-687-5300

775-684-4808

### **Hospital**

Battle Mountain General Hospital (Battle Mtn.)

Banner Churchill Community Hospital (Fallon)

**911**

775-635-2550

775-423-3151

### **Agency Representatives**

Nevada Division of Minerals

Lowell Price

[lprice@govmail.state.nv.us](mailto:lprice@govmail.state.nv.us)

775-864-7040 (Office)

775-721-1774 (cell)

Nevada Division of Environmental Protection: Bureau of Water Pollution Control

Russ Land

[rland@ndep.nv.gov](mailto:rland@ndep.nv.gov)

775-687-9428 (Office)

Bureau of Land Management

William Coyle - Battle Mountain Office

[tcoward@blm.gov](mailto:tcoward@blm.gov)

775-635-4000

775-482-7830 (Office)

John Menghini - State Office

[jmenghin@blm.gov](mailto:jmenghin@blm.gov)

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775-223-1359 (cell)

### **Ormat McGinness Hills Representatives**

Ormat Nevada (Reno)

775-356-9029 (Office)

Nathan Garner (Environmental)

775-560-7829 (Cell)

John Christiansen (Plant Manager)

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## **Appendix K: Greater Sage-Grouse Monitoring and Mitigation Plan**

Bureau of Land Management

McGinness Hills Geothermal Development Project EA

Environmental Assessment: DOI-BLM-NV-B010-2011-0015-EA

Appendix K: Greater Sage-Grouse Monitoring and Mitigation Plan

*This was developed as part of the 2011 Development EA and can also be found as Appendix C of that EA. All Figures and Appendices referenced in this plan refer to the 2011 Development EA.*

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## **Greater Sage-Grouse Monitoring and Mitigation Plan for the McGinness Hills Geothermal Development Project**

### **C.1 MITIGATION MEASURES TO ADDRESS ANTICIPATED PROJECT IMPACTS**

Greater sage-grouse (*Centrocercus urophasianus*) use of the Project area has been documented through field surveys (GBE 2010; NDOW 2011), observational records (Battle Mountain District Office 2010), and telemetry data collection (NDOW 2011). Suitable habitat exists throughout and around the Project area for all seasonal uses (i.e. winter, lek/breeding/nesting, brood rearing, and fall) by sage-grouse. Predicted impacts to sage-grouse are from Project construction, well and facility testing, existence and maintenance of the power plants, appurtenant facilities, wells, and pipelines, increased human activity, and increased noise.

The following measures (developed in consultation with the Nevada Department of Wildlife [NDOW]), required to mitigate anticipated Project effects to greater sage-grouse, would begin to be implemented in concert with the initiation of Project construction, where appropriate Other mitigation measures should be implemented over the life of the project as monitoring indicates the need for mitigation implementation, as determined by the Bureau of Land Management (BLM) and United States Forest Service (USFS).

It should be noted that while a large portion of the impacted sage-grouse habitat is located on lands managed by the BLM, there is sage-grouse habitat proximate to the USFS proposed transmission line route. It should also be noted that known sage-grouse leks are located on both agencies' lands. However, it is presumed that not all leks have been identified. Thus, all mitigation discussions apply to both agencies land for sage-grouse mitigation when identified.

As noted in Chapter 3 of this Environmental Assessment (EA), all BLM/USFS clearances, including Section 106 of the National Historic Preservation Act (NHPA), Native American Consultation, Endangered Species Act, and Special Status Species clearances, along with migratory bird requirements will be completed prior to implementation of any sage-grouse habitat restoration/ enhancement projects.

#### **C.1.1 MITIGATION OF DIRECT EFFECTS ASSOCIATED WITH THE GEOTHERMAL COMPONENTS AND TRANSMISSION LINE**

##### **Key Issues for Sage-Grouse**

Impacts to sage-grouse include the loss of 217 acres of sage-grouse foraging and nesting habitat, including potential Category 1 habitat as defined by Nevada's Governor

Sage-Grouse Conservation Team (NGSCT 2010), resulting from direct and/or long-term surface disturbance associated with Project construction and operation. Effects of habitat fragmentation from this habitat loss would be concentrated around the plants, production and injection pipelines, and wells.

### **Mitigation Measures**

Ormat will complete, at a 4:1 ratio (NGSCT 2010), terrestrial habitat restoration/enhancement, and improvements to compensate for disturbance in sage-grouse habitat in the vicinity of the Project (Figure 1). Ormat will fund all restoration and enhancement projects to BLM and/or USFS specifications, following all BLM/USFS requirements.

At a 4:1 ratio, this equates to 868 acres (4 x 217 acres) of habitat restoration/enhancement. The potential or likely treatment areas to be restored/enhanced include BLM/USFS-managed lands within the vicinity of the Project area, as shown on Figure 1. These potential treatment areas will be identified on a case-by-case basis, based on field inventory of habitats, conditions, and potential value to sage-grouse as well as indications of effects to sage-grouse based on monitoring results. A preference will be given to areas in close proximity to the Project, but outside a two-mile buffer around the Project, thus minimizing any conflicting indirect effects of Project operation, testing, or maintenance. Preference for habitat restoration/enhancement treatment areas will also be given to locating restoration/enhancement in NDOW-designated sage-grouse core-breeding habitat (Figure 14 in the EA as denoted in light blue). While the project will directly and indirectly impact core-breeding habitat, the goal of the restoration/enhancement efforts will focus on entire habitat throughout the life cycle of sage-grouse. Habitat enhancement/restoration treatments will be prescribed for specific sites based on the probability of successful restoration/enhancement and the greatest benefit to local sage-grouse metapopulations (i.e., a group of spatially separated populations of the same species, which interact at some level). The determination of where a specific restoration/improvement/enhancement project is located and when work would be conducted would rest with the BLM/USFS to allow for incorporation of applicable study or monitoring data and identification of areas with the best habitat potential. Prior to implementation of these various or potential treatment options (and after an area is designated for treatment) cultural surveys and Native American Consultation/Coordination will be completed per BLM/USFS protocols.

Goals of these restoration/enhancement projects will be established based on habitat requirements for sage-grouse. Examples of these requirements include breeding habitats with 15 to 25% sagebrush canopy cover, grass cover greater than or equal to

15% and a diverse forb cover greater than or equal to 10%. Breeding habitats should also have a perennial herbaceous cover that is greater than or equal to 18 centimeters in height. In winter habitat areas, the sagebrush canopy cover should be 10 to 30% with heights of 25-35 cm (Connelly et al. 2000). Additional guidelines from the Western Association of Fish and Wildlife Agencies (Connelly et al. 2000) may be used in conjunction to those outlined above.

Restoration/enhancement projects could be completed in R-1, R-2, R-3, or R-4 value habitats (NGSCT 2010). These R-values are restoration habitats defined from the “Energy and Infrastructure Development Standards to Conserve Greater Sage-Grouse Populations and Their Habitats in Nevada” produced by the Nevada Governor’s Sage-Grouse Conservation Team 2010. Below are the descriptions for the associated R-values:

- “R-1 – Habitat areas that currently lack sufficient sagebrush and are currently dominated by perennial grasses and forbs, yet have the potential to produce sagebrush plant communities with a good understory composition of desired grasses and forbs.
- R-2 – Existing sagebrush habitat areas with insufficient desired grasses and forbs in the understory to meet seasonal needs of sage-grouse.
- R-3 – Sagebrush habitat areas where pinyon-juniper encroachment has affected the potential to produce sagebrush plant communities that provide adequate cover and forage to meet the seasonal needs of sage-grouse.
- R-4 – Habitat areas that have the potential to produce sagebrush plant communities, but are currently dominated by annual grasses, annual forbs, or bare ground.”

Treatments may include the following:

- Burn restoration (historic burns) including: seedings (sagebrush and understory vegetation via broadcast, broadcast and harrow, drill or hand planting of seedlings), noxious and invasive plant treatment (Plateau® for cheatgrass and other herbicides as needed for other invasive and/or noxious weed species), and possible temporary fencing to protect areas of restoration.
- Brush thinning via mechanical methods, herbicide or hand thinning followed by seeding (seeding to be done via broadcast or drill methods) to increase the diversity in monotypic sagebrush habitats;
- Mechanical or hand shrub thinning or green stripping to reduce fuels and fire risk to sage-grouse habitats followed with successful seeding (seeding to be done via broadcast or drill methods);

- Weed treatment followed with successful seeding (seeding to be done via broadcast or drill methods);
- Pinyon-juniper reduction by hand thinning areas in which shrubs are still the dominant form (Phase I pinyon-juniper woodland) or are co-dominant (early Phase II pinyon-juniper woodland).

### **Monitoring and Trigger Points**

Implementation of the above 4:1 land treatment options would be a requirement of the BLM/USFS approval of Ormat's various applications for the McGinness Hills Geothermal Development Project. For this aspect of the mitigation plan, the BLM/USFS, working with the NDOW have determined through the NEPA process that the loss of 217 acres of sage-grouse habitat will require 4:1 replacement (by enhancement and/or restoration of nearby habitat) of that lost habitat. The trigger points for implementation and location of habitat restoration/enhancement projects will be based on monitoring (see section C.2) and identified impacts of the project proposal.

### **Effectiveness of Proposed Mitigation**

These measures will improve sage-grouse habitat to substitute and offset the habitat lost through Project development (IM 2008-204). Increasing the quality and the quantity of sage-grouse habitat will benefit not only individuals but also the local population.

Restoration of burned areas will in time return those areas to sage-grouse habitat. Without sagebrush, the birds are less likely utilize or at best have limited use of the burned areas. Increasing the quality of the habitat through sagebrush and understory seedings, individuals are expected to once again utilize the areas.

Monotypic sagebrush habitats do not provide high valued habitat as they lack the majority, if not all, of the perennial understory. Breeding habitat should contain a sagebrush cover of 15 to 25% with greater than 15% for grasses and greater than 10% for forbs; winter habitat having sagebrush cover ranging from 10 to 30% (Connelly et al. 2000). By thinning sagebrush canopy cover to the desired amount and seeding the interspaces with desired native forbs and grasses, the habitat quality should increase. By green stripping and brush thinning to create fuel breaks, the likelihood of a catastrophic fire is reduced, in turn, protecting existing and potential enhanced/restored sage-grouse habitat.

Invasive and noxious weed species reduce the health of a sagebrush stand, in turn reducing the quality of sage-grouse habitat. Treating these species to remove them from the area increases the quality of habitat for sage-grouse.

Pinyon-juniper woodlands are expanding and encroaching into sagebrush communities throughout the Great Basin (Miller et al. 2008). This expansion and encroachment leads to a reduction in viable sage-grouse habitat. Hand thinning early phases of expansion/encroachment would return areas previously used by sage-grouse to quality habitat.

In order to protect the restored or enhanced habitat, temporary fencing may be used. Once restoration/enhancement objectives, as identified above, are achieved, these fences will be removed.

### **Mitigation Impacts**

Ormat's financial contributions that ensure the sage-grouse habitat will be replaced at a 4:1 ratio will have some financial impact to Ormat.

Any herbicide treatments for invasive or noxious weeds shall be completed within the constraints of the Battle Mountain Programmatic Weed Environmental Assessment (2009). Vegetation reseeding using mechanical means will result in some level of soil disturbance. Appropriate clearances prior to implementation of the reseeding efforts will avoid potential impacts to other resources. Successful establishment of vegetative understories and sagebrush communities over time will provide quality habitat restoration and enhancement for sage-grouse and sage-grouse broods, which should ensure propagation of the local populations.

Burned area reseeding of grasses, forbs and sagebrush seedlings and fencing such restoration habitat will re-establish sage-grouse habitat over time. The restored areas will provide additional quality habitat, thus allowing sage-grouse populations to re-establish formerly destroyed habitats.

Fencing of restored/enhanced habitat, depending on the size of the project, could reduce a portion of the grazing permittee's carrying capacity. Agreements for fencing with the permittee/s will be required prior to fencing such projects. Ormat will be required to maintain all restoration/enhancement project fences.

Hand thinning of pinion/juniper expansion and encroachment into sage-grouse habitat will have a positive effect on sage-grouse habitat since both types of trees limit understory growth. Removal of individual trees will limit competition for nutrients and water, thus providing opportunities for understory growth.

Where prescribed, hand thinning will be conducted by individuals on foot, using chainsaws and handsaws to remove individual trees. Trees may be left on the ground to decompose naturally over time, providing microsites for establishment of desirable plant species and habitat for small animals such as rabbits and mice.

Mechanical brush thinning or green stripping to reduce wildland fire threats to sage-grouse habitat will assist firefighters in reducing the size and intensities of potential wildland fire threats to existing sage-grouse habitats. Mechanical or hand thinning of brush will reduce horizontal and vertical continuity of fuel beds. Short-term loss of some habitat may occur. Soils may be disturbed if mechanical thinning occurs. Potential impacts to other resources will be reduced by implementation of requisite clearances prior to thinning applications. Long-term protection of remaining sage-grouse habitat may occur as a result of reduced fire intensity or fire size in existing habitat.

The changes in sage-grouse habitat by increasing diversity through seeding, seedlings, plantings, etc. will improve habitat quality, reduce the potential for plant disease, and improve sage-grouse propagation and survivability.

### **C.1.2 MITIGATION OF PREDATION EFFECTS ASSOCIATED WITH THE TRANSMISSION LINE**

#### **Key Issues for Sage-Grouse**

The primary impact from the proposed transmission line is the increased predation risk due to an increased presence of common ravens and other avian predators resulting from added perching and nesting sites associated with the transmission line.

#### **Mitigation Measures**

The Project would require the implementation of the Common Raven Monitoring, Mitigation, and Management Plan (Appendix D). This plan includes the following mitigation measures:

- During all phases of the Project (i.e., construction and maintenance), all food, waste, and trash will be placed in closed containers.
- Ormat will prohibit employees, contractors and sub-contractors from feeding wildlife or leaving food available for scavenging wildlife.
- Road-killed animals on the Project site and associated travel routes will be promptly removed and disposed of in closed containers to eliminate access to ravens.
- Presence of road-killed animals will also be minimized by Ormat's environmental protection measure of a maximum 25 mph speed limit within the Project area.
- Ormat has committed to implement the following environmental protection measures: perch and nest deterrents on all power poles; single-pole transmission line design (APLIC 2006).
- Ormat will acquire common raven depredation permits from NDOW or USFWS.

**Monitoring and Trigger Points**

For all aspects of the monitoring plan for sage-grouse impacts, refer to Section C.2. This mitigation is required; there are no trigger points.

**Effectiveness of Proposed Mitigation**

These measures will lead to a decreased presence of common ravens and other avian predators within the vicinity of the project, thereby decreasing predation risk to sage-grouse. Travel speeds of <25 mph will also decrease the probability of collisions with animals.

**Mitigation Impacts**

The requirement to properly collect all food, waste, and trash are Best Management Practices and State requirements for all industrial plant operations. These are considered operating costs for Ormat.

Acquiring depredation permits will add to Ormat's ability to maintain lower numbers of ravens. In turn, this reduction will lower potential predation on sage-grouse by ravens. The prohibition of workers feeding wildlife or leaving food at the project or construction sites will limit the likelihood of attracting wildlife (e.g., common ravens and raptor species). Removal of road kill will limit the attraction of ravens, buzzards, and other carrion eating raptors such as golden eagles; thus, limiting the likelihood of additional predation on sage-grouse. Speed limits proposed by Ormat on their workers, contractors, and sub-contractors should limit accidents that may kill or maim animals.

Application of the 2006 APLIC standards should limit perching opportunities of raptors on sage-grouse. These standards should also prevent the accidental electrocution of most avian species, especially eagles and large hawks. Application of APLIC standards to transmission line facilities will be an additional financial burden to Ormat through the purchase and use of anti-perching devices and changes in engineering design of conductors to limit potential electrocution of most avian species.

**C.1.3 MITIGATION OF INDIRECT EFFECTS TO SAGE-GROUSE LEKS FROM GEOTHERMAL PROJECT CONSTRUCTION, TESTING, AND MAINTENANCE  
Key Issues for Sage-Grouse**

Indirect effects to sage-grouse during lekking season resulting from noise, visual intrusion and human activity associated with geothermal project construction, testing, and maintenance.

**Mitigation Measures**

- Ormat will ensure that timing of shift changes and deliveries will be scheduled outside the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).
- Venting pressure or steam to the atmosphere (e.g., during well or flow testing) would occur outside the lekking period (March 15-May 15, 1 hour before sunrise– 10:00 AM).
- Construction or maintenance activities (including helicopter fly-overs) associated with well pads, pipelines, transmission lines, plant facilities, and roads will not be permitted within two miles of active leks (see Sage-Grouse Population Monitoring below) during the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).
- Noise generated by the Project will be managed so that sound pressure levels will be below 49 dBA (MTSGWG 2005; NDGFD 2005; WYSGWG 2006) at active leks (see Sage-Grouse Population Monitoring section below) during the lekking period (March 15-May 15, 1 hour before sunrise–10:00 AM).

**Monitoring and Trigger Points**

For all aspects of the monitoring plan for sage-grouse impacts, refer to Section C.2.

This mitigation is required; there are no trigger points.

**Effectiveness of Proposed Mitigation**

Reduction of noise, visual, and human activity disturbances associated with the Project during the lekking season at the time of day lekking occurs will reduce the disturbance on a lek. Diminished disturbance to the lek will likely lessen the chance of lower male attendance, shifting of lek locations, or loss of active lek locations.

**Mitigation Impacts**

The shift changes proposed from March 15 through May 15 may be a minor inconvenience to plant employees and operations of the facilities during these periods. There should be no financial burden to Ormat from implementation of this mitigation.

The requirement to vent steam outside of the prescribed times may delay testing procedures for Ormat. Since such test procedures are usually longer than twenty-four hours, Ormat will be required to forgo such tests during the prescribed periods.

Finalization of construction and maintenance activities for well placement, pipelines, etc. are required for development of power plant and appurtenant facilities. Implementation of the above mitigation may delay full or timely facility development.



See Section C.2.1 for an analysis of the impacts of the proposed noise mitigation.

#### **C.1.4 MITIGATION OF DIRECT AND INDIRECT EFFECTS TO NESTING SAGEGROUSE FROM THE GEOTHERMAL PROJECT**

##### **Key Issues for Sage-Grouse**

In addition to direct effects, Project impacts to nesting sage-grouse are expected from indirect effects such as noise, human activity, and habitat fragmentation. The greatest impacts to nesting sage-grouse are expected during Project construction due to nest abandonment.

##### **Mitigation Measures**

During the period from March 15 to June 30, nest “clearance” surveys will be conducted prior to any proposed surface-disturbing activities. The area to be disturbed and a 0.5-mile radius buffer will be surveyed by BLM/USFS-approved specialists to determine if nesting sage-grouse are present. If an active nest is located, a 0.5-mile radius buffer will be placed around the nest and no surface-disturbing activities will occur until the nest is vacated.

##### **Monitoring and Trigger Points**

For all aspects of the monitoring plan for sage-grouse impacts, refer to Section C.2. This mitigation is required; there are no trigger points.

##### **Effectiveness of the Proposed Mitigation**

These measures will decrease the chance of nest destruction or abandonment due to construction and surface-disturbing activities.

##### **Mitigation Impacts**

By avoiding any occupied nest during construction, the likelihood of nest success would be increased, thus ensuring propagation of the local sage-grouse populations.

Should Ormat pursue construction or other surface-disturbing activities during nesting periods, and a nest is found within the construction zone or within the 0.5-mile buffer zone, construction delays for those aspects of the project would occur.

#### **C.1.5 MITIGATION OF INDIRECT EFFECTS OF THE PROJECT TO SAGEGROUSE BROOD-REARING HABITAT**

##### **Key Issues for Sage-Grouse**

Several springs, seeps, wet meadow, and riparian areas occur in close proximity to components of the Project. Although it is unknown to what extent these areas are being utilized by sage-grouse, any use by sage-grouse would likely be reduced or

discontinued during and after Project development. The project is anticipated to impact 34 acres of brood-rearing habitat.

### **Mitigation Measures**

Ormat will complete treatments at a 4:1 ratio (NGSCT 2010) to protect, enhance and/or restore brood-rearing habitat in targeted locations (Figure 1) on BLM- or USFS-managed land near the Project; this equates to 136 acres (4 x 34 acres). The specific areas to be treated will be identified on a case-by-case basis, determined by field inventory of habitats, conditions, and potential value to sage-grouse. Treatments will be prescribed for specific sites based on the probability of successful restoration/enhancement and the greatest benefit to local sage-grouse metapopulations. The design for these projects will allow access to water for beneficial use through the use of water gaps. Placement and construction of exclosures will also need general concurrence from the appropriate permittee/s. Ormat will fund all such restoration/enhancement/protection projects to BLM or USFS specifications.

- Treatments may include fencing of riparian areas and meadows for protection, plantings or seedings of desired native riparian species to increase biodiversity and habitat condition, stream restoration to improve riparian areas where there are currently incised channels or nick points, and treatment of invasive and noxious weeds (e.g., salt cedar). Stream restoration may include check dams, rip/rap fortification of damaged banks and nicks, and large boulder placement within stream channels to decrease water velocity during peak flows.
- Riparian exclosures may be grazed if the BLM or USFS determine that it would be beneficial to riparian health. Specifics of this grazing will be based on a return to a healthy riparian condition based on current sage-grouse guidelines and working with the local grazing permittee/s.

### **Monitoring and Trigger Points**

For all aspects of the monitoring plan for sage-grouse impacts, refer to Section C.2. This mitigation is required; there are no trigger points.

### **Effectiveness of Proposed Mitigation**

These treatments will improve sage-grouse brood-rearing habitat to substitute and offset the habitat lost through Project development (IM 2008-204). Riparian areas and meadows are important habitat for sage-grouse brood-rearing. Having healthy riparian areas and meadows that support the native forb species and invertebrate fauna is imperative (Sveum et al. 1998). Excluding riparian areas and meadows from grazing until deemed beneficial, protects the health of those areas. Managed grazing within

these exclosures may increase species diversity with desired native species valuable to brood rearing habitat.

Sage-grouse chicks require a diet high in protein that consists mainly of forbs and insects (Sveum et al. 1998). The cover that a healthy riparian habitat provides may reduce predation from terrestrial and avian predators on sage-grouse broods. Effectively protecting and increasing the condition of the riparian habitats provides an improved value of brood-rearing habitat.

Incised channels and nick points degrade the stream habitat and can reduce the size and health of riparian areas. Resolving those stream issues will increase the riparian health and increase the quality of the habitat.

### **Mitigation Impacts**

Riparian exclosures (fences) positively impact riparian health and may increase diversity of desired native species and improve cover and diet for sage-grouse broods. Positive changes in stream morphology will lead to higher perennial water yields, resistance to spring flood events, and improved stream water quality.

The successful planting or seeding of desired riparian vegetation when combined with exclosure fencing will hasten recovery of vegetation, increase species diversity, and enhance the overall recovery of damaged riparian areas.

Stream channel restoration of incised channels and nicks with check dams, rip/rap fortification, and boulder placement will limit future riparian habitat loss by reducing stream bank erosion during high water events. Overtime, these structures will be silted in; preventing soil loss and decreasing nick and stream incising.

Fencing springs, seeps, meadows, and riparian areas may provide perching opportunities for raptors; which may lead to some predation of sage-grouse and other animals.

## **C.1.6 MITIGATION OF INDIRECT EFFECTS ASSOCIATED WITH THE VISUAL PRESENCE OF PROJECT COMPONENTS**

### **Key Issues for Sage-Grouse**

Indirect effects to sage-grouse may occur during all seasons resulting from human activity and visual disturbances associated with the geothermal components of the Project.

**Mitigation Measures**

Where Project lighting is required, low output, motion sensor lights will be installed at facilities and must be shielded and directed to focus light only on the area requiring illumination. In addition to limiting human activity impacts to sage-grouse, such lighting will assist Ormat in meeting the National Dark Skies initiative where ambient nighttime lighting has been identified as causing potential impacts to many wildlife species including volant species such as bats.

Non-reflective, tinted windows will be utilized in Project buildings to reduce visual disturbance.

**Monitoring and Trigger Points**

For all aspects of the monitoring plan for sage-grouse impacts, refer to Section C.2. This mitigation is required; there are no trigger points.

**Effectiveness of the Proposed Mitigation**

Reduced disturbance from visual and human activities will minimize effects to sage-grouse that could otherwise increase shifts of individuals or groups of sage-grouse away from the immediate Project area.

**Mitigation Impacts**

Low output, shielded and motion sensor lights could cost more than other types of lighting, increasing costs to Ormat.

Reduced ambient light emanating from the construction sites and operational facilities of the Project would create less visual disturbance to sage-grouse and other wildlife.

Any ambient nighttime light emanating from the facility or construction site (as compared to the current, unlighted desert setting) could cause a concentration of insects and other prey bases for bats, night hawks and other insectivores in the vicinity of the light source. Possible collisions by nighttime insectivores with construction equipment or completed plant facilities could increase, leading to volant fatalities. Ormat would be required to report to the NDOW and the BLM any incidents of such fatalities.

Non-reflective tinted facility windows will likely be more costly to Ormat than regular glass windows. Conversely, the likelihood of volant mortality caused by window strikes will be reduced. Solar glare will be reduced from facility windows, reducing visual disturbance to sage-grouse and other wildlife (e.g., attraction to or avoidance of the project site).

## **C.2 MONITORING OF MITIGATION MEASURE EFFECTIVENESS**

All mitigation measures outlined above are effective for the life of the Project unless subsequent monitoring deems them inadequate and modification is necessary.

Subsequent monitoring will include sound pressure level monitoring (see below), sage-grouse population monitoring (see below), and common raven population monitoring (Appendix D). Because time lags in sage-grouse response to development have been documented (Walker et al. 2007; Harju et al. 2010), all monitoring will be conducted for a minimum of 10 years, commencing with construction of permitted activities.

### **C.2.1 SOUND PRESSURE LEVEL MONITORING WITHIN THE PROJECT AREA AND 2-MILE BUFFER**

The main goal for sound pressure level monitoring is to ensure sound pressure levels are below 49 dBA (MTSGWG 2005; NDGFD 2005; WYSGWG 2006). By recording daily sound pressure levels and monitoring sage-grouse activity at lek locations, a determination can be made as to the adequacy of the 49 dBA level to protect sage-grouse leks (see Sage-grouse Population Monitoring below). During the lekking season (March 15-May 15), when leks are active (one hour before sunrise –10:00 AM), continuous sound pressure level monitoring will be conducted at the four leks closest to the Project using appropriate acoustic monitoring equipment. To determine seasonal lek locations, at least one lek survey would be completed prior to placement of monitoring equipment. Acoustic monitoring equipment will be placed at the lek edge closest to the Project during the afternoon (12:00 –16:00) to avoid disruption to lek activity. During the lekking season, Ormat is required to monitor sound pressure levels daily and report any levels of 49 dBA and above to the BLM immediately. Weekly reports of monitoring will also be filed with the BLM.

#### **Mitigation Measures**

Future mitigation measures to reach appropriate sound pressure levels include the following:

- Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing Project equipment during lekking hours (one hour before sunrise–10:00 AM) during the lekking season (March 15-May 15);
- Employment of an acoustic engineer to identify and assess options to further reduce noise from Project components;
- Installation of sound damping shelters, walls, enclosures, or other barriers for pumps or other noise-producing equipment to reduce noise emitting from geothermal facilities (e.g., power plant, wellheads, etc.);

- Reducing the amount or changing the timing of project related vehicular traffic;
- Installing poly-slats on chain link fences or other barriers around geothermal facilities to further attenuate noise emitted from those facilities.

**Trigger Point*****Threshold:***

If through daily monitoring, sound pressure levels are documented that exceed 49 dBA at any lek, Ormat must implement additional mitigation measures to reduce sound pressure levels below 49 dBA immediately. Sound pressure level monitoring data documenting successful reduction in dBA levels must be demonstrated and reported to the BLM within one week of the occurrence.

**Effectiveness of Proposed Mitigation**

By reducing noise disturbances associated with the Project during the lekking season at the time of day lekking occurs, disturbance to a lek will be reduced. The diminished disturbance to the lek will reduce the chance of lowered male lek attendance, shifting of lek locations, or loss of active lek locations due to sound disturbance.

**Mitigation Impacts**

Modification of plant operations to reduce noise impacts, employment of an acoustic engineer, and installation of sound dampening barriers will increase operational costs to Ormat. Any operational changes resulting from additional plant modifications prescribed by the acoustical engineer will also likely increase Ormat's operational costs.

By reducing noise levels from plant operations, impacts to occupied sage-grouse leks should be reduced or eliminated, thus enabling lek activities to continue and protecting displaying males from noise disturbance.

**C.2.2 SAGE-GROUSE POPULATION MONITORING WITHIN THE PROJECT AREA AND 2-MILE BUFFER**

Annual monitoring of sage-grouse leks will be required. This includes both active leks and leks with unknown status, until those leks with unknown status are determined to be inactive. Conversely, if any unknown status leks are determined to be active, the active leks mitigation would apply. Data sheets or copies of these data sheets will be provided weekly to the BLM, NDOW and USFS. Lek surveys must be completed by BLM/USFS-approved biologist/s following standard lek survey protocol (Attachment 1) and ensure the following:

- Surveys must be conducted between March 15 and May 15 of each year. Male lek attendance is typically greatest later in the season; thus, adjustments to lek survey schedules may be needed to collect accurate data.
- Surveys must be conducted at least four times per lek during the lekking season with eight days between lek visits.
- A center point of the lek activity will be recorded during each monitoring visit to document any shift in the lek location over time. The center point location will be recorded with a GPS unit either after lek activity has dispersed or by projecting the location using a rangefinder and compass bearing.
- Surveys must be conducted from one-half (1/2) hour before sunrise until 10:00 AM each survey period.
- Utilizing current roads, transects will need to be completed within the 2-mile project buffer area to look for new leks. This will also need to be completed within the above seasonal and daily time frames.

To account for and evaluate annual climatic variations that may be influencing male lek attendance, the results from each of the monitored leks should be compared to the closest NDOW trend leks outside the Project influence.

Monitoring movements of sage-grouse at the affected leks will be conducted through radio-telemetry efforts. This monitoring will provide additional information should shifts in lek locations occur after the Project has been initiated. All efforts regarding capture and telemetry will be the responsibility of Ormat through coordination with the BLM, USFS and NDOW. A minimum of three males and three females per targeted lek will be monitored per season for all affected leks. A minimum of one GPS radio-collar per lek per sex will be utilized. If radio-collars continue to function annually, the same males and females as previous years may be monitored. Monitoring will occur at minimum once per week during the lekking season (March 15-May 15), and once per month outside of the lekking season.

***Threshold:***

If population monitoring detects any of the following conditions and they are determined to be a result of the Project, Ormat must take measures to mitigate these impacts.

- >50% decrease in the average three-year lek attendance compared to the long-term average.
- >50% decrease in male lek attendance in two consecutive years of monitoring.

## MITIGATION

Mitigation measures to eliminate decreased male lek attendance:

- Reduction in sound pressure level to 40 dBA (Crompton 2005) at sage-grouse leks must be demonstrated during the next lekking season. This may be accomplished by adjusting to stricter levels of the previously identified measures:
- Modifying operations to reduce the use of cooling fans, pumps, or other noise-producing Project equipment during lekking hours (one hour before sunrise– 10:00 AM), during the lekking season (March 15-May 15);
- Employment of an acoustic engineer to identify and assess options to further reduce noise from Project components;
- Installation of sound damping shelters, walls, enclosures, or other barriers for pumps or other noise-producing equipment to reduce noise emitting from geothermal facilities (e.g., power plant, wellheads, etc.);
- Reducing or changing the timing of vehicular traffic;
- Installing poly-slats on chain link fences or other barriers around geothermal facilities to further attenuate noise emitted from those facilities.

### Effectiveness of Proposed Mitigation

Reducing noise disturbances associated with the Project during the lekking season at the time of day lekking occurs will reduce the disturbance to a lek. The diminished disturbance to the lek will likely lessen the chance of lower male lek attendance.

### Mitigation Impacts

Refer back to C.2.1 “Mitigation Impacts” for a discussion of the above mitigation impacts.

## C.3 REPORTING

An annual report documenting results from sound pressure level monitoring and sage-grouse lek and nest monitoring will be submitted to the BLM, USFS and NDOW no later than August 31 each year. Reports should include the following:

- Sound pressure level monitoring results, including daily dBA levels during the outlined lekking season and times; location (UTM NAD83) of acoustic monitoring equipment; any isolated incidents that may have increased dBA levels temporarily



- Sage-grouse lek monitoring, including lek count data sheets, center point of sage-grouse leks (UTM NAD83), isolated incidents disturbing sage-grouse lekking activities
- Sage-grouse radio-telemetry results
- Sage-grouse nest sites (UTM NAD83) found during “clearance” surveys or collected opportunistically through other monitoring activities.
- If future mitigation measures are implemented, identification and a detailed description of the mitigation measure and date of implementation will also be reported.

An annual meeting, to be held in the winter months, with Ormat, contractors, BLM, USFS, USFWS and NDOW. This meeting will involve a presentation and discussion of the previous year’s monitoring data and further discussions regarding activities and requirements for the coming year.

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## Attachment 1

### LEK COUNT/LEK ROUTE PROTOCOLS

#### NEVADA DEPARTMENT OF WILDLIFE INSTRUCTIONS FOR GREATER SAGE-GROUSE LEK COUNTS

- 1) Arrive at the lek at least 45 minutes before sunrise.
- 2) Do not approach any closer than about 200 yards from the lek. This will prevent disturbance of the birds while strutting.
- 3) Conduct all counts between 30 minutes before sunrise and 1.5 hours after sunrise.
- 4) If at all possible, observe the lek from inside your vehicle. Sage grouse are less sensitive to the approach of a vehicle and its presence than they are to you.
- 5) Note your arrival time and departure time on the lek count form.
- 6) Obtain a minimum of three counts at 15-minute intervals of each lek on each date counted. A count of males, females, and unknown birds is always preferable to a flush count.
- 7) In the comments section of the form, please note the following information
  - a. Wind direction and speed
  - b. Temperature in degrees Fahrenheit
  - c. Ground condition – dry, muddy, snow (depth in inches)
  - d. Cloud cover in the following manner:
    - i. Clear
    - ii. Partly cloudy (less than 25% cover)
    - iii. Scattered (more than 25% but scattered horizon to horizon)
    - iv. Cloudy (more than 50% cover)
    - v. Foggy
- 8) Note the presence of predators by species, time and activity: Example – golden eagle @ 6:45 a.m. flying over lek; coyote chasing grouse at 8:15 a.m.
- 9) Be sure to use the common name of the lek

#### INSTRUCTIONS FOR GREATER SAGE-GROUSE LEK ROUTES

As established by Connelly et al. (2003) in Monitoring Greater Sage-grouse Habitats and Populations.

In many portions of Nevada, lek routes can only be conducted in limited areas because of remote lek locations and limited access because of both spring runoff conditions and the lack of roads.

Lek routes should only be conducted when weather conditions are characterized by clear to partly cloudy skies and winds less than 15 kph.

Each route should be repeated at least four times during the spring. The Nevada Department of Wildlife recommends alternating travel routes when conducting the survey. For example, the first lek surveyed on a route in late March would be the last lek surveyed on a subsequent survey.

Conduct lek routes in late March, early April, mid April, and late April. Counts may begin a week earlier in weather conditions permit or where lek occur in lower elevations and can also be extended a week in higher elevations when snow conditions permit.

- 1) Conduct all route surveys between 30 minutes before and 1 hour after sunrise for a total survey period of 1.5 hours.
- 2) Locate a spot that provides good visibility of the entire lek. If the lek is very large (100 or more birds) it may be necessary to select two vantage points.
- 3) Record the time that the count begins
- 4) Count the birds from left to right (or vice versa)
- 5) Wait one to two minutes, then count from right to left
- 6) Obtain at least three counts of birds
- 7) Record the high number of males and females separately, and then move on to the next lek.
- 8) If a lek is not occupied (and it had been in the previous weeks or years), the observer should leave his/her vehicle and (with the engine off) listen for sounds of displaying grouse.



## NEVADA DEPARTMENT OF WILDLIFE

### LEK COUNT DATA COLLECTION FORM



#### LEK ATTRIBUTES

LEK NAME: \_\_\_\_\_ LEK ID: \_\_\_\_\_

GPS COORD (NAD83): \_\_\_\_\_ EASTING \_\_\_\_\_ NORTHING \_\_\_\_\_ NEW/UPDATED: ☐ (only if lek is new or has moved substantially)

#### SURVEYOR ATTRIBUTES

DATE OF SURVEY: \_\_\_\_\_  
 OBSERVER NAME(S): \_\_\_\_\_  
 SURVEY METHOD\*: \_\_\_\_\_  
 LEK ACTIVITY: \_\_\_\_\_

#### LEK COUNT DATA

	COUNT 1	COUNT 2	COUNT 3	COUNT 4
MALES:	_____	_____	_____	_____
FEMALES:	_____	_____	_____	_____
UNKNOWN:	_____	_____	_____	_____
HIGH COUNT    MALES:	_____	FEMALES:	_____	UNKNOWN: _____

#### SURVEY ATTRIBUTES

SURVEY START TIME: _____	WIND SPEED: _____	(Consult Beaufort Wind Scale - on back)
SURVEY END TIME: _____	PRECIPITATION: _____	(None, Rain, Snow, Sleet, Hail)
TEMPERATURE (F°): _____	CLOUD COVER: _____	(0-25%, 25-50%, 50-75% or 75-100%)
RECENT SIGN OBSERVED?: <input type="checkbox"/>	(Y or N, use for new locations or if birds are absent and ground search was conducted)	

COMMENTS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### \* Survey Methods:

Lek count - lek count conducted during ground survey of **this lek site** only  
 Lek route - lek count conducted during ground survey of **several known** lek sites  
 Lek survey - lek count conducted **during ground survey for new lek sites**  
 Helicopter (route) - count conducted during aerial survey of **several known lek sites**  
 Helicopter (survey) - count conducted during aerial **survey for new lek sites**  
 Fixed-wing - count conducted during aerial survey from fixed-wing aircraft

**!!! In addition please indicate what you did: Glass count only, glass and flush, glass and ground search, etc.**

Form Revised: 1\_30\_14

**Beaufort Wind Scale**

0	1 mph	Calm	Smoke rises vertically.
1	2 mph	Light	Smoke drifts.
2	5 mph	Light Breeze	Leaves rustle.
3	10 mph	Gentle Breeze	Lighter branches sway.
4	15 mph	Moderate Breeze	Dust rises.
5	21 mph	Fresh Breeze	Branches sway.
6	28 mph	Strong Breeze	Small trees sway.
7	35 mph	Moderate gale	Larger branches move.
8	42 mph	Fresh gale	Trees move.
9	50 mph	Strong gale	Twigs break.
10	59 mph	Whole gale	Branches break.
11	69 mph	Storm	Trees fall.
12	75+ mph	Hurricane	Violent blasts.
			Structures shake.

## **Appendix L: Emergency Action Plan**

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# Eastern Nevada Operations

**ORMAT®**



Group	Site Safety Procedure	Procedure No.	MH-SAF-SSP-08
Title:	Emergency Action Plan Procedure – McGinness Hills 1&2	Revision:	1
Approval:		Date:	Dec 19, 2014
		Page:	1 of 21

**WARNING:**

This document may be printed from Ormat's SharePoint site. The user has the responsibility of the appropriate use of it, including the verification of the applicable revision. The use of a non-applicable document will be considered as nonconformity.

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## LIST OF ACRONYMS

CRO:	Control Room Operator	CCW:	Counter Clockwise
CW:	Clockwise	EAP:	Emergency Action Plan
HMI	Human Machine Interface	IAW:	In accordance with
LEL	Lower Explosive Limit	MOC:	Management of Change
Maint	Ormat plant maintenance personnel including mechanics and instrument & electrical technicians	NDEP CAPP	Nevada Division of Environmental Protection, Chemical Accident Prevention Program
OEC	Ormat Energy Converter	OSHA:	Occupational Safety and Health Administration
PO	McGinness Hills Plant Operator	SP:	Safety Procedure (issued by corporate office)
SOP:	Standard Operating Procedure	UV / IR	Ultra Violet / Infra Red
SSP:	Site Safety Procedure	VOI	Voice Over Internet

## SITE SAFETY PROCEDURE LIST

SSP-03	Hazardous Communication (HAZCOM)
SSP-04	Written Workplace Safety Program (WWSP)
SSP-05	Contractor Safety
SSP-08	Emergency Action Plan (EAP)
SP-15	Lockout/Tagout
SP-16	Confined Space Entry
SSP-18	Hot Work
SSP-19	Controlled Access
SSP-22	Procedure Writing, Implementation & Control
SSP-25	Program Management Plan & Document Control
SSP-26	Breaking System Integrity
SSP-23	Mechanical Integrity
SSP-28	Incident Investigation
SSP-29	Employee Participation
SSP-33	Training & Qualification Program
SSP-35	Pre-Startup Safety Review
SSP-37	Management of Change
SSP-38	Compliance Audit Program

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## 1. PURPOSE

This EAP has been developed specifically for the McGinness Hills Plants 1&2 to:

### 1.1 Ensure that personnel:

- 1.1.1 Know how to recognize an emergency so that they know when to initiate this plan.
- 1.1.2 Know how and when to make notification of the emergency to the emergency responders so that the appropriate assistance is provided.
- 1.1.3 Know which actions they may perform prior to evacuation.
- 1.1.4 Know the expectation with regard to rescue and medical duties.
- 1.1.5 Know how to evacuate and account for anyone on site.
- 1.1.6 Know how to interact with emergency responders.

### 1.2 Provide a comprehensive emergency response training tool.

### 1.3 Provide direction to company management on how to coordinate, maintain and re-evaluate this plan.

### 1.4 Facilitate compliance with the emergency response requirements codified in state and federal regulation.

## 2. SCOPE

### 2.1 This procedure applies to:

- 2.1.1 All personnel working at the McGinness Hills 1&2 Power Plants or monitoring the McGinness Hills plants from the Eastern NV Ops control room.
- 2.1.2 Any visitors to the McGinness Hills plants, including contractors.

### 2.2 This procedure incorporates:

- 2.2.1 The Emergency Action Plan (Appendix A)
- 2.2.2 Supporting documentation for EAP training (Sections 3 through 12 and Appendix B)
- 2.2.3 An implementation plan for complying with the Nevada regulatory requirements for the Emergency Action Plan (Appendix C)

## 3. PROGRAM RESPONSIBILITIES

### 3.1 The responsibility for following this procedure is binding upon all employees, temporary employees, contractors, and support personnel. Willful violation of the procedural requirements defined in this procedure will result in disciplinary action up to and including termination.

### 3.2 While engaged in the implementation of the emergency action plan note that *personal safety is never to be compromised to protect plant equipment.*

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### **3.3 Plant Manager:**

- 3.3.1** Has overall responsibility for the development and implementation of the EAP at his or her respective facilities. Coordinates changes to this plan with other plant locations to ensure that the emergency response philosophy remains consistent.
- 3.3.2** Notifies the Vice President of Operations of the activation of the Emergency Action Plan.
- 3.3.3** Serves as the primary contact with the press until either the Vice President of Operations or corporate public relations personnel are available.
- 3.3.4** Provides a point of contact for additional training in the event that any individual does not understand their specific duties or responsibilities under this procedure.

### **3.4 Site Operations & Maintenance Manager:**

- 3.4.1** Fills the responsibilities of the Plant Manager in the event that they are not available during an emergency.
- 3.4.2** Assists CRO and PO with implementation of the emergency action plan.
- 3.4.3** Contacts the HAZMAT responder to perform site cleanup and decontamination after pentane spills or after an FM-200 discharge.
- 3.4.4** Provides a point of contact for additional training in the event that any individual does not understand their specific duties or responsibilities under this procedure.

### **3.5 EHS Coordinator:**

- 3.5.1** Ensures alarm indications and detector locations are verified adequate by visual and audible inspection as noted in Appendix C.
- 3.5.2** Trains Ormat operations and maintenance personnel in the EAP.
- 3.5.3** Coordinates an annual EAP drill following the guidance provided in this procedure.
- 3.5.4** Ensures on an annual basis:
  - 3.5.4.1** All comments and issues generated by the most recent drill or actual emergency have been reviewed and incorporated into the EAP, consistent with the requirements of this procedure, the incident investigation procedure and the MOC procedure.
  - 3.5.4.2** The EAP reflects the current configuration for the plant, the process, the alarms, and the organization. Also ensure that the procedure reflects how emergency response is implemented.
  - 3.5.4.3** The correct EAP revision is present in the plant control room and the remote control room.
  - 3.5.4.4** Contacts the emergency response organizations to review the EAP and ensures that the responders listed in Section 5 have the current EAP revision.
- 3.5.5** If EAP revisions are deemed necessary, works through the plant manager to propose changes to this procedure as events or findings identify the need.
- 3.5.6** Provides a point of contact for additional training in the event that any individual does not understand their specific duties or responsibilities under this procedure.

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### **3.6 Control Room Operator (CRO):**

- 3.6.1** Directs the implementation of the EAP.
- 3.6.2** Upon notification from the site or through the control network that an emergency has occurred, works with the PO to implement the EAP. Dedicated support is required from the CRO since the PO may not have the ability to initiate control actions or make emergency responder notification.
- 3.6.3** Informs the PO specifically which device is in alarm because the PO may not be in the vicinity of the computer screen at the time of the alarm. Remains in contact with the PO throughout the emergency.
- 3.6.4** Makes emergency responder notifications as requested by the PO or as circumstances dictate.
- 3.6.5** Notifies Ormat management of emergency.
- 3.6.6** In the event of an evacuation, communicates with the PO to account for all personnel.
- 3.6.7** Logs the event on the Control Room Shift Log throughout the entire emergency event.
- 3.6.8** Establishes communications with the emergency response personnel, and / or Ormat personnel on site for the duration of the emergency.

### **3.7 Plant Operator (PO):**

- 3.7.1** Works with the CRO to implement the EAP. The PO must remain in contact with the CRO throughout the emergency as the CRO will provide location-specific alarm status and will be available to provide any other assistance as required.
- 3.7.2** Performs rescue and medical duties pursuant to guidelines presented in this procedure.
- 3.7.3** Meets emergency services personnel and briefs them of the situation to include: equipment status, status of electrical power, list of any missing personnel and what is involved in the emergency.

### **3.8 Plant Mechanics and Electrical, Instrument & Controls Technicians (Maint):**

- 3.8.1** Upon stand-down alarm, congregate in designated plant safe areas.
- 3.8.2** Upon evacuation alarm, evacuate unless requested by the PO to assist with any duties that may be defined in this procedure.
- 3.8.3** Perform rescue and medical duties pursuant to guidelines presented in this procedure.
- 3.8.4** If the PO is incapacitated, take direction from the CRO during the emergency and serve as the liaison with the emergency responders.

### **3.9 Contract personnel (Contractor):**

- 3.9.1** Upon stand-down alarm, congregate in designated plant safe areas.
- 3.9.2** Upon evacuation alarm, evacuate pursuant to guidelines presented in this procedure.

### **3.10 Other Ormat Personnel and non-Ormat visitors (visitors):**

- 3.10.1** Upon stand-down alarm, congregate in designated plant safe areas.
- 3.10.2** Upon evacuation alarm, evacuate pursuant to guidelines presented in this procedure.

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## 4. TRAINING

- 4.1 The CRO, PO, Plant Mechanics, Electrical, Instrument & Control Technicians and Plant Supervision are all trained in the EAP pursuant to SSP-33. This training includes certification in 1<sup>st</sup> Aid, CPR and bloodborne pathogens.
- 4.2 The contractors are trained in the EAP pursuant to SSP-5.
- 4.3 Other plant visitors are trained in their EAP duties pursuant to the controlled access procedure, SSP - 19.
- 4.4 All training records will be maintained in accordance with SSP-33, SSP-05, and SSP-19.
- 4.5 Initial review of the EAP shall be completed with Emergency Services Personnel including a tour of the site, gas and fire detection system operations, and familiarization with the motive fluid characteristics. Additional review will also be provided as needed or requested by Emergency Responders. Emergency responder participation in annual drills should be encouraged.
- 4.6 Refresher training for plant personnel defined in section 4.1 shall be conducted annually at a minimum or when:
  - 4.6.1 There is a significant change in policy or procedure.
  - 4.6.2 There is a change in job assignments as they pertain to the EAP procedure.
  - 4.6.3 A change in equipment / systems presents a new hazard.
  - 4.6.4 When an employee(s) fails to demonstrate understanding of the EAP

## 5. EMERGENCY RESPONDER COORDINATION

- 5.1 Fire, police, and/or ambulance crews will be called as necessary. There are no plant alarms that automatically notify any emergency responder. Guidance on making emergency responder notification is provided in the EAP, which is located in Appendix A. While the PO is the designated liaison with the emergency responders, any person may fill this role as dictated by circumstance.
- 5.2 First response will be provided by the Austin Volunteer Fire Department, supported by the Kingston Volunteer Fire Department as required. The Austin Volunteer Fire Department can also perform decontamination. Medical response is provided by Summit Air (helicopter) and Austin Volunteer Fire Department (ground).

Calls are made by plant personnel or the CRO to the Sheriff's dispatch center in Battle Mountain. The dispatcher is aware of the McGinness Hills plant operation and the plant's EAP. They will dispatch responders based upon the nature of the emergency and the availability of the responders.

First responders provide perimeter fire defense, emergency medical technician response to injuries and patient decontamination. The Austin Volunteer Fire Department determines the need for additional resources. They do not provide fire or spill response capability within the plant boundaries. When responding to a call that

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requires plant evacuation, the first responder assumes control of the emergency as incident commander upon arriving on site. Coordination of the emergency responder incident command system after that initial response is beyond the scope of this plan.

Medical responders are dispatched through the Sheriff's dispatcher. Given the distance between medical facilities and the plant site, both air and ground ambulances are dispatched.

First responders can transport injured personnel via ground ambulance. Personnel transported by ground are taken by the Austin Volunteer Fire Department to Banner Churchill Community Hospital in Fallon. *If ambulance transport is necessary, it will usually occur by air, unless weather or responding unit availability dictates otherwise.*

Helicopter transport will be initiated through the Sheriff's dispatcher along with other responders.

**Note:**

Plant personnel should not call the helicopter company directly as there are typically numerous notifications required during any emergency and in the event the helicopter transport is not available, the Sheriff's dispatcher is in the best position to find the next available resource and coordinate the quickest response.

**Note:**

Injured personnel that are contaminated by pentane or other chemicals on site will not be transported until they are adequately decontaminated. It is important for plant personnel calling to inform dispatch if the injured party is contaminated by pentane or other chemicals. Dispatch will inform the Austin Volunteer Fire Department of the need to perform patient decontamination.

The helicopter responder is Summit Air out of Elko. They dispatch a team that includes a critical care nurse and a paramedic. This medical team assesses the patient, determines which medical facility is appropriate and transports the patient to that facility. They have the ability to transport patients to medical facilities in Fallon (125 miles via road) or Battle Mountain (100 miles via road) or to trauma and specialty care centers in Reno, Las Vegas, Sacramento, Salt Lake City and Boise. A backup helicopter responder is Care Flight out of Reno. Depending upon distance and weather, some trips can be made without refueling. Some approximate straight line distances are provided below:



Approximate Distance Between Destinations in Miles								
	Fallon	Battle Mountain	Reno	Elko	Las Vegas	Sacramento	Salt Lake City	Boise
McGinness Hills	100	70	155	100	260	260	275	275

- 5.3** When the plant is evacuated, the first responders will meet with plant personnel at the evacuation point. If plant personnel are reported missing, the responders and the plant personnel must evaluate the situation and determine how, or if, to proceed with any rescue activity.

Prior to allowing the plant personnel to re-enter an evacuated plant, the responder must concur that it is safe to do so. The responder is not expected to function as a plant operator, but must make this decision based upon discussion with plant personnel that results in a reasonable assurance that entry can be done in a safe manner.

- 5.4** 24-hour hazmat response will be provided by H2O Environmental for pentane spill containment and cleanup. Other vendors as qualified by their HAZMAT training may be used as they are identified. They will also be utilized to ventilate and decontaminate electrical enclosures after an FM-200 discharge. There are no HAZMAT entry scenarios that need to occur during an emergency. H2O or other vendors will be contacted as needed by the control room operator or plant management.
- 5.5** Law enforcement response will be performed by the Lander County Sheriff's Office. They will be primarily responsible for establishing road blocks to control traffic on Grass Valley Road as necessary. The Sheriff Deputy may frequently also be the first on scene when an emergency notification is made. They are included in the emergency action plan and alarm system overview at the plant and are aware of the necessary evacuation distances.
- 5.6** The following organizations request that they be provided with an electronic copy of this Emergency Action Plan Procedure and be kept current with subsequent revisions:

**5.6.1** Lander County Sheriff

**5.6.2** Lander County LEPC

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## 6. COMMUNICATION DURING EMERGENCIES

### 6.1 Calling the emergency dispatcher in Lander County:

**6.1.1 Phone number (land line):** Dialing '911' over the Ormat VOI land line will contact an emergency dispatcher in Washoe County. Consequently, '911' is not dialed in an emergency at McGinness Hills. The following number is dialed during an emergency and goes directly to the emergency dispatch center in Battle Mountain: 775-635-5161. Although this is a non-emergency line, one of the '911' emergency dispatchers answers. Inform the dispatcher of the emergency and they will handle the call just like any other '911' call.

**6.1.2 Phone number (cell phone):** Dialing '911' over the cell phone may not reach the Sheriff's dispatcher in Battle Mountain. Again, in an emergency dial the direct line to the dispatch center: 775-635-5161. If '911' is dialed and a dispatch center other than the Lander County, Nevada dispatch center is reached, ask the operator to transfer the call.

**6.1.3 Information to provide:** As the dispatcher is mobilizing the necessary resources promptly, it is critical to provide the most thorough description of the emergency that is possible.

In addition to what is happening in the plant:

- Be clear on the number and types of injuries,
- Identify the number of missing persons,
- Note whether an evacuation is taking place and where you will be.

**Note:**

If an evacuation is in progress, there is danger of explosion. Inform dispatch that responders should meet plant personnel at the evacuation point and consider establishing road blocks on Grass Valley Road to the north and south of the plant.

- If weather or other factors make an entrance road impassible, inform dispatch.
- If someone is contaminated with pentane or another chemical, ensure that the dispatcher knows this. They will ensure that the Austin Volunteer Fire Department is aware of the potential need for patient decontamination.

**Note:**

Both the ground and air ambulance services have made it clear that injured personnel that are contaminated with pentane or other chemicals will not be transported until decontaminated.

### 6.2 Radio Communication Protocol:

**6.2.1** There are effectively two radio links between the control room and the plant site. The Common Channel is always on one base station in the control room and can be accessed by all plants. The second base station in the control room is multi-channel and is used to access a select Plant Local Channel to communicate directly with personnel at a particular plant location.

- 6.2.2** Plant operators **[PO]** and mechanical and I&E personnel **[Maint]** communicate on the plant local channel at the site.
- 6.2.3** Control Room Operators **[CRO]** switch to the specific plant local channel to communicate with plant personnel. The **[CRO]** always monitors the Common Channel and can communicate on that channel at all times.
- 6.2.4** The **[PO][Maint]** can hail the **[CRO]** on the Common Channel. The **[CRO]** then switches to the local channel on the second base station for communication. Any plant radio has access to the Common Channel, although this channel is not used for local plant communication.
- 6.2.5** In an emergency, **[PO][Maint]** and **[CRO]** communicate on the plant local channel. If an emergency responder needs to communicate with the **[CRO]**, they would borrow a local plant radio from one of the plant personnel.

### 6.3 Radio Channel Summary

Channel	Access	Use
Common Channel	All Plants & Control Room Operator	Plant Operator to request Control Room switch to plant local channel
		Communicate between plants if use of a phone line is not practical in a particular circumstance.
Plant Local Channels	Local Plant & Control Room Operator & Emergency Responder	Interplant communication
		Control Room and Local Plant communication
		Control Room and Emergency Responder communication (responder borrows plant personnel radio)

### 6.4 Extent of Radio Coverage

Radio coverage extends from the plant site to the southern well sites and the primary and secondary evacuation sites. Refer to section 6.6 for more information on radio coverage.

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## 6.5 Use of Cellular Phone or Land Line Telephone

Use of a cellular phone or land line telephones at the McGinness Hills site are viable emergency notification alternatives, dependent upon the particular circumstance.

**6.5.1 Cell Phone:** *Under normal circumstances, personnel are prohibited from utilizing cellular phones in plant area because they are not intrinsically safe. Avoid this option within the plant area if possible.* The quality of cellular coverage is variable within the plant boundaries and good to fair at most well sites (refer to section 6.6 below) Note that these findings are based upon coverage provided by Verizon.

**6.5.2 Land Line:** There is one land line-based system that is connected to the Voice Over Internet (VOI) digital line. If this link fails, the cell phone would serve as a backup.

## 6.6 Communication Summary

	<b>Location</b> (numbers are actual wells or pad sites)	<b>Coordinates</b>	<b>Radio Line of Sight to Repeater?</b>	<b>Cell Phone Strength</b> (Verizon)	<b>Land Line Access</b>
Immediate Plant Area	McGinness 1 Plant Entrance at Grass Valley Road	Lat: 39°35'29.44" Long: -116°54'56.16"	Yes	3 bars	Within 5 minutes
	McGinness 2 Plant Entrance at Grass Valley Road	Lat: 39°35'10.20" Long: -116°55'0.62"	Yes		
	<b>Helicopter Landing Zone McGinness 1</b> (north of equipment, east of control room)	Lat: 39°35'30.48" Long: -116°54'42.84"	Yes	3 bars	Within 5 minutes
South & East of Plant	<b>Primary Evac Point</b> Cattle Grate at National Forest Land Boundary 1.2 miles south of plant on Grass Valley Road Land	Lat: 39°34'28.56" Long: -116°55'23.88"	Yes	2 bars	No
	<b>Alternate Helicopter LZ</b> Monitoring Well 67-15	Lat: 39°35'31.2" Long: -116°54'2.16"	Yes	2 bars	No
	66b-22	Lat: 39°34'44.04" Long: -116°54'0.0"	Yes	1-2 bars	No
	58b-22	Lat: 39°34'31.08" Long: -116°54'3.6"	Yes	2 bars	No
North of Plant	<b>Secondary Evac Point</b> Top of Rise on Grass Valley Road 1.0 mile north of plant	Lat: 39°36'14.11" Long: -116°54'32.72"	Yes	1-2 bars	No
	<b>Alternate Helicopter LZ</b> Monitoring Well 38-10	Lat: 39°36'16.2" Long: -116°54'25.56"	No	1 bar	No
	36-10 & 36A-10	Lat: 39°36'29.21" Long: -116°54'26.11"	No	1 bar	No
	Grass Valley Road 0.4 miles north of McGinness 1 entrance (pipe underpass)	Lat: 39°35'47.4" Long: -116°54'45.36"	Yes	1-2 bars	No

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## 7. PLANT STAND DOWN & EVACUATION

The circumstances initiating the need for a plant stand down or a plant evacuation are detailed in the emergency procedures in the EAP found in Appendix A. This section describes how to take those actions. There are two external alarms in the plant that require prompt action by all personnel that are present on site.

### Note:

Given the proximity of McGinness 1 to McGinness 2, alarms at one plant will be somewhat audible at the other. However, the difference in volume will be discernable and the audible alarms that are sounding at the select location will be accompanied by flashing strobes.

### 7.1 Stand Down – Red Strobe and Continuous Tone Horn:

- 7.1.1 When the alarm is sounded, plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If any type of pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
- 7.1.2 Check the wind direction on one of the plant windsocks. Move upwind to the nearest exit gate. There is one gate on each side of the plant. *Select the gate that is most directly opposite the direction of the windsock.* If there is no wind, move to the gate at the main plant entrance. **Walk around the plant perimeter, not through the plant.**
- 7.1.3 The [CRO] and [PO] will proceed as defined in the EAP. All other personnel will stand by awaiting further instruction.

### 7.2 Evacuate – White Strobe and Pulsing Tone Horn:

Evacuation is prompted automatically by the activation of a combination of flame or gas detectors or is prompted manually by the [CRO], [PO] or other authorized personnel because they have determined that people in the plant may be in imminent danger. The primary hazards in the plant that may influence the decision to evacuate are fire, explosion or a significant pentane release that could ultimately lead to a fire or explosion. Consequently when evacuating, these hazards must be considered when selecting the evacuation route.

- 7.2.1 When the alarm is sounded, plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If any type of pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
- 7.2.2 If plant operating and maintenance personnel have duties defined prior to evacuating, perform those duties as directed in the EAP.
- 7.2.3 Other personnel in the plant must evacuate immediately.
- 7.2.4 There is one primary and one secondary evacuation point. Evacuate to the upwind location. If there is no, or very little wind, evacuate to the primary evacuation point.
  - 7.2.4.1 Primary Evacuation Point: 1.2 miles south of the plant on Grass Valley Road.

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7.2.4.2 Secondary Evacuation Point: 1.0 miles north of the plant on Grass Valley Road.

**7.2.5** A pentane release, fire or both could be the reason for the evacuation. Avoid the potential to walk through pentane vapors or liquid. **Walk around the plant perimeter, not through the plant.**

7.2.5.1 When evacuating from the site, personnel shall exit the fenced plant area, leaving behind tools, equipment and vehicles.

7.2.5.2 Proceed to the nearest man gate in the perimeter fence. There are four gates located around the plant perimeter.

7.2.5.3 Move across and upwind to get to the road leading to the evacuation point. (Determine wind direction from the windsocks located throughout the plant). Walk around the outside perimeter of the plant fence if necessary.

7.2.5.4 Proceed to the evacuation point.

**7.2.6** Upon exiting the plant, observe your surroundings and render evacuation assistance to anyone requiring help if possible. As this is a matter of personal safety, the requirement is to leave either immediately or upon finishing the designated tasks. There is no individual that is designated to stay behind and assist with the orderly evacuation of other personnel.

**7.2.7** Once personnel have evacuated:

7.2.7.1 The [CRO] will confirm the safe evacuation of all personnel by confirming evacuees against the roster generated under SSP-19.

7.2.7.2 If personnel are offsite, such as at a well pad, the [CRO][PO] will contact them via radio or cell phone and direct them to the evacuation point.

7.2.7.3 Do not leave the area until told to do so by the [CRO] or emergency responders.

**7.2.8** Do not reenter the plant, even to retrieve tools or vehicles, until permitted by the [CRO] or emergency responders.

## 8. RESPONSE TO FIRES

The plant is equipped with fire extinguishers and an extensive fire water system. Both have defined application within the plant. Refer to SOP-2, Fire Protection and Gas Detection System for installation detail and operation.

### Note:

Plant personnel are not professional fire fighters.

Limited defensive actions may be taken by plant personnel as defined below.

Personal safety is never to be compromised to protect plant equipment.

### 8.1 Pentane Fires

- The primary response to pentane fires is to remotely isolate and shutdown equipment and processes.
- Boiling Liquid Expanding Vapor Explosions (BLEVE) are a significant concern when there is a plant fire. A BLEVE occurs when flames impinge on a

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pressure vessel or pipe steel wall, reducing the strength of the steel, resulting in a rupture. During this fire exposure, the boiling liquid pentane would rapidly expand to vapor upon rupture and likely result in a large fireball. Personnel in near proximity would be exposed to a dangerous concussive force, radiant heat and shrapnel.

- **Because of concerns of the BLEVE potential, the following is mandatory:**  
If outside the plant perimeter when a fire is present, do not enter the facility to shutdown equipment, close valves, retrieve vehicles or tools or to apply fire water. Only remote actions are permitted at that point.

The general response for any pentane fire is to ALWAYS:

- Remotely shut down the plant in an attempt to reduce the OEC process system pressure and reduce the flow of pentane feeding the fire.
- Isolate the source of the pentane feeding the fire if possible (remotely close valves and close manual valves if possible).
- Evacuate the plant. If not automatically initiated, manually activate an Emergency Stop / Evacuation button on the way out of the plant, or by requesting the CRO to activate the Evacuation Alarm and ESD.

## 8.2 Electrical Fires

De-energize the source. CO<sub>2</sub> or Dry Chemical fire extinguishers may be used as directed in SOP-2.

## 8.3 Use of Other Fire Extinguishers in Plant

Refer to SOP-2 for circumstances other than pentane or electrical fires under which fire extinguishers may be used. Also refer to SSP-18, which describes duties of the fire watch while performing hot work.

# 9. RESCUE AND MEDICAL DUTIES

All plant operations and maintenance personnel receive training and certification in First Aid and Cardiopulmonary Resuscitation (CPR). The intent of the training is to provide personnel with the ability to render potentially life-saving assistance prior to the arrival of emergency medical responders. Personnel are expected to render needed assistance to others at the plant, without placing themselves in danger.

# 10. DECONTAMINATION

Personnel that have been splashed or soaked with pentane liquid or other hazardous chemicals on site will not be transported by the emergency medical responders without being decontaminated. The plants have no decontamination facilities. However, if the injured person is ambulatory, plant personnel can assist them with getting under the safety shower and removing contaminated clothing. Sometimes this gross decontamination will suffice to enable transport, but plant personnel should never make that assumption.

Ensure that the dispatcher knows if injured personnel have been exposed to pentane or other hazardous materials. Inform dispatch if personnel at the plant are attempting to



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decontaminate the injured, but ensure that dispatch alerts the Austin Fire Department of the potential need to provide patient decontamination.

## **11. BUILDING FM-200 SYSTEMS**

The FM-200 systems are provided to extinguish electrical fires in motor control centers. They operate from dedicated fire control panels and are monitored through the process computer. Smoke detector activation will initiate a pre-discharge alarm and provide warning to building occupants to leave the room.

Personnel must not enter this building once the external alarms indicate that a fire is present. The FM-200 must maintain its design concentration for a period of 10 minutes in order to ensure the fire is extinguished. If the room doors are not securely closed, the fire retarding capabilities of the FM-200 could be compromised. If personnel are inside the room when a fire alarm activates, they are to leave promptly.

The building must not be entered after discharge until the room has been purged of residual FM-200 and its byproducts of combustion. Some of those byproducts, such as hydrogen fluoride, are toxic and may be present in harmful concentrations. The HAZMAT responder would be utilized to purge the rooms.

## **12. EMERGENCY RESPONSE DRILLS AND CRITIQUE OF EMERGENCY RESPONSE EVENTS AND EMERGENCY RESPONSE DRILLS**

**12.1 Emergency Response Drills:** The emergency action plan defines the facility's approach to responding to various emergency scenarios. Numerous types of emergency response drills can be used to exercise the plan and to discover vulnerabilities in the plan's approach. The emergency responders should be invited to participate and help plan any drill. The different types of drills to consider include:

**12.1.1 Focused Drill:** This drill is intended to test a limited portion of the emergency action plan, such as the response to a 'Stand Down' or 'Evacuation' alarm. The drill could be unannounced.

**12.1.2 Table Top Exercise:** This exercise uses written or verbal scenarios to test the effectiveness of the emergency action plan. A facilitator coordinates the discussion among the facility and responders to discuss how the scenario would be handled. Having emergency responders and LEPC representatives present for this type of drill would provide for the most effective exercise.

**12.1.3 Functional Exercise:** A functional exercise would utilize actual resources on site to simulate response to a selected emergency scenario. For example, responding units may arrive on site, and emergency equipment, such as the plant fire water monitors may be activated. Communications equipment could be tested and actual response times from fire departments could be tested.

**12.1.4 Local Emergency Planning Committee (LEPC) Annual Drill:** Each county LEPC is obligated to conduct an annual emergency response exercise that tests

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their community emergency response plan. They should be encouraged to consider utilizing an emergency scenario involving the plant for that drill.

- 12.2** Both drills and actual emergency responses must be promptly critiqued to ensure emergency action plan effectiveness. Company personnel, contractors and responders should be included.
- 12.3** There is no prescribed format for the critique, but the drill or the response should be evaluated for conformance to the plan. The following should be considered:
  - 12.3.1** That the evacuation and accounting for all personnel was performed in accordance with this plan and in a timely manner.
  - 12.3.2** Evaluation of the effectiveness and adequacy of all alarms and warnings on the following points:
    - 12.3.2.1** Could the alarms be heard and seen by all personnel in all areas of the site?
    - 12.3.2.2** Is the number and location of detectors, strobes, or horns adequate?
    - 12.3.2.3** Did the responding Fire Department and other applicable emergency services responders have concerns or comments?
  - 12.3.3** Effectiveness and usability of camera monitoring system during the drill or actual emergency.
  - 12.3.4** Did personnel involved in the drill or actual emergency demonstrate adequate knowledge of their duties and take appropriate action?
  - 12.3.5** Were notifications to Ormat Management made in a timely manner?
- 12.4** Whenever the actual EAP is activated, the response must also be critiqued.
  - 12.4.1** If the event also prompts an incident investigation, the EAP may be critiqued through the incident investigation process.
  - 12.4.2** Actual activation of the EAP will count as a drill for the purpose of this EAP as long as lessons learned are captured and trained on.

### **13. DEFINITIONS**

- 13.1 Contractor [Contractor]:** Non-Ormat personnel engaged in maintenance or construction tasks at the plant.
- 13.2 Control Room Operator [CRO]:** The individual on shift qualified and assigned duties in the Ormat Eastern NV Ops Control Room to monitor and operate the McGinness Hills unit.
- 13.3 Evacuation:** The act of leaving the plant boundaries in an orderly fashion for the purpose of protection.
- 13.4 Evacuation Site:** Based on wind direction a location approximately 1 mile away and upwind from the McGinness Hills facility.
- 13.5 McGinness Hills Plant Operator [PO]:** The individual who is qualified to operate the McGinness Hills power plant in accordance with NOP-SAF-SSP-33, Qualification

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and Training Program. Having completed at a minimum the “Initial Training” section of the McGinness Hills Operator qualification card.

- 13.6 Major Motive Fluid Release:** Any uncontrollable release of pentane which results in vapor clouds, liquid streams, pooling or breach of any component containing pentane.
- 13.7 Eastern NV Ops Control Room:** The location from which the McGinness Hills unit is monitored and or operated during normal operations. This is the location of the control room operator.
- 13.8 Plant Mechanical and I&E Personnel [Maint]:** The individuals who are qualified to perform mechanical, electrical and instrumentation work at the McGinness Hills power
- 13.9 Visitors [Visitor]:** Ormat personnel that are not part of the plant operations or maintenance staff. This would include engineers and company upper management. This would also include non-Ormat personnel, excluding contractors.

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# Appendix A

## Emergency Action Plan

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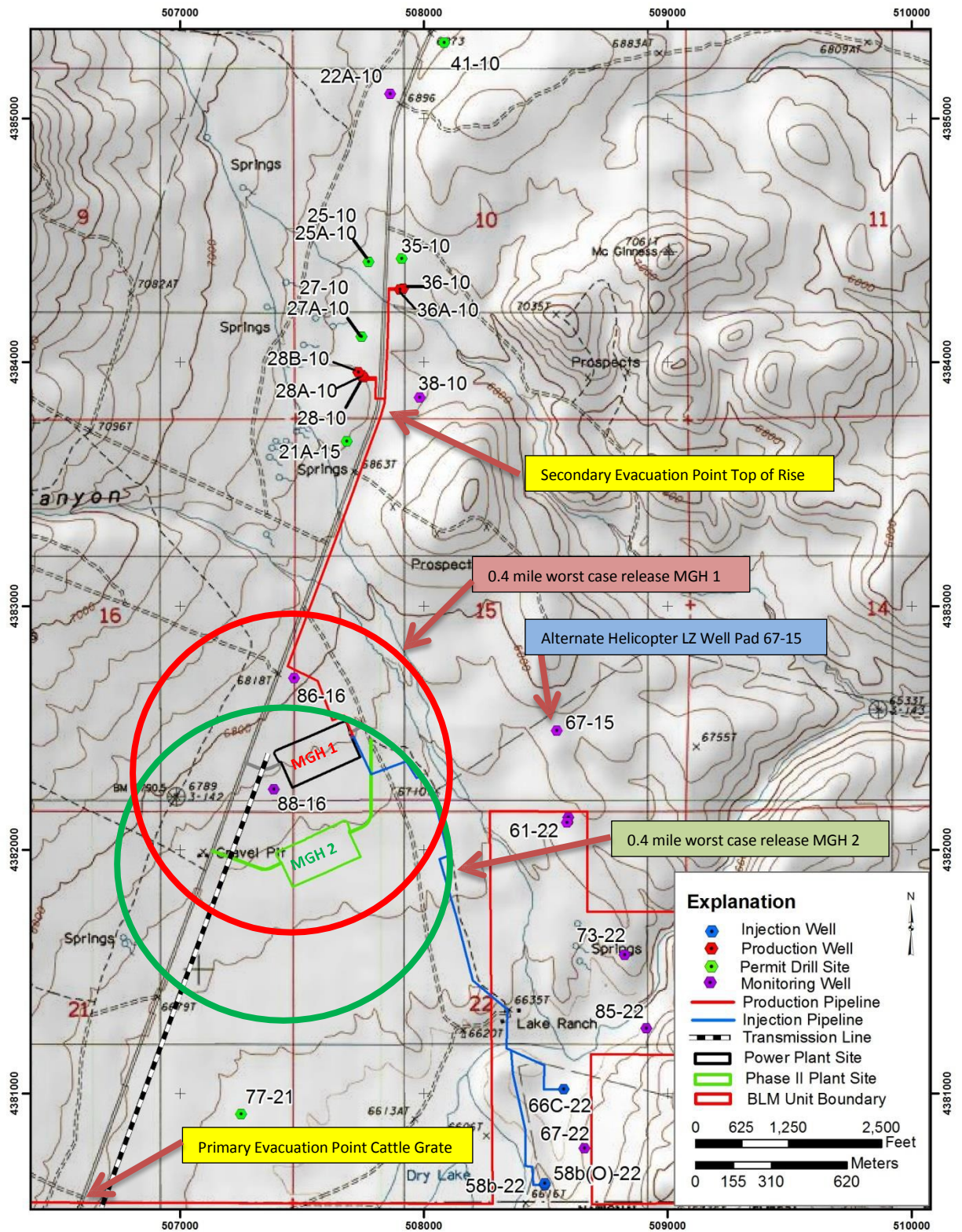
## Appendix B

# Employee Alarm System Specification, Validation & Maintenance

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# Appendix C

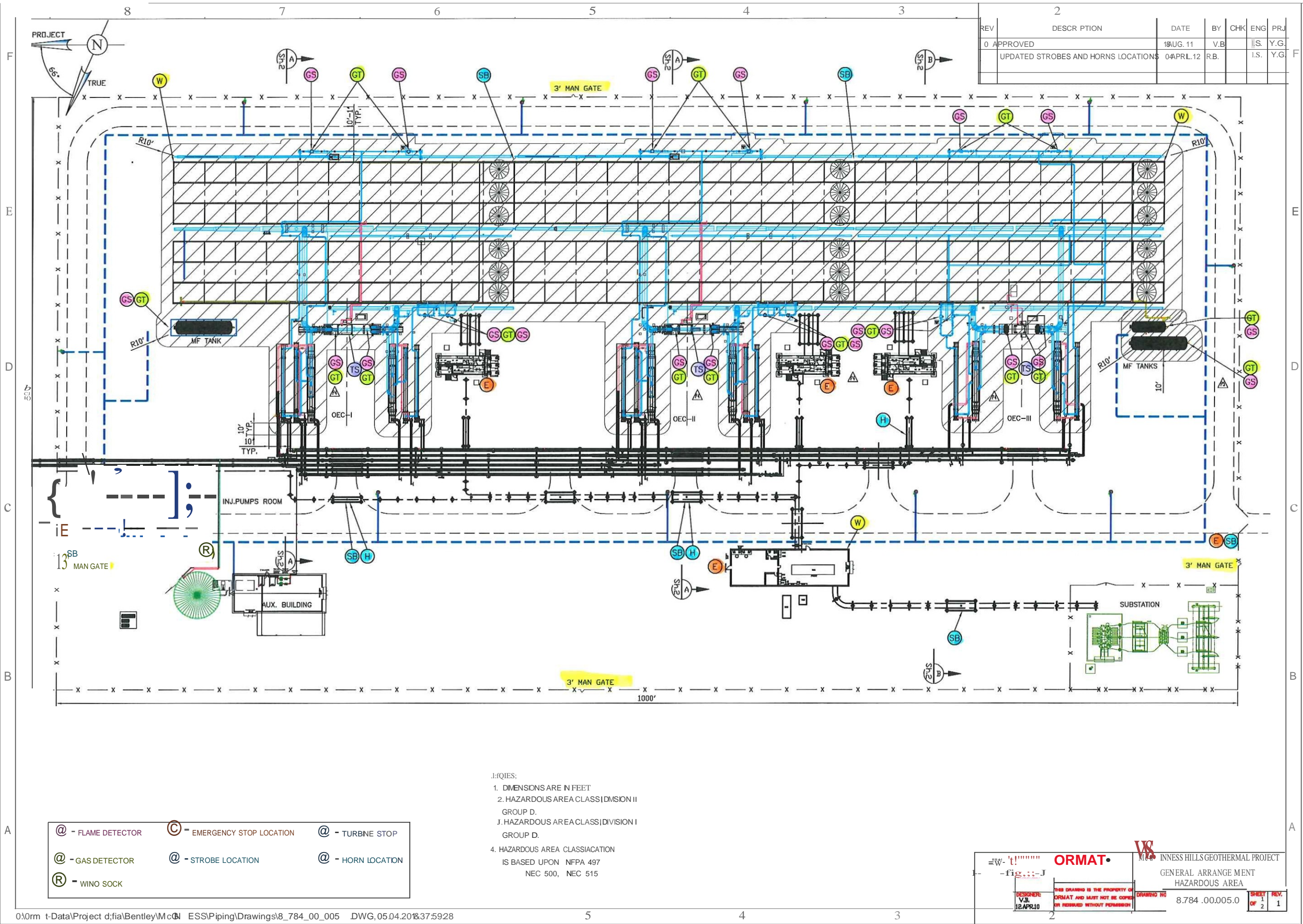
## Program Implementation Plan



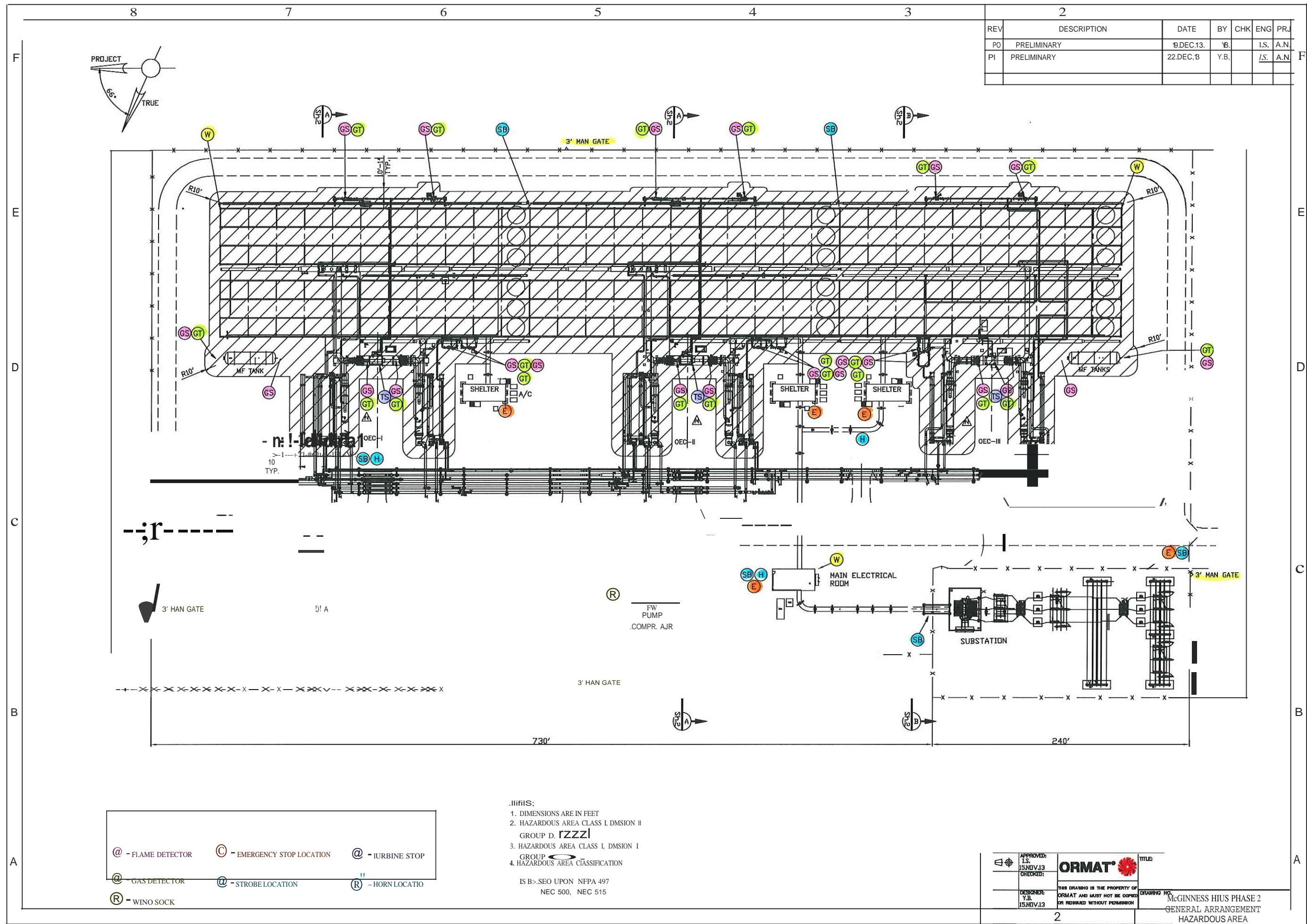
## Site Plan: McGinness 1 & 2 Evacuation Routes

Revision 1, February 10, 2014









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## 1. Emergency Contact Numbers

HAZMAT Response, 24-hour H2O Environmental Dispatch ( <b>Contacted by CRO or Plant Management</b> )		775-351-2237
Wild Land Fire Response (outside of plant) BLM Dispatch ( <b>Dispatched by Lander County</b> )		775-635-5161
Ormat Eastern NV Ops Control Room CRO	CRO:	775-323-1189 VOIP - 35722
Ormat Eastern NV Ops (secondary contact number)	Secondary Number:	John Christiansen
Plant Manager (Sean O'Shea)	Work:	775-327-5416
	Cell:	775-771-3427
	Home:	775-626-5926
Site O&M Manager (John Christiansen)	Work:	NA
	Cell (24 hour):	760-457-5823
	Home:	NA
EHS Coordinator (Nicholas Favier)	Work:	775-299-4240
	Cell:	775-384-7807
	Home:	775-835-2773
Steamboat Facilities Main Office	Work:	775-852-1444
	Fax:	775-852-1807
Ormat Corporate Office	Work:	775-356-9029
	Fax:	775-356-9039

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	<b>Location</b> (numbers are actual wells or pad sites)	<b>Coordinates</b>	<b>Radio Line of Sight to Repeater?</b>	<b>Cell Phone Strength</b> (Verizon)	<b>Land Line Access</b>
Immediate Plant Area	McGinness 1 Plant Entrance at Grass Valley Road	Lat: 39°35'29.44" Long: -116°54'56.16"	Yes	3 bars	Within 5 minutes
	McGinness 2 Plant Entrance at Grass Valley Road	Lat: 39°35'10.20" Long: -116°55'0.62"	Yes		
	<b>Helicopter Landing Zone McGinness 1</b> (north of equipment, east of control room)	Lat: 39°35'30.48" Long: -116°54'42.84"	Yes	3 bars	Within 5 minutes
South & East of Plant	<b>Primary Evac Point</b> Cattle Grate at National Forest Land Boundary 1.2 miles south of plant on Grass Valley Road Land	Lat: 39°34'28.56" Long: -116°55'23.88"	Yes	2 bars	No
	<b>Alternate Helicopter LZ</b> Monitoring Well 67-15	Lat: 39°35'31.2" Long: -116°54'2.16"	Yes	2 bars	No
	66b-22	Lat: 39°34'44.04" Long: -116°54'0.0"	Yes	1-2 bars	No
	58b-22	Lat: 39°34'31.08" Long: -116°54'3.6"	Yes	2 bars	No
North of Plant	<b>Secondary Evac Point</b> Top of Rise on Grass Valley Road 1.0 mile north of plant	Lat: 39°36'14.11" Long: -116°54'32.72"	Yes	1-2 bars	No
	<b>Alternate Helicopter LZ</b> Monitoring Well 38-10	Lat: 39°36'16.2" Long: -116°54'25.56"	No	1 bar	No
	36-10 & 36A-10	Lat: 39°36'29.21" Long: -116°54'26.11"	No	1 bar	No
	Grass Valley Road 0.4 miles north of McGinness 1 entrance (pipe underpass)	Lat: 39°35'47.4" Long: -116°54'45.36"	Yes	1-2 bars	No

## 2. Emergency Actions

Event	How Detected	Action						
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	1. Control Room Operator, Control Room Supervision [CRO] 2. Plant Operators, Plant Supervision [PO] 3. Plant Mechanics, Plant I&E [Maint] 4. Contractors [Contractor] 5. Other Ormat Personnel & non-Ormat visitors [Visitor] 6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]	
Pentane Release	Single Gas Detector > 20%	X	X				[PO] [Maint] [Contractor]	Operating, maintenance and contract personnel in the plant must stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
							[All]	Move to an upwind gate per the stand-down procedure. Await further instruction from [PO] or [CRO].
							[PO][CRO]	If contact between the CRO and plant personnel is not established or lost during this event, the [CRO] and [PO] will communicate from upwind via cell phone to determine how to proceed.
							[PO][CRO]	Evaluate and respond per the pentane release procedure in Section 3.
							[CRO]	If the release scenario requires the shutdown of an OEC, inform plant management.

Event	How Detected	Action					
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<ol style="list-style-type: none"> <li>Control Room Operator, Control Room Supervision [CRO]</li> <li>Plant Operators, Plant Supervision [PO]</li> <li>Plant Mechanics, Plant I&amp;E [Maint]</li> <li>Contractors [Contractor]</li> <li>Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</li> <li>All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</li> </ol>
Pentane Release	Any Two Gas Detectors > 20%	X		X			<p><b>Note:</b></p> <p>When two gas detectors alarm at simultaneously, personnel must assume that there is a large gas release. The evacuation alarm will be activated automatically. All personnel must evacuate immediately. Once safe evacuation is confirmed, the [CRO] and [PO] will evaluate the situation and determine the appropriate course of action.</p>
							<p>[PO] [Maint] [Contractor]</p> <p>Operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.</p>
							<p>[All]</p> <p>Evacuate per the evacuation procedure. Await further instruction from [PO] or [CRO].</p>
							<p>[CRO]</p> <p>Confirm the safe evacuation of all personnel logged in at the plant with the [PO]. If radio contact is lost, use cell phones.</p>
							<p>[CRO]</p> <p>Inform plant management of the alarm and evacuation.</p>
							<p>[PO][CRO]</p> <p>If not all personnel are accounted for, attempt to reach them by radio or cell phone. <b>Note: If missing personnel cannot be contacted, the plant cannot be re-entered until it is deemed safe to do so through the pentane leak procedure. The Lander County Dispatcher should be notified of the incident and that a person is missing who is presumed to be injured.</b></p>
							<p>[PO][CRO]</p> <p>Evaluate and respond per the pentane release procedure in Section 3.</p>



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Event	How Detected	Action						
		HMI	Red Strobe & Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>	
Pentane Release	Visual Detection of Major Pentane Release* by Any Personnel on Site or by CRO via Camera	Possibly, but not necessarily	Possibly, but not necessarily	Possibly, but not necessarily	X		<div>Note:</div>	Visual detection of a major pentane release requires immediate evacuation. If the evacuation alarm has not been activated, it must be manually activated at once. Once safe evacuation is confirmed, the [CRO] and [PO] will evaluate the situation and determine the appropriate course of action.
							<div>[PO] [Maint] [Contractor]</div>	Operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
							<div>[PO] [Maint] [Contractor] [CRO]</div>	Any individual that recognizes the release must manually activate the evacuation alarm through the HMI or external buttons if it has not been activated automatically. Personnel in the plant should request the [CRO] to initiate the alarm if they are unable.
							<div>[PO] [Maint] [Contractor] [CRO]</div>	Initiate the plant emergency shutdown (ESD). Note: The plant ESD and evacuation alarm are activated simultaneously in the plant by depressing either of the two Emergency Stop / Evacuation buttons located at man gate egress points adjacent to the vehicle gates. If activating through the HMI, note that the evacuation alarm and ESD are initiated separately.
							<div>[All]</div>	Evacuate per the evacuation procedure. Await further instruction from [PO] or [CRO].
							<div>[CRO]</div>	Confirm the safe evacuation of all personnel logged in at the plant with the [PO]. If radio contact is lost, use cell phones.
							<div>[PO][CRO]</div>	If not all personnel are accounted for, attempt to reach them by radio or cell phone. Note: If missing personnel cannot be contacted, the plant cannot be re-entered until it is deemed safe to do so through the gas leak procedure. The emergency responder should be notified of a missing person who is presumed to be injured.
							<div>[PO][CRO]</div>	Evaluate and respond per the pentane release procedure in Section 3.
							<div>[PO][CRO]</div>	After the release evaluation, direct plant personnel accordingly.
							* A major pentane release is defined as any uncontrollable release of pentane which results in vapor clouds, liquid streams, pooling or a breach of any component containing pentane.	

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Event	How Detected	Action						
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>	
Fire	Single Flame Detector	X	X				<div>Note:</div>	Even with the refined hydrocarbon flame detection capabilities of a UV/IR detector, false alarms are known to occur due to non-emergency events (welding, sunlight, lightening). Most operating equipment is viewed by redundant detectors from multiple angles. The single detector alarm requires immediate action, however, definitive confirmation of a lack of fire would allow for alarm reset and resumption of normal activity.
							<div>[PO] [Maint] [Contractor]</div>	Plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
							<div>[All]</div>	Move to an upwind gate per the stand-down procedure. Await further instruction from [PO] or [CRO].
							<div>[CRO]</div>	Inform [PO] of alarm location. View the location with the site cameras.
							<div>[PO][CRO]</div>	If contact between the CRO and plant personnel is not established or lost during this event, the [CRO] and [PO] will communicate from upwind via cell phone to determine how to proceed.
							<div>[PO]</div>	Check the area for evidence of fire.
							<div>[PO][CRO]</div>	If a fire is confirmed, follow the procedure for visual indication of a fire, which is to ESD the plant and evacuate.
							<div>[CRO]</div>	If no fire is detected, reset the detector, note if there is a probable cause for the detector activation and schedule for recalibration.

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Event	How Detected	Action					
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<ol style="list-style-type: none"> <li>Control Room Operator, Control Room Supervision [CRO]</li> <li>Plant Operators, Plant Supervision [PO]</li> <li>Plant Mechanics, Plant I&amp;E [Maint]</li> <li>Contractors [Contractor]</li> <li>Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</li> <li>All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</li> </ol>
Fire	Multiple, Redundant Flame Detectors	X		X			<p><b>Note:</b></p> <p>All turbines and pumps are viewed by redundant flame detectors from multiple angles. When any two detectors detect a flame, all OECs ESD and the evacuation alarm is automatically initiated. The two detectors do not need to be viewing the same area.</p>
							<p>[PO] [Maint] [Contractor]</p> <p>Plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.</p>
							<p>[All]</p> <p>Evacuate per the evacuation procedure. Await further instruction from [PO] or [CRO].</p>
							<p>[CRO]</p> <p>Contact the Lander County Dispatcher.</p>
							<p>[CRO]</p> <p>Confirm the safe evacuation of all personnel logged in at the plant with the [PO]. If radio contact is lost, use cell phones.</p>
							<p>[PO][CRO]</p> <p>If not all personnel are accounted for, attempt to reach them by radio or cell phone. <b>Note: If missing personnel cannot be contacted, the plant cannot be re-entered until it is deemed safe to do so by the fire department. The emergency responder should be notified of a missing person who is presumed to be injured.</b></p>
							<p>[PO]</p> <p>Meet the fire department at the evacuation point to apprise of the incident status.</p>
							<p>[PO][CRO]</p> <p>Evaluate and determine how to proceed.</p>



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Event	How Detected	Action						
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>	
Fire and Pentane Release	One Flame Detector AND One Gas Detector > 20%	X		X			<div>Note:</div>	<div>Similar to multiple gas detector alarms, personnel must evacuate immediately. The evacuation alarm will activate automatically. No ESD will be initiated automatically.</div>
							<div>[PO] [Maint] [Contractor]</div>	<div>Plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.</div>
							<div>[All]</div>	<div>Evacuate per the evacuation procedure. Await further instruction from [PO] or [CRO].</div>
							<div>[CRO]</div>	<div>Contact the Lander County Dispatcher.</div>
							<div>[CRO]</div>	<div>Confirm the safe evacuation of all personnel logged in at the plant with the [PO]. If radio contact is lost, use cell phones.</div>
							<div>[PO][CRO]</div>	<div>If not all personnel are accounted for, attempt to reach them by radio or cell phone. Note: If missing personnel cannot be contacted, the plant cannot be re-entered until it is deemed safe to do so by the fire department. The Lander County Dispatcher should be notified of a missing person who is presumed to be injured.</div>
							<div>[PO]</div>	<div>Meet the fire department at the evacuation point to apprise of the incident status.</div>
							<div>[PO][CRO]</div>	<div>Evaluate and determine how to proceed.</div>

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Event	How Detected	Action					
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>
Fire	Visual Confirmation of Fire by Any Personnel on Site or by CRO via Camera	Possibly, but not necessarily	Possibly, but not necessarily	Possibly, but not necessarily	X		<b>Visual confirmation of a fire requires immediate evacuation. If the evacuation alarm has not been activated, it must be manually activated at once. Once safe evacuation is confirmed, the [CRO] and [PO] will evaluate the situation and determine the appropriate course of action.</b>
						[PO] [Maint] [Contractor]	Plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
						[PO] [Maint] [CRO]	Initiate plant ESD and evacuation alarm. <b>Note: The plant ESD and evacuation alarm are activated simultaneously in the plant by depressing either Emergency Stop / Evacuation button. If activating through the HMI, the evacuation alarm and ESD are initiated separately.</b>
						[All]	Evacuate per the evacuation procedure. Await further instruction from [PO] or [CRO].
						[CRO]	Contact the Lander County Dispatcher.
						[CRO]	Confirm the safe evacuation of all personnel logged in at the plant with the [PO]. If radio contact is lost, use cell phones.
						[PO][CRO]	If not all personnel are accounted for, attempt to reach them by radio or cell phone. <b>Note: If missing personnel cannot be contacted, the plant cannot be re-entered until it is deemed safe to do so by the fire department. The Lander County Dispatcher should be notified of a missing person who is presumed to be injured.</b>
						[PO]	Meet the fire department at the evacuation point to apprise of the incident status.
						[PO][CRO]	Evaluate and determine how to proceed.

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Event	How Detected	Action						
		HMI	Red Strobe &	Auto Activation & White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>	
Smoke in an Electrical Room	Two Smoke Detectors	X		X		X	<div>Note:</div>	<div>Activation of two smoke detectors in an electrical room activates the 30-second pre-discharge sequence for FM-200 in addition to the alarms. Inside and outside of the room, a strobe/Klaxon alarm will activate.</div> <div>If FM-200 is discharged into:</div> <div><div>An OEC electrical shelter, the power to that particular OEC will be shunt tripped.</div><div>The plant MCC room, power to the plant will be shunt tripped.</div></div>
							<div>Warning:</div>	<div>Once the strobe/Klaxon has activated, do not enter the room. If inside the room, exit at once.</div>
							<div>[PO]</div> <div>[Maint]</div> <div>[Contractor]</div>	<div>Plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.</div>
							<div>[All]</div>	<div>Evacuate per the evacuation procedure. Await further instruction from [PO] or [CRO].</div>
							<div>[CRO]</div>	<div>Contact the Lander County Dispatcher.</div>
							<div>[CRO]</div>	<div>Confirm the safe evacuation of all personnel logged in at the plant with the [PO]. If radio contact is lost, use cell phones.</div>
							<div>[PO][CRO]</div>	<div>If not all personnel are accounted for, attempt to reach them by radio or cell phone.</div> <div>Note: If missing personnel cannot be contacted, the plant cannot be re-entered until it is deemed safe to do so by the fire department. The Lander County Dispatcher should be notified of a missing person who is presumed to be injured.</div>
							<div>[PO]</div>	<div>Meet the fire department at the evacuation point to apprise of the incident status.</div>

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Event	How Detected	Action					
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<ol style="list-style-type: none"> <li>Control Room Operator, Control Room Supervision [CRO]</li> <li>Plant Operators, Plant Supervision [PO]</li> <li>Plant Mechanics, Plant I&amp;E [Maint]</li> <li>Contractors [Contractor]</li> <li>Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</li> <li>All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</li> </ol>
Medical Emergency	By any personnel on site						<p>[All]</p> <p>Call the Lander County Dispatcher.</p> <p>Provide detail of the emergency to the dispatcher and follow their direction.</p> <p>A helicopter will be dispatched for life threatening emergencies. If they will be landing in the plant, ensure that the helicopter landing zone is clear of any vehicles.</p> <p><b>Plant LZ coordinates: Lat: 39°35'30.48"</b> <b>Long: -116°54'42.84"</b></p> <p>If this is not possible, inform the dispatcher of the need to land at the alternate site, which is Well pad 55-8, just south of the plant entrance.</p> <p><b>Monitoring Well 67-15 coordinates: Lat: 39°35'31.2"</b> <b>Long: -116°54'2.16"</b></p> <p>Administer first aid to the extent possible.</p>
							<p>[All]</p> <p>Inform the CRO of situation.</p>

Event	How Detected	Action				
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn
Medical Emergency	If continued failure by CRO to receive response from anyone onsite					
						<p><b>If several attempts to reach plant personnel by radio and land line or PA system have failed, assume that there may be an emergency.</b></p>
						<p>[CRO] Sound the evacuation alarm.</p>
						<p>[All] Evacuate and contact the CRO via radio or cell phone immediately.</p>
						<p>[CRO] Failing to obtain a response after 15 minutes, call the Lander County Dispatcher listed on the emergency contact list. Inform them of lack of response by onsite personnel and request emergency response to a possible medical emergency.</p> <p><b>After the HMI-initiated evacuation alarm has sounded for 15 minutes, turn the alarm off as any responders accessing the site will not enter with an active alarm.</b></p>
						<p>[CRO] Notify the plant manager, who will decide on mobilizing further resources.</p>

Event	How Detected	Action					
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<ol style="list-style-type: none"> <li>Control Room Operator, Control Room Supervision [CRO]</li> <li>Plant Operators, Plant Supervision [PO]</li> <li>Plant Mechanics, Plant I&amp;E [Maint]</li> <li>Contractors [Contractor]</li> <li>Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</li> <li>All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</li> </ol>
Trespassing	Unknown individual(s) detected by any onsite authorized personnel OR Unknown individual(s) detected by CRO on camera						<p>[PO]</p> <p>Inquire about the individual's business. If they claim to have business at the plant, confirm with the CRO via radio. Do not enter the control room and leave the individual unescorted on the site. Do not allow the individual to enter the control room for any purpose.</p>
							<p>[PO]</p> <p>If the individual does not have confirmed business at the plant, ask them to leave.</p>
							<p>[PO]</p> <p>If the individual refuses to leave, proceed as outlined under hostile intruder.</p>

Event	How Detected	Action					
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<ol style="list-style-type: none"> <li>Control Room Operator, Control Room Supervision [CRO]</li> <li>Plant Operators, Plant Supervision [PO]</li> <li>Plant Mechanics, Plant I&amp;E [Maint]</li> <li>Contractors [Contractor]</li> <li>Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</li> <li>All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</li> </ol>
Hostile Intruder	Unknown individual(s) detected by any onsite authorized personnel OR Unknown individual(s) detected by CRO on camera						<p>[All] Seek a secured shelter away from motive fluid systems if a hostile or armed intruder enters the site while you are on site.</p>
							<p>[All] Attempt to contact CRO once in a safe place, and report the hostile or armed intruder.</p>
							<p>[CRO] Initiate an emergency shutdown using the HMI or any emergency shutdown button.</p>
							<p>[CRO] Contact the Lander County Central Dispatch of the emergency as related by the operator.</p>
							<p>[CRO] Notify the plant manager, who will notify Ormat management of the hostile or armed intruder at the McGinness site.</p>

Event	How Detected	Action						
		HMI	Red Strobe &	Auto Activation & White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>	
Range Fire	Visual Or Notification by External Source						[PO]	If discovered by personnel onsite, immediately contact the Lander County Dispatcher and inform the CRO.
							[PO] [Maint] [Contractor]	Plant operating, maintenance and contract personnel in the plant are required to stop work in progress and shut down equipment. If pentane trans-loading is in progress, stop the transfer by shutting down pumps and closing isolation valves.
							[All]	Move to the main exit gate. Await further instruction from [PO] or [CRO]. <b>Warning: Given the potential gravity of the situation, all personnel are required to follow direction of the [PO] and emergency responders. Evacuate as directed. Do not leave the site without direction to do so.</b>
							[CRO]	Inform management of the situation.
							[PO][CRO]	Confer with plant management and emergency responders on how to proceed. The situation could dictate any number of responses including plant ESD and evacuation. <b>If there is any question about the proximity of the fire to the plant and the safety of the plant personnel, do not hesitate to evacuate and ESD the plant. Note that communication of your actions is critical to ensuring the safety of all personnel.</b>



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Event	How Detected	Action						
		HMI	Red Strobe &	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<div>1. Control Room Operator, Control Room Supervision [CRO]</div> <div>2. Plant Operators, Plant Supervision [PO]</div> <div>3. Plant Mechanics, Plant I&amp;E [Maint]</div> <div>4. Contractors [Contractor]</div> <div>5. Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</div> <div>6. All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</div>	
Bomb Threat	Via Telephone						<div>Warning:</div>	<div>Throughout the bomb threat and until the all clear is given by emergency response personnel (bomb squad leader / incident commander) do not use radios or mobile phones for communications, as some radios and mobile phone signals can result in the detonation of explosive devices. Direct the evacuation of all personnel, by person as this is a small site. If radios or mobile phones must be used to contact emergency services or the [CRO] evacuate the site prior to making calls.</div>
							<div>Call Recipient</div>	<div>Record as much information as possible using the Bomb Threat Check List in Section 4 of this EAP to record as much information as possible.</div>
							<div>Call Recipient</div>	<div>Contact the Lander County Dispatch, immediately after the call was received if the threat was directed at the McGinness site.</div>
							<div>Call Recipient</div>	<div>Contact the [CRO] after contacting Lander County Dispatch, to confirm that they are aware of the threat.</div>
							<div>[PO][CRO]</div>	<div>Initiate plant ESD and unit evacuation.</div>
							<div>[CRO]</div>	<div>Confirm the safe evacuation of all personnel logged in at the plant with the [PO].</div>
							<div>[PO]</div>	<div>Meet the responding personnel at the evacuation site.</div>

Event	How Detected	Action					
		HMI	Red Strobe & Horn	Auto Activation White Strobe & Horn	Manual/Activate White Strobe & Horn	Electrical Room Fire Strobe & Horn	<ol style="list-style-type: none"> <li>Control Room Operator, Control Room Supervision [CRO]</li> <li>Plant Operators, Plant Supervision [PO]</li> <li>Plant Mechanics, Plant I&amp;E [Maint]</li> <li>Contractors [Contractor]</li> <li>Other Ormat Personnel &amp; non-Ormat visitors [Visitor]</li> <li>All Personnel in Plant, PO, Mech, Contractor, Visitor [All]</li> </ol>
Remote Operation		X	X	X			[CRO]  <b>For a Stand Down Alarm (Red Strobe &amp; Horn), or Automatically-initiated Evacuation Alarm (White Strobe &amp; Horn):</b>  Mobilize a minimum of two people (PO or Maint) to evaluate.
One Operator on Site		X	X				<b>[PO]</b>  <b>For a Stand Down Alarm (Red Strobe &amp; Horn):</b> Proceed as described above for the particular stand down emergencies.
							<b>[CRO]</b>  Resolve the issue with the PO. Mobilize additional resources to assist as necessary.
CRO is Operating out of this location's Control Room				X	X		<b>Note:</b>  <b>If the plant must evacuate, the CRO must evacuate. As the CRO is on site, they will have a manual visitor log pursuant to SSP-19.</b>
							<b>[CRO]</b>  Collect the visitor log and copy of the EAP prior to evacuating. If responder notification is necessary, contact them via cell phone. Contact the control room operator at Don Campbell (DC) to request assistance.
							<b>DC [CRO]</b>  Provide assistance with the implementation of the EAP.

### 3. Pentane Release Procedure

**Vapor cloud explosions, BLEVEs, jet fires and pool fires are the potential consequences of a pentane release.** Whenever a pentane release is confirmed visually, or detected by a combustible gas detector, the initial response must be to stop work in the area, stop any maintenance or pentane transfer activities, and then determine the next action from a safe location. Before re-entering the area, every effort must be made to isolate and depressurize the potential sources of the release. Maximum use will be made of gas and flame detection instrumentation prior to re-entering.

#### 3.1 Single Gas Detector > 20% LEL

[CRO]	While personnel are at the stand down location, identify the detector in alarm and the equipment that is upwind of the detector. Ask the [PO] to identify the wind direction if necessary.
[CRO]	Monitor the gas levels and note if they continue to rise, fall or hold steady.
[CRO]	Evaluate potential leak sources: <ul style="list-style-type: none"> <li>• Check the status of mechanical seal barrier fluid systems</li> <li>• Check system pressures to determine if a PSV may have relieved</li> <li>• View the area with the cameras to see if there is any indication of the source of the leak.</li> </ul>
[CRO]	Have the [PO] approach the equipment from upwind with a portable gas detector to identify the source of the leak or to confirm that the release from an identified source has dropped below 20% LEL.
[PO]	If the [PO] continues to read above 20% LEL with the portable device, retreat from the area and confer with the [CRO] and plant management on how to proceed.
[CRO]	Once the matter has been resolved, have the gas detector recalibrated regardless of whether the accuracy was in question.
[CRO][PO]	Confer with plant management about restarting processes, if they were shut down, and about having other personnel resuming activities in the plant.

### 3.2 Multiple Gas Detector > 20% LEL

[CRO]	After safe personnel evacuation has been confirmed, identify the detector in alarm and the equipment that is upwind of the detector. Ask the [PO] to identify the wind direction if necessary.
[CRO]	Monitor the gas levels and note if they continue to rise, fall or hold steady.
[CRO]	Evaluate potential leak sources: <ul style="list-style-type: none"> <li>• Check the status of mechanical seal barrier fluid systems</li> <li>• Check system pressures to determine the if a PSV may have relieved</li> <li>• View the area with the cameras to see if there is any indication of the source of the leak.</li> </ul>
[CRO]	If the gas level stays above 20% LEL at any sensor and shows no sign of abating, initiate a controlled shut down of all of the OECs.
[CRO]	Continue to monitor the gas detector and equipment pressures. Wait for the high side pressure to equalize. Once the gas levels have reduced below 20% LEL, direct the re-entry of the PO and other plant personnel, to investigate the extent of the release and any mitigation that may be required. <b>Note that if the Fire Department has responded to the scene, they are the ultimate authority on re-entering the plant. They will confer with the plant personnel, the CRO and Ormat management, but plant personnel will not re-enter until the Fire Department concurs.</b>
[CRO]	If any gas detector reading continues to stay above 20% LEL at the detectors, confer with plant management on an approach to troubleshooting this situation.
[CRO]	Once the matter has been resolved, have the gas detector recalibrated regardless of whether the accuracy was in question.
[CRO][PO]	Confer with plant management about restarting processes and about having other personnel resuming activities in the plant.

#### 4. Bomb Threat Checklist

<b>Bomb Threat Check List</b>
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Date:		Time at Call Start:	
-------	--	---------------------	--

Caller ID Information		Time at Call End:	

<b>Write Down the Exact Words of the Threat Below.</b>
--


<b>Ask the caller the following questions and record answers below:</b>
---

Where is the bomb located?	
When will it go off?	
What does it look like?	
What kind of bomb is it?	
What will make it explode?	
Did you place the bomb?	
Why?	
What is your name?	

<b>Try to determine and gain information about the caller keeping these points in mind keep notes on the back of this form or a separate sheet of paper.</b>
--

Callers Voice:	Accents	Anger	Calm	Clearing Throat
	Cracking	Crying	Deep	Deep breathing
	Disguised	Distinct	Excited	Female
	Male	Nasal	Laughter	Lisp
	Raspy	Rapid	Ragged	Slow
	Slurred	Soft	Stutter	

Background Sounds	Animal Noises	House Noises	Kitchen Noises	Street Noises
	Booth	PA System	Conversations	Music
	Motor	Clear	Static	Office Machinery
	Factory Machinery	Local	Long Distance	

Threat Language	Incoherent	Message Read	Message Taped	Irrational
	Profane	Well Spoken		

<b>Record any additional information that may be helpful in identifying the caller below or on the back of this page.</b>
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## 5. Plot Plan: Safety Systems MGH 1&2

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## 6. Site Plan: Evacuation Routes

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# Appendix B

## EMPLOYEE ALARM SYSTEM SPECIFICATION, VALIDATION & MAINTENANCE

### Employee Alarm System Specification

**Alarm Indication:** Under the provisions of the Emergency Action Plan, the plant external alarms indicate one of two immediate responses: Stand Down or Evacuate. The alarms indicating these two responses must be:

1. Distinctive from each other and any other plant alarms,
2. Capable of being perceived audibly above background noise, and
3. Capable of being perceived visually from any location.

Visual indication will be provided by a dual strobe unit or two adjacent strobes. Each strobe shall provide at least 75 candela (OSHA Evacuation Plans and Procedures eTool) and not exceed 1,000 candela (effective intensity). Flash rate shall be between 1 to 2 flashes per second.

1. Stand Down alarm shall be indicated by a red strobe.
2. Evacuation alarm shall be indicated by a white (or clear) strobe.

Audible indication for both Stand Down and Evacuation may be provided through the same horn or speaker. The device or devices will be capable of producing a tone 10 decibels above background noise levels at the loudest areas in the plant. From noise studies at Galena 1, 2, and 3, this would translate to requiring approximately 102 decibels at the turbine area.

Regarding tones:

1. Stand Down alarm shall be indicated by a continuous tone horn
2. Evacuation alarm shall be indicated by a temporal pattern tone (refer to NFPA 72, section 18.4.2.1)

**Alarm Location:** The audible alarms shall be evaluated by project and located as necessary to meet the audible criteria defined above. The visual alarms shall be located throughout the plant site as deemed necessary, but at least:

1. One for each man gate that is located adjacent to vehicle entrance.
2. One on the back side (the side opposite of the OEC equipment) of the air fin coolers or water cooling towers.
3. Others as deemed necessary to ensure adequacy of notification.



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- Design: Both the audible and visual alarm devices:
1. Shall be capable of operating in a Class I, Division 2, Group D electrical hazardous area when located within a Division 2 area. Otherwise, provide appropriate outdoor enclosure.
  2. Shall be supplied from an uninterruptable power supply source.
  3. The audible tones shall be synchronized among the alarm horns.
  4. Where audible tone requirements would exceed 115 decibels at any particular location, a strobe light indication alone may suffice.
- Resources: The specification is based upon industrial and regulatory guidelines and requirements:
1. OSHA employee alarm system standard, 29CFR1910.165
  2. OSHA occupational noise exposure standard, 29CFR1910.95
  3. NFPA 72, National Fire Alarm and Signaling Code, 2010 Edition
  4. OSHA guidance: Evacuation Plans and Procedure eTool located at <http://www.osha.gov/SLTC/etools/evacuation/alarms.html>

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## Employee Alarm Validation Once Plant is Operational

1. As part of the Pre-Startup Safety Review ensure that the strobes meet specification. Ensure visibility from areas within the process.
2. Within the first year of operation, contract the performance of an audible (noise) survey.

**Visual:** As long as the labeled strobe intensity, flash rate and color meet the specification, no measurements need to be done. Ensure that a strobe is visible from the various locations within the process. If this is not the case, have strobe locations altered as necessary.

**Audible:** Conduct an equipment noise survey in the plant throughout, concentrating on the highest noise level areas which include the turbines and feed pumps. Determine the change in normal background decibel levels when the audible evacuation and stand down alarms are sounded.

Per OSHA guidance, the decibel level with the alarm annunciation should increase by at least 6 decibels above the normal background. If this is not the case at some location, consider altering the location of a horn or increasing the tone decibels so that the relative decibel level is corrected. As an alternative, a visual indicator can be installed in the high noise area.

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## Employee Alarm System Maintenance

1. Refer to the facility maintenance procedures for detailed, site-specific instructions.
2. Refer to the training program for technician training requirements. All the following is tested and maintained by Ormat personnel.

**ALARM DEVICES:** Conduct functional tests monthly, device inspections annually and replace or repair components as necessary.

Monthly:

1. Activate the evacuation horns and strobe lights throughout the plant by having the CRO enable the evacuation alarm through the HMI.
2. Activate the stand down horns and strobe lights throughout the plant by activating the test switch through the HMI.
3. With each test, ensure that each strobe and horn is functioning. Also verify that the HMI alarms function.

Annually:

1. Check each strobe flash tube for degradation per the instructions in the strobe light vendor manual.

**SENSOR/DETECTOR:** Conduct calibrations per vendor recommendations. Commence with inspections as indicated below.

Quarterly:

1. Flame Detector
  - a. Visual inspection only, per vendor manual.
  - b. Make sure sight window is not dirty. Clean if needed.
2. Gas Detector
  - a. Calibrate with calibration gas.

Semi-Annually:

1. Flame Detector
  - a. Trigger the detector using the test device
  - b. Ensure output is within specification

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# Appendix C

## EAP Program Implementation Plan

The following plan defines how the requirements of the Emergency Action Plan will be implemented at the McGinness 1 & 2 Geothermal Plant. This plan addresses the implementation, maintenance and modification of an existing plan.

		Task	Task Description	Timing
EHS Coordinator	1	Periodic Plan Review	<ol style="list-style-type: none"> <li>1. Ensure EAP reflects plant equipment, alarms and intended response actions.</li> <li>2. Ensure recommendations resulting from PHAs, Incident Investigations, drill critiques and emergency response critiques are incorporated into the EAP.</li> <li>3. Ensure that EAP changes initiated by MOCs are incorporated.</li> <li>4. Document how the plan was reviewed, which documents were reviewed and who the participants were.</li> </ol>	Annual before refresher training
	2	Plan Coordination with Emergency Responders	<ol style="list-style-type: none"> <li>1. Review the written emergency action plan and appropriate mechanisms for notification developed for the facility with the responders.</li> <li>2. Prepare a written record of such review meetings, including their comments on the EAP &amp; notification procedures.</li> <li>3. Agree upon timing for EAP review. Try to coordinate with an annual drill or responder site visit.</li> </ol>	Pre-Startup
	3	Conduct EAP Training for Plant Operations and Maintenance	Initial Training per Training Procedure, SSP-33	<ol style="list-style-type: none"> <li>1. Upon Initial Assignment</li> <li>2. When a change in Duties changes EAP responsibility</li> </ol>
			Training per MOC Procedure, SSP-37	<ol style="list-style-type: none"> <li>1. When there is a significant Change in policy or procedure.</li> <li>2. When there is a change in equipment or a new hazard is discovered.</li> </ol>
			Conduct Refresher Training per Training Procedure, SSP-33. Ensure that the annual EAP review is completed first.	Annually
	4	Emergency response critiques	Lead response critique pursuant to the guidance in section 12 of the EAP program procedure.	As necessary.
	5	Drill Coordination (with or without Responders)	<p>Select type of drill, design the exercise and oversee the drill pursuant to the guidance in section 12 of the EAP program procedure. Plan and conduct the drill in conjunction with local responders and the LEPC to the extent they are willing and available.</p> <p>Additionally, may also conduct smaller, focused drills without responder.</p>	Annually (drill even if responders not available)
	6	EAP Plan Review with Emergency Responders	Review EAP with responders as agreed upon. Preferably, review in conjunction with a drill.	Annually
EHS Coordinator	7	Triggered Plan Review	<ol style="list-style-type: none"> <li>1. Review EAP after or in conjunction with an incident investigation to ensure plan adequacy.</li> <li>2. Review EAP in conjunction with an MOC that triggers EAP review.</li> </ol>	As necessary.
	8	Verify Employee Alarm Adequacy	Conduct verification of employee alarm adequacy pursuant to Appendix B of this EAP program procedure.	<p>Visual Alarms – Pre Startup</p> <p>Audible – Within 1 year of Startup</p> <p>Subsequent verification – as required by modifications.</p>