UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

DECISION RECORD

Dixie Meadows Geothermal Utilization Project

DOI-BLM-NV-C010-2016-0014-EA

INTRODUCTION:

The United States Department of the Interior, Bureau of Land Management (BLM) Carson City District (CCD), Stillwater Field Office received a proposed geothermal Utilization Plan under the provision of 43 Code of Federal Regulation (CFR) 3272.11 and Plan of Development for the Dixie Meadows Geothermal Utilization Project from ORNI 32 LLC (ORNI 32 or Ormat), a subsidiary of Ormat Nevada, Inc.

ORNI 32 is proposing the Dixie Meadows Geothermal Utilization Project (project) in Dixie Valley, approximately 43 miles northeast of Fallon in Churchill County, Nevada. The project area of interest includes lands within the Dixie Meadows Geothermal Unit that have been shown to have the highest potential for commercial feasibility through previously conducted exploration activities. ORNI 32 proposes to construct up to two geothermal power plants; drill, test, and operate up to 18 geothermal production and injection well sites and 8 core hole sites; construct and operate pipelines to carry geothermal fluid between well fields and the power plants; and construct a 120-kilovolt gen-tie line and associated structures.

The proposed power plants and related wells and pipelines will be on geothermal leases that are on public lands administered by the BLM CCD, Stillwater Field Office, and a segment of US Department of Navy (Navy) lands that have mineral rights owned by Ormat. The gen-tie line will be located on and off the leases, but on public lands administered by the BLM CCD, and the BLM Winnemucca District Office, Humboldt River Field Office, and a portion of Navy lands. The proposed gen-tie will follow the existing Dixie Valley Road, outside of wetlands and riparian areas in Dixie Meadows.

The purpose of the Proposed Action is to allow ORNI 32 to develop the geothermal resources within the Dixie Meadows Geothermal Unit Area on public lands managed by the BLM that are leased to ORNI 32.

The need for the Proposed Action is established by the BLM's responsibility under the Geothermal Steam Act of 1970; the regulations under 43 CFR 3270; the Minerals Leasing Act of 1920, as amended; and Secretarial Order 3285 of March 11, 2009. In addition, states across the western US have adopted renewable portfolio standards that require electricity providers to obtain a certain percentage of power from renewable energy resources. Nevada's renewable portfolio standard requires that the state's utilities procure 50 percent of their energy from renewable sources by 2030. The Proposed Action will help to meet these mid- and long-term regional needs.

The Combined Dixie Meadows Geothermal Unit Area (NVN-89456X) was created by combining the Dixie Hope and Dixie Meadows geothermal lease units. It also contains mineral rights to 760 acres of Navy land known as the Lamb Mineral interests. Two environmental assessments (EAs) have been completed for lands within the Combined Dixie Meadows Geothermal Unit. Findings of No Significant Impact (FONSIs) and Decision Records for the Terra-Gen Power Geothermal Exploration EA (DOI-BLM-NV-C010-2010-0010-EA) and the Dixie Meadows Geothermal Exploration Project EA (DOI-BLM-NV-C010-2011-0516-EA) were signed in June 2010 and January 2012, respectively. Combined, the two EAs analyzed and permitted up to 34 well pads (with multiple wells on each pad), 205.6 acres of surface disturbance on BLM-administered lands, and four acres of surface disturbance on the Navy's Lamb Mineral interests. Two groundwater wells were also approved.

Since the two FONSIs and Decision Records were issued, nine wells (four full-size wells and five core holes) have been drilled. The results of these wells indicate that geothermal resources are more likely to exist near the western margin of the valley. Consequently, ORNI 32 obtained two additional geothermal lease areas (N-92479 and N-92717) on December 1, 2013, on the western side of the lease blocks, which extend up to the boundary with the Stillwater Range Wilderness Study Area (WSA) that is present west of the Dixie Valley Road.

ALTERNATIVES:

An EA (DOI-BLM-NV-C010-2016-0014-EA) was completed for the Proposed Action, Alternative 1, and the No Action Alternative. A description of each alternative is below, along with a discussion regarding the development of the Proposed Action. Refer to the Rationale section, following the Decision below, for rationale of selecting the Proposed Action. Alternatives considered but eliminated from detailed study are also described below.

Proposed Action (Northern Gen-tie Route)

The Proposed Action includes construction and operation of up to two 30 MW net rated geothermal power plant facilities and associated electrical substations, construction of up to 18 production and injection well pads; construction of up to 8 core hole well pads; construction and operation of geothermal production and injection wells, pipelines, access roads, and support facilities; and construction and operation of a 120 kV gen-tie to Ormat's Jersey Valley power plant.

The 120 kV gen-tie would extend about 48 miles in a northeasterly direction from the proposed Dixie Meadows Geothermal power plants to Ormat's existing Jersey Valley Geothermal Power Plant. In the draft EA (EA dated May 9, 2017), ORNI 32 proposed to construct approximately 6,200 linear feet of the northern gen-tie alignment across an area containing a series of springs and associated wetlands and riparian vegetation in the Dixie Meadows. The BLM received numerous public comments describing the potential effects of this alignment and requesting that the gen-tie be realigned (see Public Outreach and Involvement, below). In response, ORNI 32 realigned the portion of the gen-tie that formerly crossed wetlands and riparian areas in Dixie Meadows. The proposed gen-tie now follows the existing Dixie Valley Road, outside of wetlands and riparian areas. The previous alignment is no longer a consideration for the Proposed Action.

As part of the Proposed Action, ORNI 32 would implement applicable environmental protection and mitigation measures, including monitoring and mitigation measures described in the Dixie Meadows Geothermal Project Aquatic Resources Monitoring and Mitigation Plan (ARMMP)(Appendix H of the EA) to avoid, minimize, and mitigate as needed, effects on aquatic resources; the Memorandum of Agreement Among the Bureau of Land Management, the Department of the Navy, the Advisory Council on Historic Preservation and the Nevada State Historic Preservation Officer Regarding the Dixie Meadows Development Project, Churchill County, NV (Appendix N of the EA) to resolve adverse effects and to mitigate unanticipated effects to NRHP-eligible sites; and the bird and bat conservation strategy (Appendix C of the EA) to reduce the potential for impacts on birds and bats. ORNI 32 would also comply with geothermal lease stipulations (attached) and applicant-committed environmental protection measures.

Alternative 1 (Southern Gen-tie Route)

Under Alternative 1, ORNI 32 would construct and operate the proposed project as described in the Proposed Action. The only differences would be a different gen-tie route and associated facilities. Under Alternative 1, the gen-tie would extend about 31 miles to the south from substations at the proposed Dixie Meadows Geothermal power plants to NV Energy's Fort Churchill to Gonder 230 kV transmission line. Throughout its length, the gen-tie would run parallel to the existing Oxbow power line. This existing transmission line cannot be used by the proposed project because, per discussions with the line's operator, there may not be adequate capacity for it; therefore, a separate transmission line is required. To maintain adequate separation from Navy-operated low-altitude aircraft, gen-tie towers would not exceed 100 feet in height.

Approximately 26.7 miles of this line would be located within an area that has been segregated from all forms of appropriation under the public land laws, including the mining laws, mineral leasing laws, and geothermal leasing laws, subject to valid existing rights. The BLM has segregated this area in response to an application received from the Navy for a withdrawal expansion for military use of the Naval Air Station Fallon, Fallon Range Training Complex in Churchill County, Nevada. The segregation was in effect for a period of 2 years from September 2, 2016 and extended for a period of 4 years on August 31, 2018. The administrative withdrawal expires on August 22, 2022.

No Action Alternative

Under the No Action Alternative, the BLM would not approve the Proposed Action, the facilities would not be constructed, and ORNI 32 would likely suspend exploration activities authorized under the two previous Decision Records for the foreseeable future. If exploration activities authorized under the two previous Decision Records are permanently suspended, ORNI 32 would remove and reclaim existing facilities.

Alternatives Considered but Eliminated from Detailed Study

No alternatives other than the Proposed Action, Alternative 1, and the No Action Alternative were analyzed in detail as part of this EA. However, during draft EA preparation, the BLM considered alternative project configurations for proposed geothermal development facilities that

would still meet the purpose of and need for action. These are briefly summarized below, and are described in detail in the EA.

The BLM considered alternative power generation plant locations. The location of the power plants and facilities are limited by the bounds of the geothermal resources at the site and the proximity of the Stillwater Range WSA and are also dependent on site-specific engineering factors and the location of sensitive biological and cultural resources. No other reasonable power plant technology was identified; a flash steam power plant is not suitable for this project area. This is because the temperature of the geothermal resource is too low.

The BLM considered an alternative analyzing a single power generation plant. However, based on the conceptual model of the geothermal resource in the Dixie Meadows Geothermal Unit Area, a single power generation plant would limit production capacity. Therefore, this alternative would not meet the purpose of action, which is to allow ORNI 32 to develop the geothermal resources within the Dixie Meadows Geothermal Unit Area.

The BLM considered alternative locations and numbers of geothermal wells. Well numbers and locations were determined based on the commercial potential. Well locations are in accordance with lease stipulations for cultural and riparian resources, which would minimize effects on sensitive resources.

The BLM considered alternatives to constructing a new gen-tie alignment. In the draft EA Proposed Action, ORNI 32 proposed to construct approximately 6,200 linear feet of the northern gen-tie alignment across an area containing a series of springs and associated wetlands and riparian vegetation the northern portion of Dixie Meadows. The BLM received numerous public comments requesting that this portion of the proposed gen-tie be realigned. In response, ORNI 32 realigned the portion of the gen-tie that formerly crossed wetlands and riparian areas in Dixie Meadows. The proposed gen-tie would now follow the existing Dixie Valley Road, outside of wetlands and riparian areas. The previous alignment is no longer a consideration for the Proposed Action.

CONFORMANCE:

The Proposed Action and alternatives described below are in conformance with the 2001 Carson City Field Office Consolidated Resource Management Plan (CRMP). The desired outcome for minerals and energy management under the CRMP, page MIN-1, is to "encourage development of energy and mineral resources in a timely manner to meet national, regional, and local needs consistent with the objectives for other public land uses." The CRMP minerals and energy management direction applies the following restriction on geothermal leasing: "No Surface Occupancy (NSO) 1. Within 500 feet of any water." The Proposed Action is in conformance with this measure.

DECISION:

Based on the EA (DOI-BLM-NV-C010-2016-0014-EA) and signed Finding of No Significant Impact (FONSI), it is my decision to select the Proposed Action for implementation, subject to mitigation measures and applicant-committed environmental protection measures developed and summarized in the EA (and ARMMP), and other requirements as are included in this decision, will become part of the Conditions of Approval (COAs).

The Proposed Action is also subject to the individual geothermal lease stipulations which were developed at the time of issuance of the leases. These are attached to this Decision for reference and include *Cultural Resource Protection* and *Endangered Species Act Section 7 Consultation* lease stipulations. Nothing about this Decision authorizes take of any species as defined under the Endangered Species Act.

Additional conditions for any authorizations implementing the Proposed Action are as follows:

- ORNI 32 will implement the Dixie Meadows Geothermal Project ARMMP (Appendix H of the EA). The ARMMP establishes monitoring goals and objectives and sets threshold and trigger values to ensure timely mitigation of any potential impacts on hydrologic resources, sensitive habitats, and sensitive species. Achievement of monitoring goals and objectives is required to ensure project activities do not significantly affect hydrologic resources (such as groundwater, and thermal and cool springs and seeps), aquatic habitat (such as wetlands, meadows, and vegetation), or known sensitive species, including the Dixie Valley toad and springsnails.

- The ARMMP is an adaptive document and as such this ARMMP will use an adaptive management approach to accommodate undefined variances, and address uncertainties in hydrologic and biologic system responses. The ARMMP includes "early warning" features (thresholds and objectives) which will be monitored continuously and/or weekly and if triggered solicits a response. Using this approach, baseline conditions, thresholds, management actions, and mitigation measures will be adapted throughout the life of the project to respond to the needs of the hydrologic and biologic resources, and to ensure mitigation is appropriate to reduce impacts to hydrologic resources, aquatic habitat, or sensitive species. The BLM may determine that more or less frequent monitoring is needed, and will make that determination after coordination with ORNI 32, the Fish and Wildlife Service, and other agencies as appropriate. Any changes or modifications to the ARMMP will require approval by the BLM Authorized Officer (AO).

- Upon implementation of this decision, ORNI 32 may start construction of a power plant, estimated at 12-megawatt output. The 12-megawatt plant will not become operational until after the minimum 12-month baseline data collection period has been successfully completed. If the 12-month timeframe is exceeded, the monitoring and reporting requirements will continue until the power plant becomes operational, then will continue after operations have begun in accordance with the ARMMP. Furthermore, if adaptive management thresholds have not been achieved or mitigation measures prove insufficient, the plant may not become operational until and unless thresholds are successfully achieved. At the end of the 12-month period, ORNI 32 must prepare a baseline summary report and deliver it to the BLM (and share with the technical working group) so that the adequacy of the baseline dataset can be evaluated before the project can proceed into energy production phases. A second facility may not be constructed until and unless the initial facility has been in successful operations (all thresholds have

not been exceeded) for a minimum 12 months and the geothermal reservoir data indicates that additional production is sustainable.

- Adaptive Management- If the ongoing prescribed monitoring indicates potential impacts to the water and riparian resources and/or sensitive species habitat, then the mitigation measures outlined in the ARMMP will be implemented to the degree necessary to minimize or avoid impacts. If mitigation measures prove to be insufficient, operations at individual production sites or power plant(s) will be suspended until adequate mitigation can be implemented to achieve thresholds.

- Based on ongoing prescribed monitoring, to avoid, minimize, or mitigate any adverse impacts on resources, the BLM will determine whether additional monitoring sites are necessary. If the BLM deems that additional monitoring sites are necessary, these will be designed to provide for more accurate monitoring of potential changes to water, riparian resources and special status species habitat.

- Conclusions of the USFWS's species status 12-Month Finding of the Dixie Valley Toad will be incorporated through adaptive management practices outlined in the ARMMP.

- Technical working group meetings will be scheduled by the BLM Authorized Officer on an as-requested basis upon implementation of this decision.

ORNI 32 will adhere to the Memorandum of Agreement Among the Bureau of Land Management, the Department of the Navy, the Advisory Council on Historic Preservation and the Nevada State Historic Preservation Officer Regarding the Dixie Meadows Development Project, Churchill County, NV (MOA). The MOA stipulates ORNI 32 will adhere to the stipulations of the agreement, including but not limited to:

- The resolutions of adverse effect on the Dixie Meadows Hot Springs Site, a historic property with traditional religious and cultural significance to the Fallon Paiute-Shoshone Tribe and eligible for the National Register of Historic Places under Criterion A, as set forth in Section II of the MOA.

- The Discovery and Unanticipated Effects Plan to identify, avoid and/or mitigate additional adverse effects to NRHP-eligible sites, as set forth in Attachment B of the MOA.

- The requirement to hire at least one archaeological monitor and one Tribal monitor during construction on previously-undisturbed land and adhere to the Tribal Monitor Provisions, as set forth in Attachment C of the MOA.

All rights and permits must be final prior to proceeding with facility construction. The project will not be allowed to proceed until ORNI 32 applies for and obtains sufficient water rights/appropriations, and the approval is subject to the operator's acceptance and compliance with any additional constraints that any regulatory agencies may require.

- Construction will not begin until ORNI 32 obtains the following permits and submits them to the BLM AO:
    - Facility construction permit (43 CFR 3272)
    - Site license (43 CFR 3273)
    - Notice to Proceed (Form 2800-15)
    - Commercial use permit (43 CFR 3274) CUP is needed prior to the facility providing electricity to the grid.

ORNI 32 may not initiate any construction or other surface disturbing activities without prior written authorization of the Authorized Officer. Such authorization will be a signed Geothermal Sundry Notice (Form 3260-3) issued by the Authorized Officer or their delegated representative.

The BLM will monitor approved operations to ensure that ORNI 32 is in compliance with the ARMMP, COAs, and lease stipulations in accordance with this decision and 43 CFR 3260 and 43 CFR 2800.

Furthermore, ORNI 32's adherence to the ARMMP (and the following key elements from the ARMMP) are requirements as part of this decision (see Appendix H of DOI-BLM-NV-C010-2016-0014-EA for the entire ARMMP):

Monitoring Goals and Objectives (as set forth in Table 17 of the ARMMP)

Hydrology (Ground/Surface Water)

Goal 1- Gain a clear understanding of the local hydrogeology, including areas of groundwater discharge and recharge and their potential relationships with surface water bodies, to maintain water quantity at Dixie Meadows. • *Objective 1* – Maintain surface water flow and stage within ±10% or ±15gpm/20mm (whichever is less) outside the natural range of baseline conditions for 90% of tier-1 monitoring sites. • *Objective 2* – Maintain hydraulic head within ±15% outside the natural range of baseline conditions for 90% of tier-1 groundwater monitoring wells.
Goal 2 – Maintain current groundwater and surface water quality conditions at Dixie Meadows. • *Objective 3* – Maintain water temperatures within ±10% or ±10°F (whichever is less) outside the natural range of baseline conditions at all tier-1 monitoring sites. • *Objective 4* – Maintain field parameters within ±10% outside the natural range of baseline conditions at 85% of tier-1 monitoring sites. • *Objective 5* – Maintain key geothermal indicator values* within ±15% outside the natural range of baseline concentrations at 85% tier-1 monitoring sites. *Key geothermal indicators: SiO_2 and Mg (other geothermal constituents may apply as appropriate for site-specific locations).

Aquatic Habitat/Special Status Species

Goal 3 – Maintain special status species populations and life cycle diversity within Dixie Meadows.

- *Objective 6* – Avoid direct impacts to the Dixie Valley Toad population (as currently understood based on USGS data) by maintaining abundance of all life stages. Biologically relevant abundance trigger and threshold values that account for natural variability will be determined in consultation with the working group as additional population data is collected for this species.
- *Objective 7* – Avoid direct impacts to the Dixie Valley Toad by maintaining the seasonal distribution of all life stages (as currently understood based on USGS data) throughout occupied habitat of Dixie Meadows. Biologically relevant trigger and threshold values for distribution that account for natural variability will be determined in consultation with the working group as additional distribution data is collected for this species.
- *Objective 8* – Maintain springsnail populations (average abundance within springbrook) at >80% from baseline for tier-1 monitoring sites.

Goal 4 – Maintain appropriate hydrologic conditions (habitat quality indicators) at surface water locations occupied by springsnails and Dixie Valley toad.

- *Objective 9* – Maintain surface water temperature within ±2.0°F outside the natural range of springsnail thermal tolerance (as defined by the range of temperatures measured throughout the occupied spring brook at Dixie Meadows) at all springsnail occupied sites.
- *Objective 10* – Maintain surface water stage within ±10% outside the natural range of baseline conditions at springsnail occupied springs.
- *Objective 11* – Maintain surface water temperature within ±4.0°F outside the natural range of baseline conditions at 90% of monitoring locations.
- *Objective 12* – Maintain surface water stage within ±10% or 20mm (whichever is less) outside the natural range of baseline conditions at 90% of monitoring locations.

Goal 5 – Ensure the continuity of aquatic habitats is maintained, with respect to vegetative composition, cover, hydric soils, and habitat extent.

- *Objective 13* – Maintain total vegetative cover and species composition (key riparian indicator species*) within ±10% outside the natural range of baseline ecological (aquatic habitat) potential for 85% of tier-1 monitoring sites.
- *Objective 14* – Maintain aquatic habitat extent (sum of all wetland communities in the Water and Aquatic Resource Delineation (WARD) by acreage) within natural climatic variations for all habitat types within Dixie Meadows.
- *Objective 15* – Maintain hydric soil indicators at 85% of tier-1 monitoring sites (Table 20).

*Key riparian indicator species include those from Army Corps of Engineers (ACOE) wetland survey indicators listed in Table 20.

Monitoring of Surface Water (ARMMP, Section 3.1)

To quantify the natural variability of hydrologic conditions in the Dixie Meadows area, 23 surface water monitoring locations, including four control points are proposed. Of the monitoring locations, 20 are seep/springs, two are channels, and one is a pond. Each surface water monitoring location will be monitored for water quality, flow/stage, and field parameters

(temperature, pH, electrical conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity). Additional surface water monitoring locations may be added and/or existing monitoring locations may be modified as new information is gained throughout the life of the project. Monitoring parameters, and the timing and frequency of data collection may also increase or decrease as necessary to complement objectives of the monitoring plan and adaptive management approach for the ARMMP, of which are subject to prior approval by the BLM Authorized Officer (AO).

Monitoring Schedule

A BLM-approved third-party contractor (Contractor) must perform a weekly site visit to inspect field equipment and to collect/download field parameters from the surface water monitoring locations and control points. Water samples will be collected for chemical analysis on a weekly basis during the minimum 12-month baseline period. Reporting frequencies could be changed after peak impacts occur and the system has stabilized. Once it is determined that the system has stabilized and/or analysis of data indicates that less frequent monitoring is needed, then monitoring frequency may be reduced to a level agreed upon. Upon power plant start-up, the monitoring frequency may be adjusted at some locations, and for some specific parameters, to aid in providing early warning data.

Continuous flow and temperature data will be recorded at USGS-101, NDOWSS-1, USGS-301 Salt Cedar, and Spring 5A/5B Confluence. These data will be downloaded during each site visit. Manual measurements of pH, EC, DO, ORP, and turbidity must be made at these locations during each site visit. Field parameter measurement and flow/stage measurement frequency at all other surface water monitoring locations will be weekly. Baseline data collection must continue for a minimum of 12-months from the date that the monitoring network is fully implemented, as described in Section 3.0. Monitoring must continue throughout the life of the project at locations and frequencies determined to be appropriate by the BLM.

Monitoring of Groundwater and Geothermal Reservoir (ARMMP, Section 3.2)

Groundwater monitoring is required at thirteen wells, including two geothermal bedrock wells, one freshwater bedrock well, and four alluvial wells, along with three monitoring wells completed in alluvium between Complex 2 and 3 and the geothermal facilities (MW-33, MW-4, and MW-55), and one monitoring well to the west of the geothermal facilities (MW-2)(see ARMMP Figure 17 for specific locations). Additional monitoring wells may be added as additional phases of geothermal power plant development progress, with potential future monitoring wells indicated in the ARMMP at Figure 18. Groundwater wells will be monitored for chemistry, field parameters, and hydraulic head; geothermal reservoir wells will be monitored for temperature, pressure, and water chemistry.

Additionally, fifteen drive point piezometers will monitor the shallow water table at each of the spring complexes within Dixie Meadows. Data collection at the drive point piezometers will include depth to groundwater and shallow groundwater temperature. Upon completion of additional production or injection wells, the Contractor must estimate hydraulic properties of the local aquifer (hydraulic conductivity, transmissivity, storativity, etc.) by monitoring water levels in the new well and surrounding wells during well development or aquifer testing. Additional

hydrogeologic conditions will be assessed, including vertical and horizontal boundaries and aquifer type (confined, unconfined, etc.). Vertical aquifer boundaries will be noted from the lithology logs. Horizonal boundaries will be noted if indicated on time-drawdown plots produced during testing. Borehole geophysical surveys must be conducted for the depth of the borehole. The temperature of penetrated aquifers will be noted, and when feasible, water quality will be tested.

Prior to initiating utilization, ORNI 32 must conduct further geothermal testing to further refine the characteristics of the geothermal reservoir that will be used to provide heat for the geothermal power plant(s). This "pre-utilization" testing will take place concurrent with power plant construction and be designed to mimic the anticipated production and injection regime for the proposed power plant. During this pre-utilization testing the surface water and groundwater monitoring program described in Sections 3.1 and 3.2 (ARMMP) will be in place. To obtain a more detailed understanding of any potential interaction between pre-utilization testing and existing surface and groundwater resources within Dixie Meadows during pre-utilization testing, weekly reporting will occur at surface water and groundwater monitoring locations (ARMMP Tables 18 and 19). ORNI 32 will be required to notify BLM of any unusual data figures weekly or immediately when anomalies are identified.

If during the pre-utilization testing, parameters at the surface water and groundwater monitoring locations exceed the threshold/trigger criteria, then utilization at the specific site(s) will be suspended until appropriate adaptive management mitigation is implemented. These actions will provide assurances that a threshold is not again exceeded. The mitigation action(s) outlined in Section 3.9 and at Table 12 of the ARMMP will be implemented to address the threshold/trigger exceedance(s).

Each trigger and mitigation action may have its own unique remedy. The next course of actions in relation to ORNI 32's testing activities will be decided by the AO and technical working group if appropriate. Until a decision is made by the AO, testing will be suspended at the applicable location until an appropriate adaptive management mitigation is determined and implemented.

Schedule

The Contractor must conduct groundwater monitoring activities (manual measurements and recorder downloads) on a weekly basis for the remainder of the 12-month baseline data collection period. Monitoring will continue throughout the life of the project; however, the monitoring frequency and locations may vary depending on observed responses, in accordance with the adaptive management approach. In addition, the timing, frequency, and duration of groundwater monitoring may be subject to temporary changes during specific project activities (e.g., increase site specific monitoring frequency to daily hydraulic head and temperature measurements during production-injection well flow testing). Any alterations to monitoring site locations and/or the timing, frequency, and/or duration of monitoring data collection is subject to prior approval by the BLM AO.

Monitoring of Biological Resources (ARMMP, Section 3.3)

The following monitoring frameworks were developed for several parameters that are indicative of aquatic and wetland habitat functionality and health. This decision requires the frameworks to be followed, and associated monitoring must be implemented.

- Hydrology—hydrological conditions that foster and maintain aquatic and wetland habitats would be monitored during the surface water monitoring program (as described in Sections 3.1 and 3.2), and at additional locations which provide habitat to special status species;
- Extent of wetland vegetation and hydric soils;
- The distribution and abundance of special status species throughout Dixie Meadows; and,
- Habitat quality indices—known parameters of preferred habitat (e.g., water temperature) will be monitored during the surface water monitoring program (as described in Section 3.1 and 3.2), and at additional locations which provide habitat to special status species.

Biologic baseline conditions, thresholds and management actions would continue to be refined through the baseline data collection period for a minimum of 12-months. The ARMMP may be updated/amended, upon BLM approval, as those monitoring data are collected and thresholds are refined.

Wetland Vegetation

The Contractor will monitor wetland vegetation in terms of percent cover and species composition using qualitative (photo points) and quantitative (Line Point Intercept [LPI] transect) monitoring methods. Wetland vegetation monitoring locations are co-located with each of the tier-1 hydrological monitoring locations (ARMMP Figures 19 and 20) and additional monitoring locations will be identified based on DVT habitat monitoring findings by the USGS that are currently underway. The Contractor will analyze and report the data per Section 3.5 of the ARMMP.

Hydric Soils

To monitor the extent of hydric soils throughout Dixie Meadows, soils will be co-located with the tier-1 hydrological monitoring sites and characterized on an annual basis using the Army Corps of Engineers Wetland Delineation Manual (ACOE 2008) and reported per Section 3.5 of the ARMMP. Proposed hydric soil monitoring locations are shown on Figure 19 and Figure 20 of the ARMMP.

Schedule - Wetland Vegetation/Hydric Soils

The Contractor will conduct wetland vegetation monitoring activities quarterly (photo points) and annually (LPI transects, drone imagery, hydric soils). Monitoring must continue throughout the life of the project; however, the monitoring frequency and locations may vary depending on observed responses, in accordance with the adaptive management approach. Any alterations to monitoring site locations and/or the timing, frequency, and/or duration of monitoring data collection is subject to prior approval by the BLM AO.

Special Status Species

Several special status species occur in the aquatic and wetland habitats of Dixie Meadows, including the Dixie Valley toad (*Anaxyrus williamsi*) and springsnails (*Pyrgulopsis* sp.). These species require stable habitat conditions and, in the case of *A. williamsi*, access to a variety of habitats throughout their lifecycle. These monitoring frameworks are designed to complement this previous and on-going work and will be adaptively modified in response to the best available science (e.g., forthcoming USGS publications) and agency recommended best practices.

Dixie Valley Toad

- The monitoring framework for the DVT was informed primarily by technical working group discussions in September and October 2020, and by the following two documents: 1) the 2019 USGS report titled *Monitoring Protocol Development and Assessment for Narrowly Endemic Toads in Nevada* (Halstead et al. 2019), and 2) the 2021 peer-reviewed paper by Halstead et al. (2021) titled *Water Temperature and Availability Shape the Spatial Ecology of a Hot Springs Endemic Toad (Anaxyrus williamsi)*.
- Currently, the monitoring framework relies on monitoring of: 1) habitat quality indices collected during the surface water component (Section 3.1 of the ARMMP), 2) wetland vegetation/extent (Section 3.3.1 of the ARMMP), and 3) locations of importance to various life stages of DVT (i.e. brumation and reproduction sites). The monitoring framework will be adaptively modified into the future by incorporating findings from the above-mentioned forthcoming data (i.e. distribution and abundance).
- The USGS (Halstead et al. 2019) suggests using the proportion of wetland area cumulatively utilized by *A. williamsi* for reproduction (as evidenced by pre-metamorphic life stages) and occupied by adults as a metric of population health. Prior to beginning production activities, ORNI 32 must consult with BLM to develop a baseline and establish appropriate thresholds (Section 3.6.2, Table 19 of the ARMMP) of this metric for *A. williamsi* within the WARD. Once project activities commence, the BLM AO will conduct biannual (at a minimum) meetings. The BLM AO will coordinate and include the technical working group and analyze current data to inform any updates to the ARMMP associated with the Dixie Valley toad. Monitoring the extent of wetland vegetation (Section 3.3.1) will serve as an important component of this analysis by quantifying the amount of available habitat.
- The USGS (Halstead et al. 2019) determined the distribution of Dixie Valley toads within the WARD to be a function of water temperature and availability of wet habitats, and that significant changes in these parameters could affect the proportion of area suitable for Dixie Valley toads. These parameters, in addition to other habitat quality indices of importance to amphibians (e.g., electrical conductivity, temperature, pH, etc.), will be gathered during the surface water monitoring program. In addition, the extent of the wetland communities (i.e. wet habitats) will be monitored (Section 3.3.1 of the ARMMP). The Contractor will analyze these data in light of the best available science for this species, which will inform determining thresholds and triggers for corrective action.

- The USGS (Halstead et al. 2021) studied seasonal (spring and autumn) home ranges, movement patterns, and habitat associations for this species. They concluded DVT selected for: 1) habitat closer to water, 2) and for warmer water and substrates than at nearby available locations. The selection of warmer substrates was achieved in different locations in spring and autumn. In the spring, DVT were found in warm shallows associated with oviposition sites. While in the autumn, toads tended to be found near warm water in or near spring heads. DVT were found to select brumation sites in, over, or near water, often near springs where water depths and temps are likely stable through the winter. Thermal preferences and tolerances were not established, and threshold and trigger values were difficult to establish. Therefore, as part of this decision, temperature and water stage data will be collected at brumation and reproduction sites to more fully inform the ARMMP and its adaptive management approach.

Schedule

- Dixie Valley toad (*Anaxyrus williamsi*) distribution and abundance will be monitored twice annually at locations to be determined by BLM, after discussions with the USFWS. Surface water temperature and stage must be monitored continuously or weekly (depending on location) during both the Dixie Valley toad reproductive season (March-May) and brumation (October-February) at eight sites co-located with hydrological monitoring sites, and elsewhere as determined by BLM.

Springsnails

- Two hot springs located within the WARD were sampled for springsnails (*Pyrgulopsis* spp.) by Dr. Don Sada in 1991 (Dr. J. Umek, personal communication, September 2020). Springsnails were not found to be present during this survey. A springsnail survey was conducted by Ormat in October 2018 (Stantec 2019; Table 10 ARMMP). Two species of springsnail, representing three populations, were identified within three small and isolated springs (Spring Complex 1b) (Figure 19) after an inventory of 46 springs within the WARD. Snail collections were submitted for deoxyribonucleic (DNA) analysis. Genetic sequences for two specimens were found to be most similar to three previously described species including the Pleasant Valley pyrg (*Pyrgulopsis aurata*) (no difference in base pairs), the Cortez Hills pebblesnail (*Pyrgulopsis bryantwalkeri*) (difference of two base pairs out of 658 base pairs) and the Ovate Cain Spring pyrg (*Pyrgulopsis pictilis*) (no difference in base pairs). Currently, these three species are not considered to be genetically unique (Liu 2018a and 2018b). Genetic sequences for two other specimens indicate similarity to the Surprise Valley pyrg (*Pyrgulopsis gibba*) with a difference of three base pairs out of 658 base pairs (Liu 2018a).
- A second springsnail survey was conducted in September 2020 by McGinley biologists to quantify abundance, distribution, and to document physical characteristics of occupied springs (McGinley 2020b). The 2020 survey implemented the USFWS recommended protocol titled: Appendix B - Springsnail Inventory, Monitoring, and Collecting Protocols (Sada 2019). All 117 springs identified during the surface water inventory (Section 2.5) were surveyed for springsnails. *Pyrgulopsis* spp. were encountered in the same three springs as in 2018, plus an additional two

springs within spring complex 1B. Note that five new springs were encountered during the 2020 springsnail survey that were not identified during the surface water inventory, including spring 118. Detailed distribution, abundance, temperature, habitat, and stage data were collected at all five occupied springs (McGinley 2020b; Tables 11 and 12 of the ARMMP).

- Habitat quality indices of importance to springsnails that will be monitored are maintaining consistent water quantity (flow or pool stage) and temperature. These data (water temperature and flow or pool stage) will be analyzed weekly and adaptive management and mitigation measures will be implemented in accordance with the hydrologic thresholds outlined in Section 3.6 of the ARMMP.
- The Contractor must conduct springsnail abundance and distribution surveys every year at all spring sites in spring Complex 1B with identified springsnails, applying protocol consistent with Sada (2019) to permit comparative analyses of the data. Surveys will be conducted in October. Thresholds for adaptive management actions and mitigation measures, based on survey findings, are outlined in Section 3.6 of the ARMMP.

Schedule

- The Contractor will conduct springsnail distribution and abundance surveys annually at all occupied springs. Habitat quality indices (water temperature and stage) will be collected and analyzed weekly.

Management Actions (ARMMP, Section 3.8)

Monitoring sites applicable to achievement of these objectives were identified using specific criteria to stratify sites into two categories: tier-1 and tier-2 (Tables 18-21 of the ARMMP).

Tier-1 Sites
Criteria utilized for establishing tier-1 sites includes those sites with measurable flow, representative temperatures of spring complexes, areas of known DVT and/or springsnail populations and occurrence, areas of importance for breeding/reproduction and brumation of DVT, and dominant vegetation habitat representative of spring complexes and/or DVT populations.

Tier-2 Sites
Are monitoring sites described in Section 3.6 of the ARMMP as well as randomly generated locations that represent each spring complex (complexes 1-6) and associated wetland habitat types (tier-2 sites, Tables 18-21 of the ARMMP).

Tier-1 sites will be used as representative spring complex sites to establish baseline conditions, thresholds and evaluate exceedances of thresholds for hydrologic objectives. Tier-1 sites for aquatic habitat and/or special status species objectives will further be revised based on available information of springsnail and DVT populations and habitat occurrence from NDOW and USGS surveys.

If an objective is not being achieved within the established monitoring timeframe and a threshold is exceeded at a tier-1 site, then a more detailed look at the spring complex level (tier-2 sites) will occur to determine if additional tier-2 monitoring sites within the same spring complex are also exceeding thresholds, or not achieving the objective(s). There are nine tier 1 surface monitoring sites and 15 tier 2 surface monitoring sites. There are nine tier 1 groundwater monitoring wells and 10 tier 2 groundwater wells. There are eight tier 1 vegetation and hydric soil sites, and 13 tier 2 sites that are proposed but have not been identified. Tier-2 sites may also be revised as needed upon receipt of available information based on NDOW and USGS surveys.

If a monitoring threshold or critical threshold is exceeded at a tier-1 and/or tier-2 site, then operations at the specific site or plant will be suspended, adaptive management and mitigation is triggered, and identified in one of three categories by the BLM AO:

- *Code A* – Discuss and re-evaluate within 10 days of exceeding a threshold the monitoring indicators, baseline conditions, thresholds, and timing of monitoring to determine if additional adaptive management or mitigation is required.
- *Code B* – Discuss and determine within 5 days the appropriate adaptive management or mitigation action to be taken.
- *Code C* – Discuss and determine within 24 to 48 hours the appropriate adaptive management or mitigation action to be taken immediately.

The Codes identified above identify the timing and course of action. In most cases, the BLM AO will request a meeting with the technical working group to assist in identifying the appropriate adaptive management or mitigation action to remedy the issue. Until the appropriate action is identified, and the BLM AO makes a decision, operations will be suspended.

Mitigation Measures (ARMMP, Section 3.9.1)

Adaptive management or mitigation measures will be triggered if an indicator has exceeded a monitoring/critical threshold. The following is a general list of proposed adaptive management actions and mitigation measures that may implemented. This is not a complete list and additional adaptive management actions or mitigation measures may be developed to ensure goals and objectives are being achieved. Additional management actions and/or mitigation measures may be proposed throughout the life of the project (exploration, pre-utilization and testing, utilization, decommissioning, and reclamation phases) and would require prior approval from the BLM AO before implementation.

1. Providing geothermal fluids to the affected hot springs of a quality and quantity to approximately restore the pre-production temperature; flow, stage or equivalent; and basic thermal water chemistry of the hot springs; and/or

2. Implementing appropriate geothermal reservoir management techniques to adjust the geothermal reservoir pressure regime and reduce and/or reverse these adverse effects to the springs. Such geothermal reservoir management techniques may include:

a. Modifying the volume (and/or pressure) of geothermal fluids produced from one or more production wells within the geothermal unit area field and monitor the reservoir and hot spring response; and/or

b. Modifying the volume (and/or pressure) of geothermal fluids injected into one or more injection wells within the geothermal unit area field to balance injection throughout the system either vertically or laterally and monitor the reservoir and hot spring response; and/or

c. Relocating one or more injection well(s) within the geothermal unit area. Relocation of production wells could prove to be difficult and not feasible/plausible; however new injection wells could also be drilled in other areas to supplement additional areas of injected water.

3. Any other measure as directed by the BLM AO which, pursuant to the lease stipulations, may include shutting down the operation.

Additional Adaptive Management Actions and Mitigation Measures (ARMMP, Section 3.9.2)

Hydrology (Ground/Surface Water)

1. Increase the frequency, duration and/or timing of monitoring specific parameters at defined monitoring locations to determine if other applicable adaptive management actions or mitigation measures need to be implemented.

2. Modify (increase and/or decrease) pumping and/or injection rates of geothermal fluid until maintenance of pre-operation conditions is achieved.

3. Alter the location(s) of pumping and/or injection of geothermal fluid (into specific geological units) until maintenance of pre-operation conditions is achieved.

4. Install spring boxes and pipeline to pipe spring water directly to a discharge point while controlling flow rates.

5. Install a temporary injection pipeline from injection well(s) to spring(s) to supplement losses in water volume.

6. Install a temporary pipeline from production well(s) to spring(s) to supplement losses in water temperature.

7. Install shallow injection wells to maintain shallow groundwater levels, and indirectly support spring flows.

8. Temporary cessation of pumping and/or injection at site-specific well locations until maintenance of pre-operation conditions is achieved.

Aquatic Habitat/Special Status Species

1. Continue population monitoring program. Studies could also allow for a better understanding of life history, genetics, and ecological requirements for the Dixie Valley toad.

2. Implement habitat manipulation and improvement projects for Dixie Valley toad. Experimental habitat manipulation and improvement projects (e.g. modifying breeding pools, vegetation thinning, re-seeding, etc.) would be developed and implemented to enhance reproduction, recruitment, survival, and dispersal of the Dixie Valley toad.

3. Work with the BLM and the Navy to reduce the threats of grazing and/or grazing during critical periods for Special Status Species. Examples could include changes to grazing rotation, additional water troughs or supplements away from wetland habitats, and excluding livestock grazing from the Dixie Meadows/habitat complex.

4. Conduct tamarisk and other noxious and non-native weed treatments in conformance with the BLM and Navy and approved aquatic methods in the Project Weeds Management Plan to improve habitat for Special Status Species within Dixie Meadows.

5. Investigate predation and disease threats from non-native species (e.g. bullfrogs, crayfish, fish, etc.) for the Dixie Valley toad and springsnails and develop a program to reduce these threats within Dixie Meadows.

RATIONALE:

The following rationale are in support of the actions identified in this decision which have been informed by the Dixie Meadows Geothermal Utilization Project EA #DOI-BLM-NV-C010-2016-0014-EA (and its Aquatic Resources Management and Mitigation Plan (ARMMP) Appendix H particularly) and the signed Finding of No Significant Impact (FONSI). The BLM is able to reach a FONSI because of the adaptive management approach in the ARMMP, which requires continuous monitoring and collection of data to support thresholds and mitigation measure implementation and modifications for the life of the Dixie Meadows project. Additionally, the ARMMP requires that any time a threshold is exceeded, site specific and power plant operations may be suspended until appropriate mitigation through adaptive management is identified to successfully achieve thresholds. The ARMMP includes "early warning" features (thresholds and objectives) which will be monitored continuously and/or weekly and if triggered solicits a response. The BLM also made this decision for these same reasons. Selection of the proposed action, as set forth in this decision, hinges on the successful implementation and adherence to the requirements found in the ARMMP. This decision requires implementation of an intensive adaptive management plan that includes continuous monitoring, which is intended to be continually updated and informed with the best available scientific information and monitoring data to assure avoidance of any significant impacts. This decision also requires that

if a threshold is exceeded or if mitigation measures prove to be insufficient, operations at individual production sites or power plant(s) will be suspended until and unless adequate mitigation can be implemented to achieve thresholds.

Adherence and implementation of the ARMMP and its key elements are requirements of this decision.

The Proposed Action is in conformance with the 2001 BLM Carson City Field Office Consolidated Resource Management Plan. The BLM has authority to issue this Decision in accordance with the Mineral Leasing Act of 1920 (30 USC 181), as amended, the Geothermal Steam Act of 1970 (30 USC 23), as amended, the Federal Land Policy and Management Act of 1976 (43 USC 35), and the Energy Policy Act of 2005 (42 USC 149), as amended.

Implementing the ARMMP (an adaptive management monitoring and mitigation plan), which was developed in coordination with ORNI 32, US Fish and Wildlife Service, Naval Air Station Fallon, US Geological Survey, and the Nevada Department of Wildlife, in concert with lease stipulations, and environmental protection measures, will mitigate any adverse effects to the hydrologic resources, aquatic habitat, and sensitive species known to be present in the Dixie Meadows area. As a result, there would be no significant impacts on unique characteristics of the area.

The BLM engaged in extensive government-to-government consultation with Native American tribes (see Government-to-Government Consultation, below). The BLM and ORNI 32 must adhere to the MOA, which was developed in coordination with SHPO, ACHP, the Navy, ORNI 32, and the Fallon Paiute-Shoshone Tribe, which will resolve adverse effects to sites eligible for the NRHP.

The BLM also involved the public, as set forth below in the Public Outreach/Involvement section.

The Decision to select the Proposed Action meets the BLM's purpose and need for action. The EA adequately analyzed and disclosed the environmental effects of implementing this Decision. The FONSI for the Proposed Action supports the Decision.

Geothermal lease stipulations, applicant-committed environmental protected measures, and COAs, as set forth in this Decision, are sufficient to protect resource values and meet BLM's multiple use, sustained yield mission, while allowing for implementation of the Proposed Action. Implementation of this Decision will not result in any undue or unnecessary environmental degradation of public lands and is consistent with federal, state, and local laws, regulations and plans.

Development of geothermal resources in the Combined Dixie Meadows Geothermal Unit Area (NVN-89456X) supports state and federal initiatives to expand development and use of renewable energy resources.

Government-to-Government Consultation

Since the Proposed Action is an expansion to the BLM's 2012 Dixie Meadows Geothermal Exploration Project FONSI and Decision Record (DOI-BLM-NV-C010-2011-0516-EA), and

since the location is identical to that of the original project, consultation and coordination conducted for that project are incorporated into this Decision.

The BLM has coordinated and consulted with Native American tribal representatives throughout the project timeline. Coordination with the Fallon Paiute-Shoshone Tribe began in 2007 and consultation was initiated in 2010. Numerous meetings and field trips to the Dixie Meadows were held between 2010 and 2021, as described in Section 3.13 of the EA.

Through government-to-government consultation with the Fallon Paiute-Shoshone Tribe, the BLM obtained and considered Native American religious values and views of Native American leaders. The BLM evaluated policies and procedures with the aim of protecting Native American Religious freedom, to refrain from prohibiting access and performance of religious ceremonies, and consulted with the Fallon Paiute-Shoshone Tribe in regard to the Proposed Action. The BLM, in consultation with the Proponent, has redesigned the Project to avoid, lessen or minimize adverse audible or visual impacts and to avoid unnecessary interference with Tribal religious practices. The BLM, in consultation with the Fallon Paiute-Shoshone Tribe, the SHPO, ACHP, and the Navy, resolved any potential adverse effects to the Dixie Meadows Hot Springs site. a historic property with traditional religious and cultural significance to the Fallon Paiute-Shoshone Tribe.

Public Outreach and Involvement

Since the Proposed Action is an expansion to the BLM's 2012 Dixie Meadows Geothermal Exploration Project FONSI and Decision Record (DOI-BLM-NV-C010-2011-0516-EA), and since the location is identical to that of the original project, consultation and coordination conducted for that project are incorporated into this Decision.

The BLM released the public draft EA on May 9, 2017. Notification of draft EA availability was made to 110 state and federal offices through the Nevada State Clearinghouse. Direct emails were also sent that day to 8 individuals, organizations and agencies. The BLM also published a news release on May 9, 2017 that was sent to media outlets listed on the Nevada BLM State Office media list.

Comments on the draft EA were accepted during the comment period, which ran from May 9, 2017 through June 30, 2017; although comments received in a timely manner after this date were also considered. The BLM received 664 comment submissions on the draft EA. Comment submissions were received from the Fallon Paiute-Shoshone Tribe, US Fish and Wildlife Service, Nevada Department of Wildlife, Nevada Division of Water Resources, Nevada Department of Environmental Protection, and the Nevada State Historic Preservation Office. Submissions were also received from the Sierra Club, Basin and Range Watch, Center for Biological Diversity, Defenders of Wildlife, Wildlands Defense, and private individuals. Of the 664 submissions, 643 were form letters received via email and US mail. While there were minor variations, the content in all the form letters was essentially the same.

Substantive comments generally highlighted the potential for effects of the proposed geothermal development on nearby hydrologic conditions, spring-dependent ecosystems, and sensitive aquatic species in the Dixie Meadows area, including the Dixie Valley toad and springsnails. Other comments expressed concern over potential impacts on cultural resources, air quality, and

wildlife. Commenters also requested more information on proposed monitoring, mitigation measures, and adaptive management strategies.

Over five years have elapsed between the draft EA publish date and this Decision. Since that time, ORNI 32 and BLM, in coordination with US Fish and Wildlife Service, Naval Air Station Fallon, US Geological Survey, and Nevada Department of Wildlife, developed the ARMMP. The ARMMP was developed as a tool for implementing adaptive management and to further identify and characterize hydrologic conditions, spring-dependent ecosystems, aquatic habitat, and sensitive species in the Dixie Meadows area.

Based on the comments received on the public draft EA, and additional information gathered during development of the ARMMP, the BLM revised the EA to clarify the known characteristics of the Dixie Meadows Geothermal Unit hydrologic and geothermal systems, and presence and distribution of wetlands and riparian areas, and sensitive species distribution in the geothermal unit. The BLM, in consultation with ORNI 32, also redesigned the Project based on public comments and government-to-government consultation with the Fallon Paiute-Shoshone Tribe to avoid, lessen or minimize adverse audible or visual impacts to sites of traditional religious and cultural significance, and to avoid unnecessary interference with Tribal religious practices.

In January of 2021, the BLM conducted an additional 30-day public comment period for the 'Revised Draft' EA, including the ARMMP as Appendix H. Comments were received from the USFWS, NDOW, Churchill County, Center for Biological Diversity, Nevada Department of Water Resources, NDOT, NDEP, Navy, Fallon Paiute Shoshone Tribe, James Moore, Rhonda Robinson, and Matthew Forrest. Appendix G to the Final EA includes BLM responses to these comments.

In response to substantive comments received, the EA and ARMMP were further modified, with a primary focus on providing further clarification to the EA and ARMMP. In the case of the ARMMP, a more thorough explanation regarding the use of existing monitoring data and information was incorporated to support adaptive management processes. The ARMMP identifies a framework of proposed adaptive management actions and mitigation measures based on monitoring results, baseline conditions and triggers, as well as thresholds based on the current understanding of the natural variability of hydrological and biological conditions, and the potential importance to special status species in Dixie Meadows. The ARMMP adopts an adaptive management approach, whereby monitoring attributes, frequencies, triggers, adaptive management, and mitigation measures may be refined as additional data are collected and in response to monitoring observations. Adaptive management and mitigation are tied to the parameter range identified for hydrologic conditions, special status species, and aquatic habitat sustainability. If potential changes are detected in baseline conditions and threshold values are exceeded, a proactive set of adaptive management actions and mitigation would be implemented with the goal of preventing any potential impacts to hydrologic resources, special status species, or aquatic habitat.

This Decision hinges on the successful implementation and adherence to the requirements found in the ARMMP, which includes "early warning" features (thresholds and objectives) which will be monitored continuously and/or weekly and if triggered solicits a response. This decision requires implementation of an intensive adaptive management, continuous monitoring and adjust

approach, intended to be continually updated and informed with the best available scientific information and monitoring data to assure avoidance of any significant impacts. This Decision also requires that if a threshold is exceeded or if mitigation measures prove to be insufficient, operations at individual production sites or power plant(s) will be suspended until and unless adequate mitigation can be implemented to achieve thresholds and avoid impacts.

AUTHORITY:

Authority for this Decision is contained in the Geothermal Steam Act of 1970, the Federal Land Policy Management Act of 1976, and 43 CFR 3200 and 2800.

The ARMMP developed for implementation of this decision uses adaptive management as defined under 43 CFR 46.145, which states: Bureaus should use adaptive management, as appropriate, particularly in circumstances where long-term impacts may be uncertain and future monitoring will be needed to make adjustments in subsequent implementation decisions. The NEPA analysis conducted in the context of an adaptive management approach should identify the range of management options that may be taken in response to the results of monitoring and should analyze the effects of such options. The environmental effects of any adaptive management strategy must be evaluated in this or subsequent NEPA analysis.

APPEAL:

A person who wishes to appeal to the Interior Board of Land Appeals must do so under 43 CFR 4.411 and must file in the office of the officer who made the decision (not the board), in writing to: Jake Vialpando, Stillwater Field Manager, Carson City District, 5665 Morgan Mill Rd, Carson City, Nevada 89701. A person served with the Decision being appealed must transmit the notice of appeal in time to be filed in the office where it is required to be filed within thirty (30) days after the date of service.

The notice of appeal must give the serial number or other identification of the case and may include a statement of reasons for the appeal, a statement of standing if required by 43 CFR 4.412(b), and any arguments the appellant wishes to make. Form 1842-1 (enclosed) provides additional information regarding filing an appeal.

No extension of time will be granted for filing a notice of appeal. If a notice of appeal is filed after the grace period provided in 43 CFR 4.401(a), the notice of appeal will not be considered, and the case will be closed by the officer from whose decision the appeal is taken. If the appeal is filed during the grace period provided in 43 CFR 4.401(a), and the delay in filing is not waived, as provided in that section, the notice of appeal will not be considered, and the appeal will be dismissed by the Board.

The appellant shall serve a copy of the notice of appeal and any statements of reason, written arguments, or briefs under 43 CFR 4.413 on each adverse party named in the Decision from which the appeal is taken and on the Office of the Solicitor, Pacific Southwest Regional Solicitor, U.S. Department of the Interior, 2800 Cottage Way, Room E-1712, Sacramento, California 95825-1890. Service must be accompanied by personally serving a copy to the party or by sending the document by registered or certified mail, return receipt requested, to the address of record in the bureau, no later than 15 days after filing the document.

SIGNATURE OF AUTHORIZED OFFICIAL:

11-23-2021

Jake Vialpando
Stillwater Field Manager
Carson City District

Date

Attachments:
COAs
Lease Stipulations
Form 1842-1

cc: Interested Party

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Kelly Fuller
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Depoe Bay, OR 97341

NDOW
Mark Freese
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Sustainable Grazing Coalition
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Western Watersheds Project
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USFWS, Shawna Theisen
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Reno, NV 89507

Fallon Paiute-Shoshone Tribe
Richard Black
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Conditions of Approval (COAs)

- Prior to construction, ORNI 32 would submit to the Bureau of Land Management (BLM) an invasive plant management plan to monitor and control noxious weeds and to ensure that there would be no net increase in the amount of weeds on-site during the life of the project. If any infestations of noxious weed species are discovered along the interconnection line route during construction, their location would be communicated to the BLM Carson City District (CCD), Stillwater Field Office weed coordinator.
- Prior to the start of construction, ORNI 32 would obtain a dust permit issued by the appropriate regulating agency. Construction would comply with all the requirements of that dust permit.
- Portable chemical sanitary facilities would be available and used by all personnel during periods of well drilling and/or flow testing and construction. These facilities would be maintained by a local contractor.
- Speed limits of 20–25 miles per hour (mph) would be maintained for project related travel through the project area (BLM 2007a).
- 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.
- All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available in all vehicles and equipment on the active sites. 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 regarding smoking.
- No hazardous materials would be used on the gen-tie right-of-way (ROW). ORNI 32 would store trash and solid waste generated from construction activities in closed containers at the construction yards and staging sites located at staging locations. ORNI 32 would dispose of the trash and solid waste in accordance with regulatory requirements. Any spills of petroleum hydrocarbons would be removed. Affected soils and spill absorbents would be labeled and stored at an ORNI 32-designated facility off the ROW for accumulation and off-site disposal. ORNI 32 construction inspectors, the BLM, and the Nevada Division of Environmental Protection (NDEP) would be notified if a spill of a reportable quantity occurred, and cleanup would be implemented immediately.
- Cut and fill activities would be minimized through the selection of the power plant sites and pipeline routes. Off-site stormwater would be intercepted in ditches and channeled to energy dissipaters as necessary to minimize erosion around the power plants. To minimize erosion from stormwater runoff, access roads would be maintained consistent with the best management practices (BMPs) applicable to development roads. BLM BMPs for stormwater would be followed, as applicable, on public lands.
- A buffer of 50 feet would be established around the sand cholla individual observed within the northern gen-tie route before construction of the gen-tie line. If avoidance is not possible during construction activities, potential mitigation could include

transplanting the individual into suitable habitat, followed by monitoring of transplantation success. Any subsequent gen-tie line maintenance would also avoid the sand cholla individual by remaining outside a 50-foot buffer around the individual. These measures would apply to any other sensitive plant species observed in the work areas.

- Construction activities on playa habitats would be limited to dry periods when seasonal surface inundation is not present.
- ROW construction activities would be designed to not inhibit natural surface flow patterns.
- Transmission towers, string sites, and other temporary work areas would be sited outside of identified surface water resources, wetlands/riparian areas, special status species habitat, and areas with hydric soils.
- Geothermal pipelines would be sited to avoid wetland and riparian habitats.
- Surface grading or vegetation clearing would not occur on hydric soils or near springs, seeps, or sensitive resource areas as identified by the BLM from preconstruction surveys as identified from the wetland delineation (Water and Aquatic Resources Delineation [WARD]).
- All power poles would utilize BLM-approved raptor deterrents. The transmission line would also provide raptor protection in compliance with the standards described in the Suggested Practices for Raptor Protection on Power Lines, The State of the Art in 2006 (APLIC 2006). If the Nevada Department of Wildlife (NDOW) determines that anti-perch and anti-nesting devices are warranted, ORNI 32 would retrofit transmission line components within 6 months of an NDOW request. To further reduce predator perching, the construction of vertical facilities and fences would be limited to the minimum number and amount needed, and anti-perch devices would be installed where applicable.
- All pits or containers containing liquids potentially harmful to wildlife, avian, and bat species would be fenced, netted, or otherwise covered when not in active use. Fencing would be 8 feet high and of a material conforming to NDOW Geothermal Sump Guidelines. It would include a 0.5-inch or smaller mesh screen at the lower 2 feet, buried at least 6 inches to prevent small mammal and amphibian entry. Netting or other covering would be installed if toxic substances were stored in a pit or if fluids would remain after drilling equipment is removed from the well pad. Netting would consist of 1.5-inch mesh, secured to the ground, 4 to 5 feet above the liquid solution surface. Netting would be monitored and maintained in functioning condition.
- Pits, cellars, open-top tanks, and trenches that are not otherwise fenced, screened, covered, or netted would be constructed to exclude livestock, wildlife, and humans. At a minimum, escape ramps, ladders, or other methods of escape would be maintained at appropriate intervals, where entrapment hazards exist.
- Exclusion fencing approved by the BLM would be installed around all work areas near special status aquatic wildlife species habitat, and preconstruction surveys would be conducted to ensure no direct impacts would occur on these species.
- If sensitive plant species are identified within the project area, impacts would be avoided by flagging/fencing and by applying an appropriate buffer determined by the qualified

botanist and the BLM. If avoidance is not feasible, mitigation would be determined by the BLM to ensure no net loss of sensitive plants

- Any areas containing cultural resources of significance would be avoided, or the potential for impacts would be mitigated in a manner acceptable to the BLM. ORNI 32 employees, contractors, and suppliers would be reminded that all cultural resources are protected and if uncovered, shall be left in place and reported to the ORNI 32 representative or their supervisor, or both.
- A buffer of approximately 98 to 164 feet (30 to 50 meters) would be established around eligible and unevaluated cultural sites that lie within project activities. When initial construction is close to the buffered areas, an archaeological monitor would be present to ensure that eligible and unevaluated cultural sites are not disturbed.
- Temporarily stockpiled topsoil would be seeded with a BLM-approved seed mix. This would be done to minimize erosion and soil loss, increase topsoil organic content, and ultimately increase restoration success at reclamation.
- Following project construction, ORNI 32 would reclaim areas of disturbed land no longer required for operations to promote the reestablishment of native plant and wildlife habitat.
- On BLM-administered lands, revegetation would include site-appropriate BLM-approved, weed-free seed mixes 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 would be reseeded with a diverse mix of perennial native or introduced plant species. Noxious, invasive, and nonnative seeds listed in the Nevada Designated Noxious Weed List (Nevada Administrative Code 555.010) or prohibited by the Federal Seed Act (7 CFR 201) would be excluded. Seed mixtures would be subject to the approval of the BLM.
- The power plant(s), pipelines, wellheads, pump motors, and motor control buildings would each be painted to blend with the area and minimize visibility.
- ORNI 32 would obtain and comply with an underground injection control permit, as appropriate.
- ORNI 32 has submitted a wildland fire mitigation plan, spill or discharge contingency plan, and hydrogen sulfide contingency plan to the BLM; ORNI 32 would comply with these plans.
- Geothermal fluids would not be discharged to the ground under normal operating conditions. Accidental discharges of geothermal fluids are unlikely because of frequent inspections, ultrasonic testing of the pipeline, flow and pressure monitoring, and well pump and pipeline valve shutdown features.
- Facility lighting would follow "dark-sky" lighting practices by screening light sources to prevent upward – or outward – shining light, hooding and shielding light fixtures, directing light sources toward the pertinent site, locating light sources in building soffits, and locating light sources to avoid light pollution onto adjacent lands.

- Cooling fan and equipment design and plant operation practices would be implemented to reduce power plant noise. Vinyl fencing slats would be used, and the plant design would be reviewed for opportunities to reduce noise.
- A reclamation plan describing interim and final reclamation procedures for this project would be developed and implemented after BLM approval.

GEOTHERMAL LEASE STIPULATION SUMMARY

As discussed in **Section 1.5.1**, the BLM's Geothermal Leasing PEIS (BLM 2008c) and Record of Decision and Resource Management Plan Amendments for Geothermal Resources Leasing in the Western United States (BLM 2008d) developed geothermal leasing stipulations that were applied to geothermal resource leases subsequently issued by the BLM.
Stipulations are included in the federal geothermal leases issued to or acquired by ORNI 32 in the Dixie Valley Geothermal Unit Area. These stipulations are summarized below, and full copies are provided in **Appendix A**. The table below, the stipulations attached to each lease in the geothermal unit area.

Lease Number	Endangered Species Act Consultation	Cultural Resource Protection	Riparian Areas (650-foot buffer)	Riparian Areas (500-foot buffer)	Native American Consultation
NVN-60686	—	—	—	—	—
NVN-60685	—	—	—	—	—
NVN-83934	X	X	X	—	X
NVN-83935	X	X	X	—	X
NVN-83936	X	X	X	—	X
NVN-83937	X	X	X	—	X
NVN-83939	X	X	X	—	X
NVN-83941	X	X	X	—	X
NVN-83942	X	X	X	—	X
NVN-86885	X	X	X	—	X
NVN-91823	X	—	X	—	X
NVN-92479	X	—	—	X	X
NVN-92717	X	X	—	X	X

Cultural Resource Protection Lease Stipulation

Leases with this stipulation 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, or other statutes and executive orders. The BLM would 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.

Endangered Species Act Section 7 Consultation Stipulation

Leases with this stipulation may contain plants, animals, or their habitats determined to be threatened or endangered or to have special status. The BLM may recommend modifying exploration and development proposals. This would be done to further its conservation and management objective and to avoid a BLM-approved activity that would contribute to a need to list such species or their habitats,

Native American Consultation Stipulation

All development activities proposed under the authority of leases with this stipulation are subject to the requirement for Native American consultation before the BLM authorizes the activity.

Riparian Areas Stipulation

Most leases in the project area contain a stipulation to protect riparian areas. This states that no surface occupancy or disturbance would be allowed within either 500 or 650 feet (horizontal measurement), depending on the lease, from any surface water bodies, riparian areas, wetlands, playas, or 100-year floodplains (see full lease stipulations in **Appendix A**). This stipulation would protect the integrity of these resources, which would be delineated by the presence of riparian vegetation and not actual water. Exceptions may be considered on a case-by-case basis if the BLM determines at least one of the following conditions applies:

- Additional development is proposed in an area where current development has shown no adverse impacts
- Suitable off-site mitigation would be provided if habitat loss is expected
- The BLM determines development proposed under any plan of operations would ensure adequate protection of the resources

Form 1842-1
(September 2020)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INFORMATION ON TAKING APPEALS TO THE INTERIOR BOARD OF LAND APPEALS

DO NOT APPEAL UNLESS

1. This decision is adverse to you,

AND

2. You believe it is incorrect

IF YOU APPEAL, THE FOLLOWING PROCEDURES MUST BE FOLLOWED

1. NOTICE OF APPEAL

A person who wishes to appeal to the Interior Board of Land Appeals must file in the office of the officer who made the decision (not the Interior Board of Land Appeals) a notice that they wish to appeal. A person served with the decision being appealed must transmit the *Notice of Appeal* in time for it to be filed in the office where it is required to be filed within 30 days after the date of service. If a decision is published in the FEDERAL REGISTER, a person not served with the decision must transmit a *Notice of Appeal* in time for it to be filed within 30 days after the date of publication (43 CFR 4.411 and 4.413).

2. WHERE TO FILE

NOTICE OF APPEAL.....

WITH COPY TO SOLICITOR.....

3. STATEMENT OF REASONS

Within 30 days after filing the *Notice of Appeal*, file a complete statement of the reasons why you are appealing. This must be filed with the United States Department of the Interior, Office of Hearings and Appeals, Interior Board of Land Appeals, 801 N. Quincy Street, MS 300-QC, Arlington, Virginia 22203. If you fully stated your reasons for appealing when filing the *Notice of Appeal*, no additional statement is necessary (43 CFR 4.412 and 4.413).

WITH COPY TO SOLICITOR.....

4. SERVICE OF DOCUMENTS

A party that files any document under 43 CFR Subpart 4, must serve a copy of it concurrently on the appropriate official of the Office of the Solicitor under 43 CFR 4.413(c) and 4.413(d). For a notice of appeal and statement of reasons, a copy must be served on each person named in the decision under appeal and for all other documents, a copy must be served on each party to the appeal (including intervenors). Service on a person or party known to be represented by counsel or other designated representative must be made on the representative. Service must be made at the last address of record of the person or party (if unrepresented) or the representative, unless the person, party or representative has notified the serving party of a subsequent change of address.

5. METHOD OF SERVICE....

If the document being served is a notice of appeal, service may be made by (a) Personal delivery; (b) Registered or certified mail, return receipt requested; (c) Delivery service, delivery receipt requested, if the last address of record is not a post office box; or (d) Electronic means such as electronic mail or facsimile, if the person to be served has previously consented to that means in writing. All other documents may be served by (a) Personal delivery; (b) Mail; (c) Delivery service, if the last address of record is not a post office box; or (d) Electronic means, such as electronic mail or facsimile, if the person to be served has previously consented to that means in writing.

6. REQUEST FOR STAY.....

Except where program-specific regulations place this decision in full force and effect or provide for an automatic stay, the decision becomes effective upon the expiration of the time allowed for filing an appeal unless a petition for a stay is timely filed together with a Notice of Appeal (43 CFR 4.21). If you wish to file a petition for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Interior Board of Land Appeals, the petition for a stay must accompany your Notice of Appeal (43 CFR 4.21 or 43 CFR 2801.10 or 43 CFR 2881.10). A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the Notice of Appeal and Petition for a Stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay. Except as otherwise provided by law or other pertinent regulations, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards: (1) the relative harm to the parties if the stay is granted or denied, (2) the likelihood of the appellant's success on the merits, (3) the likelihood of immediate and irreparable harm if the stay is not granted, and (4) whether the public interest favors granting the stay.

Unless these procedures are followed, your appeal will be subject to dismissal (43 CFR 4.402). Be certain that **all** communications are identified by serial number of the case being appealed.

NOTE: A document is not filed until it is actually received in the proper office (43 CFR 4.401(a)). See 43 CFR Part 4, Subpart B for general rules relating to procedures and practice involving appeals.

(Continued on page 2)

43 CFR SUBPART 1821-GENERAL INFORMATION

Sec. 1821.10 Where are BLM offices located? (a) In addition to the Headquarters Office in Grand Junction, CO and seven national level support and service centers, BLM operates 12 State Offices each having several subsidiary offices called Field Offices. The addresses of the State Offices can be found in the most recent edition of 43 CFR 1821.10. The State Office geographical areas of jurisdiction are as follows:

STATE OFFICES AND AREAS OF JURISDICTION:

Alaska State Office ---------- Alaska
Arizona State Office ---------- Arizona
California State Office --------- California
Colorado State Office ---------- Colorado
Eastern States Office ---------- Arkansas, Iowa, Louisiana, Minnesota, Missouri and, all States east of the Mississippi River
Idaho State Office ---------- Idaho
Montana State Office --------- Montana, North Dakota, and South Dakota
Nevada State Office---------- Nevada
New Mexico State Office ------ New Mexico, Kansas, Oklahoma, and Texas
Oregon State Office ---------- Oregon and Washington
Utah State Office ---------- Utah
Wyoming State Office --------- Wyoming and Nebraska

(b) A list of the names, addresses, and geographical areas of jurisdiction of all Field Offices of the Bureau of Land Management can be obtained at the above addresses or any office of the Bureau of Land Management, including the Headquarters Office, Bureau of Land Management, 760 Horizon Drive, Grand Junction, CO 81506.