

**FINDING OF NO SIGNIFICANT IMPACT
PATUA GEOTHERMAL PROJECT
IN CHURCHILL AND LYON COUNTIES, NEVADA**

**Environmental Assessment
DOI-BLM-NV-C010-2010-0016-EA
Patua Geothermal Unit NVN-85168X**

INTRODUCTION

Vulcan Power Company (Vulcan) proposed the construction of a 60 MW geothermal power plant and associated production/injections wells, access roads, pipelines, and transmission line in Lyon and Churchill Counties in Nevada. They have submitted an operations plan for their geothermal well drilling involving federal leases - 4 to 6 new well pads on federal leases. Their associated pipelines on federal leases lead to the power plant situated on private lands and are described in their utilization plan. The majority of their project lies within the boundaries of the Patua Geothermal Unit, NVN-85168X, excepting a portion of the transmission line connecting the power plant project to existing lines lies outside of the unit area.

The project area includes checkerboard ownership of federal lands managed by the US Bureau of Reclamation Lahontan Basin Area Office (Reclamation) and private lands. The environmental analysis was jointly prepared between the BLM Carson City Office (BLM) and Reclamation as the BLM manages the subsurface geothermal resources underlying the federal geothermal leases and Reclamation is the surface management agency. Due to this federal agency relationship BLM oversees the processing of the geothermal utilization in consultation with Reclamation and both agencies determine through the analysis the terms and conditions under which it will authorize the geothermal facilities. Elements of the project are on federal, state, and private lands. Neither Reclamation nor BLM have any decisions over activities on private or state land. The transmission line will be constructed over Reclamation and state owned lands so Reclamation will determine whether to grant a ROW and license for the transmission line. In addition, the Nevada State Lands Commission is responsible for authorization of the transmission line in consultation with NDOW on state managed lands within the proposed path of the line.

The purpose of the proposed action is to develop the geothermal resource within the Patua Geothermal Unit area in response to EO 13212, which directs the BLM in a timely manner to support efforts to increase energy production from federal minerals, while preserving the health of public lands.

This EA, DOI-BLM-NV-C010-2010-0016-EA, was jointly prepared by Reclamation and the BLM Carson City District Stillwater Field Office and analyzes the proposed project correspondingly with the national Reclamation/BLM Interagency Agreement, December 1982 and with the 43 Code of Federal Regulations, Subpart 3200. The EA evaluates the impacts on the natural and human environment that could result from implementation of this geothermal development project on federal land. The impact analysis in the EA characterizes the potential for impacts for each resource in the project area. The determination of environmental risk is

resource-specific and is based on a number of factors, including the presence and extent of resources within the proposed lease section, the extent of resources in the surrounding area, and the quality of existing data.

PLAN CONFORMANCE AND CONSISTENCY

The Proposed Action has been reviewed for conformance with the Carson City Field Office Consolidated Resource Management Plan (2001) and is found to be consistent with current BLM policies, plans and programs. The proposed action is consistent with Churchill and Lyon County ordinances, policies and plans.

FINDING OF NO SIGNIFICANT IMPACT DETERMINATION

Based on the analysis of Patua Geothermal Project, environmental assessment DOI-BLM-NV-C010-2010-0016-EA, I have determined that the action will not have a significant effect on the human environment and an environmental impact statement (EIS) will not be prepared. This finding is based on the context and intensity of the project as described:

Context:

The proposed 4 to 6 wells, access road construction, and pipeline development of the federal geothermal resources will produce renewable energy that may exist in the project area. BLM has management responsibility for the underlying geothermal resources and the surface management agency is the Bureau of Reclamation, Lahontan Basin Area Office (Reclamation). Reclamation has been appraised of this project pursuant to the Reclamation/BLM Inter-Agency Agreement of 1982 and the analysis was jointly conducted. BLM approves the projects under the Conditions of Approval attached hereto as Exhibit B.

Intensity:

The Council on Environmental Quality (CEQ) regulations includes the following ten considerations for evaluating intensity:

1) Impacts that may be both beneficial and adverse.

None of the environmental effects discussed in detail in the EA are considered significant, nor do the effects exceed any known threshold of significance, either beneficial or adverse. The Proposed Action is geothermal resource development consisting of construction of 4 to 6 well pads, access roads, and pipelines and their associated activity as described in the EA, as well as reclamation of these disturbances if the wells are not developed.

2) The degree to which the selected alternative will affect public health or safety:

The Proposed Action is to drill into and develop the geothermal resources in the project area analyzed in the EA. It is reasonable to expect further resource exploration and development which could affect public health or safety but those types of activities would be subject to further environmental analysis when considered. These types of issues could be addressed through conditions of approval for further exploration and development actions as determined by federal and state agencies.

3) *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wilderness, wild and scenic rivers, or ecologically critical areas.*

The Reclamation and BLM have considered the Area of Potential Effects (APE) relative to cultural resources and historic properties, providing oversight for a full inventory of the areas that include construction of the proposed well pads, access roads, and pipelines and their associated activity. Based on the cultural inventory, both agencies determined that historic properties are present in the APE and Vulcan shall avoid these sites. There are no park lands, prime farm lands, wild and scenic rivers or ecologically critical areas in or near the sites proposed.

4) *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

The effects of the Proposed Action on the human or natural environment were determined to be negligible. Drilling for geothermal resources and its potential effects on the subsurface in this project area has been analyzed in this EA.

5) *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*

The Proposed Action is not unique or unusual. The action described in the EA is drilling for geothermal resource. There are no predicted effects on the human environment that are considered highly uncertain or involve unique or unknown risks. Public comment has been minimal.

6) *The degree to which the action may establish a precedent for future actions with significant effects or presents a decision in principle about a future consideration.*

As exploration advances and additional development of energy generation facilities is proposed on a geothermal lease, an environmental analysis maybe warranted to assess impacts resulting from these types of projects. The progression of the project from leasing to exploration to development is customary and expected.

7) *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.*

Resource values, as identified in this EA, were evaluated for cumulative impacts and determined that cumulative impacts would be negligible for the proposed exploration project. Subsequent actions for geothermal resource exploration and/or development would be evaluated for cumulative impacts in associated environmental analysis that maybe warranted and would be addressed through mitigation of the proposed future action and conditions of approval.

8) *The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*

As described in the EA, the project will not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor will

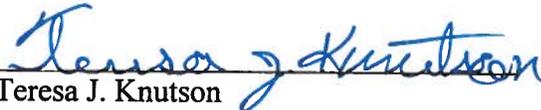
it cause loss or destruction of significant scientific, cultural, or historical resources because all activity is subsurface.

9) *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under ESA of 1973.*

As described in the EA, no known threatened or endangered species or critical habitat has been identified in the subsurface area considered in the EA. Any future exploration and development actions would be evaluated in a future environmental analysis for the future project.

10) *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*

As described in the EA, the Proposed Action does not violate any known Federal, State, or local law or requirement imposed for protection of the environment. Resource specialists from the BLM Stillwater Field office and from Reclamation, the State of Nevada, Churchill County, and the Fallon Paiute-Shoshone Tribe were notified of the proposal.


Teresa J. Knutson
Stillwater Field Manager
Carson City District Office


Date

**DECISION RECORD
PATUA GEOTHERMAL PROJECT
IN CHURCHILL AND LYON COUNTIES, NEVADA**

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resources within the proposed lease section, the extent of resources in the surrounding area, and the quality of existing data.

2. DECISION

I approve the exploration drilling projects and associated activities as describe in the Proposed Action of DOI-BLM-NV-C010-2010-0016-EA. This decision is contingent on meeting all stipulations and conditions of the geothermal leases/drilling permits. The Conditions of Approval are attached to this Decision Record.

3. RATIONALE

The Proposed Action and COAs meets the criteria described in the Federal Land Policy and Management Act of 1976 to prevent undue and unnecessary degradation of public land; the 43 CFR 3200, 3250 and 3260. The Proposed Action is in conformance with the Carson City Field Office Consolidated Resource Management Plan (2001) which states that the BLM desired outcome 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 action must comply with the conditions of permit for the Nevada Division of Minerals Geothermal Resource Development Permit Application and with applicable rules and regulation of other local, state, and federal agencies



Teresa J. Knutson, Manager
Stillwater Field Office
Carson City District Office



Date

Attachment: Exhibit B Conditions of Approval

EXHIBIT B

December 3, 2010
Vulcan Power Company
Patua Geothermal Operations/Utilization Plans

CONDITIONS OF APPROVAL (COAs)

Term: The term for Geothermal Drilling Permits is two (2) years from the date of approval, but may be extended by BLM. The GDP term is intended to be commensurate with the Nevada NRS 534A.070

Drilling Operations

1. Once a drilling contractor has been selected, submit a detailed schematic of the BOP equipment, materials, and choke manifold you will use.
2. Once a cementing company has been selected, a complete cementing program for our review prior to commencing any cementing operations.
3. Notify the BLM & NDOM 24 hours prior to running and cementing any casing or production string.
4. Notify the BLM & NDOM 24 hours prior to testing BOPE.
5. Notify the BLM 12 hours prior to spudding, commencing drilling.
6. All operations shall be conducted in accordance with the Federal regulations and as outlined in Vulcan's approved GDP.

Pre-Construction

1. Roads to be constructed, improved or reclaimed as part of the Projects would be reviewed by the BLM and Reclamation and required to conform to the requirements the Gold Book (4th Ed revised 2007), as applicable to the intended Project Use.
2. Off road travel will be restricted to terrain with less than 30 percent slopes unless approved by the authorized BLM officer and Reclamation.
3. Proposed surface disturbance and vehicular travel will be limited to the approved well location and access route.
4. Any changes in well location, facility location, and access or site

expansion must be approved by the authorized BLM officer and Reclamation in advance.

5. The underside of all heavy equipment will be cleaned by water before entering federal lands to do work. Driving through or parking on noxious weed infestations will be avoided.

Well Pad and Facility Construction

1. The design of all facilities, including well pads, roads, and pumps, shall be approved by the authorized BLM officer in consultation with Reclamation prior to construction to avoid unnecessary conflicts with visual resources management objectives.
2. The reserve pit shall be fenced in conformance with the Gold Book (4th Ed revised 2007).
3. Drainage from disturbed areas will be confined or directed so that erosion of undisturbed areas is not increased. In addition, no runoff water (including that from roads) will be allowed to flow into intermittent or perennial waterways without first passing through a sediment-trapping mechanism. Erosion control structures may include: waterbars, berms, drainage ditches, sediment ponds, or other devices.
4. Access road construction for exploratory wells shall be planned such that a permanent road can be constructed considering field development.
5. Construction of access roads on steep hillsides and near watercourses will be avoided where alternate routes provide adequate access.
6. Access roads requiring construction with cut and fill will be designed to minimize surface disturbance and take into account the character of the landform, natural contours, cut material, depth of cut, where the fill material will be deposited, resource concerns and visual contrast.
7. Fill material will not be cast over hilltops or into drainages. Cut slopes should normally be no steeper than 3:1 and fill slopes no steeper than 2:1.
8. As required, fill slopes surrounding culverts will be rip-rapped with a well graded mixture of rock sizes containing no material greater than two feet or smaller than three inches. The ratio of maximum to minimum dimension of any rock shall not exceed 6:1.
9. Water turnouts needed to provide additional drainage will be constructed

not to exceed two percent slope to minimize soil erosion.

10. Well site layout shall take into account the character of the topography and landform. Deep vertical cuts and steep long fill slopes shall be avoided. All cut and fill slopes should be constructed to the least percent slope practical.
11. Trash will be retained in portable trash cages and hauled to an authorized disposal site for disposal. Burial or burning of trash will not be allowed unless done at an authorized site.
12. Springs and water developments on public lands shall be used only with the prior written approval of the authorized BLM officer in consultation with Reclamation and the water rights holder.
13. To maintain esthetics values, all semi-permanent and permanent facilities will be painted to blend with the natural surroundings. The Standard Environmental Colors will be used for color selection.
14. Fences shall not be cut without prior approval of the authorized BLM officer and Reclamation. Before cutting through any fences, the operator shall firmly brace the fence on both sides of the cut; a temporary gate will be installed for use during the course of operations, unless the fence is immediately repaired. Upon completion of operations, fences shall be restored to at least their original condition.
15. As directed by the authorized BLM officer in consultation with Reclamation, cattle guards will be installed whenever access roads are through pasture gates or fences. These cattle guards shall be maintained by the geothermal operator/lessee. This includes cleaning out under cattle guard bases when needed.
16. The depth of surface soil material to be removed and stockpiled will be specified by the authorized BLM officer in consultation with Reclamation. If topsoil is stockpiled for more than one year, the stockpile shall be seeded or otherwise protected from wind and water erosion. The stockpile shall be marked or segregated to avoid loss or mixing with other subsurface materials. Any trees removed will be separated from soils and stockpiled separately.
17. Mud, separation pits and other containments used during the exploration or operation of the lease for the storage of oil and other hazardous materials shall be adequately fenced, posted or covered.

18. Lessee/operator shall comply with all regulatory requirements for storage and handling of hazardous materials and wastes.
19. If historic or archaeological materials (other than human remains) are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, flag the cultural resource from avoidance, and contact the authorized BLM officer and Reclamation. Within five working days the authorized BLM officer will inform the operator as to:
 - a. whether the materials appear eligible for the National Register of Historic Places;
 - b. the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
 - c. a time frame for the authorized BLM officer in consultation with Reclamation to complete an expedited review under 36 CFR 800.11 or other applicable Programmatic Agreement, to confirm, through the State Historic Preservation Officer, that the findings of the authorized BLM officer are correct and that mitigation is appropriate.
20. If human remains are exposed at any time during the course of the project, work shall cease within 100 meters (330 feet) of the find and the remains shall be protected from further damage or exposure. If the remains are on lands managed by the federal government, the BLM and Reclamation must be notified immediately. The BLM will assume responsibility for coordination with local authorities, NSHPO, and appropriate tribes for discoveries on federal land. Local authorities will determine whether the remains are of an unrecorded dead body as defined by Nevada statutes (NRS 440.020) and whether the remains are part of a crime scene. If the remains are part of a crime scene, local law enforcement shall assume jurisdiction and responsibility, and NSHPO, BLM and Reclamation for federal lands, will be immediately notified, by telephone or in person. This notification will be followed by a written notification. Work will not resume until authorized by the local authorities. If the remains are Native American, the federal agency will follow the procedures set forth in 43 CFR 10, the Native American Graves Protection and Repatriation Act.
21. No surface use will be permitted within 0.6 miles of occupied raptor aeries (nests) during the nesting and fledging period.

22. Fences shall be flagged with bright colored flagging at least every rod from visibility to wild horses. All fences should be constructed using green steel posts with white or silver tops to increase visibility. Fences should also avoid obvious horse migration routes (deep trails, stud piles) if at all possible.

Field Operation

1. Operations shall be done in a manner which prevents damage, interference, or disruption of water flows and improvements associated with all springs, wells, or impoundments. It is the operator's responsibility to enact the precautions necessary to prevent damage, interference, or disruptions.
2. Unauthorized use or failure to lock gates during specified time frames by the lessee or its subcontractors would be considered a violation of the terms of the GDP or associated grants.
3. The operator shall regularly maintain all roads used for access to and within the lease units. A Maintenance and Dust Management Plan may be required. A regular maintenance program may include, but not be limited to: BLM authorized upgrading of existing roads, blading, ditching, culvert, drainage installation, and graveling or capping of the roadbed.
4. Management actions within riparian areas will be designed to maintain or, where possible, improve riparian habitat condition.
5. Noxious weeds which may be introduced due to soil disturbance and reclamation will be treated by methods to be approved by the authorized BLM officer in consultation with Reclamation. These methods may include biological, mechanical, or chemical. Should chemical methods be approved, the lessee must submit a Pesticide Use Proposal to the authorized BLM officer and Reclamation 60 days prior to the planned application date.
6. All drill rig and well test facility lights will be limited to those required to safely conduct the operations, and will be shielded and/or directed in a manner which focuses direct light to the immediate work area.
7. If previously unrecorded cultural resources are encountered during grading or other surface-disturbing activities, all grading or other surface-disturbing activities at the location of the discovery will cease within 100 meters/330 feet of the discovery, and the BLM and Reclamation

would be notified. No surface disturbing activities will be allowed until the BLM authorized officer in consultation with Reclamation issues a Notice to Proceed (NTP) based upon the evaluation, mitigation, as necessary, and the acceptance of a summary description of the fieldwork performed for the discovery situation.

8. Petroleum products such as gasoline, diesel fuel, helicopter fuel, crankcase oil, lubricants, and cleaning solvents used to fuel, lubricate, and clean vehicles and equipment will be containerized in approved containers.
9. Hazardous material shall be properly stored in separate containers to prevent mixing, drainage or accidents. Hazardous materials shall not be drained onto the ground or into streams or drainage areas.
10. Totally enclosed containment shall be provided for all solid construction waste including trash, garbage, petroleum products and related litter will be removed to an authorized sanitary landfill approved for the disposal of these classes of waste.
11. All construction, operation, and maintenance activities shall comply with all applicable federal, state, and local laws and regulations regarding the use of hazardous substances and the protection of air and water quality.
12. In construction areas where recontouring is not required, vegetation will be left in place wherever possible and the original contour will be maintained to avoid excessive root damage and allow for resprouting.
13. Watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) will be repaired or replaced if they are damaged or destroyed by construction activities to its pre-disturbed condition as required by the authorized BLM officer and Reclamation.

Reclamation and Abandonment

1. The operator or contractor will contact the authorized BLM officer and Reclamation 48 hours prior to reclamation work.
2. Restoration work may not begin on the well site until the reserve pits are completely dry.
3. Disturbed areas will be recontoured to blend as nearly as possible with the natural topography prior to revegetation with a BLM and Reclamation approved seed mix. This includes removing all berms and refilling all cuts. Compacted portions of the pad will be ripped to a depth of 12 inches

unless in solid rock.

4. Site preparation for reclamation may include contour furrowing, terracing, and reduction of steep cut and fill slopes, installation of water bars, etc.
5. All portions of the access roads not needed for other uses as determined by the authorized BLM officer in consultation with Reclamation will be reclaimed.
6. The stockpiled topsoil will be spread evenly over the disturbed area.
7. The operator will be required to construct waterbars and re-open drainages on abandoned access roads and pipeline routes to minimize erosion as required. Water bars will be spaced appropriately dependant upon topography and slope. Pipeline routes shall be water-barred perpendicular to the fall-line of the slope.
8. The area is considered to be satisfactorily reclaimed when all disturbed areas have been recontoured to blend with the natural topography, erosion stabilized and an acceptable vegetative cover has been established.
9. Rehabilitation shall be planned on the sites of both producing and abandoned wells. The entire site or portion thereof not required for the continued operation of the well should be restored as nearly as practical to its original condition. Final grading of back-filled and cut slopes will be done to prevent erosion and encourage establishment of vegetation.
10. When sites are abandoned, they will be inventoried for the presence of noxious weeds and treated if noxious weeds are present.
11. Seed and mulch used to reclaim disturbed areas must be weed free. Mulching of the seedbed following seeding will be required under certain conditions (i.e., expected severe erosion), as determined by the authorized BLM officer in consultation with Reclamation.
12. Seed will be broadcast between October 1 and March 15 using a site-specific seed mixture and depth of planting as determined by the authorized BLM officer in consultation with Reclamation. Seed may be applied with a rangeland drill at half the rate of broadcast seeding. All seeding application rates will be in pounds of pure live seed per acre. Seed should be adapted varieties.