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DEPARTMENT OF ADMINISTRATION
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BUDGET AND PLANNING DIVISION

VULCAN POWER COMPANY

UEPA APPLICATION FOR A PERMIT TO CONSTRUCT

CHURCHILL AND LYON COUNTIES, NEVADA

Patua Geothermal Project

March 9, 2010

Kenneth Bonin, Sr.
Director Regulatory Affairs
Vulcan Power Company
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Tel. 541-317-1984
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[1] NAC 703.421(1)(a)

[2] Under NRS 704.870(2)(a), if a federal agency is required to conduct an environmental analysis of a proposed utility facility, the utility is required to also file an application with the Commission that provides notice of the federal filing. This initial UEPA Application serves such notice

[3] NAC 703.421(1)(b)

[4] NAC 703.421(1)(c)

PUBLIC UTILITIES COMMISSION OF NEVADA
DRAFT NOTICE
(Applications, Tariff Filings, Complaints, and Petitions)

Pursuant to Nevada Administrative Code ("NAC") 703.162, the Commission requires that a draft notice be included with all applications, tariff filings, complaints and petitions. Please complete and include **ONE COPY** of this form with your filing. (Completion of this form may require the use of more than one page.)

A title that generally describes the relief requested (see NAC 703.160(5)(a)):

VULCAN POWER COMPANY APPLICATION FOR A PERMIT TO CONSTRUCT THE PATUA GEOTHERMAL PROJECT

The name of the applicant, complainant, petitioner or the name of the agent for the applicant, complainant or petitioner (see NAC 703.160(5)(b)):

VULCAN POWER COMPANY

A brief description of the purpose of the filing or proceeding, including, without limitation, a clear and concise introductory statement that summarizes the relief requested or the type of proceeding scheduled **AND** the effect of the relief or proceeding upon consumers (see NAC 703.160(5)(c)):

VULCAN POWER COMPANY (VPC), a Colorado corporation, is applying for approval of a permit to construct utility facilities pursuant to the Utility Environmental Protection Act set forth in NRS 704.820 to 900 and NAC 703.415 to 427 (UEPA).

The purpose of constructing the proposed geothermal power plant and associated facilities is to generate electricity from geothermal resources in Churchill and Lyon Counties, NV and deliver the power to the electrical grid. VPC holds both private and federal geothermal leases, which are included in the Patua Geothermal Unit N-85168X (the Unit); private leases and federal leases total 18,694 acres in 30 sections. Federal geothermal leases within the Unit are managed by the Bureau of Land Management (BLM). The Patua Geothermal Project anticipates using up to approximately 40 acres in six sections within the Unit for construction of the facility.

VPC has previously conducted geothermal resource exploration activities within the Unit consisting of geologic reconnaissance, geophysical surveys (gravity, magnetotelluric and two-dimensional seismic reflection), and exploration drilling. Exploration drilling conducted to date has been on private land only. VPC has filed with the BLM a Utilization Plan in order to describe utilization facilities to be partially located on federal lands, an Operations Plan in order to describe proposed geothermal drilling and testing operations to be partially located on federal lands, as well as, a Plan of Development in order to describe a proposed transmission line to be jointly located on private, federal and State of Nevada lands. These facilities would be connected to a binary-cycle geothermal power plant facility, capable of producing 60 MW net of electricity, that will be located on a privately owned section of land (Section 21, T20N, R26E, MDBM), within the Unit.

Construction of the 60 MW net geothermal power plant and related facilities will deliver baseload electrical power to another developer's substation. Construction and operation of the proposed geothermal facilities will create many stable, good paying jobs, contribute to the county tax base and provide other substantial economic development for Nevada.

VPC seeks approval to construct the geothermal power plant and associated facilities which include geothermal wells, geothermal fluid pipelines needed to transport geothermal fluids, and transmission lines needed to deliver electricity to the grid. The power plant facility will have up to six turbine generator modules with a combined net capacity output to the utility of approximately 60 MW. Utilized geothermal resources will be injected back to the reservoir; however, if used for the cooling process, a small percentage of geothermal fluids may be evaporated. Other major appurtenances associated with the power plant include but are not limited to a fire water storage tank, a potable water storage tank (if necessary) and an electrical switchyard. The transmission line will consist of an overhead 120 kV single circuit electrical interconnection line extending approximately 6 1/3 miles from the project location to another developer's substation.

Under the UEPA, if a federal agency is required to conduct an environmental assessment of a proposed project, the proponent is required to file with the Public Utilities Commission of Nevada (PUCN) a notice of the federal filing. The initial UEPA application must provide a general description of the proposed project pursuant to the National Environmental Policy Act (NEPA). Subsequently, within 30 days after issuance of the federal environmental assessment or impact statement prepared by the U.S. Bureau of Land Management (BLM) and cooperating agencies, the proponent will file with the PUCN, an amended UEPA application.

A statement indicating whether a consumer session is required to be held pursuant to Nevada Revised Statute ("NRS") 704.069(1)[1]:

The proposed proceeding is not a general rate application or another proceeding that requires a consumer session under NRS 704.069.

If the draft notice pertains to a tariff filing, please include the tariff number **AND** the section number(s) or schedule number(s) being revised.

The draft notice does not pertain to tariff filling.

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[1] NRS 704.069 states in pertinent part:

> 1. The Commission shall conduct a consumer session to solicit comments from the public in any matter pending before the Commission pursuant to NRS 704.061 to 704.110 inclusive, in which:
> (a) A public utility has filed a general rate application, an application to recover the increased cost of purchased fuel, purchased power, or natural gas purchased for resale or an application to clear its deferred accounts; and
> (b) The changes proposed in the application will result in an increase in annual gross operating revenue, as certified by the applicant, in an amount that will exceed $50,000 or 10 percent of the applicant's annual gross operating revenue, whichever is less.

BEFORE THE PUBLIC UTILITIES COMMISSION OF NEVADA

IN THE MATTER OF: Docket No._____

Application of Vulcan Power Company
For a Permit to Construct the Patua
Geothermal Project pursuant
To the provisions of the Utility Environmental
Protection Act

APPLICATION FOR A PERMIT TO CONSTRUCT UNDER THE UTILITY ENVIRONMENTAL PROTECTION ACT

Applicant, VULCAN POWER COMPANY (VPC), by and through the undersigned, and in accordance with NRS 704.870(2)(a) hereby files with the Public Utilities Commission of Nevada (Commission) an Application for a Permit to Construct pursuant to the Utility Environmental Protection Act (UEPA) set forth in NRS 704.810 to 900.

UEPA established a two-step application procedure for projects subject to federal permitting and environmental review. Under NRS 704.870(2)(a), if a federal agency is required to conduct an environmental analysis of a proposed Utility facility, the applicant is also required to file an application with the Commission that provides notice of the federal filing. This initial Application must be filed no later than the date of the request for an environmental analysis with the appropriate federal agency. The initial UEPA application must provide a general description of the proposed facility and a summary of any studies that the utility anticipates will be made of the proposed facility as required by statute [NRS 704.870(2)(a)(1) and (2)]. Subsequently, no later than 30 days after the issuance of the federal environmental assessment or impact statement, the applicant is required to file with the Commission an amended UEPA application [NRS 704.870(2)(b)].

VPC's project includes one 60 MW (net) binary-cycle geothermal power plant, related wells and pipelines and support facilities within private and federal geothermal leases in Churchill and Lyon Counties, NV. The proposed power plant will be constructed on private land. VPC plans to construct approximately 6 1/3 miles of overhead 120-kV single circuit interconnection line in order to connect the power plant to another developer's substation. Electricity produced by the geothermal power plant will be categorized as a renewable energy and will aid the receiving utility in satisfying their Renewable Portfolio Standard requirements.

VPC requests that the Commission accept the UEPA Application for its Permit to Construct as complying with the statutory and regulatory requirements set forth above. Upon completion and acceptance of the federal agency NEPA document, VPC will submit the required amended UEPA Application to the Commission. At that time, VPC will request approval for a Permit to Construct the proposed project pursuant to NRS 704.8905.

GENERAL ALLEGATIONS

1. At the time of filing Vulcan Power Company is a privately held, for profit, corporation.

2. Vulcan Power Company's principal place of business, mailing address, and telephone number are 775 SW Bonnett Way, Suite 210, Bend, OR 97702, Tel. (541) 317-1984.

AUTHORITY

3. This Application for the Vulcan Power Company Patua Geothermal Project is made in accordance with the Commission's regulations governing pleadings (NAC 702.530 et seq), the Utility Environmental Protection Act (UEPA) (NRS 704.820 to 900), specifically NRS 704.870(2)(a), time for filing application when there is a federal agency involved, NRS 704.873 (Commission has exclusive jurisdiction to determine need for utility facilities), and NRS 704.890 (Grant or denial of application; Required findings, conditions, and modifications), and the Commission's regulations governing construction of utility facility (NAC 703.415 to 427), specifically, NAC 704.421 (Application for permit and amended application).

4. The Nevada Division of Environmental Protection is designated as a party to this proceeding, pursuant to NRS 704.885(1)(b), and will be served a copy of this Application, pursuant to NRS 704.870(3), simultaneously with this filing.

REQUEST FOR RELIEF

WHEREFORE, Vulcan Power Company respectfully requests that the Commission:

A. Accept this initial UEPA Application as complying with NRS 704.870(2)(a), and NAC 703.421 pursuant to which an amended UEPA application requesting approval of a permit to construct will be filed in accordance with NRS 870(2)(b) after the final federal agency process is complete.

B. Grant such deviations from the Commission's regulations as may be in the public interest.

C. Grant Vulcan Power Company, such other and further relief as the Commission may find reasonable and appropriate under the circumstances.

RESPECTFULLY SUBMITTED this 9th day of March, 2010

By _____

Kenneth Bonin, Sr.

Director Regulatory Affairs

Vulcan Power Company

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1.0 PROJECT COVER SHEET

1.1 Name of Applicant

Vulcan Power Company

1.2 Name of Proposed Utilization Facility

Patua Geothermal Project

1.3 Name, Address and Telephone Number of Contact Person

Direct all questions, correspondence, pleadings and papers related to the application to:

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1.4 Environmental Statement Summary

Proposed facilities at the Patua Geothermal Project are on private lands, federal Bureau of Reclamation (BOR) lands, as well as, on State of Nevada lands. Vulcan Power Company (VPC) is currently conducting exploratory drilling at existing well pads on

private lands, under an approved drilling program and has submitted a Utilization Plan, an Operations Plan and a Plan of Development to the Bureau of Land Management (BLM), revised February 2010, to describe proposed facilities at potential sites identified in the application that are related to the 60 MW net geothermal power plant to be built on private land. BLM will conduct an environmental analysis (EA) of the proposed development, pursuant to the National Environmental Policy Act (NEPA), describing existing environmental characteristics of resources present within the project area and analyzing consequences of project implementation on these resources. Botanical, cultural and wildlife surveys are currently ongoing to identify and evaluate any such resources potentially affected by the Project. VPC's goal is to develop a project that avoids creating significant environmental impacts. Accordingly, VPC is working in coordination with the botanist, wildlife biologist, cultural resource consultant, BLM, BOR, Nevada Department of Wildlife (NDOW), and other relevant agencies to understand potential impacts of the proposed project on the environment, in the immediate vicinity of the proposed power plant and other utilization facilities, and prepare appropriate mitigation measures as necessary. The Project area is unpopulated and the nearest residences are approximately two miles to the South, on the opposite side of Highway 50. Positive socioeconomic effects will result from the Project's generation of tax revenue and jobs within the State of Nevada.

1.5 Copy of the Public Notice required by Section 704.870(5) of the Nevada Revised Statutes

VPC published a public notice of the Application in the Lahontan Valley News and the Nevada Appeal on February 24, 2010 See **Exhibit 1: Public Notice and Affidavits of Publication** for a copy of the text of the notice.

1.6 Affidavit of Publication

Exhibit 1: Public Notice and Affidavits of Publication contains copies of the affidavits of publication provided by Lisa Barwig, Legal Clerk for the Lahontan Valley News and the Nevada Appeal.

1.7 Intervention Bar Date

The date before which any person or entity identified in NRS 704.885 must file a petition for leave to intervene or a statement of position with the Public Utilities Commission of Nevada (PUCN) is March 26, 2010 (i.e., within 30 days after the date of this published notice).

2.0 SUMMARY OF THE APPLICATION

2.1 General Description of the Proposed Utility Facility

VPC is proposing to construct one 60 MW net binary-cycle geothermal power plant on a private geothermal lease and associated utilization facilities on both private and federal leases, approximately ten miles east of Fernley, Nevada. Construction for the plant could start very soon after completion of the NEPA analysis and issuance of necessary permits. The plant will consist of up to six turbine-generator modules, each capable of generating approximately 15 MW (gross). Combined net output will be approximately 60 MW. Other prominent features on the power plant site will include, but not be limited to, heat exchangers, vaporizers, condensers, a fire water storage tank with distribution piping, a potable water storage tank (if necessary), an electrical switchyard, a control/administration building, a warehouse and maintenance building, a fire pump house, housing for a diesel generator (for use during a black start), as well as a fence surrounding the entire power plant site. See **Exhibit 3: Plant Site Drawings** for Drawing 1: General Arrangement Binary Power Plant Site Concept, Water Cooled and Drawing 2: General Arrangement Binary Power Plant Site Concept, Air Cooled, for potential site configurations.

An estimated 23 production wells could be needed to supply the 60 MW net power plant. Where possible, multiple production wells could be located on one well pad. Geothermal fluids will be transferred from the wells to the power plant via insulated, mostly aboveground, pipelines. At the power plant, geothermal fluids would pass through heat exchangers, transferring their heat to a secondary (binary) fluid with a boiling point lower than that of water. Typical binary fluids include isopentane, pentane, butane, or isobutene. Once heated, a binary fluid flashes to vapor, expanding rapidly, and powering the turbines. The binary vapor is then condensed in a separate heat exchange system and reused continually in a closed loop cycle. Utilized geothermal fluids are injected back to the geothermal reservoir after passing through the heat exchanger; however if used for the cooling process, a small percentage of geothermal fluids may be evaporated. Typically, both processes are closed systems, where both geothermal and binary fluids remain isolated throughout the system; the surrounding environment is not exposed to these fluids during normal operations. The number and location of injection wells is a function of various resource variables that are not known at this time, therefore the number and location of injection wells cannot yet be reasonably estimated.

Approximately 6 1/3 miles of overhead 120 kV transmission line will be required to deliver power from the power plant to another developer's substation to be located in Section 9, T20N, R25E, MDBM.

2.2 General Description of the Location of the Proposed Utility Facility

VPC is proposing to construct a binary-cycle geothermal power plant approximately ten miles east of Fernley, Nevada. See **Exhibit 2: Maps** for Map 1: General Vicinity Map and Map 3: Patua Project Overview.

2.3 Description of the Natural Resources That Will be Affected or Required to be Used in the Construction or Operation of the Proposed Facility

Botanical, cultural and wildlife surveys are currently ongoing to evaluate any such resources potentially affected by the Project. VPC's goal is to develop a project that avoids creating significant environmental impacts. Accordingly, VPC is working in coordination with the botanist, wildlife biologist, cultural resource consultant, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed project on the environment in the immediate vicinity of the proposed power plant and other utilization facilities and prepare appropriate mitigation measures as necessary.

Gravel and other earth materials will be required for use during project construction; options for their acquisition are abundant in the general vicinity. During previous well pad construction native soil and rock were found to be suitable as fill materials. Therefore, the need for fill material from other sources would be unlikely, but would be determined on a case-by-case basis. If additional base rock or other earth materials are needed for roads, well pads, or plant construction and maintenance, they will be obtained locally, from either a previously permitted gravel operation within the Unit, located in Section 24, T20N, R26E, MDBM, or from local commercial sources.

Water will be required for dust control and soil compaction during construction of the power plant, well pad facilities, geothermal fluid pipelines, and associated access roads and will be obtained from offsite sources. Cooling water may be needed during plant operation; quantities and sources of cooling water are being determined at this time. Geothermal fluids remaining after the power generation/cooling process will be injected back into the reservoir after use, thereby minimizing the potential for emissions of non-condensable gases during normal operations, which may be present in geothermal fluids. Runoff will be managed during routine operations in accordance with the Storm Water Pollution Prevention Plan (SWPPP). Operation of proposed facilities is not expected to have adverse effects on existing surface water or groundwater. The Project area is unpopulated and the nearest residences are approximately two miles to the South, on the opposite side of Highway 50. Positive socioeconomic effects will result from the Project's generation of tax revenue and jobs within the State of Nevada.

Utilization of the geothermal resource at the project location is not anticipated to create a materially adverse effect on the resource potential over the life of the project (30 years or more) due to the employment of advanced resource management techniques.

Production and injection of geothermal fluids will be managed to promote long term productivity of geothermal resources in the area.

2.4 Legal Description of the Site and Proposed Facilities

The proposed power plant site is located in Section 21, Township 20 North, Range 26 East, MDBM, in Churchill County, Nevada. The proposed site will occupy approximately 18 acres. See **Exhibit 2: Maps** for Map 3: Patua Project Overview, which depicts the proposed power plant location.

2.5 Environmental Conclusions and Areas of Controversy

The BLM will conduct an environmental assessment to evaluate potential effects on environmental resources associated with implementing the proposed project. It is not expected that analysis of the Project will result in findings of significant impacts or areas of controversy. Botanical, cultural and wildlife surveys are currently ongoing to evaluate any such resources potentially affected by the Project. VPC's goal is to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the botanist, wildlife biologist, cultural resource consultant, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed project on the environment in the immediate vicinity of the proposed power plant and utilization facilities and either avoid areas of potential impacts and/or prepare appropriate mitigation measures as necessary.

Any potential hazardous and/or solid waste generated during construction, operations or maintenance of the proposed facilities will be stored and disposed of properly to avoid potential impacts to the environment, workers and the public. Best Management Practices (BMPs) will be utilized during construction and operation to contain fluids onsite and prevent accidental spills or discharges to surface waters.

3.0 DETAILED DESCRIPTION OF PROPOSED UTILITY FACILITY AND ITS LOCATION

3.1 Description of the Plant and Binary Cycle Unit

Proposed facilities include one power generating plant, capable of producing 60 MW net of electricity, as well as associated wells, geothermal fluid pipelines, access roads, and an overhead 120 kV transmission line connecting the plant to another developer's substation to be located in Section 9, T20N, R25E, MDBM.

The power plant will be built on an approximately 800 foot by 1,000 foot site (18.4 acres). This plant will require up to six 15 MW (gross) turbine-generator modules to produce approximately 60 MW (net) output. Other prominent features on the power plant

site will include, but not be limited to, heat exchangers (e.g. vaporizers, preheaters, etc), a fire water storage tank with distribution piping, a potable water storage tank (if necessary), an electrical substation, a control/administration building, a warehouse and maintenance building, a fire pump house, housing for a diesel generator (for use during a black start), as well as a fence surrounding the entire power plant site. Equipment will be constructed with proven materials for geothermal applications and designed for at least a 30 year life. See **Exhibit 3: Plant Site Drawings** for Drawing 1: General Arrangement Binary Power Plant Site Concept, Water Cooled and Drawing 2: General Arrangement Binary Power Plant Site Concept, Air Cooled, for potential site configurations.

In a binary-cycle power plant, geothermal brine is piped to the plant site where it enters a system of shell and tube heat exchangers, transferring heat to a binary fluid. Heat from geothermal fluid causes the binary fluid to flash to a vapor state, expanding rapidly and powering the turbines. Fluids such as isopentane, pentane, butane, or isobutene are generally used for the binary fluid. Each binary fluid has a different boiling point, generally lower than that of water, and is selected to optimize thermodynamic efficiencies once a resource temperature is known. From the turbine exhaust, binary fluid is passed through a recuperator to increase efficiency. The recuperator consists of an additional shell and tube heat exchanger which initiates the condensing process and provides some preheating to liquid binary fluid returning to the vaporizer. From the recuperator, the binary fluid flows to the condenser (or air-coolers, if used) where it is returned to a liquid state. Liquid binary fluid then flows through the recuperator and preheater prior to repeating the cycle. When geothermal brine exits the heat exchanger system it is directed through this preheater vessel to give up more heat to the binary fluid. Geothermal brine not used for cooling then flows back to the well field to be injected back to the reservoir. This cycle repeats continuously in normal operation of the power plant.

Turbine-generator sets will be supplied with necessary auxiliaries for control, lube oil and cooling. They will be installed adjacent to shell and tube heat exchangers and condensers. Generators will be totally enclosed, two-pole synchronous units, directly coupled to the turbines. Each generator will be rated at 20 megavolt ampere (MVA), 13.8-kV, 3-phase, 60 hertz (Hz) at a power factor (PF) of 0.85. Generator output will be stepped-up to 120 kV for delivery of power to the utility.

The control building will house the control system, motor control centers (MCCs), switchgear and other electrical and monitoring equipment; it will be equipped with adequate lighting, heating, cooling, potable water, restroom facilities and fire protection systems. The warehouse will have storage areas and a bridge crane that spans the length of the building.

3.2 Site Plan Drawings of Proposed Utility Facility and Associated Equipment

See **Exhibit 2: Maps** for Map 1: General Vicinity Map and Map 3: Patua Project Overview.

3.3 Layout Diagrams of Proposed Utility Facility and Associated Equipment

See **Exhibit 3: Plant Site Drawings** for Drawing 1: General Arrangement Binary Power Plant Site Concept, Water Cooled and Drawing 2: General Arrangement Binary Power Plant Site Concept, Air Cooled.

3.4 Description of Associated Equipment and its Locations

3.4.1 Pipelines

Well field piping will consist of nominal 12 to 24 inch diameter seamless welded steel pipe; piping will have two to three inches of insulation with a protective aluminum sheath to minimize thermal losses and protect personnel. Colors for the outer layer will be appropriately selected to blend with the surrounding area. Pipelines will be designed to minimize the number of thermal expansion loops, thereby requiring less piping and disturbing less area.

Pipelines will be primarily above ground with supports placed approximately every 30 feet on center. Certain sections of pipelines will need to be buried underground in order to cross under roadways. In general, pipelines will be located within five to six feet from one edge of a 20 foot corridor, with the remaining 14 to 15 feet reserved as an access road for construction equipment and inspection traffic. Where expansion loops are needed, corridor widths may be significantly increased to accommodate such structures. As necessary, access roads beside pipelines will be improved to sufficiently allow negotiation by tracked and all-wheel drive equipment. Design will focus on minimizing damage to vegetation during both construction and utilization as well as on preventing pipeline failure.

3.4.2 Plant and Well Field Control System

The power plant systems and well field will be monitored, controlled and protected via a Distributed Control System (DCS). The DCS will interface with the turbine-generator control system and well field systems to provide routine operator control, including shut down, synchronizing and set point load control from the DCS control room consoles.

A Supervisory Control and Data Acquisition (SCADA) system will provide the human machine interface (HMI) to operators locally, or to remote sites. A virtual network of sites allows for unmanned operation and remote operation.

Each site control room will maintain the environment for sensitive telecommunication equipment, telecommunication routers, and SCADA servers; it will also contain a pair of workstations with dual monitors. A general desktop computer will provide access to operation and maintenance records, documentation, piping and instrumentation diagrams (P&IDs), sequence of operation, construction record documents and parts inventories.

3.4.3 Cooling System

At this point in time, VPC is undecided on the technology to be used for cooling of the binary fluid during plant operation. Two cooling options, water cooled and air cooled, are generally described below.

3.4.3.1 Water Cooled

A water cooled system for a binary-cycle geothermal power plant generally consists of cooling towers, circulating water pumps, condensers and a water treatment system. Cooling water from the cooling towers is pumped through the condensers in order to cool and condense the binary vapor as it is exhausted from the turbine; the water then flows to the top of the cooling towers.

Heat absorbed into the cooling water is then rejected through the process of evaporation. Make-up water is required on a continuous basis. There are several possible sources of make-up water, including ground water, geothermal fluids, purchased irrigation water, etc. Depending on the source of water, minimal or extensive water treatment will be required. VPC has not yet determined the most appropriate source of make-up water.

3.4.3.2 Air Cooled

If an adequate source of water cannot be obtained, VPC will use an air-cooled system. The primary component of an air-cooled system is the large arrays of air-coolers. These consist of banks of binary fluid tubing on top of an elevated structure with a series of fans to force air flow around the tubing thus rejecting the heat of the binary vapor exhausted from the turbines and condensing it back to the liquid state.

3.4.4 Electrical System

Facility power will be supplied through ancillary transformers connected to the main bus. Ancillary transformers will provide power for normal operation of generating and support facilities including process pumps, cooling fans and well pumps. Diesel generators will be installed to supply start-up power under complete shutdown conditions (black start). Emergency power for the plant will be supplied from 125 V direct current (DC) battery systems. Emergency power for the turbine-generator critical loads and plant common critical loads will be supplied from the balance of plant (BOP) 125 VDC system which will be sized to accommodate critical loads for a maximum of one hour.

3.4.5 Plant Substation

The power plant site will include an electrical substation where electric power generated at 13.8 kV will pass through a transformer to increase its voltage to 120 kV. The substation will also consist of a 13.8 kV circuit breaker to protect the electric generator, 120 kV potential and current transformers for metering and system protection, and a 120 kV circuit breaker to protect the substation. The main control building will contain electrical instrumentation and telecommunication equipment.

3.4.6 Transmission Line

Proposed transmission line facilities will consist of approximately 6 1/3 miles of an overhead, 120 kV, single circuit transmission line constructed on H-frame ("HF") structures using either direct embedded wood poles or self-supporting, self-weathering steel poles where guying room is unavailable. There will be approximately 50 to 60 such structures, typically 60 feet above ground.

4.0 ENVIRONMENTAL STATEMENT

BLM will conduct an EA of the proposed development, pursuant to the NEPA, describing existing environmental characteristics of resources present within the project area and analyzing consequences of project implementation on these resources. Upon issuance of the final EA, an amended UEPA application will be submitted within 30 days.

4.1 Nature of the Probable Effect on the Environment

Botanical, cultural and wildlife surveys are currently ongoing to evaluate any such resources potentially affected by the Project. VPC's goal is to develop a project that avoids creating significant environmental impacts. Accordingly, VPC is working in coordination with the botanist, wildlife biologist, cultural resource consultant, BLM, BOR,

NDOW, and other relevant agencies to understand the nature of probable effects of the proposed Project on the environment, in the immediate vicinity of the proposed power plant and other utilization facilities, and prepare appropriate mitigation measures as necessary.

4.2 Minimum Adverse Effect on the Environment

The proposed Project represents the minimum adverse effect on the environment per MW energy produced, considering the resources at the Patua Geothermal Project, available technology, and costs of alternatives. Binary-cycle geothermal power plants are best suited for geothermal resource temperatures below 360°F, which are anticipated for the Project location. This design represents the least amount of surface disturbance coupled with maximum efficiency when compared to alternative designs for utilization of the expected resource.

The geothermal power plant location and design were optimized to produce the most efficient option while resulting in the least disturbance. At this time there are no restrictions on the preferred power plant location; as such, there are no current alternatives for the plant location. Furthermore, the approximately 18 acre site required for the plant site will be located somewhere within a 40 acre environmental study area (indicated in the Map 3: Patua Project Overview, **Exhibit 2: Maps**); the site may be moved as needed within the environmental study area to reduce its impact on significant environmental resources.

4.3 Evaluation and Comparison

Electricity from geothermal power plants requires significantly less surface disturbance than most fossil fuel plants and has minimal emissions. Coal power, for example, requires extensive surface disturbance for mining and transport of coal. Combustion of coal and other fossil fuels results in substantial emissions of criteria pollutants and greenhouse gases.

Geothermal projects are baseload renewable energy facilities. Wind and solar projects also provide renewable energy, yet both require significantly more disturbance and are intermittent due to reliance on meteorological and seasonal fluctuations. Both require the coordination of utilities with multiple facilities to maintain continuous and reliable generation for load centers.

Due to its close proximity to existing transmission lines, the proposed geothermal Project will require a relatively small amount of new transmission line construction. The location is also close to Highway 50, requiring shorter trips for construction vehicles; therefore, it is expected to have a smaller construction footprint.

4.3.1 Environmental Characteristics

The Patua Geothermal Project is located on both federal and private geothermal leases, approximately ten miles east of Fernley, in Churchill County and Lyon County, Nevada. Federal geothermal leases are on BOR managed land but are managed by the BLM.

The project area lies within the Great Basin which is characterized by low lying alluvial filled valleys, beach gravels, dune deposits and north or northeast trending, fault-bounded mountain ranges. The arid climate of the area has an average annual precipitation of less than eight inches on the basin floor to around sixteen inches on surrounding ranges. Vegetation primarily consists of desert shrub. Soil is almost all Biddleman association in the western part of the lease area and Celeton, very cobbly sandy loam in the eastern part of the lease area.

VPC leases within the Geothermal Unit lie adjacent to the Fernley Wildlife Management Area (FWMA). The FWMA is not available for geothermal leasing (43 CFR 3201.11(e)). The proposed corridor for the 120 kV transmission line roughly follows (approximately parallel and adjacent to) the south border of the FWMA in order to connect the project to another developer's substation to be located in Section 9, T20N, R25E, MDBM. Applications have been submitted to the BOR, BLM, and the Nevada Division of State Lands (in coordination with the Nevada Department of Wildlife) for approval of the transmission line right-of way.

The Pyramid Lake Paiute Indian Reservation is approximately six miles northwest of the Hazen-Patua lease area; the Fallon Paiute-Shoshone Indian Reservation is approximately sixteen miles southeast of the area. It is expected that these tribes will be consulted during the environmental assessment process.

4.3.2 Environmental Impacts

Environmental resources potentially impacted by the Patua Geothermal Project as well as other issues of concern are described below as they are currently understood. The BLM will prepare a comprehensive EA of the project under NEPA that will further evaluate potential environmental impacts. Potential impacts will be further evaluated upon BLM completion of the EA document and will be submitted with the amended UEPA application within 30 days of EA completion.

4.3.3 Selection of Primary Location and Design

VPC has identified a 40 acre environmental study area within which the 18 acre geothermal power plant site will be placed. The environmental study area is

suitable for installation of the 60 MW net power plant facilities proposed to utilize the geothermal resources expected for the project area. A binary-cycle, geothermal power plant is the most efficient for anticipated resource temperatures expected in the planned production zone. The final location of the 18 acre site may be moved as needed within the environmental study area to reduce its impact on significant environmental resources.

In order to site proposed locations of the power plant, geothermal wells, access roads, and transmission interconnection line, various factors were considered. These factors include, but are not limited to: a review of existing topography, a review of published geologic literature and maps, geologic field reconnaissance and mapping, review of recent geophysical survey data, and review of existing drill logs and reports. In general, proposed geothermal pipeline corridor locations were chosen to accommodate the proposed geothermal well locations, which were chosen based on geologic and engineering analyses of subsurface data.

Geothermal fluid pipelines have been located such that they follow proposed geothermal well pad access roads, while maintaining engineering efficiency, to the extent practical. Following the proposed well pad access roads reduces the amount of surface disturbance required for additional access roads. Remaining sections of pipeline will be routed in corridors that follow the shortest distance between well pads. This approach will minimize surface disturbances associated with the pipelines, minimize lengths of piping required and reduce heat/energy losses, allowing for more efficient utilization of the geothermal resource.

The proposed transmission route was developed in coordination with NDOW, as well as the City of Fernley and NV Energy, in order to address their concerns early on in the process. Out of four routes considered, the proposed route represents the one route determined to have the least potential for impacts and other concerns.

4.3.4 Studies Made to Assess Potential Environmental Impact

In development of this project to date, BOR has conducted one EA (October, 2008) for the construction of a bypass road related to the Patua Geothermal Project. The Patua Bypass Road Environmental Assessment is specific to construction of a bypass road built to allow water trucks and other heavy equipment to cross federal lands to access potential geothermal development of private leases in adjacent lands.

Exploratory drilling is currently being conducted at existing well pads on private land, under a NDOW approved drilling program. A Utilization Plan, an Operations Plan and a Plan of Development were submitted to the BLM and BOR, revised

February 2010, to describe proposed facilities at potential sites identified in the application that are related to the 60 MW net geothermal power plant.

The BLM will prepare a comprehensive EA of the project under NEPA that will evaluate impacts on biological, cultural and other environmental resources in the area from construction and operation of the proposed power plant, well pads, pipelines, roads and the overhead 120 kV transmission line. Upon issuance of the final EA, an amended UEPA application will be submitted within 30 days.

Botanical, cultural and wildlife surveys are currently ongoing to evaluate any potential environmental effects of the Project. These studies will be complete in time for consideration in the EA for the Project. Ongoing consultation with the BLM and other appropriate regulatory agencies will determine whether any additional studies are necessary. Applicable findings of such studies will be included in the final EA and submitted with the amended UEPA application.

4.3.5 Analysis and Comparison of the Costs and Benefits

Typical environmental issues considered in an Environmental Assessment for a geothermal power plant include air quality, land use, soils/geology/minerals, water resources, vegetation, wildlife, special status species, cultural resources, visual resources, public safety and environmental justice. VPC's goal is to develop a project that avoids creating significant environmental impacts. Accordingly, VPC is working in coordination with the botanist, wildlife biologist, cultural resource consultant, BLM, BOR, NDOW, and other relevant agencies to understand the nature of probable effects of the proposed Project on the environment, in the immediate vicinity of the proposed power plant and other utilization facilities, and prepare appropriate mitigation measures as necessary.

Benefits of geothermal power include increased availability of renewable energy, diversified domestic baseload power generation, low greenhouse gas emissions, increased revenue for state and local governments, and potential employment opportunities for local residents. Geothermal power provides a cleaner alternative to fossil fuel power plants, including smaller land disturbance and water requirements per MW generated.

4.3.6 Description of the Natural Resources

Geothermal fluid, used to supply heat to power turbine-generators, is the principal natural resource required for operation of the proposed geothermal power plant. Construction of the power plant and related utilization facilities requires earth materials for grading and surfacing of roads, well pads and plant sites. Other natural resources potentially affected by construction and operation of proposed facilities will be evaluated during the environmental assessment

process. VPC's goal is to develop a project that avoids creating significant environmental impacts. Accordingly, VPC is working in coordination with the botanist, wildlife biologist, cultural resource consultant, BLM, BOR, NDOW, and other relevant agencies to understand the nature of probable effects of the proposed Project on the environment, in the immediate vicinity of the proposed power plant and other utilization facilities, and prepare appropriate mitigation measures as necessary.

4.4 Effect of Decision to Deny the Application

If the Public Utilities Commission of Nevada were to deny the application, VPC would not build the proposed power plant and associated facilities, and exploration and development of the area would be abandoned. The decision would prevent clean, renewable energy from being provided to the Western Interconnection that would help utilities meet renewable portfolio standard (RPS) requirements and help our country decrease dependence on fossil fuels. Generation of the same amount of electricity by a fossil fuel power plant would result in increased greenhouse gas and criteria pollutant emissions, as well as increased environmental disturbance. Generation of the same amount of electricity by intermittent solar or wind project would require more surface disturbance than the proposed baseload geothermal plant, due to the nature of required structures.

4.5 Maps of all Reasonable Locations

See **Exhibit 2: Maps** for Map 3: Patua Project Overview, depicting the 40 acre environmental study area, within which the 18 acre power plant site is proposed to be located.

4.6 Preparation of the Environmental Statement and Bibliography

4.6.1 Preparers

Vulcan Power Company

775 SW Bonnett Way, Suite 210

Bend, Oregon 97702

Telephone: (541) 317-1984

Fax: (541) 749-4318

Jason A. Hefner, Project Development Coordinator

jhefner@vulcanpower.com

Emily Thornley, Environmental Engineer

ethornley@vulcanpower.com

4.6.2 Bibliography

Bureau of Land Management. United States Forest Service. 2008. Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States. October 2008.

Bureau of Land Management. 2008. Patua Bypass Road Environmental Assessment. October 2008.

Vulcan Power Company. 2010. Patua Geothermal Project Utilization Plan. Revised February 2010.

Vulcan Power Company. 2010. Patua Geothermal Project Operations Plan. Revised February 2010.

Vulcan Power Company. 2010. Patua Geothermal Project Plan of Development. Revised February 2010.

5.0 UTILITY SERVICES

5.1 Services to State of Nevada Customers

The proposed geothermal Project will result in increased availability of baseload power to the grid, providing additional stability overall. Grid stability reduces the chance of power shortages, and generally stabilizes rates paid by utility customers.

5.2 Enhancement of Reliability of State of Nevada Electricity and the Western Interconnection

Geothermal power is just one of a handful of clean renewable energy technologies available to support the ever increasing energy demands of the world. Geothermal power is also recognized as a baseload renewable technology because a geothermal power plant can typically produce electricity 24 hours a day, seven days a week. This provides stability to the Western Interconnection, as the receiving utility can count on this electricity supply without variances due to factors such as weather conditions.

6.0 HOW THE NEED FOR THE FACILITY BALANCES ANY ADVERSE EFFECT ON THE ENVIRONMENT

Executive Order (EO) 13212 and the Energy policy Act of 2005 address the need for increasing energy supplies and expedited renewable energy projects. The need for addressing climate change with renewable energy is also addressed by the RPS requirements in Nevada and other states. It is expected that construction of the Patua Geothermal Project will result in minimal to no adverse impacts on the environment. Impacts on vegetation, soils, wildlife and habitat are small in comparison with the open space available in the surrounding areas. Generation of geothermal power has positive environmental impacts due to reduction of the need for an equal amount of energy requirement generated by fossil fuels. Geothermal power provides a cleaner alternative to fossil fuel combustion due to reduction of criteria pollutant and greenhouse gas emissions, as well as the lack of a fuel delivery system.

7.0 AGENCY APPROVALS AND REQUIRED PERMITS

7.1 Permitting Status

Exhibit 4: Permitting Status Table is an up to date status list of permitting requirements as of the time of this application's submission and will be updated as required.

7.2 Documentation

Exhibit 5: Copies of Pertinent Permits and Plans includes copies of existing pertinent permits, applications, plans, sundry notices, etc.

8.0 SERVING THE PUBLIC INTEREST

The Project consists of a geothermal power plant, designed to generate 60 MW net of electric power. The expected life of the project is 30 years; however, it is likely that the project will have an even longer useful lifetime. Proposed development also includes the associated 120 kV transmission line required for interconnection to deliver power from the power plant to another developer's substation to be located in Section 9, T20N, R25E, MDBM. Operation of the geothermal power plant will provide 60 MW net of firm, baseload renewable energy to the utility, and help achieve Renewable Portfolio Standard (RPS) goals in the western United States.

Benefits of geothermal power include increased availability of renewable energy, diversified domestic baseload power generation, low greenhouse gas emissions,

increased revenue for federal, state and local governments, potential increased revenue to several types of local businesses, as well as temporary and permanent employment opportunities for local residents. Geothermal power provides a cleaner alternative to fossil fuel power plants, including smaller land disturbance and water requirements per MW generated.

Temporary employment will include numerous types of construction and construction support positions. The permanent employment opportunities span across a large range of skill levels. Positions will include various types of skilled labor (mechanics, electricians, engineers, plant operators, scientists, etc.), administrative labor (secretarial, accounting and other office work), general labor (technical support, janitorial, etc) as well as managerial and supervisory positions.

9.0 REFERENCE TO COPIES FILED WITH THE ADMINISTRATOR OF THE NEVADA DIVISION OF ENVIRONMENTAL PROTECTION AND THE NEVADA STATE DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

The required copies of the Application have been filed with the Administrator of the Nevada Division of Environmental Protection and the State Department of Conservation and Natural Resources. Proof of service of a copy of the application is attached in **Exhibit 7: Certificate of Service.**

10.0 PROOF OF SERVICE OF A COPY OF THE APPLICATION ON THE CLERK OF EACH LOCAL GOVERNMENT IN THE AREA

Proof of service of a copy of the application on the clerk of Churchill County and the City of Fernley, Nevada is attached in **Exhibit 7: Certificate of Service.**

11.0 PROOF THAT PUBLIC NOTICE OF THE APPLICATION WAS GIVEN TO PERSONS IN THE MUNICIPALITIES ENTITLED TO RECEIVE NOTICE BY THE PUBLICATION OF A SUMMARY OF THE APPLICATION IN NEWSPAPERS PUBLISHED AND DISTRIBUTED IN THE AREA

Public notice of the Application was made in the Lahontan Valley News and the Nevada Appeal on February 24, 2010. See **Exhibit 1: Public Notice and Affidavits of Publication** for a copy of the text of the notice.

Attached hereto as **Exhibit 1: Public Notice and Affidavits of Publication** are copies of the affidavits of publication provided by Lisa Barwig, Legal Clerk for the Lahontan Valley News and the Nevada Appeal.

12.0 PROOF THAT A COPY OF THE APPLICATION HAS BEEN SUBMITTED TO THE NEVADA STATE CLEARINGHOUSE WITH THE DEPARTMENT OF ADMINISTRATION

Proof that a copy of the application submitted to the Nevada State Clearinghouse with the Department of Administration to enable agency review and comment is attached in **Exhibit 7: Certificate of Service**.

EXHIBIT 1: PUBLIC NOTICE AND AFFIDAVITS OF PUBLICATION

Public Notice

__LEGAL NOTICE LEGALNOTICE__

BEFORE THE PUBLIC UTILITIES COMMISSION OF NEVADA

Notice of Application

Notice is hereby given that Patua Project, LLC, a subsidiary of Vulcan Power Company, ("Applicant") will file with the Public Utilities Commission of Nevada ("Commission") an Application for Permit to Construct Utility Facilities ("Application") for a new 60-MW (net) binary-cycle geothermal power plant to be built within private and federal geothermal leases in Churchill and Lyon Counties, Nevada. The project is located north of Highway 50, approximately ten miles east of Fernley, Nevada. The Applicant holds multiple geothermal leases within 30 Sections totaling 18,694 acres in the Patua Geothermal Unit N-85168X.

THE PROPOSED SITE FOR THE PATUA GEOTHERMAL PROJECT POWER PLANT IS LOCATED IN SW¼NW¼ OF SECTION 21, TOWNSHIP 20 NORTH, RANGE 26 EAST (T20N, R26E), MOUNT DIABLO BASE AND MERIDIAN.

The Application will be filed in accordance with the provisions of the Nevada Utility Environmental Protection Act (UEPA), NRS 704.820 through NRS 709.900 inclusive and the Commission's rules and regulations within NAC 703.415 through NAC 703.438. The Application will include a description of the proposed power plant and related facilities, an explanation of the need for the proposed project and additional information needed to meet the requirements of the application. The proposed plant is a binary-cycle geothermal power plant using heat from onsite geothermal fluids for power generation. Geothermal fluids will be returned to the resource by reinjection after being used for their heat; however, if used for the cooling process, a small percentage of geothermal fluids may be evaporated.

The Application will be on file and available for public viewing at the offices of the Commission: 1150 East William Street, Carson City, Nevada 89109. Written comments, protests and/or petitions regarding the application must be filed with the Commission as provided by law, NRS 704.885.

Prepared this 19 day of February, 2010

Vulcan Power Company

Affidavits of Publication

03/01/2010 03:37 FAX 7758872408 SIERRA NEVADA MEDIA 002

LVN Lahontan Valley News & Fallon Standard

Proof and Statement of Publication

P.O. Box 1888 Carson City, NV 89702
(775) 881-1201 FAX: (775) 887-2408

Customer Number: # 1066369

Legal Account
Vulcan Power Company
345 SW Cyber Dr., Ste. 103
Bend, OR 97702

Lisa Barwig says:
That (s)he is a legal clerk of the **LAHONTAN VALLEY NEWS**, a newspaper published Wednesday, Friday and Sunday at Fallon, in the State of Nevada.

Before the Public Utilities
Commission of Nevada
NOTICE OF APPLICATION
Patua Geothermal Project

Ad #4687254

of which a copy is hereto attached, was published in said newspaper for the full required period of 1 time commencing on **February 24, 2010**, and ending on **February 24, 2010**, all days inclusive.

Signed: Lisa Barwig

Subscribed and sworn to before me this 26 day of **February, 2010**

STATEMENT:

Notary Public State of Nevada
Appointment No. 01-67604-5
My Appt. Expires Mar 10, 2013

Date	Amount	Credit	Balance
02/24/10	$ 102.73	$ 0.00	$ 102.73

BEFORE THE PUBLIC UTILITIES COMMISSION OF NEVADA

Notice of Application

Notice is hereby given that Vulcan Power Company ("Applicant") will file with the Public Utilities Commission of Nevada ("Commission") an Application for Permit to Construct Utility Facilities ("Application") for the Patua Geothermal Project, a low 60-MW (net) binary-cycle geothermal power plant to be built within private and federal geothermal leases in Churchill and Lyon Counties, Nevada. The project is located north of Highway 50, approximately ten miles east of Fernley, Nevada. The Applicant holds multiple geothermal leases within 30 Sections totaling 16,604 acres in the Patua Geothermal Unit N-85160X.

THE PROPOSED SITE FOR THE PATUA GEOTHERMAL PROJECT POWER PLANT IS LOCATED IN SW 1/4 NW 1/4 OF SECTION 21, TOWNSHIP 20 NORTH, RANGE 26 EAST (T20N, R26E), MOUNT DIABLO BASE AND MERIDIAN.

The Application will be filed in accordance with the provisions of the Nevada Utility Environmental Protection Act (UEPA), NRS 704.820 through NRS 704.900 inclusive and the Commission's rules and regulations within NAC 703.415 through NAC 703.436. The Application will include a description of the proposed power plant and related facilities, an explanation of the need for the proposed project and additional information needed to meet the requirements of the application. The proposed plant is a binary-cycle geothermal power plant using heat from onsite geothermal fields for power generation. Geothermal fluids will be returned to the resource by reinjection after being used for their heat; however, if used for the cooling process, a small percentage of geothermal fluids may be evaporated.

The Application will be on file and available for public viewing at the offices of the Commission: 1150 East William Street, Carson City, Nevada 89100. Written comments, protests and/or petitions regarding the application must be filed with the Commission as provided by law, NRS 704.885.

Prepared this 18 day of February, 2010
Vulcan Power Company

Pub: February 24, 2010 Ad#4687254

03/05/2010 02:47 FAX 7758872408 SIERRA NEVADA MEDIA 001

NEVADA APPEAL

580 Mallory Way, Carson City, NV 89701
P.O. Box 1888, Carson City, NV 89702-2288
(775) 881-1201 FAX: (775) 887-2408

Account Number: #1066369

Legal Account
Vulcan Power Company
775 SW Bonnett Way, Ste 210
Bend, OR 97702
Attn: Emily Thornley

Lisa Barwig says:
That (s)he is a legal clerk of the NEVADA APPEAL, a newspaper published Wednesday through Sunday at Carson City, in the State of Nevada.

Before The Public Utilities
Commission of Nevada
Notice of Application
Patua Geothermal Project
Ad #4687335

of which a copy is hereto attached, was published in said newspaper for the full required period of 1 time commencing on February 24, 2010 and ending on February 24, 2010, all days inclusive.

Signed: Lisa Barwig

Subscribed and sworn to before me this 5 day of March, 2010

Notary Public

A. A. PRICE
Notary Public, State of Nevada
Appointment No. 01-87804-0
My Appt. Expires Mar 10, 2013

STATEMENT:

DATE	AMOUNT	CREDIT	BALANCE
02/24/10	$170.80	$ 0.00	$170.80

Proof and Statement of Publication

BEFORE THE PUBLIC UTILITIES COMMISSION OF NEVADA

Notice of Application

Notice is hereby given that Vulcan Power Company ("Applicant") will file with the Public Utilities Commission of Nevada ("Commission") an Application for Permit to Construct Utility Facilities ("Application") for the Patua Geothermal Project, a new 60-MW (net) binary-cycle geothermal power plant to be built within private and federal geothermal leases in Churchill and Lyon Counties, Nevada. The project is located north of Highway 50, approximately ten miles east of Fernley, Nevada. The Applicant holds multiple geothermal leases within 30 Sections totaling 18,894 acres in the Patua Geothermal Unit N-85166X.

THE PROPOSED SITE FOR THE PATUA GEOTHERMAL PROJECT POWER PLANT IS LOCATED IN SW 1/4 NW 1/4 OF SECTION 21, TOWNSHIP 20 NORTH, RANGE 26 EAST (T20N, R26E), MOUNT DIABLO BASE AND MERIDIAN.

The Application will be filed in accordance with the provisions of the Nevada Utility Environmental Protection Act (UEPA), NRS 704.820 through NRS 708.900 inclusive and the Commission's rules and regulations within NAC 703.418 through NAC 703.438. The Application will include a description of the proposed power plant and related facilities, an explanation of the need for the proposed project and additional information needed to meet the requirements of the application. The proposed plant is a binary-cycle geothermal power plant using heat from onsite geothermal fluids for power generation. Geothermal fluids will be returned to the resource by reinjection after being used for their heat; however, if used for the cooling process, a small percentage of geothermal fluids may be evaporated.

The Application will be on file and available for public viewing at the offices of the Commission, 1150 East William Street, Carson City, Nevada 89109. Written comments, protests and/or petitions regarding the application must be filed with the Commission as provided by law, NRS 704.865.

Prepared this 18 day of February, 2010
Vulcan Power Company

Pub: February 24, 2010 Ad#4687335

EXHIBIT 2: MAPS

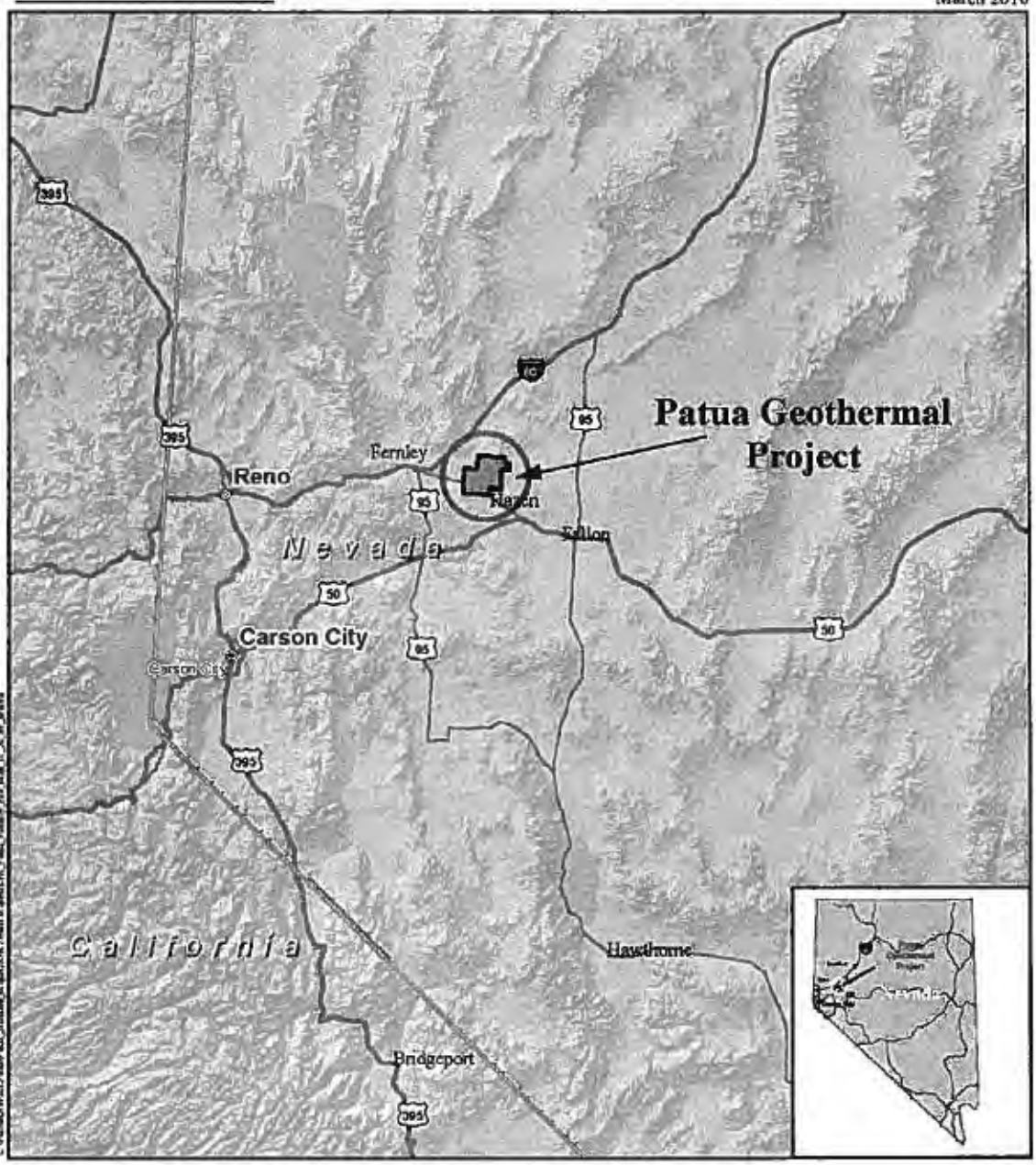
Map 1: General Vicinity Map

Patua Geothermal Project

Confidential

General Vicinity Map

UEPA Permit Application
March 2010



Legend

Patua Geothermal Project

0 12.5 25 Miles

N W E S

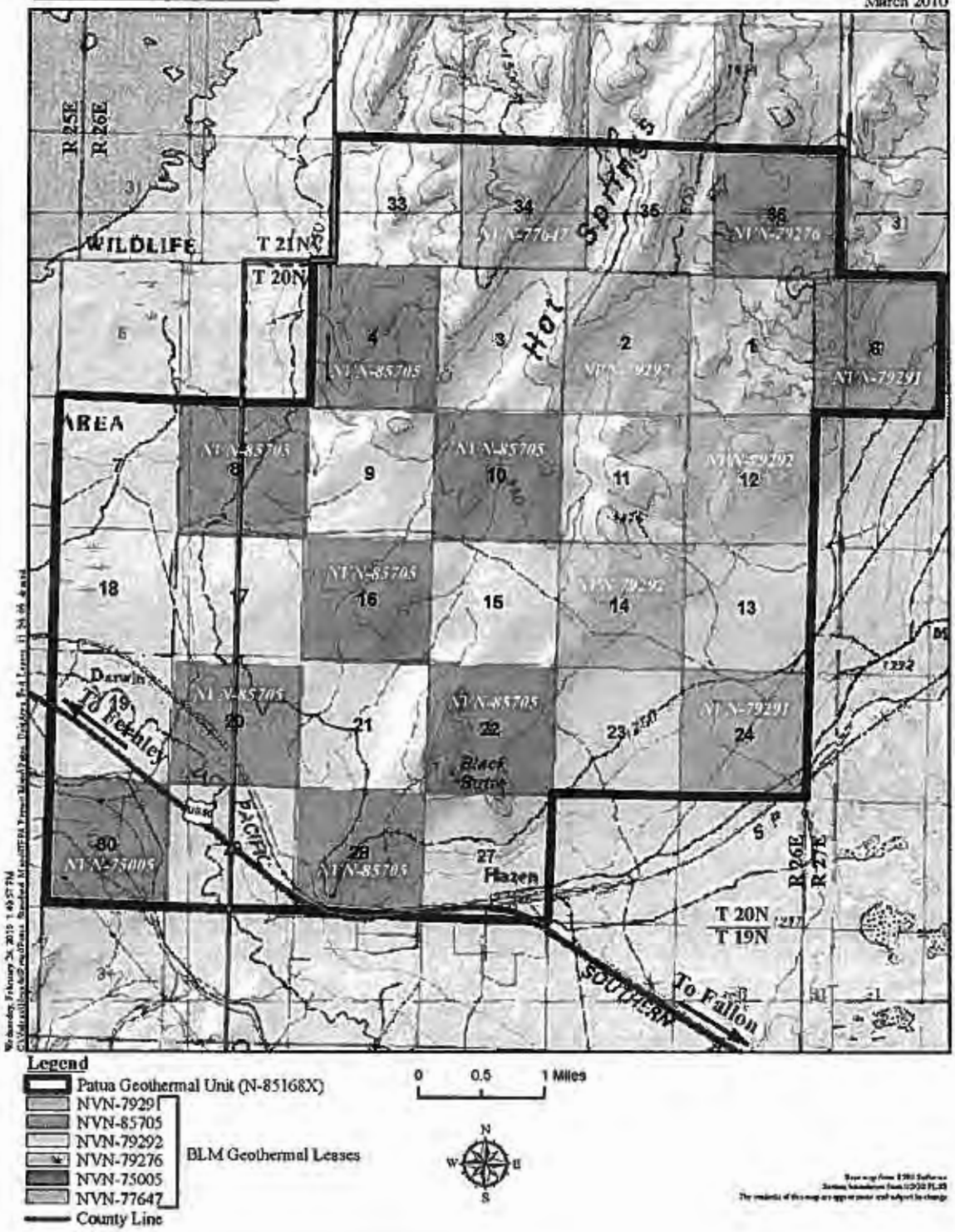
Map 2: Patua Geothermal Unit

Patua Geothermal Project

Patua Geothermal Unit

Confidential

UEPA Permit Application
March 2010



Map 3: Patua Project Overview

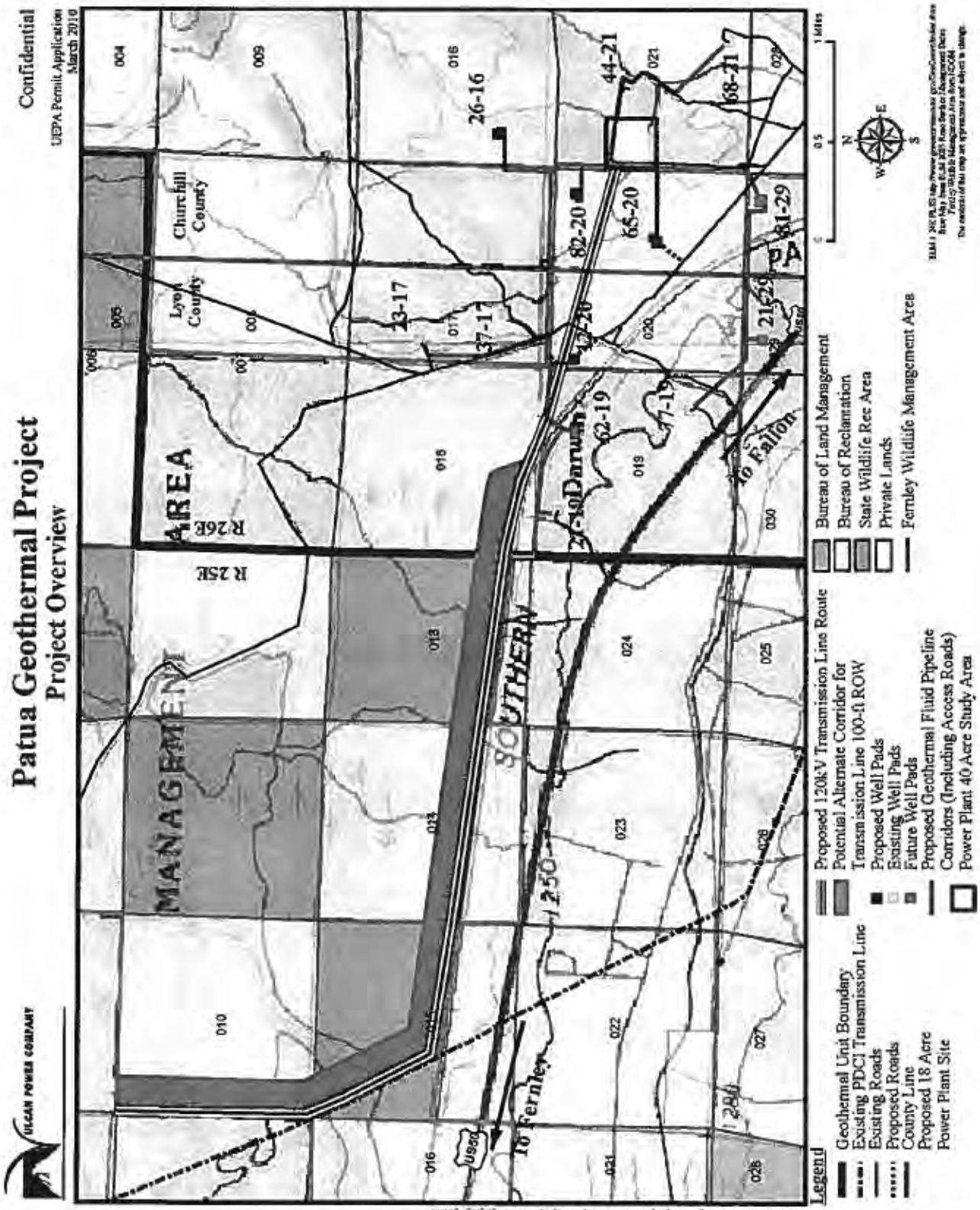
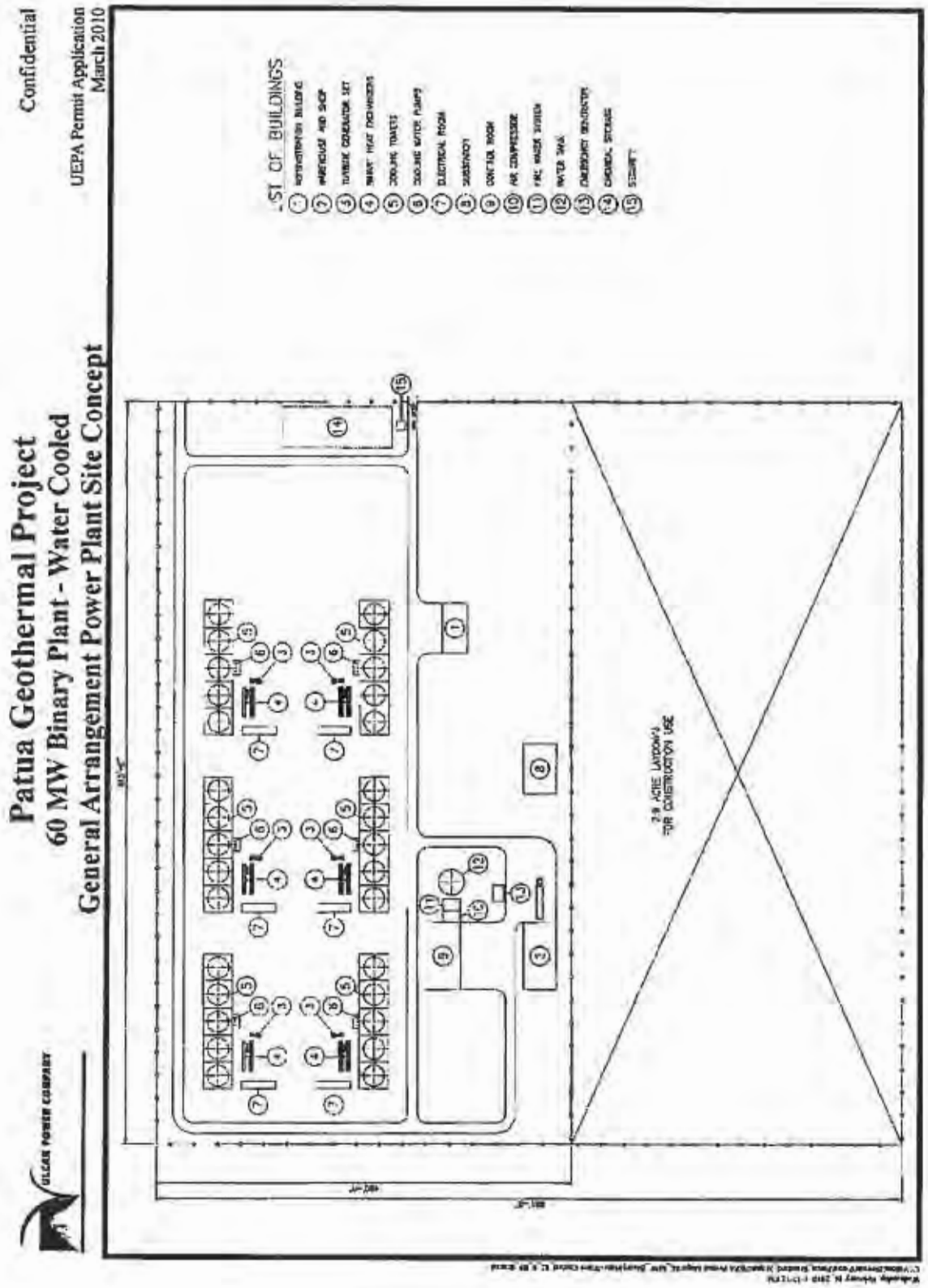

Patua Geothermal Project
Project Overview
Confidential
UEPA Permit Application
March 2010
VULCAN POWER COMPANY
MANAGEMENT AREA
SOUTHERN
Churchill County
Lyon County
R 26E
R 25E
To Fernley
To Fallon
Darwin
26-16
44-21
68-21
82-20
65-20
81-29
23-17
37-17
42-20
21-29
62-19
77-19
Legend
Geothermal Unit Boundary
Existing PDCI Transmission Line
Existing Roads
Proposed Roads
County Line
Proposed 18 Acre Power Plant Site
Proposed 120kV Transmission Line Route
Potential Alternate Corridor for Transmission Line 100-ft ROW
Proposed Well Pads
Existing Well Pads
Future Well Pads
Proposed Geothermal Fluid Pipeline Corridors (Including Access Roads)
Power Plant 40 Acre Study Area
Bureau of Land Management
Bureau of Reclamation
State Wildlife Rec Area
Private Lands
Fernley Wildlife Management Area
1 Miles

EXHIBIT 3: PLANT SITE DRAWINGS

Drawing 1: General Arrangement Binary Power Plant Site Concept, Water Cooled


Patua Geothermal Project
60 MW Binary Plant - Water Cooled
General Arrangement Power Plant Site Concept
Confidential
UEPA Permit Application
March 2010
LIST OF BUILDINGS
VULCAN POWER COMPANY

Drawing 2: General Arrangement Binary Power Plant Site Concept, Air Cooled

Confidential

UEPA Permit Application
March 2010

Patua Geothermal Project
60 MW Binary Plant - Air Cooled
General Arrangement Power Plant Site Concept

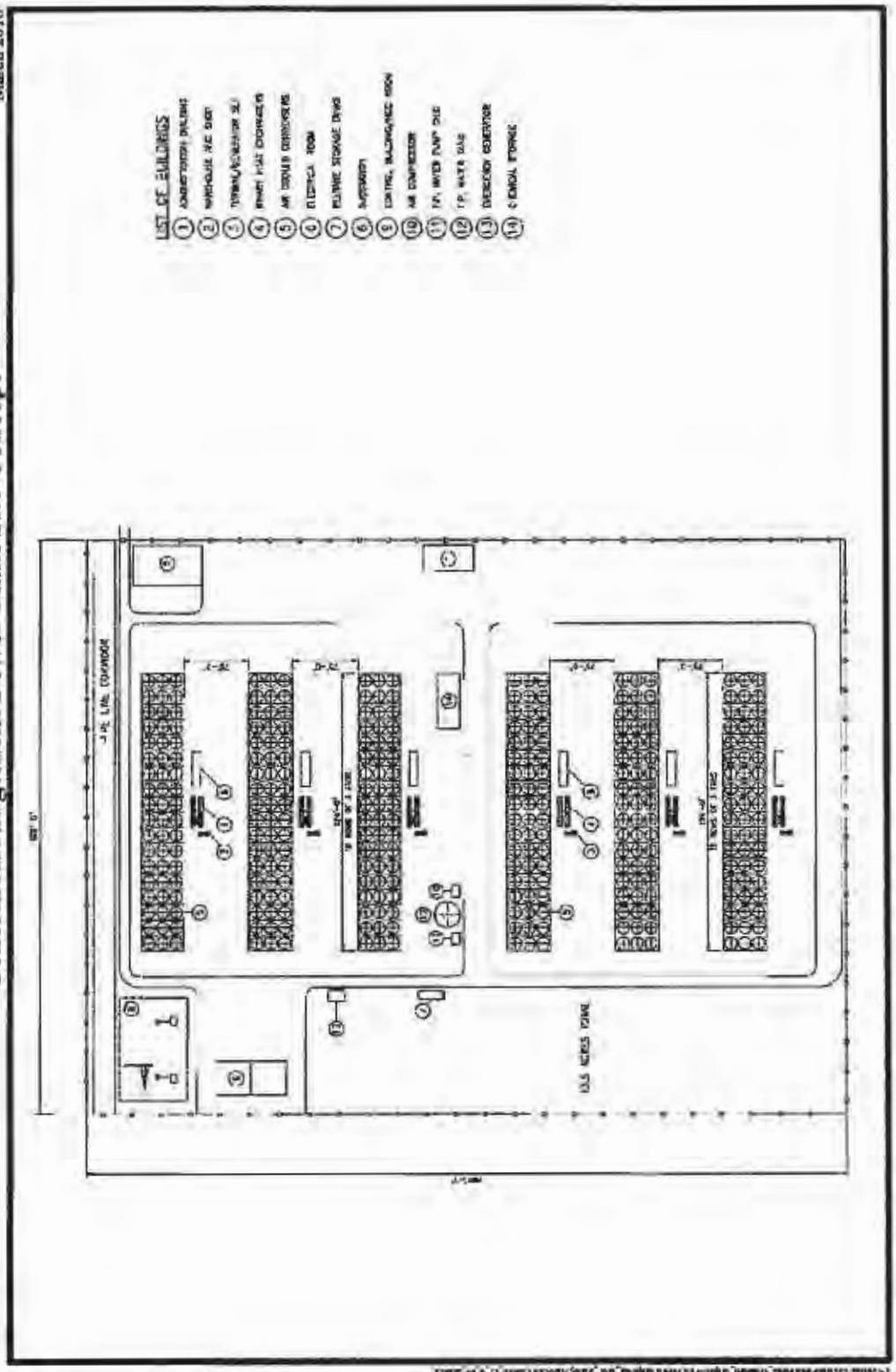


EXHIBIT 4: PERMITTING STATUS TABLE

Vulcan Power Company **Table 1** **Required Permitting and Approvals Status for Proposed Facility**	
FEDERAL	
Federal Energy Regulatory Commission (FERC) **Contact: Kimberly D Bose, Secretary** 888 First Street, NE, Washington Phone: (202) 502-6088	
Notice of Self Certification as a Qualifying Small Power Producing Facility	Permit application not yet submitted as of March 2010
U.S. Bureau of Land Management (BLM) **Contact: Teresa Knutson, Stillwater Field Office Manager** 5665 Morgan Mill Road, Carson City, NV 89701 Phone: (775) 885-6000	
Drilling Operations	Operations Plan, Revised February 2010
Utilization Facilities	Plan of Utilization, Revised February 2010
Transmission Line Development	Plan of Development, Revised February 2010
Geothermal Unit Agreement Approval	Effective July 1, 2008
Mineral Material Sale Contract (Gravel)	Approved December 17, 2008
Construction Permit and Site License	Approved within 30 days of decision on EA
Commercial Use Permit	Approved after submittal of drilling data, power contracts and production rates
U.S. Bureau of Reclamation (BOR) **Contact: Peter Neugebauer, Water and Lands Specialist** Lahontan Basin Area Office, 702 North Plaza, Room 320, Carson City, NV 89701 Phone: (775) 882-3436	
Transmission Line Right-of-Way	Standard Form(SF)-299 Submitted February 2010
Drilling Operations	Operations Plan, Revised February 2010
Utilization Facilities	Plan of Utilization, Revised February 2010
Transmission Line Development	Plan of Development, Revised February 2010
Patua Bypass Road Environmental Assessment	EA Approved January 27, 2009
STATE	
Nevada Department of Environmental Protection (NDEP)	
Bureau of Air Pollution Control **Contact: Francisco Vega, Minor Source Permits Supervisor** 901 South Stewart Street, Suite 4001, Carson City, NV 89701-5249 Phone: (775) 687-9349	
Surface Area Disturbance Permit	Permit submitted and approved, January 9, 2009

Air Quality Operating Permit	Class II Air Quality Operating Permit application not submitted as of March 2010
Bureau of Water Pollution Control **Contact: Alan Tinney, Permit Group Supervisor** 901 South Stewart Street, Suite 4001, Carson City, NV 89701-5249 Phone: (775) 687-4670	
Underground Injection Control Permit	Class V geothermal wells permit application not submitted as of March 2010
Commercial Septic Discharge Permit	Permit application not yet submitted as of March 2010
Storm Water Pollution Prevention Plan (SWPPP)	Permit submitted and approved, December 19, 2008
Nevada Division of Water Resources **Contact: Tracy Taylor, P.E. State Engineer** 901 South Stewart Street, Suite 2002, Carson, NV 89701 Phone: (775) 684-2800	
Water Appropriation Permit	Permit application not submitted as of March 2010
Nevada Division of Industrial Relations **Contact: L. Tom Czehowski, Acting Administrator** 400 West King Street, Suite 400, Carson City, Nevada 89703 Phone: (775) 684-7260	
Pressure vessel inspection and permitting	Inspected after delivery and before final installation
Nevada Division of Minerals **Contact: Linda Wells, Administrative Assistant** 400 West King Street, Suite 106, Carson City, Nevada 89703 Phone: (775) 684-7040	
Geothermal Project Area Permit	Permit submitted and approved October 7, 2008
Public Utilities Commission of Nevada **Contact: Bing Young, Staff Legal Case Manager** 1150 East William Street, Carson City, NV 89701-3109 Phone: (775) 684-6101	
Utility Environmental Protection Act (UEPA) Permit	Application in progress
Nevada Division of State Lands **Contact: Kevin Olsen, R/W-NAC, Land Agent III** 901 S Stewart St, Suite 5003, Carson City, NV 89701 Phone: (775) 684-2748	
Transmission Line Easement - Application to use State Lands	Application not submitted as of March 2010

COUNTY	
Churchill County **Contact: Eleanor Lockwood, Planning Director** 155 North Taylor Street, Fallon, NV 89406 Phone: (775) 423-5136	
Conditional Use Permit	Permit application not submitted as of March 2010
Building Permit	Permit application not submitted as of March 2010
Special Use Permit, Gravel Pit	Approved March 8, 2006
LOCAL	
City of Fernley, Public Works Department **Contact: Thomas Guinn, Development Project Manager** 595 Silver Lace Boulevard, Fernley, NV 89408 Phone: (775) 784-9821	
Grading Permit	Approved October 24, 2008
City of Fernley, Community Development **Contact: Fred Turnier, Community Development Director** 595 Silver Lace Boulevard, Fernley, NV 89408 Phone: (775) 784-9900	
Special Use Permit	Permit application not submitted as of March 2010

EXHIBIT 5: COPIES OF PERTINENT PERMITS AND PLANS

1. Geothermal Unit Agreement Approval

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Nevada State Office
P.O. Box 12000 (1340 Financial Blvd.)
Reno, Nevada 89520-0006
http://www.nv/blm/gov

TAKE PRIDE IN AMERICA

In Reply Refer To:
Patua Unit N-85168X
3280 (NV-920)

JUN 2 0 2008

James Combs
Vulcan Power Co.
345 SW Cyber Dr., Suite 103
Bend, Oregon 97702

Dear Mr. Combs:

The Patua Geothermal Unit Agreement, Lyon and Churchill Counties, Nevada is approved the date of this letter and is given the case recordation number N-85168X. The effective date of the Unit Agreement is July 1, 2008.

The request-for-approval package contained evidence that 73.79% of the lands in the unitized area are committed to the Unit Agreement. This office has determined that the lands committed to the Unit Agreement provide the unit operator, Vulcan Power Co., effective operational control of the primary resource development portions of the Unit area.

Article 11.4 of the Unit Agreement specifies the Unit Operator will drill the initial unit well to a depth that will test the Jurassic diorite formation and shall not be required to drill the initial unit well deeper than 10,000 feet. During discussions with this office regarding Unit development diligence, the Unit Operator has agreed that the initial Unit well will be spudded by the end of calendar year 2008.

Approval of this Unit Agreement does not warrant or certify that the Unit Operator thereof and other holders of operating rights hold legal or equitable title to those rights in the subject leases which are committed hereto.

One copy of the Unit Agreement is enclosed as requested. Please notify all interested parties of this action.

Sincerely,

Gary Johnson
Deputy State Director
Minerals Management

Enclosure

cc:
NDOM (w/encl.)
FM, Carson City. (w/encl.)
NV-923 (w/encl.)

CERTIFICATION – DETERMINATION

Pursuant to the authority vested in the Secretary of the Interior, under the Geothermal Steam Act of 1970, 84 Stat. 1566, 30 U.S.C. Secs. 1001-1027, I do hereby:

A. Approve the attached Unit Agreement for the development and operation of the PATUA UNIT AREA, State of Nevada.

B. Certify and determine that the Unit Plan of Development contemplated in the attached Unit Agreement is necessary and advisable in the public interest for the purpose of more properly conserving the natural resources.

C. Certify and determine that the drilling, producing, rental, minimum royalty, and royalty requirements of all Federal leases committed to said Agreement are hereby established, altered, changed, or revoked to conform with the terms and conditions of this Agreement.

Dated 6-20-08

Gary Johnson
Deputy State Director,
Minerals Management

Case Recordation Number: N-85168X

United States
Department of the Interior
Bureau of Land Management
Nevada State Office
1340 Financial Blvd.
Post Office Box 12000
Reno, Nevada 89520-0006

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

AN EQUAL OPPORTUNITY EMPLOYER

US OFFICIAL MAIL
$00.429
US POSTAGE

JAMES COMBS
VULCAN POWER CO
345 SW CYBER DRIVE SUITE 103
BEND OR 97702

9770231045 0004

2. Surface Area Disturbance (SAD) Permit

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Allan Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

January 6, 2009

Mr. Ken Bonin
Environmental Manager
Patua Project LLC
270 S. Maine St. #9
Fallon, Nevada 89406

RE: Request for Surface Area Disturbance Air Quality Operating Permit (AP4911-2517, FIN A0984)

Dear Mr. Bonin:

The application submitted by Patua LLC for the issuance of a surface area disturbance permit for construction related activities at the Patua Project, located near Hazen, Nevada has been reviewed by my staff under legal authority from Nevada Revised Statutes 445B.100 through 445B.640 and pursuant to Nevada Administrative Code 445B.001 through 445B.3689. Based on staff review and recommendation, I am hereby issuing Surface Area Disturbance Air Quality Operating Permit AP1629-2517, with appropriate restrictions. Please note that Operating Permit AP4911-2517 must be posted conspicuously at or near the source.

Nevada Administrative Code 445B.22037 requires fugitive dust to be controlled, and requires an ongoing program, using best practical methods, to prevent particulate matter from becoming airborne. Patua Project LLC must implement all appropriate measures to limit controllable emissions for all construction activities which have the potential to adversely affect the local air quality. Appropriate measures for dust control may consist of a phased approach to acreage disturbance rather than disturbing the entire area all at once; using wet suppression through such application methods as water trucks or water spray systems to control wind blown dust; the application of soil binding agents or chemical surfactant to roadways and areas of disturbed soil; as well as the use of wind-break or wind-limiting fencing designed to limit wind erosion of soils.

The dust control plan submitted by Patua Project LLC has been received by the Nevada Division of Environmental Protection, Bureau of Air Pollution Control (NDEP-BAPC), on December 11, 2008. As specified in Section III.B of the Operating Permit, the acceptance of the dust control plan by the Bureau of Air Quality does not limit the permit holder's need to control fugitive dust from the disturbance and its related activities, nor from putting into effect an ongoing program for using the best practical methods of dust control.

Enclosed is your copy of Air Quality Operating Permit AP4911-2517.In accordance with Nevada Revised Statute 445B.340, you may appeal the department's action of issuance of this operating permit within 10 days after you receive the permit. Appeals may be filed with the State Environmental Commission, 901 South Stewart Street, Suite 4001, Carson City, Nevada, 89701-5249, telephone (775) 687-9308.

901 S. Stewart Street, Suite 4001 • Carson City, Nevada 89701 • p: 775.687.4670 • f: 775.687.5856 • www.ndep.nv.gov
printed on recycled paper

If you have any questions, please feel free to contact Ray Davis at 775-687-9541.

Sincerely,

Francisco Vega

Francisco Vega
Supervisor, Permitting Branch
Bureau of Air Pollution Control

FV/rhd
Enclosures: Class II Air Quality Operating Permit Surface Area Disturbance (AP4911-2517)
Certified Mail No. 7007 0220 0003 5226 3485

Nevada Department of Conservation and Natural Resources • Division of Environmental Protection
BUREAU OF AIR POLLUTION CONTROL
901 SOUTH STEWART STREET SUITE 4001
CARSON CITY, NEVADA 89701-5249
p: 775-687-9350 • www.ndep.nv.gov/bapc • f: 775-687-6396

Facility ID No. A0984 ***Permit No. AP4911-2517***

CLASS II AIR QUALITY OPERATING PERMIT
SURFACE AREA DISTURBANCE

Issued to: PATUA PROJECT LLC (HEREINAFTER REFERRED TO AS PERMITTEE)
Mailing Address: 345 SW Cyber Drive, Suite 103, Bend Oregon 97702
Physical Address: 345 SW Cyber Drive, Suite 103, Bend Oregon 97702
General Facility Location: Hazen, Nevada
Driving Directions: Site surrounds Hazen, Nevada to the North and West

SECTION 36 T 21N, R 26E MDB&M
SECTIONS 1,3,4,5,8,9,10,12,13,14,15,16,17,19,20,21,22,23,27,29 T 20N, R 26E MDB&M
SECTION 6 T 20N, R 27E MDB&M
HA 75 BRADY HOT SPRINGS AREA, 76 FERNLEY AREA, 101 CARSON DESERT
CHURCHILL COUNTY
NORTH 4389.032 KM, EAST 325.132 KM, UTM ZONE 11 (NAD – 83)

Section I. General Conditions

A. Severability (Nevada Administrative Code (NAC) 445B.315.3(c))
Each of the conditions and requirements of this Operating Permit is severable and, if any are held invalid, the remaining conditions and requirements continue in effect.

B. Prohibited Acts (Nevada Revised Statute (NRS) 445B.470)
Permittee shall not knowingly:
1. Violate any applicable provision, the terms or conditions of any permit or any provision for the filing of information;
2. Fail to pay any fee;
3. Falsify any material statement, representation or certification in any notice or report; or
4. Render inaccurate any monitoring device or method, required pursuant to the provisions of NRS 445B.100 to 445B.450, inclusive, or 445B.470 to 445B.640, inclusive, or any regulation adopted pursuant to those provisions.

C. Prohibited Conduct: Concealment of Emissions (NAC 445B.225)
Permittee shall not install, construct, or use any device which conceals any emission without reducing the total release of regulated air pollutants to the atmosphere.

D. Compliance/Noncompliance (NAC 445B.315.3(d))
Permittee shall comply with all conditions of this Operating Permit. Any noncompliance constitutes a violation and is grounds for:
1. An action for noncompliance;
2. Modifying, revoking, reopening and revising, or terminating the Operating Permit; or
3. Denial of an application for a renewal of the Operating Permit.

E. NAC 445B.315.3(e)
The need to halt or reduce activity to maintain compliance with the conditions of this Operating Permit is not a defense to noncompliance with any conditions of this Operating Permit.

F. NAC 445B.315.3(f)
The director may revise, revoke and reissue, reopen and revise, or terminate the operating permit for cause.

G. NAC 445B.315.3(g)
This Operating Permit does not convey any property rights or any exclusive privilege.

H. NAC 445B.315.3(h)
Permittee shall provide the Bureau of Air Pollution Control, within a reasonable time, with any information that the Bureau of Air Pollution Control requests in writing to determine whether cause exists for revising, revoking and reissuing, reopening and revising or terminating this Operating Permit or to determine compliance with the conditions of this Operating Permit.

I. Fees (NAC 445B.315.3(i))
Permittee shall pay fees to the Bureau of Air Pollution Control in accordance with the provisions set forth in NAC 445B.327 and 445B.331.

Issued to: PATUA PROJECT LLC

Section I. General Conditions (continued)

J. Right to Entry (NAC 445B.315.3(j))
Permittee shall allow the Bureau of Air Pollution Control staff, upon the presentation of credentials, to:
1. Enter upon the premises of Permittee where:
   a. The stationary source is located;
   b. Activity related to emissions is conducted; or
   c. Records are kept pursuant to the conditions of this Operating Permit;
2. Have access to and copy, during normal business hours, any records that are kept pursuant to the conditions of this Operating Permit;
3. Inspect, at reasonable times, any facilities, practices, operations, or equipment, including any equipment for monitoring or controlling air pollution, that are regulated or required pursuant to this Operating Permit; and
4. Sample or monitor, at reasonable times, substances or parameters to determine compliance with the conditions of this Operating Permit or applicable requirements.

K. Certification (NAC 445B.315.3(k))
A responsible official of Permittee shall certify that, based on information and belief formed after reasonable inquiry, the statements made in any document required to be submitted by any condition of this Operating Permit are true, accurate and complete.

**********End of General Conditions**********

Issued to: PATUA PROJECT LLC

Section II. General Monitoring and Recordkeeping Conditions

A. NAC 445B.315:2(h)
Permittee will submit yearly reports including, but not limited to, the status of the surface area disturbance. These reports will be submitted on the form provided by the Bureau of Air Pollution Control for the surface area disturbance specified on the form. The completed form must be submitted to the Bureau of Air Pollution Control no later than March 1 annually for the preceding calendar year.

**********End of General Monitoring and Recordkeeping Conditions**********

Issued to: PATUA PROJECT LLC

Section III. Surface Area Disturbance Conditions

Surface area disturbance in excess of 20 acres – 93.48 acres for Patua Project.

A. NAC 445B.22037
Fugitive Dust
1. No person may cause or permit the handling, transporting, or storing of any material in a manner which allows or may allow controllable particulate matter to become airborne.
2. Except as otherwise provided in subsection 4, no person may cause or permit the construction, repair, demolition, or use of unpaved or untreated areas without first putting into effect an ongoing program using the best practical methods to prevent particulate matter from becoming airborne. As used in this subsection, "best practical methods" includes, but is not limited to, paving, chemical stabilization, watering, phased construction, and revegetation.

B. Dust Control Plan (NRS 445B.230.6)
1. Permittee may not cause or permit the construction, repair, or demolition work, or the use of unpaved or untreated areas without applying all such measures as may be required by the Director to prevent particulate matter from becoming airborne.
2. Permittee will control fugitive dust in accordance with the dust control plan entitled "Dust Control Plan, Patua Project", as submitted on December 11, 2008.
3. Acceptance of the plan for the control of particulate matter by the Administrator does not limit Permittee's need to control particulate matter, nor from putting into effect the ongoing program using the best practical methods as required in A.1and A.2, of this section.

C. Posting (NRS 445B.230.6)
1. The sign shall be constructed and labeled with materials capable of withstanding the strong winds, intense sunlight, and other conditions characteristic of Nevada's outdoors. The sign must be erected along the major street bordering the property, or at the main entrance to the construction site, within 50 feet of the border of the property. The sign must be clearly legible from the road and not be obstructed by signs, vehicles, vegetation, or any materials. The sign shall be replaced or repaired should it become damaged or difficult to read.
2. The sign must meet the following criteria, or meet alternative criteria acceptable to the BAPC:
   a. Grade A/C plywood ¾" thick, a minimum of 4 feet by 4 feet in dimension;
   b. Two 4"x 4" posts with the base of the sign 2 feet above ground level;
   c. The plywood sign must be attached to the posts with a minimum of two (2) carriage bolts on each post; and
   d. The front of the sign must be painted with black lettering on a white background.
   e. The sign shall clearly identify the name of the project, the name of the person (permittee, operator, or contractor) responsible for dust control, and provide the telephone number of the person responsible for dust control (valid during daylight hours, seven days a week), the project's street address, and the air quality operating permit number. The sing must remain posted for the life of the permit.
3. The sign shall be labeled in block letters or numerals at least 4" high, in lines spaced 3" apart, in accordance with the following layout:

Project Name - acreage
Name of person responsible for dust control
In case of dust complaints, please call: (Your Number)
Project street address
BAPC Permit AP1629-2517

**********End of Surface Area Disturbance Conditions**********

Issued to: PATUA PROJECT LLC

Section IV. Amendments

N/A

This permit:

1. **Is non-transferable. (NAC 445B.287.3)**
2. **Will be posted conspicuously at or near the stationary source. (NAC 445B.318.5)**
3. **Will expire and be subject to renewal five (5) years from:** January 6, 2009 . **(NAC 445B.315)**
4. **A completed application for renewal of an operating permit must be submitted to the director on the form provided by him with the appropriate fee at least 70 calendar days before the expiration date of this operation permit. (NAC 445B.3473.2)**
5. **Any party aggrieved by the Department's decision to issue this permit may appeal to the State Environmental Commission (SEC) within ten days after the date of notice of the Department's action. (NRS 445B.340)**

THIS PERMIT EXPIRES ON: January 6, 2014

Signature Francisco Vega

Issued by: Francisco Vega
Supervisor, Permitting Branch
Bureau of Air Pollution Control

Phone: (775) 687-9343 **Date:** January 6, 2009

rbd
1/09

3. Storm Water Pollution Prevention Plan (SWPPP)

COMPLETED 12/09 MG

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

STATE OF NEVADA
Department of Conservation & Natural Resources
DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor
Allen Biaggi, Director
Leo M. Drozdoff, P.E., Administrator

12/19/2008
MR. KEN BONIN
PATUA PROJECT LLC
345 SW CYBER DR. SUITE 103
BEND, OR 97702-1045

Dear: MR. KEN BONIN

Re: Stormwater General Permit: NVR100000
Project ID Number: CSW-10104
Project Name: Patua South Project

Your submittal to be included under the Stormwater General Permit has been approved effective 12/19/2008.

Please note that by submitting an NOI the permittee has certified that the project's Storm Water Pollution Prevention Plan (SWPPP) has been completed, that the SWPPP will be updated as necessary, and that it will be maintained at the permitted site.

At the time of any on-site inspections, our inspectors will ask to review your copy of the SWPPP in an effort to ensure proper compliance with the program.

Should you have any questions, I can be reached at (775) 687-9429.

Sincerely,

Steve McGoff, P.E
Staff Engineer III
Nevada Division of Environmental Protection

CC: Mr.Ken Bonin Patua Project LLC 270 S. Maine St. #9 Fallon NV 89406-3340

901 S. Stewart Street, Suite 4001 • Carson City, Nevada 89701 • p: 775.687.4670 • f: 775.687.5856 • www.ndep.nv.gov

COMPLETED

VULCAN POWER COMPANY

345 SW Cyber Dr. #103 Bend, OR 97702 (541) 317-1984

December 11, 2008

Stormwater Coordinator 3173
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
901 S. Stewart Street, Suite 4001
Carson City, NV 89701-5249

RECEIVED
DEC 1 1 2008
ENVIRONMENTAL PROTECTION

To whom it may concern,

Please find attached Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities.

Please find attached corporate check #: 7060, in the amount of Two Hundred Dollars and no cents ($200.00), for the processing of this plan.

If you have any questions or need additional information, please contact me at (775) 423-2159 or (775) 217-1663. You can also email me at (kbonin@vulcanpower.com).

Kenneth Bonin, Sr.
Permitting & Regulator Authorities Manager

Cc: Bureau of Reclamation

Vulcan Power Company

7060

12/03/08 Check #: **7060**

Vendor ID: BURWAT Vendor Name: **Bureau of Water Pollution Control**

Invoice No.	Date	Invoice Amount	Amount Paid	Discounts Taken	Credits Taken	Net Amount
11/27/08-PERMIT	11/27/08	200.00	200.00	0.00	0.00	200.00
					Net Check Amt	200.00

WPC 28127

WPC 28127

7060

VULCAN POWER COMPANY
PETTY CASH ACCOUNT
345 SW CYBER DRIVE #103
BEND, OR 97702
(541) 317-1984

WELLS FARGO BANK, N.A.
www.wellsfargo.com

24-680/1230

DATE
12/03/08

AMOUNT
$ *******200.00

********** Two Hundred & 00/100 Dollars

PAY
THE
ER
OF:

Bureau of Water Pollution Control

Nevada Division of Environmental Protect
901 South Stewart Street, Suite 4001
Carson City, NV 89701-5249

AUTHORIZED SIGNATURE

⑈007060⑈ ⑆123006800⑆ 778 254 1069⑈

THIS DOCUMENT MUST HAVE A COLORED BACKGROUND, ULTRAVIOLET FIBERS AND AN ARTIFICIAL WATERMARK ON THE BACK - VERIFY FOR AUTHENTICITY.

Vulcan Power Company

7060

12/03/08 Check #: **7060**

Vendor ID: BURWAT Vendor Name: **Bureau of Water Pollution Control**

Invoice No.	Date	Invoice Amount	Amount Paid	Discounts Taken	Credits Taken	Net Amount
11/27/08-PERMIT	11/27/08	200.00	200.00	0.00	0.00	200.00
					Net Check Amt	200.00

LMP98 M/P CHECK

Department of Conservation and Natural Resources
Division of Environmental Protection
Receipt for Payment

Check #: 7059
Check Date: 12/03/2008
Date Received: 12/11/2008
Receipt #: 28126

Vulcan Power Company
345 SW CYBER DR #103
Bend OR 97702

Bureau	FY	Amount	Permit #	Invoice #	Fee type/Fee desc
Bureau of Air Pollution Control	0	500.00			Pending
		500.00			

COMPLETED

VULCAN POWER COMPANY

345 SW Cyber Dr. #103 Bend, OR 97702 (541) 317-1984

December 11, 2008

Nevada Division of Environmental Protection
Bureau of Air Pollution Control
901 S. Stewart Street, Suite 4001
Carson City, NV 89701-5249

RECEIVED
DEC 1 1 2008
ENVIRONMENTAL PROTECTION

. o whom it may concern,

Please find attached an Application for Class II Air Quality Operating Permit for Stand-Alone Surface Area Disturbance.

Please find attached corporate check #: 7059, in the amount of Five Hundred Dollars and no cents ($500.00), for the processing of this application.

If you have any questions or need additional information, please contact me at (775) 423-2159 or (775) 217-1663. You can also email me at (kbonin@vulcanpower.com).

Kenneth Bonin, Sr.
Permitting & Regulator Authorities Manager

Vulcan Power Company

7059

12/03/08 Check #: **7059**

Vendor ID: BURAIR Vendor Name: **Bureau of Air Pollution Control**

Invoice No.	Date	Invoice Amount	Amount Paid	Discounts Taken	Credits Taken	Net Amount
11/27/08-PERMIT	11/27/08	500.00	500.00	0.00	0.00	500.00
					Net Check Amt	500.00

APC 28126

APC 28126

VULCAN POWER COMPANY
PETTY CASH ACCOUNT
345 SW CYBER DRIVE #103
BEND, OR 97702
(541) 317-1984

WELLS FARGO BANK, N.A.
www.wellsfargo.com

24-660/1230

7059

DATE
12/03/08

AMOUNT
$ *******500.00

********** Five Hundred & 00/100 Dollars

PAY THE ORDER OF:

Bureau of Air Pollution Control
Nev Division of Environmental Protection
901 South Stewart Street Suite 4001
Carson City, NV 89701

AUTHORIZED SIGNATURE

⑈007059⑈ ⑆123006800⑆ 7782541069⑈

. HIS DOCUMENT MUST HAVE A COLORED BACKGROUND, ULTRAVIOLET FIBERS AND AN ARTIFICIAL WATERMARK ON THE BACK - VERIFY FOR AUTHENTICITY.

Vulcan Power Company

7059

12/03/08 Check #: **7059**

Vendor ID: BURAIR Vendor Name: **Bureau of Air Pollution Control**

Invoice No.	Date	Invoice Amount	Amount Paid	Discounts Taken	Credits Taken	Net Amount
11/27/08-PERMIT	11/27/08	500.00	500.00	0.00	0.00	500.00
					Net Check Amt	500.00

LMP98 M/P CHECK

Department of Conservation and Natural Resources
Division of Environmental Protection
Receipt for Payment

Check #: 7060
Check Date: 12/03/2008
Date Received: 12/11/2008
Receipt #: 28127

Vulcan Power Company
345 SW CYBER DR #103
Bend OR 97702

Bureau	FY	Amount	Permit #	Invoice #	Fee type/fee desc
Bureau of Water Pollution Control	0	200.00			Pending
		200.00			

COMPLETED 4/13/09

STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR CONSTRUCTION ACTIVITIES

Project Name:	Patua South Project

Project Location:	Hazen, NV		
Street Address:	Highway 50 & California Road		
City:	Hazen, NV	County:	Churchill & Lyon
APN (at least one):	009-251-01		

Permittee* Information:			
Company or Agency :	Patua Project LLC, a subsidiary of Vulcan Power Company		
Address:	345 SW Cyber Drive, Suite 103		
City, State, Zip:	Bend, OR 97702		
Contact Person:	Ken Bonin	Phone :	(775) 423-2159

Person Responsible for Implementing SWPPP:			
Name:	Ken Bonin	Phone :	(775) 423-2159
Address:	270 S. Maine St. # 9		
City, State, Zip:	Fallon, NV 89406		

Notice of Intent Filing Date:	December 4, 2008

* The Permittee is defined as the owner and/or operator of the construction site. This is the person that has operational control of the construction plans and specifications, or has day-to-day operational control of the activities necessary to ensure compliance with the SWPPP.

NOTES:

1. **A WORKING COPY OF THIS SWPPP MUST BE KEPT AT THE CONSTRUCTION SITE OR BE LOCALLY AVAILABLE FOR REVIEW BY NDEP AND LOCAL REGULATORY AGENCIES**
2. **THIS MODEL SWPPP TEMPLATE WAS DEVELOPED FOR COMPLIANCE WITH STORM WATER GENERAL PERMIT NVR100000, DATED SEPTEMBER 16, 2007. ALL SECTION NUMBERS REFERENCED IN THIS DOCUMENT REFER TO THE 2007 PERMIT. A COPY OF PERMIT NVR100000 MUST BE ATTACHED TO THIS DOCUMENT**
3. **GUIDANCE FOR SELECTING AND IMPLEMENTING BMPs IS AVAILABLE IN THE TRUCKEE MEADOWS CONSTRUCTION SITE BMP HANDBOOK.**
4. **ATTACH ADDITIONAL PAGES WHEN NECESSARY TO PROVIDE THE REQUIRED INFORMATION**

Storm Water Pollution Prevention Plans (SWPPPs) must remain on the project site and be updated as necessary during the duration of the project.

Owner

Patua Project LLC
Mr. Ken Bonin
345 SW Cyber Dr.
Suite 103
Bend, OR 97702-1045

Operator

Patua Project LLC
Mr. Ken Bonin
270 S. Maine St. #9
Fallon, NV 89406-3340

Renewal: No

Re: Stormwater General Permit NVR100000
Confirmation Number: CSW- 10104
Project Name: Patua South Project

Your submittal to be included under the Stormwater General Permit has been received. Please mail the filing fee of $200.00 along with this notice to:

Stormwater Coordinator 3173
Bureau of Water Pollution Control
Nevada Division of Environmental Protection
901 South Stewart Street, Suite 4001
Carson City, NV 89701-5249

After receipt of the filing fee, an approval letter will be mailed to you.
*** If this is a Renewal Application, NO filing fee is required.**

At the time of any on-site inspections, our inspectors will ask to review your copy of the SWPPP in an effort to ensure proper compliance with the program.

Should you have any questions, please call Bonnie Hartley at (775) 687-9430.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. I also confirm that a storm water pollution prevention plan (SWPPP) has been completed, will be maintained at the project site from the start of construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines for knowing violations.

Confirmation Number: CSW- 10104 **Date: 11/24/2008**

Owner or Operator Name (Please Print): Kenneth Bonin, Sr.
Signature:

An unsigned or undated Notice of Intent - Section 6 Certification will not be granted permit coverage.

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I. Project Description

A. Description of the Proposed Construction Activity [§ III.A.1.f]	
Vulcan Power Company (Vulcan) holds geothermal leases on approximately 29.5 square miles of public and private land in Churchill County and Lyon County near Hazen, NV. Vulcan has constructed six drilling pads in Sections 13, 17, 19, and 23 of Township 20 North Range 26 East (T20N R26E). Vulcan upgraded two miles of existing roads to the drilling pads and submitted an Environmental Assessment (EA) to the Bureau of Reclamation (BOR) for the construction of a bypass road over a steep portion of the route for a total length of 1550 feet. Each well pad consists of a 1.72 acre (300 feet x 250 feet) graded and graveled pad area. Vulcan intends to construct 24 additional drilling pads and access roads in Sections 33, 34, 35, and 36 of T21N R26E, Sections 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 24, 27, 28, 29, and 30 of T20N R26E, and Section 6 of T20N R27E. In the future, Vulcan proposes to build up to four power plants at its Hazen-Patua leases in Sections 1, 14, 17, and 21 of T20N R26E. Vulcan has not determined the extent of the area to be disturbed for the power plants and pipelines and will revise the stormwater pollution prevention plan (SWPPP) when these plans are available.	
Total Area of Site (acres)	18,853.79 acres
Total Area to be disturbed by excavation, grading, or other construction activities including on and off-site borrow and fill areas (acres) [§ III.A.1.h]	Existing pads = 16.86 ac Proposed pads and access roads = 67.44 ac (pads)+ 9.18 ac (roads) Total 93.48 acres

B. Intended Sequence of Major Soil Disturbing Activities [§ III.A.1.g] (include dates when these activities occur.)	
1.	Grading and placement of gravel on access roads to drilling locations. (Fall 2008-Fall 2010)
2.	Grading and construction of drilling location. (Fall 2008-Fall 2010)
3.	Reserve pit excavation. (Fall 2008-Fall 2010)
4.	Finish grading of pad area with gravel. (Fall 2008-Fall 2010)
5.	Grading of access roads for power plants. (Dates tentative for 2010)
6.	Grading of areas for power plants. (Dates tentative for 2010)
7.	Placement/construction of concrete foundations for power plants. (Dates tentative for 2010)

C. Existing Soil and Water Quality Data [§ III.A.1.i]

Provide a description of the existing soil and/or water quality data of any discharges from the site, if available. Water quality data for adjacent waterways that may receive discharges from the site is also recommended.

The Hazen-Patua lease area contains a variety of soils types. Soils of the Bango-Stumble association dominate the eastern half of the Hazen area. Bango soils are on smooth lake terraces and have a sandy loam surface layer, underlain by cobbley or gravelly sandy loam and by strongly alkaline sandy and silty loam. Stumble soils form on alluvial fans that have encroached on Bango soils. Parran soils dominate the western side of the Hazen area, lying between the marshy wet areas in the north and "badlands" soils to the south. Parran soils are very deep, nearly level, and somewhat poorly drained soils that formed in clayey alluvium. Badlands soils are severely eroded, highly alkaline, and generally barren of vegetation. The Fernley State Wildlife Management Area (WMA) is west of the Hazen-Patua leases and contains low, marshy lands and wetlands. The irrigation drain water from farmland surrounding Fernley feeds the wetlands of the Fernley WMA. The areas for the proposed activities have no perennial streams. The construction of the drilling pads and access roads and the proposed drilling will not result in any discharges to the Fernley WMA or natural drainages, and short-term discharges of geothermal fluids during testing will be contained in sumps and disposed of in accordance with Nevada Division of Environmental Protection (NDEP) requirements.

D. Runoff Coefficients [§ III.A.1.i].					
Use the following worksheet for sites with only 1 or 2 land uses, such as an undeveloped site with a proposed parking lot. For sites with 3 or more land uses (pre and/or post-project) attach a separate worksheet.					
1. Describe Pre-Project Conditions and Land Use(s)					
Pre-project land uses include existing dirt and gravel roads, as well as gravel access roads and gravel top drilling locations constructed by Vulcan under previous environmental assessment.					
2. Pre-Project Land Use 1	Coefficient		Acres (A1)		C1
Undeveloped land (≤2% slope)	0.1	x	2,941.48	=	294.04
3. Pre-Project Land Use 2	Coefficient		Acres (A2)		C2
Undeveloped land (2≤7% slope)	0.15	x	1,232.60	=	184.08
4. Pre-Project Land Use 3					
Undeveloped land (>7% slope)	0.2	x	14,595.79	=	2916.35
5. Pre-Project Land Use 3	Coefficient		Acres (A3)		C3
6 Gravel Drilling Locations (existing)	0.05	x	16.86	=	0.84
6. Pre-Project Land Use 4	Coefficient		Acres (A4)		C4
Gravel Roads (existing)	0.15	x	73.60	=	11.04
7. Average Pre-Project Runoff Coefficient			(C1+C2+C3+C4)/(A1+A2+A3+A4) =		0.1802
8. Post-Project Land Use 1	Coefficient		Acres (A5)		C5
Undeveloped land (<2% slope)	0.1	x	2,932.34	=	292.58
9. Post-Project Land Use 2	Coefficient		Acres (A6)		C6
Undeveloped land (<7% slope)	0.15	x	1,217.20	=	180.78
10. Post-Project Land Use 3					C7
Undeveloped land (>7% slope)	0.2	x	14569.87	=	2911.14
9. Post-Project Land Use 4	Coefficient		Acres (A7)		C8
24 Gravel Drilling Locations (proposed)	0.05	x	84.30	=	4.22
10. Post-Project Land Use 5	Coefficient		Acres (A8)		C9
Gravel Roads (proposed)	0.15	x	82.78	=	12.42
11. Average Post-Project Runoff Coefficient			(C5+C6+C7+C8+C9)/(A5+A6+A7+A8+A9) =		0.1795

II. Site Layout Maps

Attach the Following:

A. General Location Map showing nearby roads and highways [§ III.A.1.j.]

B. Detailed Site Map [§ III.A.1.j.i. - xiii.] ***updated and revised as site conditions change, new BMPs are implemented, and areas are stabilized.***

The Detailed Site Map must be drawn to scale and indicate the following:

1. Existing and proposed topography, including drainage patterns and approximate slopes.
2. Areas where soils will be disturbed and areas that will not be disturbed.
3. Locations of onsite and offsite soil borrow and stockpile areas.
4. Locations of major structural and non-structural BMPs identified in this SWPPP.
5. Locations where stabilization practices will be applied.
6. Locations where vehicles and equipment will be stored and maintained.
7. Locations of onsite and offsite material and waste storage areas.
8. Locations of concrete washout areas.
9. Locations and aerial extent of all surface waters (including ephemeral water bodies, dry washes and wetlands) that may receive discharges from the disturbed areas of the project.
10. Locations where storm water discharges will enter surface waters, the municipal storm drain system and/or ephemeral waters or dry washes at or near the site.
11. Location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt or concrete plants;
12. Areas where final stabilization has been accomplished;
13. A legend describing all symbols, BMP numbers and abbreviations used on the map.
14. A north arrow and a map scale.

C. Industrial Discharges [§III.A.1.j.xi]

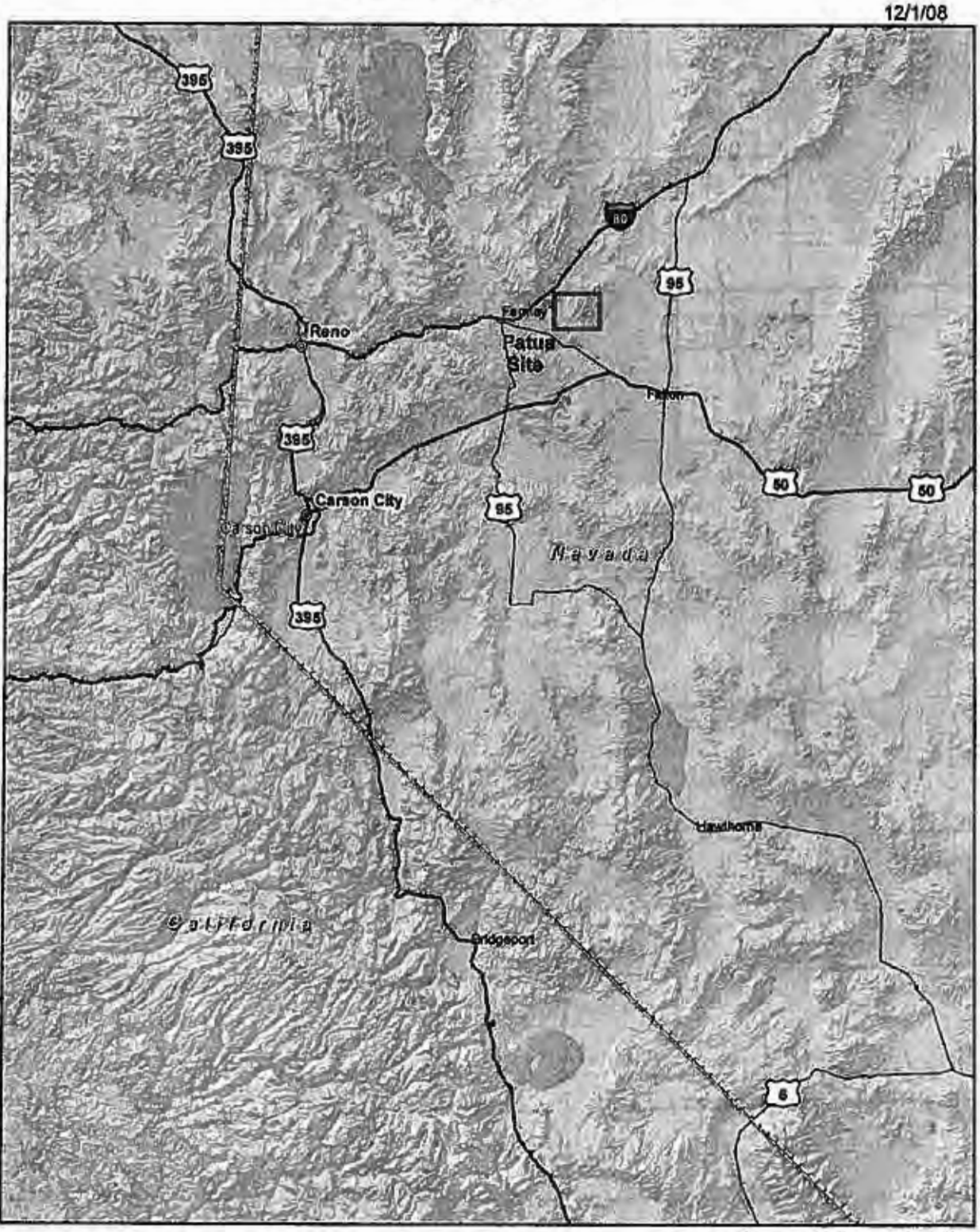
Provide the location and description of any discharge(s) associated with industrial activity other than construction, including any storm water discharges from dedicated asphalt or concrete plants covered under General Permit NVR100000.

The Vulcan lease area does not have any discharges related to industrial, asphalt, or concrete plant activities.

Vulcan Power Company

Location Map for Patua

12/1/08



0 12.5 25 Miles

Vulcan Properties

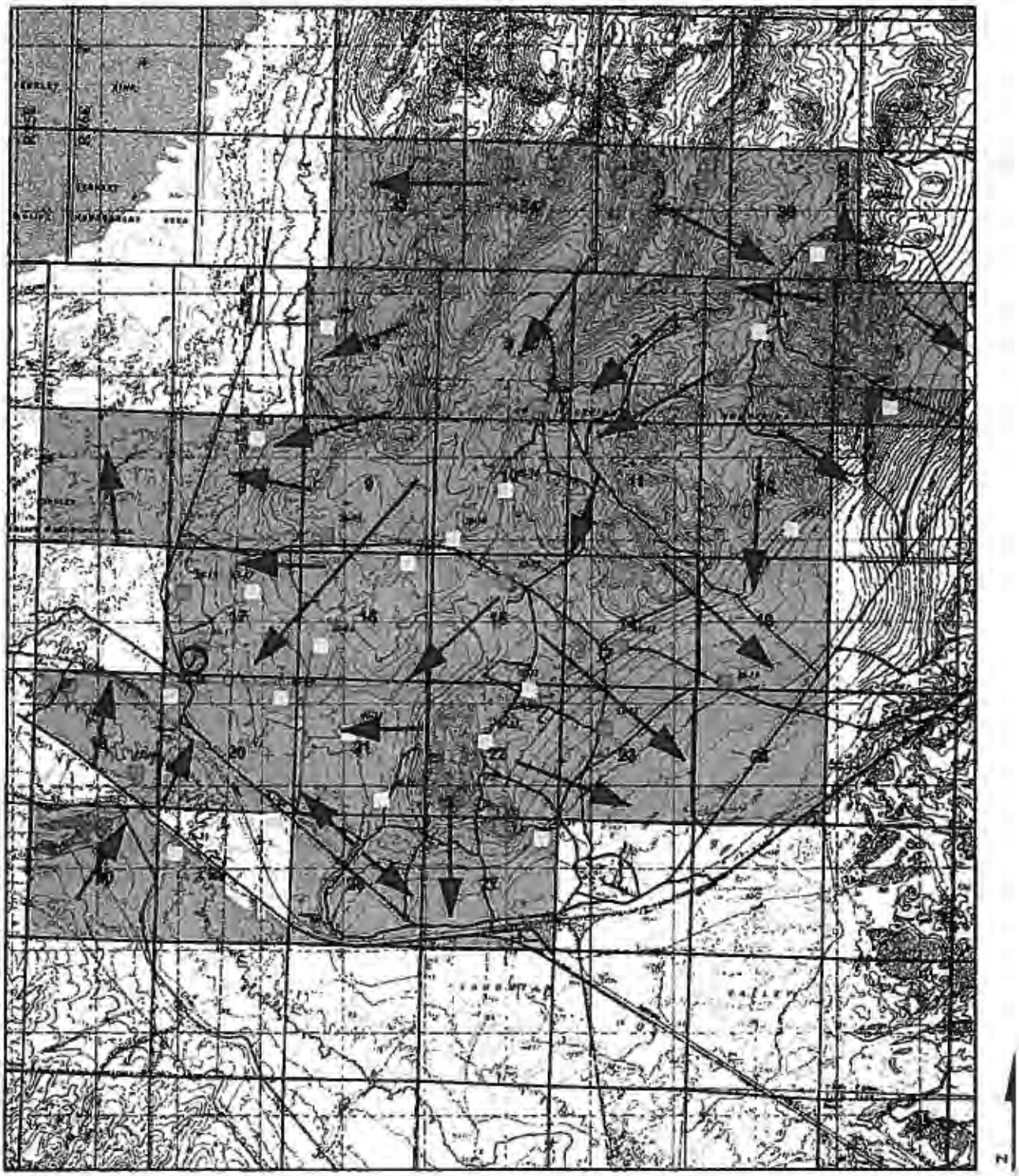
VULCAN POWER COMPANY

Boundaries from USGS 1:,33, Approximate

Vulcan Power Company

Patua Existing & Proposed Well Pads with Roads

11/13/08

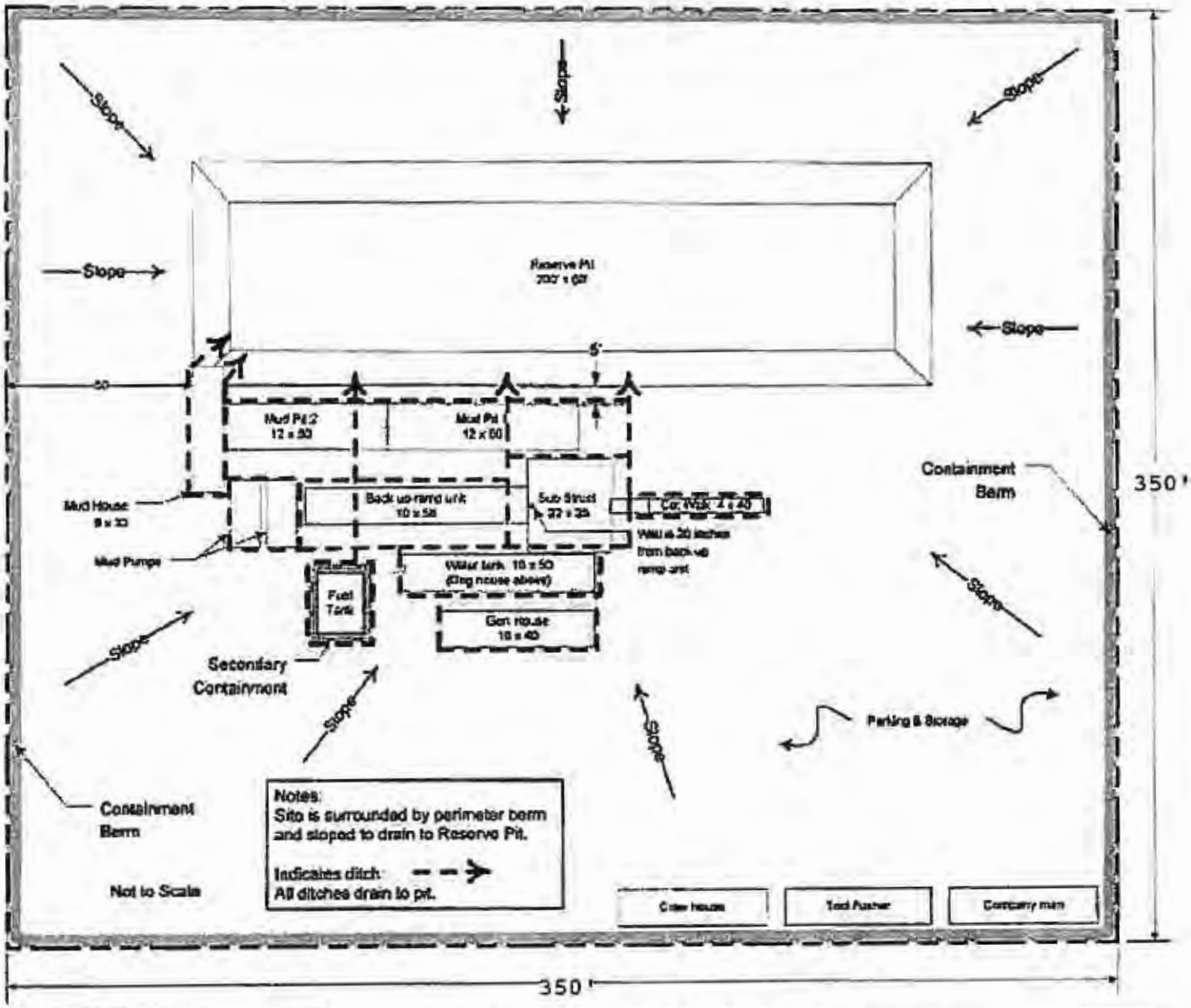


Vulcan Private & BLM Issued Leases
Direction of Overland Flow
Storage Area
Proposed Access Roads to Drilling Sites
Existing Roads

Vulcan Existing & Proposed Well Pad Locations
Proposed Pads
Staked Pads
Constructed Pads

0 1 Miles

VULCAN POWER COMPANY



NOTE: Final well pad layout will be provided by drilling contractor.

Vulcan Power Company			
1	Layout – Drill Pad	07/12/08	VWJ/USR/JC

III. Receiving Waters

A. Receiving Water(s) Identification [§III.A.1.j.xii]:
Identify the name and location of the streams, rivers, ditches, drainages, lakes, wetlands (both perennial and intermittent), or other special aquatic sites that will be disturbed or will receive runoff from the construction site. If the site will drain to the municipal storm drain system, identify the receiving water to which the system discharges.
No permanent surface waters are located in the vicinity of the proposed well pads and access roads, and the Fernley WMA and a perennial stream in Section 7, approximately 1,000 to 3,000 feet west of the proposed activities, are the surface waters nearest to the proposed activity. Berms along the perimeter of the well pads will contain runoff within the pads, and runoff will drain into the reserve pits, where the collected runoff will either evaporate or be pumped and used for dust control. Runoff from the access roads will flow to the side of the road and percolate into the soil. Proposed access roads in Sections 5, 8, 10, 13, and 21 may traverse unnamed intermittent streams, and Vulcan will avoid crossing these drainages, where possible. Where crossing are unavoidable, Vulcan will use culverts and rip-rap and other site-specific erosion controls, as necessary.
B. 303(d) Impaired Water Body Listing [§III.A.10.b]:
Check the current 303(d) listing of Impaired Water Bodies, issued by the Nevada Division of Environmental Protection (http://ndep.nv.gov/bwqp/standard.htm). If any of the receiving waters noted above appear on the 303(d) list, describe: a) the condition for which the water body has been listed, b) whether discharges from the site will contribute significantly to any 303(d) listing, and c) the BMPs that will be implemented to ensure that discharges from the site will not cause or contribute to an exceedance of State water quality standards.
N/A
C. Total Maximum Daily Load (TMDL) requirements [§III.A.10.b]:
Does the construction site discharge runoff into a water body with an established TMDL? ☐ **YES** X **NO**
Describe the BMPs that will be applied to comply with all applicable TMDL requirements
N/A

IV. BMP Implementation

A. Storm Water Best Management Practices (BMPs)	
Describe each storm water control measure and the general sequence of implementation during the construction process. Clearly identify the BMPs that will be used for each of the major soil-disturbing activities identified in Section I.B, above [§ III.A.2]. **Describe the design, installation and maintenance of each BMP, and indicate the parties that will be responsible for carrying out these functions for each control measure. Control measures must be properly selected, installed, and maintained in accordance with the manufactures specifications and good engineering practices.** **Offsite material storage areas used solely by the permitted project must also be addressed [§ III.A.3].**	
1.	Berms will be constructed around the perimeter of the 1.72-acre well pad locations.
2.	A 200-foot x 60-foot x 15-foot reserve pit will be constructed on the down-gradient side of the pad area, which will receive any fluids from the well pad.
3.	A system of berms and trenches will be created such that any fluids on the pad surface will be directed into the reserve pit.
4.	During construction, water will be used to insure compliance with atmospheric dust control regulations and optimization of compaction of the on-site materials.
5.	Similar methods will be used in the construction of power plants and additional measures will be employed as necessary.
6.	A 500-gallon diesel fuel tank will be located within a secondary containment area capable of holding any potential spilled diesel fuel.
7.	
8.	
B. Temporary Soil Stabilization Practices [§ III.A.5]	
Describe the interim or temporary stabilization BMPs (e.g. soil binders, revegetation and/or mulching) that will be provided on stockpiles and disturbed portions of the site where construction activity is expected to cease for 14 days or more and will not be resumed within 21 days.	
Construction of each drill pad will require less than five days of activity. Vulcan does not anticipate any delay or interruption of the construction process that would result in an interruption of construction activity for 14 days or more at any one location.	

C. Permanent Soil Stabilization Practices [§III.A.5]
Describe the permanent stabilization BMPs (e.g. permanent revegetation and/or rolled erosion control products) that will be provided on disturbed portions of the site where construction activities have permanently ceased.
Once construction of the pads and access roads is completed, cut and fill areas and any portions of the site where activities have permanently ceased will be stabilized and reclaimed using revegetation and landscape restoration, in accordance with the revegetation plan. Vulcan will initiate these procedures as soon as practicable, within 14 days after construction activity has ceased.
D. Structural Practices [§ III.A.6]
Provide a description of the temporary and permanent erosion and sediment control BMPs (e.g. silt fences, fiber rolls, earth dikes, drainage swales, check dams, sediment traps, storm drain inlet protection, etc.) that will be used during construction to divert flows from exposed soils, and/or temporarily store flows and limit runoff from the exposed areas of the site. **For common drainage locations serving areas with ten (10) or more acres of disturbed soils, sediment basins shall be provided until final stabilization of the site. Sediment basins must be designed to the criteria outlined in the Truckee Meadows Construction Site BMP Handbook. From May to October, water must not be allowed to pond in any structural practice in excess of 7 days.** **Velocity dissipation devices (e.g. rock outlet protection, channel lining, etc.) must be placed at stormdrain pipe outfall locations and along the length of channels to reduce flow velocities and prevent erosion and degradation of receiving waters.**
The temporary erosion control measures on the drilling pads and access roads (berms, reserve pits, and sediment traps) have been previously described.
E. Post-Construction Storm Water Management Controls [§ III.A.7]
Provide a description of the permanent measures that will be installed during construction to control pollutants in storm water discharges that will occur after construction is complete. These permanent storm water management BMPs include structural treatment controls and Low Impact Development (LID) practices such as vegetated swales, landscape detention, sedimentation basins, and sand filters (refer to the Truckee Meadows Structural Controls Design Manual and LID Handbook). Permittees are responsible for the installation and maintenance of these storm water BMPs until an approved Notice of Termination is received by NDEP. The installation of these devices may also require a separate NPDES permit.
The temporary erosion control measures on the drilling pads and access roads (berms, trenches, reserve pits, and sediment traps) will be permanent features that will remain in effect when construction is complete.

F. Non-Storm Water Discharge Management [§ III.A.8.]
Provide a description of the activities that may produce non-storm water discharges, the measures used to reduce or eliminate non-storm water discharges, and the BMPs used to minimize pollutants in any non-storm water discharges that may occur. Non-storm water discharges include, but are not limited to water line flushings, vehicle or building wash-down, and dewatering from excavation (see §I.D.2 for a full list).
Well testing produces discharges within the drilling location, and the reserve pit holds the fluids during the drilling phase until disposed of in accordance with practices approved by BOR and the NDEP. Future revisions to the SWPPP will consider any non-stormwater discharges associated with power plant operations. Additional management practices will be needed for power plant and pipeline construction. Once the power plants are operational, excess geothermal fluids will be injected back into the ground.

V. Other Controls

A. Material Storage, Spill Prevention and Response [§ III.A.9.a]
Provide a description of the construction materials and chemicals that are expected to be stored onsite, with updates as appropriate. Describe the BMPs that will be provided to ensure proper storage of these construction materials that will minimize their exposure to storm water. Describe the response measures that will be provided if a spill occurs.
Petroleum products and other common hazardous materials will be stored at the offsite staging/storage area in Section 17 during construction of the well pads and access roads. These materials include one 500-gallon diesel fuel container and one service truck for lubrication of moving parts on grading equipment. The 500-gallon fuel tank will have secondary containment capable of holding any potential spilled diesel fuel. All hazardous/petroleum based materials (highly viscous axle grease and motor oil) associated with the service vehicle will be stored in impermeable, sealed, and secured containers in the vehicle at all times. During drilling, all hazardous materials will be stored in appropriately labeled impermeable containers. These materials include diesel fuel, gasoline, motor oil, and lubricants for the rotating equipment. The diesel fuel tank will be will be located within a secondary containment area with a heavy-duty polypropylene lined catch basin. In the event of a spill, the area where the spill occurred will be isolated and any contaminated material treated appropriately or removed and disposed of. All personnel on location are trained to respond to spills of any materials listed on the Material Safety Data Sheets (MSDS) kept at the storage area. After drilling, no hazardous materials will be stored on site.

B. Offsite Vehicle Tracking Controls [§ III.A.9.b]
Provide a description of the control measures that will be provided to prevent tracking or deposition of sediments offsite and the measures that will be used to remove any sediments that have been deposited on the paved roadways bordering the site.
To prevent tracking of sediment from the site, personnel at the drilling locations will park their vehicles in designated parking areas. Vehicles entering the project area will be inspected, and sediments will be removed prior to their departure.
C. Dust Control [§ III.A.9.b]
Describe the control measures that will be used to prevent the generation of dust on-site.
Dust control measures will consist of placement of 3,850 to 7,700 gallons of water per day maximum on the access roads and the drilling location to prevent generation of atmospheric dust.
D. Construction Waste Storage and Disposal [§ III.A.9.d]
Describe the wastes that will be generated onsite. Construction wastes include concrete washout, excess building materials, chemicals, litter and debris. Describe the BMPs that will be used to temporarily store these wastes, how they will be collected and disposed, and the response measures that will be provided if a spill occurs.
Excess building materials litter and debris will be placed in trash receptacles and containers. A licensed hauling contractor or the agency from which the container was rented will then transport these materials in the containers to the dump. Any chemicals will be stored, handled, and disposed of in a manner consistent with the rules, procedures, and regulations outlined on the Material Safety Data Sheets (MSDS). Spills will be handled in a manner consistent with the MSDS and environmental protection procedures.

E. Hazardous and Sanitary Waste Storage and Disposal
Provide a description of the hazardous and/or sanitary wastes that are expected to be generated at the site, the measures used to temporarily store these wastes, how they will be collected and disposed and the response measures that will be provided if a spill occurs.
Hazardous wastes will not be stored on site during the construction phase. Any empty containers (such as oil cans) will be transported off site daily. Sanitary waste will be contained in chemical toilet facilities during construction. The licensed disposal agent hired to service the facilities will handle these wastes. During the utilization phase, hazardous/sanitary wastes will include diesel fuel, gasoline, motor oil, and lubricants. The handling of these waste materials will be consistent with rules and regulations outlined on the MSDS for each material and in accordance with environmental and Occupational Safety and Health Administration (OSHA) safety regulations.
F. Offsite Discharges [§ III.A.9.e]
Provide a description of the potential offsite pollutant sources and the BMPs that will be provided to minimize storm water pollution from these sites. Offsite sources may include dedicated sites such as asphalt or concrete plants.
N/A
G. Soil Stabilization at Culverts [§ III.A.9.c]
Provide a description of the measures used to sufficiently stabilize soil at culvert locations to prevent the formation of rills and gullies during construction.
Fluid discharge during construction will not be sufficient to form rills or gullies in the case of the drilling locations or the power plant sites because the areas are relatively level with slopes of less than 5%. Culvert locations will be stabilized using rip rap.

VI. Inspection/Maintenance Procedures

The contractor or his qualified agent is required to routinely inspect all areas of disturbed and bare soil, areas used for storage of materials and equipment that are exposed to precipitation, onsite vehicle entrance and exit locations and all onsite erosion and sediment control BMPs. Inspectors must also observe discharge locations to receiving waters to ensure proper operation of sediment and erosion control measures. **Inspections shall occur weekly, prior to forecasted rain events, and within 24 hours after any actual rain event of 0.5 inches or greater.** Sediments must be removed when the BMP design capacity has been reduced to 50%. Construction materials, chemicals, wastes, litter and debris must be prevented from becoming a storm water pollutant source. When sediment escapes the construction site, off-site accumulations of sediment must be removed to ensure no adverse effects on water quality and public safety [§ III.A.4]

The following sources may be used to obtain weather forecasts:

- The National Weather Service: Telephone: (775) 673-8100, http://www.wrh.noaa.gov/Reno/
- The Western Regional Climate Center, http://www.wrcc.dri.edu/CURRENTOBS.html
- The Weather Channel, http://www.weather.com/weather/local/USNV0076?from=search_city

Once storms are imminent, a portable NOAA weather radio can also provide useful information. NOAA weather radio broadcasts are made on one of seven high-band FM frequencies. These frequencies are typically available only on radios that provide a "weather band" as an added feature or portable weather radios that exclusively provide weather broadcasts. The local FM frequency for the Reno/Sparks area is 162.500 MHz. Taped weather messages are repeated every four to six minutes and are routinely revised at least once every one to three hours, 24 hours daily.

A. Inspection and Maintenance of Best Management Practices [§III.A.11-12]
Provide a description of the practices that will be used to inspect and maintain all Temporary and Permanent Stabilization Practices Structural Practices, Post-Construction Storm Water Management Controls and Non-Storm Water Discharges described in Section IV, above. Maintenance shall be performed if any BMP is not operating effectively or if the capacity has been reduced by 50%. Maintenance must be conducted as soon as practicable and before the next anticipated storm event.
In the event where any BMP described in section IV above is operating ineffectively or demonstrates a 50% reduction in operation capacity, necessary repairs and improvements to temporary detention or sediment basin/trapping mechanisms will be performed. These repairs, improvements and maintenance procedures include placement of new material in fallouts and channels to impede fluid velocities and control erosion as well as removal of deposited materials from on-site landscape detention measures.

B. Inspection and Maintenance of Other Controls [§III.A.11-12]
Provide a description of the practices that will be used to inspect and maintain all Other Controls described above in Section V,
With regard chemicals and hazardous/sanitary waste, all storage containers will be visually inspected on a daily basis to insure isolation of all such waste materials on location.
C. Inspector Qualifications [§III.A.12c]
Describe the qualifications of the person(s) selected to inspect the BMPs discussed above. "Qualified Personnel" means someone knowledgeable in the principles and practice of erosion and sediment control who possess the skills necessary to assess the site conditions and the effectiveness of BMPs.
Qualified on site personnel are trained in and have the following. 1) Experience in foundation and construction 2) Experience in oil and gas and geothermal drilling 3) Experience in project management 4) Experience in health, safety, and environmental management practices.

VII. Certifications of Compliance

This SWPPP must be certified that it is consistent with all applicable Federal, State and Local regulations, or other approved site plans or permits. It is to be prepared in accordance with the latest version of the Truckee Meadows Construction Site Best Management Practices Handbook. This SWPPP must be updated as necessary to remain consistent with changes in other site plans that effect soil disturbing activities, site drainage patterns or any other activity that may impact storm water runoff quality. It must also be re-certified annually by July 1 until the construction project is complete and a Notice of Termination has been submitted to NDEP.

A. OWNER/OPERATOR CERTIFICATION STATEMENT (SWPPP)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I also confirm that a storm water pollution prevention plan (SWPPP) has been completed, will be maintained at the project site from the start of construction activities, and that the SWPPP will be compliant with any applicable local sediment and erosion control plans. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines for knowing violations.

Initial Certification:	
Print Name: Ken Bonin	Title: Environmental Manager
Signature:	Date: 12/4/2008
Annual Re-Certification	
Print Name:	Title:
Signature:	Date:

All contractors and subcontractors responsible for implementing pollution control measures must be identified in this SWPPP with the measures for which they are responsible. They must also sign the following certification statement that indicates they understand the requirements of the attached General Permit for Construction Activities (Attach additional sheet if necessary for additional contractors).

B. CONTRACTOR'S CERTIFICATION STATEMENT

I certify under penalty of law that I understand the terms and conditions of the State's General Permit (NVR100000) that authorizes storm water discharges associated with industrial activity from the construction site identified as part of this certification.

Company 1		
Name: Patua Project LLC		Phone: (775) 423-2159
Address: 345 SW Cyber Drive, Suite 103		
City: Bend	State: OR	Zip: 97702
Print Name: Ken Bonin		Title: Environmental Manager
Signature: Kenneth B. Bonin		Date: 12/4/2008
Company 2		
Name:		Phone:
Address:		
City:	State:	Zip:
Print Name:		Title:
Signature:		Date:
Company 3		
Name:		Phone:
Address:		
City:	State:	Zip:
Print Name:		Title:
Signature:		Date:

VIII. Records of Inspection and Construction Activities

A. Record of Major Construction Activities and BMP Implementation [§ III.A.5.b]
Provide the dates of when major grading activities occur, the dates when construction activities on a portion of a site temporarily or permanently cease, and list the dates when temporary and permanent stabilization practices are implemented. Photo documentation of major construction activities and implementation of BMPs is strongly recommended.
See Table 1

B. Record of Construction Site Inspections [§ III.A.12.e-f]
Provide a record of inspection reports to include the name and qualifications of person making the inspections, the dates of inspection, and major observations relating to the implementation of the SWPPP. Major observation should include the location(s) of discharges of sediment or other pollutants from the site, location(s) of BMPs that need to be maintained, location(s) of BMPs that failed or proved to be inadequate, and location(s) where additional BMPs are needed. All issues of non-compliance shall be noted. If the site is in full compliance with this SWPPP and permit NVR100000 on the date of inspection, the report shall contain a certification of compliance. These records shall be retained as part of the SWPPP for at least three years from the date that permit coverage expires or the site is finally stabilized.
See Table 1

C. Record of Follow-up Actions
Based on the results of the inspections conducted above, provide a record of the follow-up maintenance and corrective actions conducted at the site. Implementation of follow-up actions should occur within seven (7) days following receipt of inspection results or prior to the next anticipated storm event.
See Table 1

TABLE 1 RECORDS OF INSPECTION AND CONSTRUCTION ACTIVITIES						
Activity	**Start Date**	**End Date**	**Stabilization Practices/BMPs**	**Observations**	**Follow- up Actions**	**Responsible Official**
Well Pad Construction 23-17	March 1, 2008	April 30, 2008	Berms, reserve pit, watering			Ken Bonin
Well Pad Construction 37-17	March 1, 2008	April 30, 2008	Berms, reserve pit, watering			Ken Bonin
Well Pad Construction 77-19	March 1, 2008	April 30, 2008	Berms, reserve pit, watering			Ken Bonin
Well Pad Construction 21-19	March 1, 2008	April 30, 2008	Berms, reserve pit, watering			Ken Bonin
Well Pad Construction 28-13	March 1, 2008	April 30, 2008	Berms, reserve pit, watering			Ken Bonin
Well Pad Construction 33-23	March 1, 2008	April 30, 2008	Berms, reserve pit, watering			Ken Bonin
Road Construction	March 1, 2008	April 30, 2008	Watering			Ken Bonin

4. Geothermal Project Area Permit

JIM GIBBONS
Governor

STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 • Fax (775) 684-7052
http://minerals.state.nv.us/

Las Vegas Branch:
2030 E. Flamingo Rd.
Suite #220
Las Vegas, Nevada 89119
(702) 486-4343
Fax (702) 486-4345

ALAN R. COYNER
Administrator

October 7, 2008

Virgil Welch
Patua Project LLC
345 SW Cyber Drive #103
Bend, OR 97702

Dear Mr. Welch:

With this letter, I am sending the signed copy of the original permit issued to Patua Project LLC for their project area permit in the Patua area. This permit was approved on October 7, 2008 and will expire on October 7, 2010 in the event that a well or wells have not been drilled.

Geothermal Resource Development Permit Applications must be submitted for each individual well that will be drilled in this project area. During the drilling, upon completion, and during production and/or injection of the well, if applicable, submission of certain forms and other actions are required as described in the Geothermal Regulations and Rules of Practice and Procedure. The forms can be found and downloaded from our website.

If you have any questions please contact Linda Wells at 775-684-7042, and thank you for your cooperation.

Sincerely,

Linda Wells
Administrative Assistant IV

cc: John Menghini, BLM – Reno
Nevada Bureau of Mines & Geology

Dennis Bryant: Small-Scale Mining and Prospecting
Richard DeLong: Large-Scale Mining
Eugene Kozlowski: Oil and Gas

Commission on Mineral Resources
Fred B. Gibson, Jr., Chairman, General Public

John Madge: Large-Scale Mining
Ron Parratt, V. Chair: Exploration and Development
John H. Sauer: Geothermal Resources

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ALAN R. COYNER
Administrator

GEOTHERMAL PROJECT AREA PERMIT NOTICE

October 7, 2008

A Geothermal Project Area Permit has been issued by the Commission on Mineral Resources, Division of Minerals to the following:

Patua Project, LLC, 345 SW Cyber Drive, Suite 103, Bend, OR 97702, 541-317-1984 filed the application on August 19, 2008, with a 30-day public comment period starting on September 5, 2008 and ending October 6, 2008.

Permit 865 allows Patua Project LLC to drill a total of 26 production wells with an estimated depth of 7,000', 15 injection wells with an estimated depth of 7,000' and 15 observation wells with an estimated depth of 7,000'. Individual well permits will be submitted and approved in accordance with NAC 534A.190 and NAC 534A.212 over the projects life as needed. The project area will be located in Sections 33, 34, 35, & 36 of T21N, R26E; Sections 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 27, 28, 29, & 30 of T20N, R26E; Section 6 of T20N, R27E in the Patua area in Churchill County, Nevada.

The purpose of the wells is for the development of geothermal power project for sale of electricity.

This project area permit is valid for a period of two years from the date of issuance and will expire on October 7, 2010 if no wells in the project area have been drilled.

Dennis Bryan: *Small-Scale Mining and Prospecting*
Richard DeLong: *Large-Scale Mining*
Eugene Kozlowski: *Oil and Gas*

Commission on Mineral Resources
Fred D. Gibson, Jr., Chairman; General Public

John Nudge: *Large-Scale Mining*
Ron Parratt, V. Chair.: *Exploration and Development*
John H. Snow: *Geothermal Resources*

RECEIVED

AUG 1 9 2008

Division of Minerals

STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 • Fax (775) 684-7052

Date Received _____
API Number N/A
County Churchill
Project Area Permit Number 865
FOR DIVISION USE ONLY

GEOTHERMAL PROJECT AREA PERMIT APPLICATION

The applicant
PATUA PROJECT, LLC
(Name or Corporate/Business Name)
of
Street Address 345 SW CYBER DR. #103
City BEND State OR Zip Code 97702
Telephone 541-317-1984

hereby makes application for a geothermal development permit, State of Nevada, Division of Minerals.

(If applicant is a corporation, show state and date of incorporation; if a partnership, list names of partners.)

STATE OF COLORADO JULY 31, 1991

This application is for (number):

26	production wells	Estimated total depth of production wells:	7,000 FT/WELL
15	injection wells	Estimated total depth of injection wells:	7,000 FT/WELL
15	observation wells	Estimated total depth of observation wells:	7,000 FT/WELL

Purpose of Wells:

OBSERVATION OF PRESSURE, FLOW RATE, TEMPERATURE AND GEOCHEMICAL DATA.
STEAM PRODUCTION FOR GENERATION OF ELECTRICITY.
INJECTION OF PRODUCED FLUIDS BACK INTO THE GEOTHERMAL RESERVOIR.

Description of Project Area by Section, Township, and Range (a map of the project area must be included with the application):

THE PROJECT AREA CONSISTS OF SECTIONS 33, 34, 35 AND 36 OF TOWNSHIP 21 NORTH; RANGE 26 EAST: SECTIONS 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 27 28, 29 AND 30 OF TOWNSHIP 20 NORTH, RANGE 26 EAST: SECTION 6 OF TOWNSHIP 20 NORTH, RANGE 27 EAST.

Applicant is: ☐ Land Owner ☒ Lease Holder PRIVATE OWNERS,
Land Owner Name: U.S. BUREAU OF LAND MANAGEMENT, U.S. BUREAU OF RECLAMATION
Geothermal Resource Owner Name: VULCAN POWER COMPANY

GEOTHERMAL PROJECT AREA PERMIT APPLICATION
PAGE 2

Operator's Name: PAUIA PROJECT, LLC
Address: 345 SW CYBER DRIVE, #103
City, St Zip: BEND, OR 97702
Drilling Contractor's Name: ROCKET DRILLCO
Address: 2556 BEASLEY DRIVE
City, St Zip: FALLON, NV 89406
Telephone: (775) 217-0813

Drilling Program - attach sample drilling program(s) which must include rotary rig description, casing program, and equipment for the prevention of a blowout.

Planned Use of Geothermal Resource:

DEVELOPMENT OF GEOTHERMAL POWER PROJECT FOR COMMERCIAL SALE OF ELECTRICITY.

Planned Disposal of Spent Geothermal Fluid:

STORE ON SITE AND INJECT BACK IN WELLS.

Type and Amount of Bond: STATEWIDE GEOTHERMAL LEASE BOND: $50,000
STATEWIDE GEOTHERMAL LEASE BOND; $50,000
(Exempt for Domestic Class)

Bond Issued by: NEVADA DIVISION OF MINERALS 0655205153
U.S.B.L.M. NEVADA STATE OFFICE Serial No. NVB000655

The Source of the Proposed Geothermal Resource is: ALLUVIUM AND FRACTURED VOLCANICS.
(List name of hot spring, geologic formation(s) or other source.)

Drilling will Begin On or Before: OCTOBER 15, 2008

Signature of Applicant/Agent: Virgil Wilk V-P Drilling
Date: 8/14/08

PERMIT APPROVAL

Approved 10-7-08 with the conditions attached and made a part of the permit.
Date

Project Area Permit Number 8165

Administrator
Division of Minerals

5. Patua Geothermal Project Utilization Plan – February 2010

VULCAN POWER COMPANY

Patua Geothermal Project Utilization Plan

Revised

February 2010

Submitted to:

Bureau of Land Management
Carson City District Office
Carson City, Nevada

Bureau of Reclamation
Lahontan Basin Area Office
Carson City, Nevada

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1.0 INTRODUCTION

1.1 Background and Project Location

The Bureau of Land Management (BLM) has issued various Federal geothermal leases within the Patua Geothermal Unit N-85166X (Unit), which is generally located east of Fernley, Nevada, in Churchill and Lyon counties: NVN-075005, NVN-077647, NVN-079276, NVN-079291, NVN-079292, and NVN-085705. Vulcan Power Company (VPC) has acquired the rights to all of the Federal geothermal leases within the Unit indirectly from private parties, with the exception of NVN-085705, which was acquired directly from the BLM. In addition, VPC has agreements with private landowners for the rights to the geothermal resources associated with the majority of private lands within the Unit. See Figure 1- General Vicinity Map for the location of the Patua Geothermal Unit and Figure 2- Patua Geothermal Unit, which depicts the geothermal leases within the Unit.

VPC has previously conducted geothermal resource exploration activities within the Unit, which consisted of geologic reconnaissance, geophysical surveys (gravity, magnetotelluric, and two-dimensional seismic reflection), and exploration drilling. It should be noted that exploration drilling conducted to date has been on the private land only. Based upon the results of the geothermal resource exploration and subsequent analyses, VPC is proposing to design, construct, and operate geothermal well pads and wells, geothermal fluid pipelines, transmission lines, and their associated access roads, on lands that are managed by the Bureau of Reclamation (BOR). These facilities would be connected to a geothermal power generation facility, capable of producing 60 megawatts (MW) net of electricity, to be located on a privately owned section of land (Section 21, T20N, R26E, MDBM), within the Unit. Figure 3- Project Overview depicts the locations of all project facilities, whether located on BOR, State of Nevada, or private lands.

In general accordance with 43 CFR 3270, this Utilization Plan has been prepared in order to describe the proposed utilization facilities to be located on BOR land. A separate Operations Plan for the Patua Geothermal Project has been prepared by VPC, revised February 2010, in order to describe the proposed drilling and testing operations to be located on BOR land. In addition, a separate Plan of Development for the Patua Geothermal Project has been prepared by VPC, revised February 2010, in order to describe the location and details of the proposed transmission line and its associated right-of-way.

1.2 Summary of Proposed Utilization Facilities

Generally speaking, the proposed utilization facilities on BOR Land would be located within the Unit, on leases NVN-085705 and NVN-075005, in portions of sections 16, 20, 28, and 30, T20N, R26E, MDBM; see Figure 4- Areas of Potential Utilization of BOR Land. Figure 5-

Proposed Utilization Facilities on BOR Land depicts the proposed locations of the geothermal well pads, geothermal fluid pipelines, and their associated access roads, on BOR land within the Unit. Pending the results of various environmental surveys and ongoing drilling, science, and engineering the locations of the proposed utilization facilities on BOR land could be slightly altered, but would remain within the areas depicted on Figure 4 and would not exceed approximately 30 acres of total disturbance. These facilities would be connected to a geothermal power generation facility, capable of producing 60 megawatts (MW) net of electricity, to be located on a privately owned section of land (Section 21, T20N, R26E, MDBM), within the Unit. It has not yet been determined whether the geothermal power generation facility will be water-cooled or air-cooled. If it is to be air-cooled, then very little water will be required during normal operations; water would be trucked in, from a private source, occasionally to top off the fire water and service water tank and a potable water system will be provided for personnel. If the facility is to be water-cooled, then it is estimated that approximately 4,500 gpm will be required for the cooling system. Further discussions of the proposed utilization facilities on BOR land can be found in Section 2- Proposed Utilization Facilities.

In order to assess the possibility for environmental impacts related to the development of the proposed utilization facilities on BOR land, environmental surveys have been organized by VPC, which cover the potential utilization areas depicted on Figure 4. These environmental surveys include a botanical evaluation, a wildlife evaluation, and a cultural resources evaluation. In accordance with the National Environmental Policy Act (NEPA) an Environmental Assessment (EA) is planned for the project development proposed on BOR land, which includes the proposed utilization facilities described herein. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Environmental protection measures relevant to the proposed utilization facilities are described below. Additionally, in general compliance with the requirements of Section 106 of the National Historic Preservation Act, cultural resource surveys are also being conducted on private lands where utilization facilities associated with the project are to be located.

In order to meet project deadlines, it is expected that well pad construction will begin immediately upon BLM approval. It is anticipated that construction of pipelines, transmission lines, and their associated access roads would not begin until Third Quarter 2011. VPC plans to begin construction of the power generation facility within the Second Quarter 2011 and complete the construction of all facilities within the First Quarter 2012 timeframe.

2.0 PROPOSED UTILIZATION FACILITIES ON BOR LAND

The proposed utilization facilities on BOR land consist of geothermal wells, geothermal fluid pipelines, and their associated access roads. Figure 4 depicts the general areas where proposed utilization facilities could be located. Figure 5 depicts the tentative locations for each proposed utilization facility. The proposed utilization facilities are summarized in greater detail below.

2.1 Geothermal Wells

In order to efficiently utilize the geothermal resource it is estimated that thirteen (13) individual well pads would be sufficient to accommodate the required number of production wells and injection wells. As depicted on Figure 3, only four (4) well pads are currently proposed on BOR land and nine (9) well pads will be located on private lands; however, it is possible that two (2) additional well pads could be located on BOR land, for a total of six (6). Generally speaking, multiple wells could be located on one (1) well pad. The proposed geothermal wells and access roads are discussed in more detail below.

2.1.1 Well Pad Locations

In a separate Operations Plan, four (4) geothermal well pads and wells are proposed for construction, drilling, and testing on BOR Land. The well pad names are 26-16, 12-20, 65-20, and 82-20, and their locations are depicted on Figure 3 and Figure 5. The locations of these four (4) well pads are tentative, and pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered. Also, it is possible that up to two (2) additional well pads could be proposed in Section 20, however, that has yet to be determined. For more information regarding the geothermal wells, well pads, and access roads, and information on well drilling and testing, refer to the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010.

Existing well pads on private land include 23-17, 37-17, 21-19, 77-19, 44-21, and 68-21. To date, drilling has been conducted on 23-17, 37-17, 21-19, and 77-19 only. Future well pads on private land are expected to include 62-19, 21-29, and 81-29. These future well pad locations are tentative, and pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered. The locations of existing and future wells on private land are depicted on Figure 3.

Although well pads during drilling operations are typically 350 foot by 350 foot and include a 200 foot by 60 foot reserve pit, the area required for the operation of geothermal production and injection wells could be smaller. Interim reclamation measures, in general accordance with the BLM Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development- Gold Book, Fourth Edition Revised 2007 (Gold Book), would be used to reclaim the portions of the drilling well pad that are not retained for use during operations.

2.1.2 Production Wells

Based on an anticipated geothermal resource temperature of approximately 325°F, it is estimated that approximately 41,500 gpm of geothermal fluid production will be required to support 60 MW net of electricity generation. Furthermore, based on an expected individual production well flow rate of approximately 2,000 gpm and allowing for back-up wells, up to twenty-three (23) individual production wells could be required to support 60 MW net of

electricity generation. Moreover, of the twenty-three (23) required production wells only up to twelve (12) production wells would be located on BOR land.

For pumped wells an average wellhead pressure of approximately 175 to 180 psi could reasonably be expected. Actual individual wellhead pressures will vary depending on well depth, resource temperature, and other factors. Each production well will be outfitted with a well pump and its necessary electrical and control systems. The well flow rates, pressures and temperatures will be continuously monitored in the power plant control room. The operators will be able to shut-in a well and shut-down each pump in the event of problems.

Generally speaking, multiple production wells could be located on one (1) 350 foot by 350 foot well pad. The well pad sump (approximately 200 feet by 60 feet) required for drilling will be retained for use during utilization operations for start-up activities and when well work-overs are required. The production well pads will have all the necessary facilities to support the well pumps. The specific size and configuration of the well pump support facilities will vary depending upon the specific well pump type and manufacturer selected. Assuming a line shaft type pump, the production well pads will require a step-down transformer (12KV to 4160V), a Power Distribution Center, which houses the motor control equipment, and a Utilities Systems Enclosure, which houses the lube oil and other auxiliary systems. Required electric power will be delivered to the well pad via cables typically installed in steel conduit constructed on the pipe supports adjacent to the pipeline; in some locations they will be direct buried along the pipeline route. See Figure 6- Typical Production Well Pad General Arrangement, which depicts a typical well site during operations.

Based on analyses of geothermal fluids from previous drilling, the resource at the Patua Geothermal Project is expected to be typical of other moderate to high temperature geothermal systems in Nevada. VPC expects neutral alkali-chloride water, rich in chloride (Cl), potassium (K), and sodium (Na), and relatively poor in bicarbonate ($HHCO_3$), calcium (Ca), and magnesium (Mg). Test results suggest that the resource would have total dissolved solids (TDS) concentrations below 3,000 parts per million (ppm). The discharge head of the pump will be specified such that the resource constituents, such as dissolved solids and non-condensable gases (NCGs), will be held in solution.

2.1.3 Injection Wells

Geothermal fluid injection wells are a necessary component to the efficient and sustainable utilization of the geothermal resource. They are strategically placed in order to provide resource recharge, support reservoir pressure, and ensure that geothermal fluids are not directly reproduced. Although unlikely, injection wells may be located on the same well pad as production wells, however, their depths would be significantly different from those of the production wells. A typical injection well pad has a sump and one (1) to three (3) injection wells. Each injection wellhead assembly consists of a set of shut in valves and monitoring instrumentation. Required electric power will be delivered to the well pad via cables typically installed in steel conduit constructed on the pipe supports adjacent to the pipeline; in some

locations they will be direct buried along the pipeline route. Characteristically, the entire assembly can be on the order of 10 to 12 feet high.

Typically, the pressure required to inject the geothermal fluids comes from the head developed from the production well pumps. However, in some cases, the topography and/or permeability of the reservoir near the well requires additional pressure from a booster pump. Booster pumps could be located on the well pad adjacent to the injection well or at a location central to multiple injection wells. Similar to production wells, the well flow rates, pressures and temperatures of the injection wells will be continuously monitored in the power plant control room. The operators will be able to shut-in a well and shut-down each pump in the event of problems.

The number and location of injection wells is a function of various resource variables that are not known at this time, therefore the number and location of injection wells cannot yet be reasonably estimated. However, based on the results of a preliminary reservoir report it is expected that the number and location of proposed well pads on BOR land in combination with the number and location of existing and future well pads on private land would be sufficient to accommodate the number and distribution of injection wells typically required to support 60 MW of electricity generation for a resource of this type.

2.1.4 Well Pad Access Roads

Access roads to the well pads during utilization will consist of the same roads used for access during drilling. No new well pad access roads are anticipated to be constructed beyond those indicated in the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010. As described in the Operations Plan, typical well pad access roads will be approximately 14 to 15 feet wide and will have a design speed of 10 to 15 miles per hour. In most instances, the well pad access road will double as the geothermal fluid pipeline access and maintenance road. Other relevant road criteria, based upon the guidelines presented in the Gold Book, Fourth Edition, Revised 2007, include:

- Maximum Road Grade- Typically grades will not exceed 8 percent.
- Minimum Road Crown- Typically roads will be constructed with not less than a 2 percent crown.
- Road Turnouts- Typically, on single lane roads, turnouts will be located at 1,000 foot intervals or they will be intervisible, whichever is the lesser. Turnouts will generally consist, as a maximum, of a 100 foot turnout width (parallel to the roadway), having a 25 foot tapered transition at each end and a depth of at least 10 feet (perpendicular to the roadway).
- Road Drainage- Road drainage will be facilitated, on an as needed basis, by the incorporation of drainage dips, in-sloping or out-sloping, crowning, utilization of natural topography, ditches, and/or culverts. If during construction, it is determined

that culverts or drainage crossings are required, they will be designed for a minimum 25 year storm frequency.

- Erosion Control- See Section 4.2- Soil Erosion and Sedimentation for a discussion of methods that will be utilized to mitigate soil erosion.
- Revegetation- See Section 4.10- Site Reclamation and Abandonment for a discussion of methods that will be utilized during reclamation activities, which includes the utilization of salvaged topsoil.

2.2 Geothermal Fluid Pipelines

The design, construction, and operation of the geothermal fluid pipelines will be in general accordance with the Geothermal Resources Operational Orders, Issued Under The Geothermal Steam Act of 1970; GRO Order 6- Pipelines and Surface Production Facilities.

2.2.1 Fluid Pipelines and Corridor Locations

The geothermal fluid pipelines are required to transport the hot geothermal fluids from the production wells to the power plant and to transport the cooler geothermal fluids from the power plant to the injection wells. The pipeline corridors are typically 5 to 6 feet wide with an adjacent access road having a width of approximately 14 to 15 feet wide, for a total corridor width of approximately 20 feet. In most instances, the adjacent access road will double as the well pad access road.

The approximate locations of proposed pipeline corridors on BOR land are depicted on Figure 3 and Figure 5. The locations of the pipeline corridors are tentative, and pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered. In any event, their locations would remain within the areas depicted on Figure 4.

2.2.2 Fluid Pipelines Design

The well field piping will consist of nominal 12 to 24 inch diameter, seamless, welded steel pipe. The piping will have 2 to 3 inches of insulation with a protective aluminum sheath, to minimize thermal losses and for personnel protection. The color of the outer layer will be appropriately selected to blend with the surrounding area. The pipeline will be designed to minimize the number of thermal expansion loops, thereby requiring less piping and disturbing less area.

The pipelines will primarily be above ground with supports placed at approximately 30 feet on center; however, certain sections of the pipelines will be buried underground in order to cross under roadways. Support foundations will consist of pre-fabricated concrete spread footings, founded as recommended by the project geotechnical engineer during construction. In general, the pipeline will be located within 5 to 6 feet from one edge of a 20 foot corridor, with

the remaining 14 to 15 feet reserved as an access road for construction equipment and inspection traffic. However, where expansion loops are needed the width of the corridor will be increased sufficiently to accommodate the appropriate dimensions of the expansion loop. The access road beside the pipeline will be improved, as necessary, to sufficiently allow negotiation by tracked and all-wheel drive equipment. The design will focus on minimizing damage to vegetation both during construction and during operations. Pipeline supports will be as depicted in Figure 7- Typical Geothermal Fluid Pipeline Supports.

The geothermal fluid pipelines will be designed to prevent failures. Special design considerations will be given to the strategic placement of thermal expansion loops and anchor supports, sufficient corrosion allowances and the installation of safety control systems. In the event of over pressurization, the operators will trim the production wells to reduce the pressure. If the pressure should continue to be too high, a pressure relief valve system will vent some of the production fluids directly to the injection pipeline. This will eliminate venting to the atmosphere. In the event of sudden under-pressurization, indicating a major leak or pipe rupture, the operators will shut-in the production wells, until the necessary repairs can be made. A check valve system will be installed to prevent back flow from the injection system.

3.0 GENERAL SITE ACTIVITIES

3.1 Site Evaluations

In order to site the proposed locations of geothermal wells and their access roads, various factors were considered, including but not limited to: a review of existing topography, a review of published geologic literature and maps, geologic field reconnaissance and mapping, review of recent geophysical survey data, and review of existing drill logs and reports. Generally speaking, proposed geothermal fluid pipeline corridor locations were chosen to accommodate the proposed geothermal well locations, which were chosen based on geologic and engineering analyses of subsurface data.

Furthermore, the geothermal fluid pipelines have been located such that they follow proposed geothermal well pad access roads while maintaining engineering efficiency, to the extent practical. Following the proposed well pad access roads reduces the amount of surface disturbance required for additional access roads. The remaining sections of pipeline will be routed in corridors that follow the shortest distance between well pads. This approach will minimize the surface disturbance associated with the pipelines, minimize the length of piping required, and reduce heat/energy losses allowing for more efficient utilization of the geothermal resource.

It is important to note that a preliminary geotechnical study was conducted during power plant siting, which found the power plant site to be suitable for the anticipated facilities. More detailed geotechnical studies will be conducted for the site prior to power plant construction, in

addition to, proposed locations for pipeline support foundations and transmission line structure locations.

It is important to note that the proposed locations of the well pads and pipeline corridors on BOR land, depicted on Figure 3 and Figure 5, are tentative. Pending the results of various environmental surveys and ongoing drilling, science, and engineering the locations of the proposed utilization facilities on BOR land could be slightly altered, but would remain within the areas depicted on Figure 4.

3.2 Site Preparation and Construction

The proposed utilization facilities on BOR land will require construction activity at the well pads, pipeline corridors, and access roads, described in greater detail in the sections below.

3.2.1 Geothermal Wells

Site preparation for the geothermal wells will mostly consist of interim reclamation of the portions of the well pad that are not required for operation. The well pad space required for drilling operations is approximately 350 feet by 350 feet, but the space required for well head facilities during operation and maintenance would be less. For additional information regarding the well pad during drilling operations, refer to the separate Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010. The number of wells to be located on each individual well pad during operations has not yet been determined, therefore, the actual areas of the well pad that would be reclaimed on an interim basis cannot be reasonably estimated here. Interim reclamation will be conducted in general accordance with the guidelines provided in the Gold Book. See Figure 6, which depicts the general arrangement of facilities on a typical production well pad.

3.2.2 Geothermal Fluid Pipelines

Pipeline construction requires little to no grading beneath the pipeline alignment. Actual disturbed areas beneath the pipeline consist only of the areas where pipe supports and their foundations will be located, except where the pipelines cross a road. Where pipelines cross roads, the pipe sections will be outfitted with a pipe sleeve and buried in an excavated trench. Pipe support foundations will be excavated approximately every 30 feet along the pipeline alignment and will comply with the recommendations of the project geotechnical engineer during construction. Foundation excavations can be accomplished with very little surface disturbance along the route. Additionally, grading of the pipeline access roads, as necessary, may be required in certain areas to allow for ease of maintenance during operations.

During construction, pipe sections will be delivered and placed along the pipeline corridor until they are ready to be lifted into place. A small crane will be used to lift the pipe sections onto the pipe supports and pipe jacks so that they can be welded in place. When complete,

the top of the pipeline will average less than 3 feet above the ground. Electric power and instrumentation cables will either be installed in steel conduit constructed on the pipe supports, adjacent to the pipeline, or will be buried along the pipeline route.

3.2.3 Access Roads

Construction of the access roads for geothermal fluid pipelines and for geothermal well pads (described in the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010) will be identical and will be conducted in general accordance with the guidelines in the Gold Book. The access roads will be cleared and grubbed as necessary and brought to grade, using standard grading practices. In the event fill material is required, suitable material will be obtained from onsite permitted sources and/or offsite commercial sources. Proper drainage control devices will be incorporated, as necessary, to accommodate natural drainage. It is not anticipated that fence cuts and/or cattlegaurds will be necessary as no existing fences will be intercepted and no open-range livestock are known to inhabit the area proposed for development. No major cuts/fills are anticipated during construction of this development. Maintenance of the access roads will be on an as needed basis and will be conducted in general accordance with the guidelines in the Gold Book.

3.3 Estimated Surface Disturbance

The approximate estimated surface disturbance for utilization facilities on BOR land is described below on a section by section basis. The estimations were determined assuming the following:

- Geothermal well pads are approximately 350 feet by 350 feet;
- Geothermal fluid pipelines are approximately 5 to 6 feet wide;
- Access roads are approximately 14 to 15 feet wide.

It should be noted that the surface disturbance associated with the geothermal wells and access roads herein and the surface disturbance for the well pads and access roads described in the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010, will overlap. More specifically, the surface disturbance associated with the well pads and access roads described the Operations Plan is also included in the values below for well pads and their access roads. In any event, the total surface disturbance on BOR land for the Patua Geothermal Project for geothermal well pads and wells, geothermal fluid pipelines and their expansion loops, and associated access roads, is not anticipated to exceed approximately 30 acres.

3.3.1 Section 16 T20N R26E MDBM

The approximate estimated surface disturbance distribution for utilization facilities on BOR Section 16, T20N, R26E, MDBM is as follows:

- Geothermal Well Pads (1): 3 acres;
- Geothermal Fluid Pipelines: ¼ acres;
- Access Roads: ½ acres.

The locations of the proposed utilization facilities listed above, which provide the basis for the estimated surface disturbance values above, are tentative. Pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered, but it is not anticipated to exceed approximately 5 acres of surface disturbance in Section 16.

3.3.2 Section 20 T20N R26E MDBM

The approximate estimated surface disturbance distribution for utilization facilities on BOR Section 20, T20N, R26E, MDBM is as follows:

- Geothermal Well Pads (up to 5): 15 acres;
- Geothermal Fluid Pipelines: 2 acres;
- Access Roads: 3½ acres.

The locations of the proposed utilization facilities listed above, which provide the basis for the estimated surface disturbance values above, are tentative. Pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered, but it is not anticipated to exceed 24 to 25 acres of surface disturbance in Section 20.

3.3.3 Section 28 T20N R26E MDBM

Although current plans, as depicted on Figure 3 and Figure 5, do not anticipate the use of land in Section 28 it is possible that a small portion in the northwest corner of the section could be required to route a geothermal fluid pipeline and its associated access road as depicted on Figure 4. The approximate estimated potential surface disturbance distribution for utilization facilities on BOR Section 28, T20N, R26E, MDBM is as follows:

- Geothermal Fluid Pipelines: $^{1}/_{16}$ acres;
- Access Roads: $^{3}/_{16}$ acres.

It is important to note that if approximately ¼ acres of land is required in Section 28 it would replace ¼ acres of estimated surface disturbance in Section 20.

3.3.4 Section 30 T20N R26E MDBM

Although current plans, as depicted on Figure 3 and Figure 5, do not anticipate the use of land in Section 30 it is possible that a small portion in the northeast corner of the section could be required to route a geothermal fluid pipeline and its associated access road as depicted on Figure 4. The approximate estimated potential surface disturbance distribution for utilization facilities on BOR Section 30, T20N, R26E, MDBM is as follows:

- Geothermal Fluid Pipelines: $^{1}/_{16}$ acres;
- Access Roads: $^{3}/_{16}$ acres.

It is important to note that if approximately ¼ acres of land is required in Section 28 it would replace ¼ acres of estimated surface disturbance in Section 20.

3.4 Fill Materials

Options for obtaining fill and base rock materials in the general vicinity are abundant. During previous well pad construction native soil and rock material were found to be suitable as fill materials. Therefore, the need for fill material from other sources would be unlikely, but would be determined on a case-by-case basis.

If additional base rock or other earth materials are needed for road or well pad construction or maintenance, they will be obtained locally, from one of the following:

- The permitted gravel operation within the Unit, located east of Black Butte, in Section 24, T20N, R26E, MDBM.
- Local commercial sources.

3.5 Construction Water

Water will be required for dust control and soil compaction during construction of the well pad facilities, geothermal fluid pipelines, and the associated access roads. It is not anticipated that water will be needed for mixing concrete because concrete will be obtained from an off-site batch plant having its own water supply. Drinking water for construction workers will be obtained from off-site sources as well. The construction sites will have portable chemical toilets that contain their own water.

Dust control will be performed on an as needed basis during construction and maintenance operations to adequately suppress fugitive dust. Fugitive dust suppression will be conducted in accordance with the Surface Area Disturbance (SAD) permit. It is understood that more water would be required during hot and dry summer months than cold and wet winter months.

The amount of water required for soil compaction during construction of the well pads, pipeline support foundation excavations, and access roads, cannot be reasonably estimated at this time. Generally speaking, water required for soil compaction is a function of in situ soil moisture content, required compaction percentage, weather conditions during compaction, and other factors that are unknown at this time. Vulcan will comply will all applicable Federal, State and Local soil compaction requirements.

Water for construction could be obtained from one or a combination of the following three (3) sources:

- On-site water well(s)- Applications could be submitted to the Nevada Division of Water Resources (NDWR) and the Nevada Division of Environmental Protection (NDEP) for approval to drill one or more water wells for dust control and soil compaction purposes during construction of the proposed utilization facilities.
- Water purchase from local public sources- VPC has purchased water from the Truckee Carson Irrigation District (TCID) over the past couple of years in addition to the City of Fernely. Both the TCID and City of Fernley have been an important source of water during drilling operations.
- Water purchased from private parties- Numerous private parties have been identified in the area who have water available for sale.

4.0 SCHEDULES

Vulcan anticipates that the overall development for the proposed utilization facilities on BOR land will require approximately 12 to 14 months from the beginning of construction to the completion of final testing and commissioning. Testing of the power plant will commence approximately 12 months after the start of its construction and is expected to have an approximate 2 week duration. It is anticipated that commercial operations would begin approximately 6 weeks after power plant testing is complete. The proposed construction schedule is presented below:

Proposed Utilization Facility Construction Schedule

	Activity	0-3M	4-6M	7-9M	10-12M	13-15M	16-18M	19-21M	22-24M	25-27M
1	**Obtain permits and approvals**									
2	**Hire Pipeline Contractor**									
3	**Construct Pipeline**									
4	**Pipeline Hydrotesting**									
5	**Pump Study/Order Pumps**									
6	**Well Pump & MCC Installation and Testing**									

4.1 Geothermal Wells and Access Roads

Construction of the well pad facilities will require 5 to 6 months from groundbreaking to substantial completion of the well pumps. Pump testing and commissioning will be performed after the geothermal fluid pipelines are finished. Final completion may follow substantial completion by 2-4 weeks.

Four (4) to six (6) well pads could be constructed on BOR land. It is anticipated that three (3) to five (5) of these well pads will have production wells and therefore well pump facilities. The proposed construction of the well pads and associated access roads, as well as, the drilling of the production and injection wells is covered in the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010.

The construction of the well pad facilities is expected to take several weeks per well pad. Construction consists of the installation of the production well pumps and motors, their motor control centers and the associated facilities for lubrication, controls and safety systems.

4.2 Geothermal Fluid Pipelines and Access Roads

Constructing the geothermal fluid piping system will occur simultaneously with construction on the well pad facilities. It is estimated to require 9 to 10 months to construct the facilities in the pipeline corridor. This consists of the access roads, installation of pipe supports, the placement and welding of pipe sections as well as the installation of the electrical distribution system to provide power to the well pumps.

5.0 WORKFORCE

Workforce estimates for the construction of the geothermal fluid pipeline, associated access roads and the installation of well pad facilities that will be constructed on BOR lands will include up to forty (40) workers during the 12 to 14 month construction period. Figure 8- Estimated Manpower Loading for the Construction of Proposed Utilization Facilities shows the manpower estimates during the construction phase. The manpower requirements for construction of the proposed utilization facilities and their normal operations are described below.

5.1 Geothermal Wells and Access Roads

Construction of the well pad facilities will require approximately six (6) workers over a period of 6 to 7 months. Construction of the well pad facilities will commence after the wells are drilled and designated as production or injection wells. The production well pad facilities will vary slightly depending on the type of well pump utilized. Injection wells do not require well pumps and therefore minimum facilities are required.

Access roads to the well pads will be constructed during the exploration phase which is covered in the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010. Additionally, the construction workforce for the well pad access roads is described in that Operations Plan.

5.2 Geothermal Fluid Pipelines and Access Roads

Construction of the geothermal fluid pipelines and their associated access roads requires approximately thirty (30) individual workers over a period of approximately 11 to 12 months. Construction of the pipelines will commence after the wells are drilled and the pipeline corridors have been established. Final connections will be made after the well pump facilities have been installed.

5.3 Workforce During Normal Operations

The normal workforce required during operations is minimal. During normal operations, an operator will be dispatched to each well pad on a daily basis for routine checks. During start-up, shut-down and upset conditions additional operators will likely be required. The specific number and duration of manpower required will depend on the specific nature of the situation. But in any event the workforce loading will be over a short period of time.

The operational workforce requirements for the geothermal fluid pipelines are very minimal. Routine checks and minimal maintenance will be conducted on a semi-annual basis. In addition, as necessary, access roads will be watered to minimize fugitive dust emissions.

6.0 ENVIRONMENTAL PROTECTION MEASURES

VPC's goal is to develop a project that avoids creating significant environmental impacts. In addition to environmental protection measures discussed herein, VPC has reviewed the lease stipulations attached to Federal geothermal leases NVN-85705 and NVN-75005, which encompass the potential areas of utilization on BOR land, depicted on Figure 4. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is planned for the project development proposed on BOR land, which includes the proposed utilization facilities described herein. Environmental protection measures relevant to proposed utilization facilities are described in general below. It is important to note that hazardous waste is not anticipated to be generated during operation of the proposed facilities.

6.1 Fire

An Emergency Response Plan will be maintained during and after construction of proposed utilization facilities to address procedures and notification requirements in the event of a fire. Water trucks to be used for watering roads, or other earthwork purposes, could be available to provide water for fire suppression and control if needed.

6.2 Soil Erosion and Sedimentation

A Stormwater General Permit NVR 100000 was issued for the Patua Geothermal Project by the Nevada Department of Environmental Protection (NDEP), effective December 19, 2008. To obtain this permit, the Patua Geothermal Project's Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities was submitted to and accepted by NDEP. The current SWPPP applies to the construction of well pads and access roads; it will be further updated to include the disturbed areas for proposed utilization facilities described herein. The SWPPP includes Best Management Practices (BMPs) that will be followed in order to reduce soil erosion within the project area.

In order to minimize the effects of wind erosion, access roads and other disturbed areas will be watered on an as needed basis. To control surface water runoff, well pads are constructed with a reserve pit and a series of berms, trenches and sediment traps. Roads will be planned, constructed and maintained in general accordance with guidelines of the Gold Book and standard construction BMPs. Cut slopes will be revegetated, as needed, pursuant to Section 6.9.2- Interim Revegetation Plan.

6.3 Surface and Groundwater

Reserve pits will be constructed on each well pad and will be lined with clay soil to impede infiltration. Any short term discharges of geothermal fluids during testing or maintenance activities will be directed to and contained within reserve pits or injected into other geothermal wells. Well pads will be encompassed by berms and finish graded to slope downward to the reserve pit to control surface water runoff. Fluids within reserve pits will evaporate or be disposed of in accordance with applicable requirements. Roads will be constructed in a manner that directs runoff to roadsides, where it will drain into the soil.

It is not anticipated that construction and/or operation of the proposed utilization facilities will adversely affect existing surface and groundwater. Protection of surface and ground water is also addressed in the Patua Geothermal Project SWPPP, submitted by VPC December 19, 2008, and the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010. As discussed in these documents, VPC will utilize standard applicable BMPs for the protection of surface and groundwater and will adhere to all applicable federal, state, and local requirements.

Stormwater drainage for the power plant site will be designed to prevent offsite discharges. Portions of the power plant site will be surfaced with asphalt or concrete, which will be appropriately finished to direct stormwater to catch basins. Catch basins will be connected via a tight-lined piping system that will direct collected water to a holding area where it can be subsequently evaporated or injected to the reservoir.

It should be noted that the power plant will include a domestic sewage treatment system, which will collect and transfer effluent from toilets, sinks, and showers to an onsite septic tank.

The liquid discharge from the septic tank will flow to a leach field on Section 21, T20N, R26E, MDBM, where it will be absorbed by the soil materials. The septic system will be designed and constructed in accordance with current Churchill County regulations and local standards of practice.

6.4 Fish and Wildlife

In order to assess the possibility for environmental impacts related to development of proposed utilization facilities on BOR land, wildlife surveys by an experienced wildlife biologist are ongoing. These surveys include potential utilization areas depicted on Figure 4. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the wildlife biologist, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed utilization facilities on recognized special status or other species of concern, in the immediate vicinity of the proposed utilization facilities, and prepare appropriate mitigation measures as necessary. Wildlife field surveys are ongoing and subsequent report(s) will be completed in time for consideration in the EA.

6.5 Vegetation

In order to assess the possibility for environmental impacts related to the development of the proposed utilization facilities on BOR land, botanical surveys by an experienced botanist are ongoing. These surveys include the potential utilization areas depicted on Figure 4. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the botanist, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed utilization facilities on recognized rare plants, invasive species, or other concerns, in the immediate vicinity of the proposed utilization facilities, and prepare appropriate mitigation measures as necessary. Although the botanical field surveys are not yet complete, it is preliminarily understood that various species of noxious weeds have been identified in the general vicinity of potential utilization areas on BOR land (Figure 4). As such, a Noxious Weed Abatement Plan is being developed for the Patua Geothermal Project. Botanical field surveys are ongoing and subsequent report(s) will be completed in time for consideration in the EA.

6.6 Cultural Resources

In order to assess the possibility for environmental impacts related to development of proposed utilization facilities on BOR land, cultural resource surveys by an experienced cultural resource consultant are ongoing. These surveys include the potential utilization areas depicted on Figure 4. Additionally, in general compliance with requirements of Section 106 of the National Historic Preservation Act, cultural resource surveys are also being conducted on private lands where utilization facilities associated with the project are to be located. It is VPC's goal to develop a project that avoids creating significant environmental impacts.

Accordingly, VPC will work in coordination with the cultural resource consultant, BLM, BOR, SHPO, and other relevant agencies to understand potential impacts of proposed utilization facilities on recognized cultural resources of concern, in the immediate vicinity of the proposed utilization facilities, and prepare appropriate mitigation measures as necessary. Cultural resource field surveys are ongoing and expected to be complete in time for consideration in the EA.

6.7 Air Quality Compliance

Air quality in the general area of the Patua Geothermal Project is designated as in "attainment" (U.S. Environmental Protection Agency, 2009). An attainment area is defined by Section 107 of the Clean Air Act (CAA) as one that meets national primary or secondary ambient air quality standards for criteria pollutants. Nevada Department of Environmental Protection (NDEP) Bureau of Air Pollution Control (BAPC) has been delegated responsibility by the EPA and the State of Nevada to regulate the emission of air pollutants throughout most of Nevada, which includes the general area of the Patua Geothermal Project. NDEP BAPC has set forth minimum standards for ambient air quality which incorporate EPA standards. In accordance with the requirements of NDEP BAPC a Surface Area Disturbance (SAD) Air Quality Operating Permit (AP1629-2517) was obtained by VPC, for the Patua Geothermal Project on January 6, 2009. Conditions of this permit include the implementation of a plan for fugitive dust control.

6.7.1 Site Preparation and Construction

Site preparation will involve earthmoving activities required to construct geothermal well pads, geothermal fluid pipelines and associated access roads. Such activities are of a temporary nature and will result in non-point source emissions including fugitive dust and vehicular emissions. Fugitive dust emissions from these activities could contribute to the background level of Particulate Matter (PM) in the air. Additionally, gasoline and diesel fuel combustion vehicles will emit relatively minor amounts of criteria pollutants.

Several steps have been taken to maintain air quality compliance during site preparation including BMPs as outlined in the SAD permit. Where possible existing roads will be utilized, decreasing the need for new construction. Vehicle speeds will be limited to 10-15 miles per hour on unpaved roads. Dust will be suppressed by applying water to unpaved roads and other disturbed surfaces, on an as needed basis. Where applicable, vehicles will be maintained to comply with State of Nevada vehicle emissions standards as put forth by the Nevada Department of Motor Vehicles (NDMV) and with relevant EPA standards for criteria pollutants from diesel engines, including particulates.

6.7.2 Geothermal Wells and Fluid Pipelines

Geothermal wells and fluid pipelines will be routinely accessed during operation for monitoring and maintenance. Fugitive dust may be generated during access and will be controlled by applying water on an as needed basis.

During normal operation, geothermal wells and fluid pipelines produce virtually no emissions other than in the case of unexpected leaks. Well field control equipment will be in place at all times during operation to detect possible leaks. Anticipated geothermal fluid chemistry is such that small leaks should not cause violations of Nevada Air Quality Standards. Still, any such detected leaks will be repaired as soon as possible.

6.8 Noise

In the event that noise mitigation measures are deemed necessary they will comply with relevant standards and be determined on a case-by-case basis. Construction of proposed utilization facilities will result in temporary noise level increases. During normal operation of proposed utilization facilities, noise level increases will be minimal and should not have a distinctive impact. Actions that create unnecessary increases in noise will be avoided where possible.

6.9 Visual Treatment

The visual contrast of proposed utilization facilities with the surrounding landscape will be reduced, to the extent practical, through design, exterior painting and some interim revegetation of disturbed surfaces. These methods are generally described below.

6.9.1 Exterior Design

Exteriors of proposed utilization facilities will be selected with consideration given to reducing their contrast with the desert landscape and mountainous terrain of surrounding lands. Geothermal fluid pipelines and well pad facilities will have their exteriors finished in hues that will blend with background features. Where practical proposed pipelines will cross roads underground and avoid the use of overhead expansion loops that increase visibility of well field features.

6.9.2 Interim Revegetation Plan

Interim revegetation will be conducted on a case-by-case basis for disturbed areas where no future use is anticipated. Interim reclamation will be conducted in general accordance with the Gold Book. Any seed mix to be used for reclamation purposes will be developed by an experienced botanist in coordination with the BLM and will ultimately be based on seed availability and quality. Reseeding will not be undertaken in areas where soil conditions are inappropriate or where the adjacent undisturbed land surface has little or no vegetation.

Native soil material and organic matter (topsoil) salvaged from site preparation operations will be reused as a top-dressing on berms and other areas requiring revegetation to the extent practical. In general, native topsoil contains native seeds and microorganisms essential for nutrient cycling and when reused should blend well with the adjacent undisturbed landscape.

6.10 Public Health and Safety

An Emergency Response Plan and a Spill Prevention Plan will be maintained during and after project completion. Both plans will address procedures and notification requirements for possible emergencies that may affect the general public. Proposed activities at the project location will be completed so as to avoid creation of hazards to public health and safety.

6.11 Site Reclamation and Abandonment

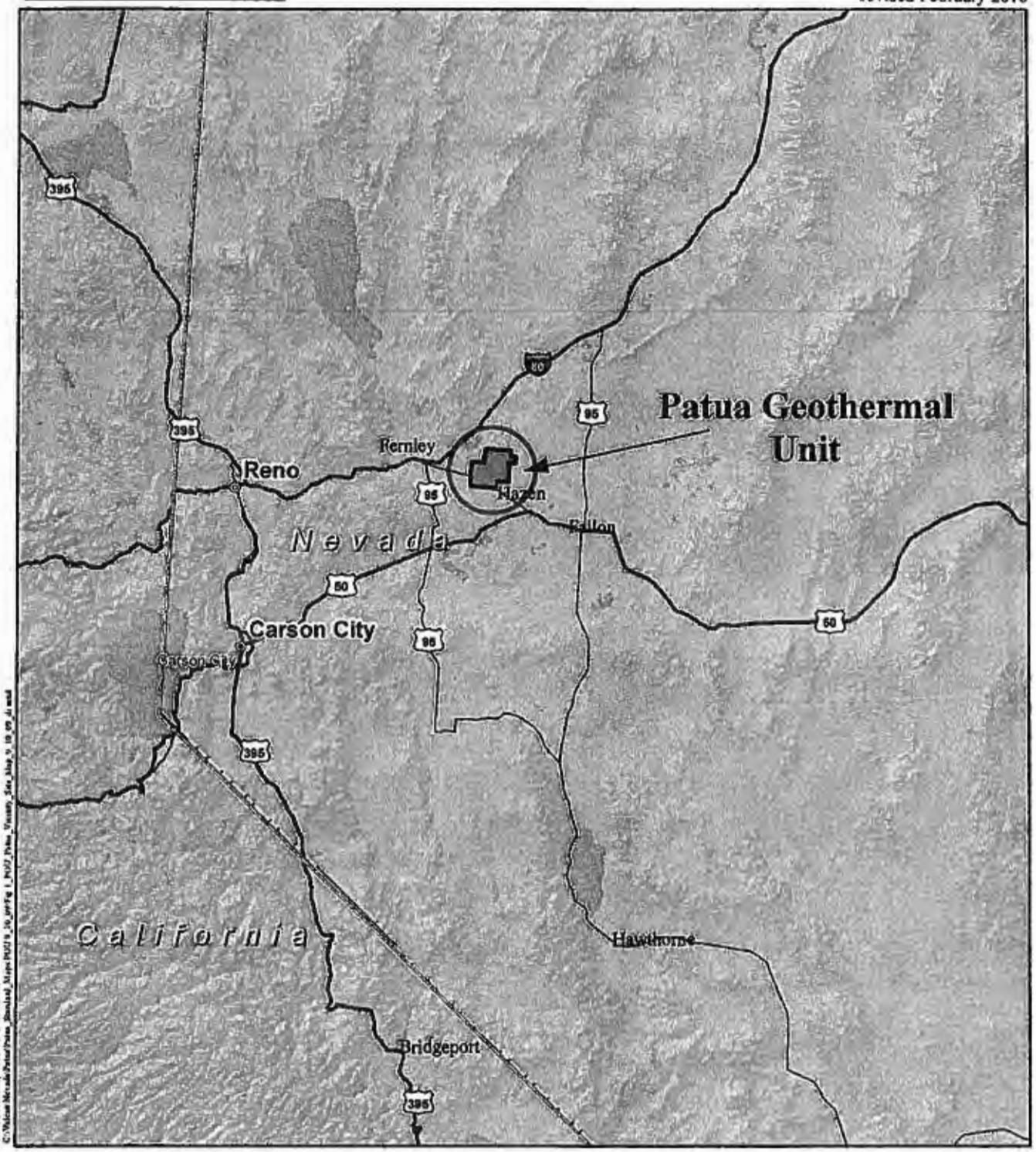
Commonly, geothermal power projects are designed for an expected lifetime of approximately 30 years. Therefore, 30 years or its useful life, whichever is longer, is the estimated life of this project. A final plan for site reclamation and abandonment will be prepared by VPC and approved by the BLM before implementation. The final plan will address, but will not be limited to, facility removal, restoration of surface grades and drainages, revegetation of disturbed sites, and relative timelines for completing these tasks.

Patua Geothermal Project

General Vicinity Map

Confidential

Utilization Plan
revised February 2010



Legend

Patua Geothermal Unit
(N-85168X)

0 12.5 25 Miles

N
W E
S

Figure 1

Base map from ESRI Software
Section boundaries from USGS 75.55.
The contents of this map are approximate and subject to change.

Patua Geothermal Project

Patua Geothermal Unit

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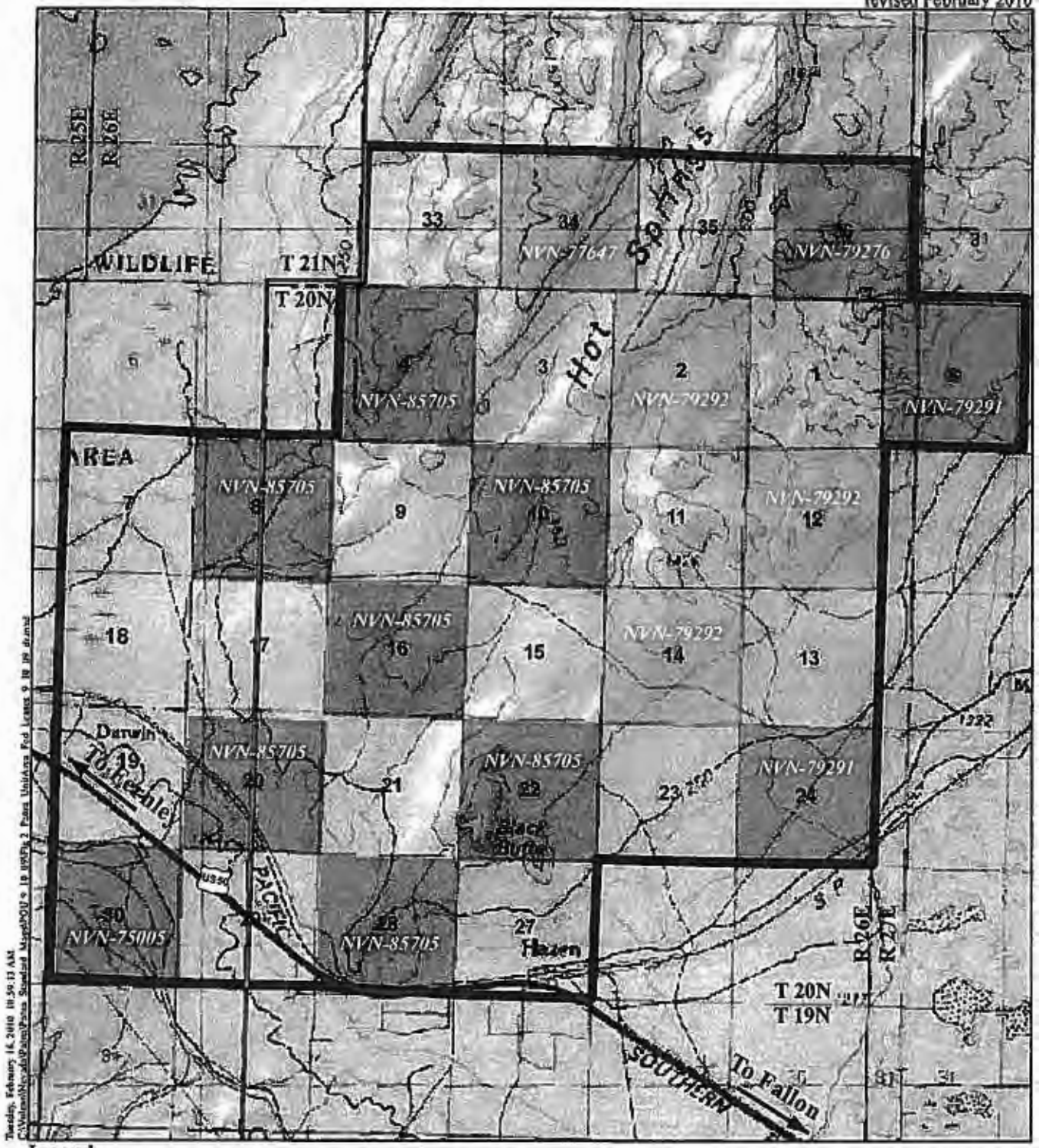
Utilization Plan
revised February 2010



Legend

- Patua Geothermal Unit (N-85168X)
- NVN-79291
- NVN-85705
- NVN-79292
- NVN-79276
- NVN-75005
- NVN-77647
- County Line

BLM Geothermal Leases

0 0.5 1 Miles

N W E S

Figure 2

Base map from ESRI SoftWare;
Section boundaries from USGS PLSS
The contents of this map are approximate and subject to change

Patua Geothermal Project
Project Overview

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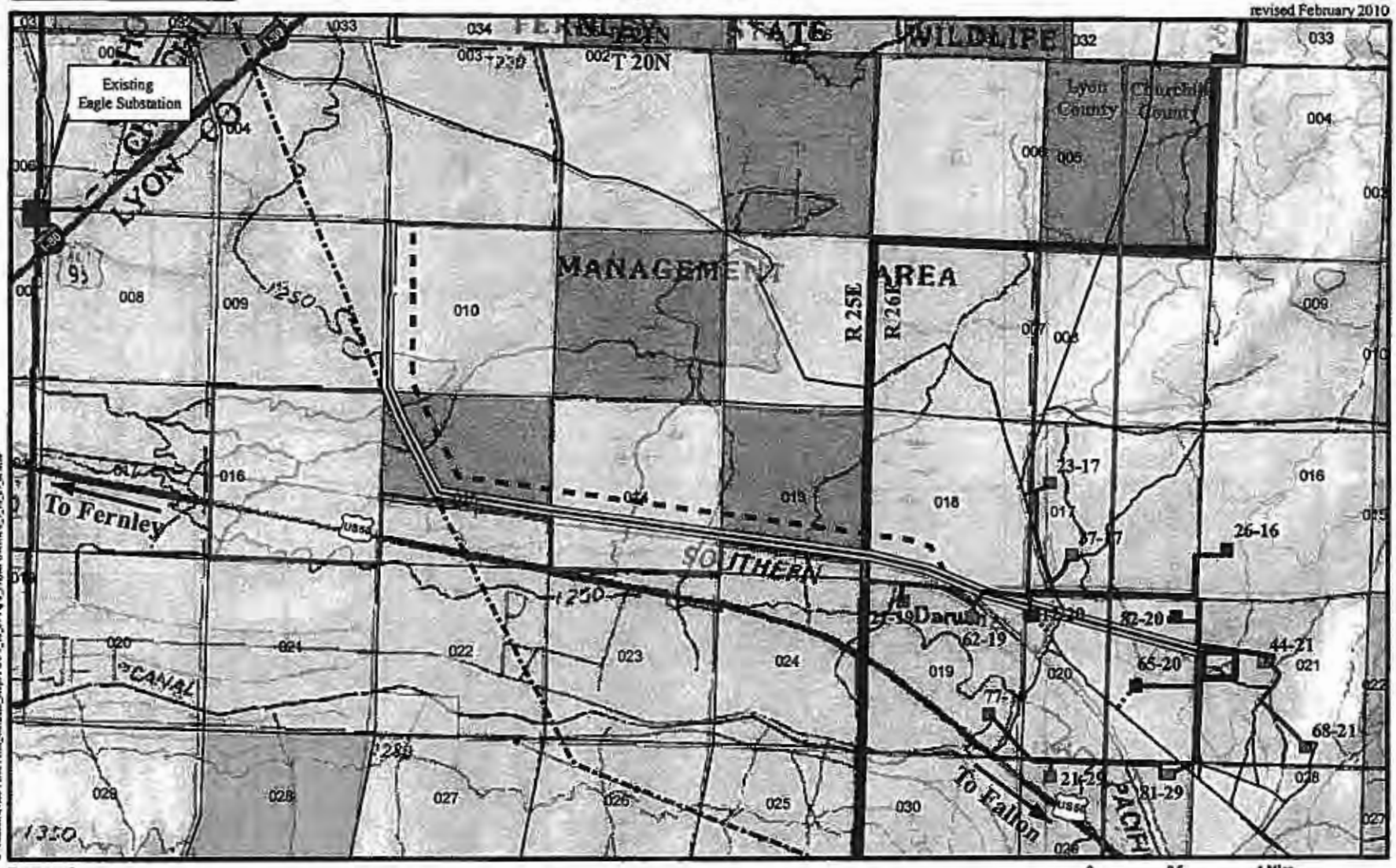
Utilization Plan
revised February 2010



Legend

- Geothermal Unit Boundary
- Existing Eagle Substation
- Existing PDCI Transmission Line
- Existing Transmission Line (Est)
- Existing Roads
- Proposed Roads
- County Line
- Proposed Transmission Line Route
- Alternate Transmission Line Route
- Proposed Well Pads
- Existing Well Pads
- Future Well Pads
- Proposed Geothermal Fluid Pipeline
- Corridors (Including Access Roads)
- Power Plant Location
- Bureau of Land Management
- Bureau of Reclamation
- State Wildlife Rec Area
- Private Lands
- Fernley Wildlife Management Area

0 0.5 1 Miles

N W E S

Figure 3

BLM 1:24K PLSS http://www.geocommunicator.gov/GeoCommunicator.shtm
Base Map from BLM 2005 Base Surface Management Status 1:100K.
Fernley Wildlife Management Area from NDOM.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Areas of Potential Utilization of BOR Land

VULCAN POWER COMPANY

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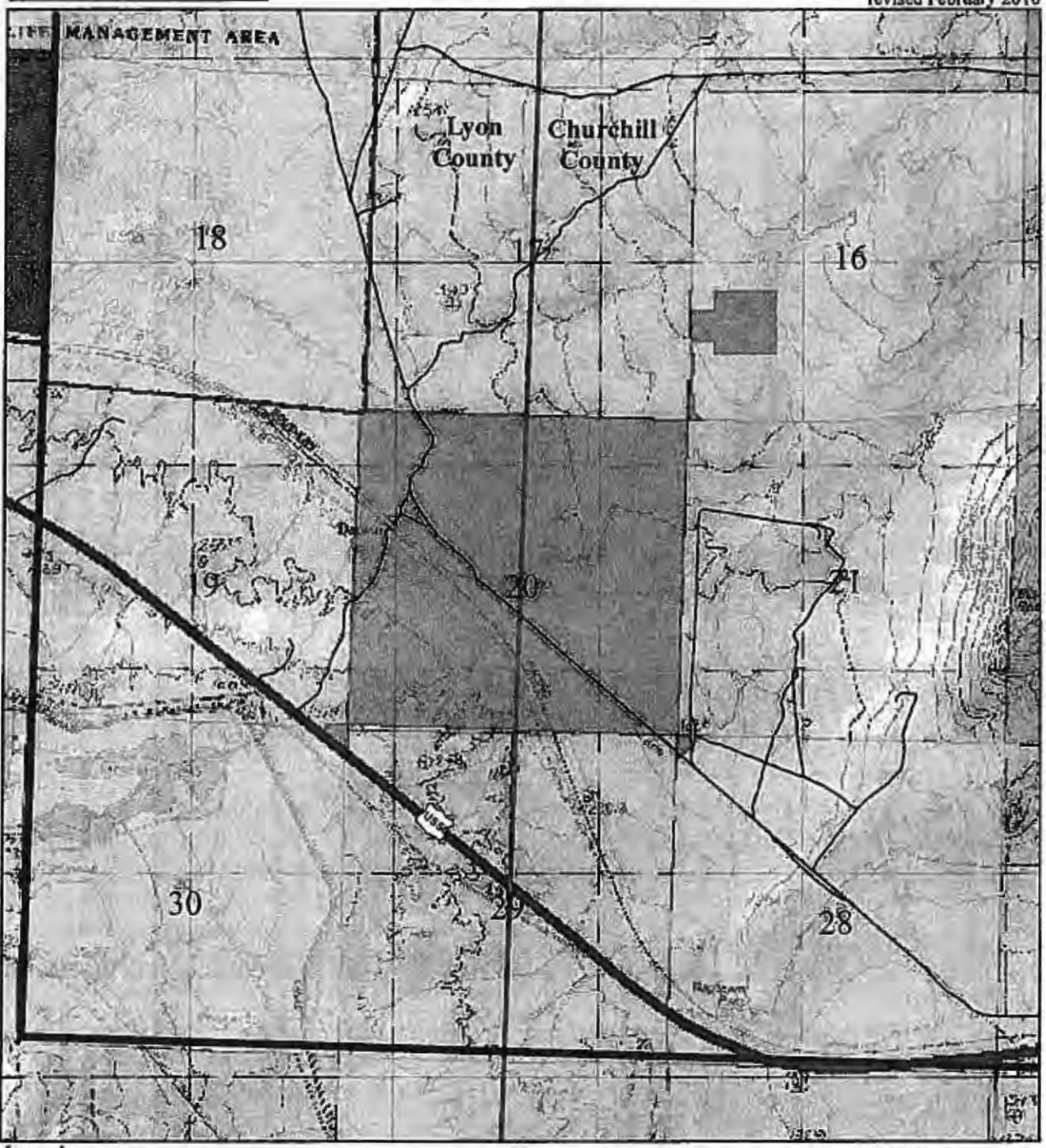
Utilization Plan
revised February 2010



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Legend

- Patua Geothermal Unit (N-85168X)
- Areas of Potential Utilization of BOR Land
- County Line
- Existing Roads
- BLM Lands
- Bureau of Reclamation Land
- State, County, City Parks & Wildlife Land
- Private Lands
- Fernley Wildlife Management Area

0 0.25 0.5 Miles

N W E S

Figure 4

Base Map from BLM 2005 Reno Surface Management Status 1:100K.
Section boundaries from USGS PLSS.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Proposed Utilization Facilities on BOR Land

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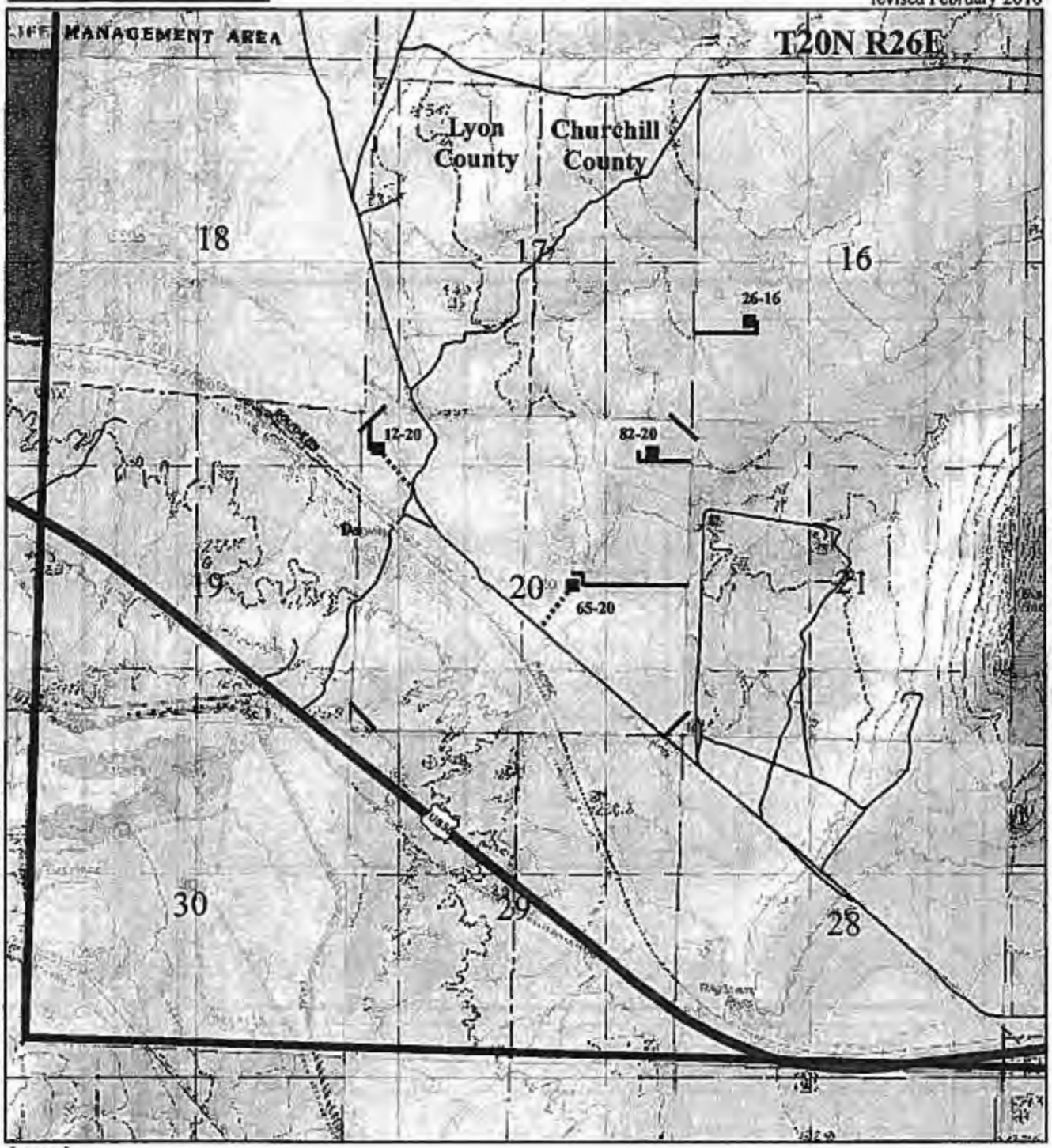
Utilization Plan
revised February 2010



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Legend

- Patua Geothermal Unit (N-85168X)
- Proposed Geothermal Fluid Pipeline Corridors (Including Access Roads)
- Proposed Well Pads
- Existing Roads
- Proposed Roads
- BLM Lands
- Bureau of Reclamation Land
- State, County, City
- Parks & Wildlife Land
- Private Lands

0 0.25 0.5 Miles

N W E S

Figure 5

Base Map from BLM 2005 Reno Surface Management Status 1:100K.
Section boundaries from USGS PLSS.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Typical Production Well Pad
General Arrangement

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revised February 2010

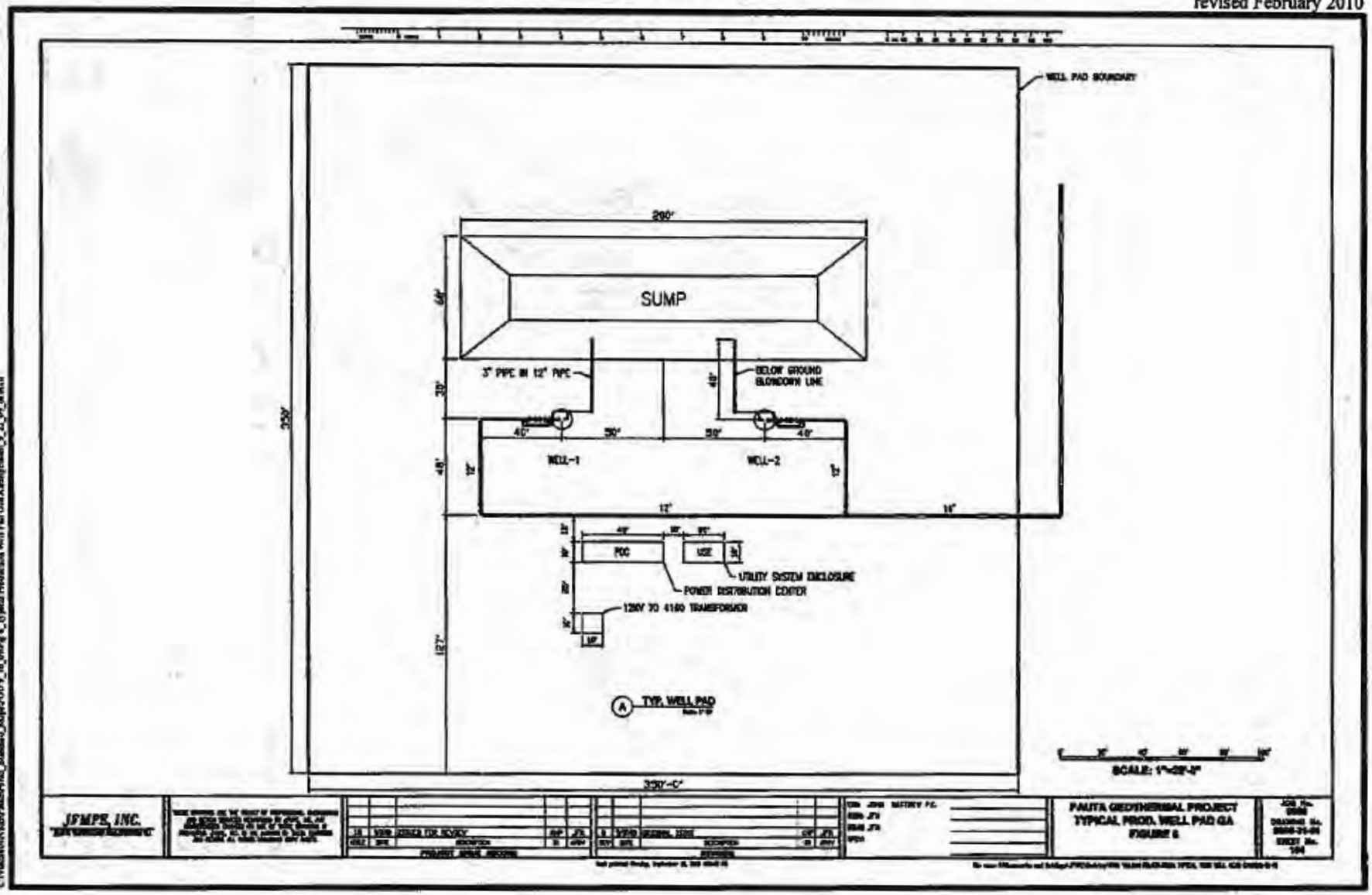

Figure 6

Patua Geothermal Project

Typical Geothermal Fluid Pipeline Supports

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Utilization Plan
revised February 2010

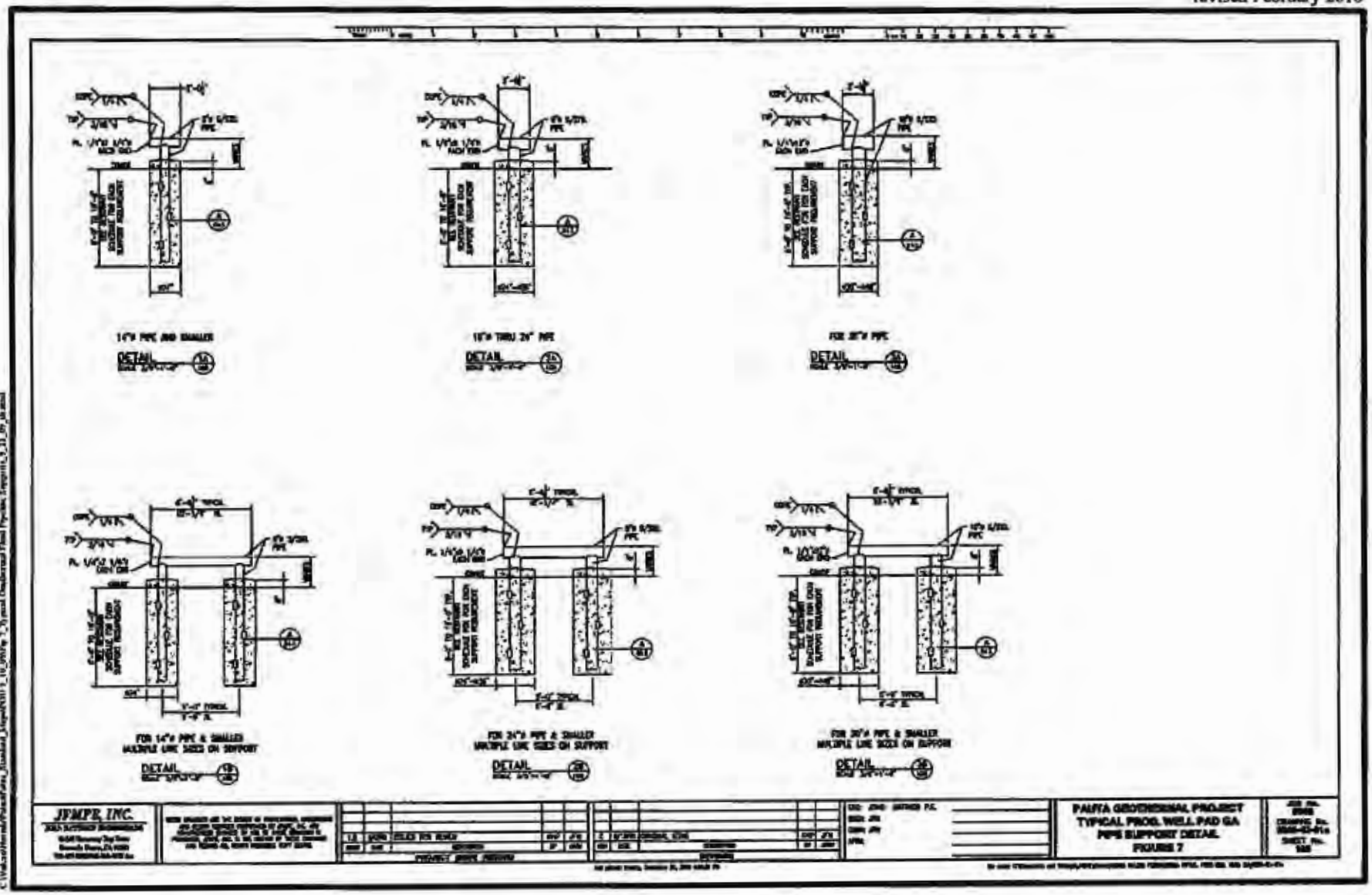

Figure 7

Patua Geothermal Project

Estimated Manpower Loading for the Construction of Proposed Utilization Facilities

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Utilization Plan
revised February 2010

Patua Pipeline and Wellpump Contruction
(2-30 MW Units)

Activity	Duration (Months)	Maximum Man Power	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Pipeline														
Pipesupports	8	6	6	6	6	6	6	6	6	6				
Welders	10	6		6	6	6	6	6	6	6	6	6	6	
Pipefitters	10	6		6	6	6	6	6	6	6	6	6	6	
Hydro testing	2	4											4	4
Electrical	6	6						6	6	6	6	6	6	
I&C	2	2										2	2	
Wellpump Installation	6	6					6	6	6	6	6	6		
Vulcan/Consultants														
Vulcan Management	12	2	1	1	2	2	2	2	2	2	2	2	1	1
Inspectors and Others	8	2			2	2	2	2	2	2	2	2		
	Manpower Loading	40	7	19	22	22	28	34	34	34	28	30	25	5
	Average		24											

Figure 8

6. Patua Geothermal Project Operations Plan – February 2010

VULCAN POWER COMPANY

Patua Geothermal Project
Utilization Plan

Revised

February 2010

Submitted to:

Bureau of Land Management
Carson City District Office
Carson City, Nevada

Bureau of Reclamation
Lahontan Basin Area Office
Carson City, Nevada

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1.0 INTRODUCTION

1.1 Background and Project Location

The Bureau of Land Management (BLM) has issued various Federal geothermal leases within the Patua Geothermal Unit N-85168X (Unit), which is generally located east of Fernley, Nevada, in Churchill and Lyon counties: NVN-075005, NVN-077647, NVN-079276, NVN-079291, NVN-079292, and NVN-085705. Vulcan Power Company (VPC) has acquired the rights to all of the Federal geothermal leases within the Unit indirectly from private parties, with the exception of NVN-085705, which was acquired directly from the BLM. In addition, VPC has agreements with private landowners for the rights to the geothermal resources associated with the majority of private lands within the Unit. See Figure 1- General Vicinity Map for the location of the Patua Geothermal Unit and Figure 2- Patua Geothermal Unit, which depicts the geothermal leases within the Unit.

VPC has previously conducted geothermal resource exploration activities within the Unit, which consisted of geologic reconnaissance, geophysical surveys (gravity, magnetotelluric, and two-dimensional seismic reflection), and exploration drilling. It should be noted that exploration drilling conducted to date has been on the private lands only. Based upon the results of the geothermal resource exploration and subsequent analyses, VPC is proposing to design, construct, and operate geothermal well pads and wells, geothermal fluid pipelines, transmission lines, and their associated access roads, on lands that are managed by the Bureau of Reclamation (BOR). These facilities would be connected to a geothermal power generation facility, capable of producing 60 megawatts (MW) net of electricity, to be located on a privately owned section of land (Section 21, T20N, R26E, MDBM), within the Unit. Figure 3- Project Overview depicts the locations of all project facilities, whether located on BOR, State of Nevada, or private lands.

In general accordance with 43 CFR 3260, this Operations Plan has been prepared in order to describe the proposed geothermal drilling and testing operations to be located on BOR lands. A separate Utilization Plan for the Patua Geothermal Project has been prepared by VPC, revised February 2010, in order to describe proposed utilization facilities to be located on BOR lands. In addition, a separate Plan of Development for the Patua Geothermal Project has been prepared by VPC, revised February 2010, in order to describe the location and details of the proposed transmission line and its associated right-of-way.

1.2 Summary of Proposed Operations

Generally speaking, the proposed geothermal drilling and testing operations on BOR lands would be located within the Unit on lease NVN-085705, in portions of sections 16 and 20, T20N, R26E, MDBM; see Figure 4- Potential Areas for Well Pads on BOR Land. Figure 5-

Proposed Well Pads and Access Roads on BOR Land depicts the proposed locations of the geothermal well pads and their associated access roads, on BOR lands within the Unit. Pending the results of various environmental surveys and ongoing drilling, science, and engineering the locations of the proposed well pads on BOR lands could be slightly altered, but would remain within the areas depicted on Figure 4. In order to assess the possibility for environmental impacts related to the proposed geothermal drilling and testing operations on the potential areas for well pads depicted on Figure 4, environmental surveys have been organized by VPC, which include these areas. The surface disturbance in Sections 16 and 20, associated with the well pads and access roads, is estimated to be only about 22 acres; it is not anticipated that the total surface disturbance for the entire project, including the geothermal fluid pipelines discussed in the Utilization Plan, would exceed 30 acres. Further discussions of the proposed geothermal drilling and testing operations on BOR lands can be found in Section 2- Proposed Geothermal Drilling and Testing Operations.

In order to assess the possibility for environmental impacts related to the proposed geothermal drilling and testing operations on BOR lands, environmental surveys have been organized by VPC, which cover the potential areas for well pads depicted on Figure 4. These environmental surveys include a botanical evaluation, a wildlife evaluation, and a cultural resources evaluation. In accordance with the National Environmental Policy Act (NEPA) an Environmental Assessment (EA) is planned for the project development proposed on BOR lands, which includes the proposed geothermal drilling and testing operations described herein. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Environmental protection measures relevant to the proposed drilling and testing operations are described below. Additionally, in general compliance with the requirements of Section 106 of the National Historic Preservation Act, cultural resource surveys are also being conducted on private lands where geothermal drilling and testing operations associated with the project are to be located.

In order to meet project deadlines, it is expected that well pad construction will begin immediately upon BLM approval and drilling and testing operations would begin shortly thereafter. It is anticipated that construction of pipelines (discussed in the Utilization Plan), transmission lines (discussed in the Plan of Development), and their associated access roads would not begin until third quarter 2011. VPC plans to begin construction of the power generation facility within the Second Quarter 2011 and complete the construction of all facilities within the First Quarter 2012 timeframe.

2.0 PROPOSED GEOTHERMAL DRILLING AND TESTING OPERATIONS

The proposed geothermal drilling and testing operations on BOR lands would potentially occur within the areas depicted on Figure 4. Figure 5 depicts the tentative locations for the well pads and their access roads. The proposed geothermal drilling and testing operations are summarized in greater detail below.

2.1 Geothermal Wells

In order to efficiently utilize the geothermal resource it is estimated that thirteen (13) individual well pads would be sufficient to accommodate the number of production wells and injection wells required to generate 60 MW net of electricity. As depicted on Figure 3, only four (4) well pads are currently proposed on BOR lands and nine (9) well pads will be located on private lands; however, it is possible that two (2) additional well pads could be located on BOR lands, for a total of six (6). Generally speaking, multiple wells could be located on one (1) well pad. The proposed geothermal wells and access roads are discussed in more detail below.

2.1.1 Well Pad Locations

Four (4) geothermal well pads and wells are proposed for construction, drilling, and testing on BOR lands. The well pad names are 26-16, 12-20, 65-20, and 82-20, and their locations are depicted on Figure 3 and Figure 5. The locations of these four (4) well pads are tentative, and pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered. Also, it is possible that up to two (2) additional well pads could be proposed in Section 20, however, that has yet to be determined.

Existing well pads on private lands include 23-17, 37-17, 21-19, 77-19, 44-21, and 68-21. To date, drilling has been conducted on 23-17, 37-17, 21-19, and 77-19 only. Future well pads on private lands are expected to include 62-19, 21-29, and 81-29. These future well pad locations are tentative, and pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered. The locations of existing and future wells on private lands are depicted on Figure 3.

2.1.2 Well Pad Layout and Design

Well pads during drilling operations typically consist of a 350 foot by 350 foot area, which includes a 200 foot by 60 foot reserve pit. Figure 6- Typical Well Pad General Arrangement depicts the general footprint of the drill rig, reserve pit, pumps, office facilities, crew facilities, parking, storage, and other drilling fluid treatment apparatus. Minor adjustments to equipment placement could be necessary based on site-specific considerations such as surface runoff; however, the pad footprint will retain the same overall dimensions and occupy the same approximate total area. Generally speaking, multiple wells could be located on one (1) 350 foot by 350 foot well pad.

2.1.3 Well Pad Access Roads

Proposed access roads to the well pads during drilling are depicted on Figure 3 and Figure 5. These roads are tentative and pending the results of various environmental surveys and ongoing drilling, science, and engineering their locations could be slightly altered, but would remain within the areas depicted on Figure 4. Typical well pad access roads will be

approximately 14 to 15 feet wide and will have a design speed of 10 to 15 miles per hour. Other relevant road criteria, based upon the guidelines presented in the Gold Book, Fourth Edition, Revised 2007, include:

- Maximum Road Grade- Typically grades will not exceed 8 percent.
- Minimum Road Crown- Typically roads will be constructed with not less than a 2 percent crown.
- Road Turnouts- Typically, on single lane roads, turnouts will be located at 1,000 foot intervals or they will be intervisible, whichever is the lesser. Turnouts will generally consist, as a maximum, of a 100 foot turnout width (parallel to the roadway), having a 25 foot tapered transition at each end and a depth of at least 10 feet (perpendicular to the roadway).
- Road Drainage- Road drainage will be facilitated, on an as needed basis, by the incorporation of drainage dips, in-sloping or out-sloping, crowning, utilization of natural topography, ditches, and/or culverts. If during construction, it is determined that culverts or drainage crossings are required, they will be designed for a minimum 25 year storm frequency.
- Erosion Control- See Section 4.2- Soil Erosion and Sedimentation for a discussion of methods that will be utilized to mitigate soil erosion.
- Revegetation- See Section 4.10- Site Reclamation and Abandonment for a discussion of methods that will be utilized during reclamation activities, which includes the utilization of salvaged topsoil.

2.2 Geothermal Drilling and Testing Operations

The geothermal drilling and testing operations will be conducted in general accordance with federal, state, and local requirements. Prior to beginning drilling a Geothermal Drilling Permit (GDP) will be submitted to BLM for each well, in addition to, the appropriate permits required by Nevada Division of Minerals (NDOM).

2.2.1 Drilling Operations

Generally speaking, a standard rotary drill rig with an approximate depth range of 7,000 feet to 10,000 feet will be used. A typical 10,000 foot deep hole requires approximately 65 days to complete; drilling on a 24 hours per day 7 days per week basis. Drill crews work in two shifts per day and typically consist of 5 people per shift.

GDPs will be submitted for each well and will contain specific information regarding hole size, casing requirements, wellhead design, drilling fluids, cementing, directional drilling, BOPE, and testing. The casing program for each well will comply with appropriate sections of the NDOM Geothermal Rules and Regulations and with applicable rules and regulations of other local, state, and federal agencies.

After permitting requirements have been satisfied, VPC will give at least 24 hours notification to the appropriate contacts at BLM and NDOM prior to spudding, setting casing, drill stem testing or well testing operations.

2.2.2 Testing Operations

Well testing consists of two types of tests on the completed wells, rig tests and long-term reservoir tests. Most well testing occurs during the exploration phase of development when long-term tests are conducted to determine that the reservoir has the capacity to support electricity production.

The primary objective is to maximize the ultimate recovery of Geothermal with minimum waste, minimum adverse effect to the reservoir, and to establish the mechanical and physical condition of the wellbore and the connectivity of the producing formations. Vulcan Power plans flow tests to evaluate these conditions, by moving formation fluids to adjacent wellbore's and monitoring all relevant field-wide wellbore's for pressure deviations. This will be accomplished by running a rain-for-rent water line, through previously disturbed areas, and transferring fluids using a high pressure pump and recording pressure deviations on all intrinsic wellheads. The duration of the test is dependent on the flow of the wellbore and the duration for equilibration.

During testing, wellhead pressure and temperature and the flow rates of steam and water are recorded in order to calculate the productivity of the well. The sum of the steam and water flow rates yields the total mass flow rate of the well. Sample taps on the pipeline will be used to collect water and steam samples. The water samples will be analyzed for concentrations of dissolved solids and for pH. Additional data may be collected to measure wellbore flow profiles and reservoir properties. Pressure, temperature, and spinner surveys may be run in order to identify and characterize potential production or injection intervals within the well bore.

2.2.3 Shut-In and Well Maintenance

Upon completion of well testing the well test equipment will be dismantled and either stored on the pad until needed at the next well, or it will be removed from the site. A pressure gage will be placed on one of the wing values for occasional pressure checks. Wellheads will be maintained on a regular basis.

3.0 GENERAL SITE ACTIVITIES

3.1 Site Evaluations

In order to site the proposed locations of geothermal wells and their access roads, various factors were considered, including but not limited to: a review of existing topography, a review

of published geologic literature and maps, geologic field reconnaissance and mapping, review of recent geophysical survey data, and review of existing drill logs and reports. The proposed geothermal well locations ultimately represent the results of geologic and engineering analyses of previously acquired data.

It is important to note that the proposed locations of the well pads and access roads on BOR lands, depicted on Figure 3 and Figure 5, are tentative. Pending the results of various environmental surveys and ongoing drilling, science, and engineering the locations of the proposed well pads and access roads on BOR lands could be slightly altered, but would remain within the areas depicted on Figure 4.

3.2 Site Preparation and Construction

The proposed drilling and testing operations on BOR lands will require construction activity at the well pads and access roads, described in greater detail in the sections below.

3.2.1 Geothermal Well Pads

Site preparation for the geothermal well pads consists of standard grading practices, including clearing and grubbing, as needed, the native ground surface and then constructing a nearly level well pad, having a minor slope downward to the excavated reserve pit, in order to direct surface water. Each well pad is covered with compacted gravel to protect the pad surface from erosion and to provide a sufficient base for vehicular traffic and drill rig foundation. Based on the existing topography at each well pad location, grading would consist of varying, but minor, degrees of cut and fills, and would be performed in general accordance with local standards of practice and the Gold Book. Any suitable topsoil will be stockpiled onsite for later use during restoration. See Section 3.4- Fill Materials, below, for a discussion of fill material sources.

3.2.2 Access Roads

Construction of the access roads for geothermal well pads will be conducted in general accordance with the guidelines of the Gold Book. The access roads will be cleared and grubbed as necessary and brought to grade, using standard grading practices. Any suitable topsoil will be stockpiled onsite for later use during restoration. In the event fill material is required, suitable material will be obtained from onsite permitted sources and/or offsite commercial sources. Proper drainage control devices will be incorporated, as necessary, to accommodate natural drainage. It is not anticipated that fence cuts and/or cattlegaurds will be necessary as no existing fences will be intercepted and no open-range livestock are known to inhabit the area proposed for development. No major cuts/fills are anticipated during construction of this development. Maintenance of the access roads will be on an as needed basis and will be conducted in general accordance with the guidelines of the Gold Book.

3.3 Estimated Surface Disturbance

The estimated surface disturbance for well pads and access roads on BOR lands is described below on a section by section basis. The estimations were determined assuming the following:

- Geothermal well pads are approximately 350 feet by 350 feet;
- Access roads are approximately 14 to 15 feet wide.

It should be noted that the surface disturbance associated with the geothermal wells and access roads herein and the surface disturbance for the well pads and access roads described in the Patua Geothermal Project Utilization Plan, submitted by VPC, revised February 2010, will overlap. More specifically, the surface disturbance associated with the well pads and access roads described below is also included in the values indicted in the Utilization Plan for well pads and their access roads. In any event, the total surface disturbance on BOR lands for the Patua Geothermal Project for geothermal well pads and wells, geothermal fluid pipelines and their expansion loops (discussed in the Utilization Plan), and associated access roads, is not anticipated to exceed approximately 30 acres.

3.3.1 Section 16 T20N R26E MDBM

The approximate estimated surface disturbance distribution for a geothermal well pad and access road on BOR Section 16, T20N, R26E, MDBM is as follows:

- Geothermal Well Pads (1): 3 acres;
- Access Roads: ½ acres.

Pending the results of various environmental surveys and ongoing drilling, science, and engineering the locations of the proposed geothermal well pad and access road listed above could be slightly altered, but it is not anticipated that the surface disturbance would exceed approximately 5 acres in Section 16.

3.3.2 Section 20 T20N R26E MDBM

The approximate estimated surface disturbance distribution for geothermal well pads and access roads on BOR Section 20, T20N, R26E, MDBM is as follows:

- Geothermal Well Pads (up to 5): 15 acres;
- Access Roads: 3½ acres.

Pending the results of various environmental surveys and ongoing drilling, science, and engineering the locations of the proposed geothermal well pads and access roads listed

above could be slightly altered, but it is not anticipated that the surface disturbance would exceed approximately 24 to 25 acres in Section 20.

3.4 Fill Materials

Options for obtaining fill and base rock materials in the general vicinity are abundant. During previous well pad construction native soil and rock material were found to be suitable as fill materials. Therefore, the need for fill material from other sources would be unlikely, but would be determined on a case-by-case basis.

If additional base rock or other earth materials are needed for road or well pad construction or maintenance, they will be obtained locally, from one of the following:

- The permitted gravel operation within the Unit, located east of Black Butte, in Section 24, T20N, R26E, MDBM.
- Local commercial sources.

3.5 Drilling and Construction Water

Water will be required during drilling and during construction for dust control and soil compaction of the well pads and their associated access roads. Drinking water for construction workers and drillers will be obtained from off-site sources and the construction and drill sites will have portable chemical toilets that contain their own water.

The amount of water required for drilling purposes will vary depending on many factors (hole diameter, hole depth, hole duration, mud requirements, etc.). Approximately 20,000 gallons of water could be required per day.

Dust control will be performed on an as needed basis during construction and maintenance operations to adequately suppress fugitive dust. Fugitive dust suppression will be conducted in accordance with the Surface Area Disturbance (SAD) permit. It is understood that more water would be required during hot and dry summer months than cold and wet winter months.

The amount of water required for soil compaction during construction of the well pads and access roads, cannot be reasonably estimated at this time. Generally speaking, water required for soil compaction is a function of in situ soil moisture content, required compaction percentage, weather conditions during compaction, and other factors that are unknown at this time. Vulcan will comply will all applicable Federal, State and Local soil compaction requirements.

Water for drilling and construction could be obtained from one or a combination of the following three (3) sources:

- <u>On-site water well(s)</u>- Applications could be submitted to the Nevada Division of Water Resources (NDWR) and the Nevada Division of Environmental Protection (NDEP) for

approval to drill one or more water wells for dust control and soil compaction purposes during construction of the proposed geothermal well pads and access roads.

- Water purchase from local public sources- VPC has purchased water from the Truckee Carson Irrigation District (TCID) over the past couple of years in addition to the City of Fernley. Both the TCID and City of Fernley have been an important source of water during drilling operations.
- Water purchased from private parties- Numerous private parties have been identified in the area who have water available for sale.

4.0 ENVIRONMENTAL PROTECTION MEASURES

VPC's goal is to develop a project that avoids creating significant environmental impacts. In addition to environmental protection measures discussed herein, VPC has reviewed lease stipulations attached to Federal geothermal lease NVN-85705, which encompass the potential areas for geothermal well pads and access roads on BOR lands, depicted on Figure 4. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is planned for the project development proposed on BOR lands, which includes the proposed geothermal well pads and access roads described herein. Environmental protection measures relevant to the proposed geothermal drilling and testing operations are described in general below.

4.1 Fire

An Emergency Response Plan will be maintained during and after construction of proposed geothermal well pads and access roads to address procedures and notification requirements in the event of a fire. Water trucks to be used for watering roads, or for earthwork purposes, could be available to provide water for fire suppression and control if needed.

4.2 Soil Erosion and Sedimentation

A Stormwater General Permit NVR 100000 was issued for the Patua Geothermal Project by the Nevada Department of Environmental Protection (NDEP), effective December 19, 2008. To obtain this permit, the Patua Geothermal Project's Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities, related to the construction of well pads and access roads, was submitted to and accepted by NDEP. The SWPPP includes Best Management Practices (BMPs) that will be followed in order to reduce soil erosion within the project area.

In order to minimize the effects of wind erosion, access roads and other disturbed areas will be watered on an as needed basis. To control surface water runoff, well pads are constructed with a reserve pit and a series of berms, trenches and sediment traps. Roads will be planned,

constructed and maintained in general accordance with guidelines of the Gold Book and standard construction BMPs.

4.3 Surface and Groundwater

Reserve pits will be constructed on each well pad and will be lined with clay soil to impede infiltration. Any short term discharges of geothermal fluids during testing or maintenance activities will be directed to and contained within reserve pits or injected into other geothermal wells. Well pads will be encompassed by berms and finish graded to slope downward to the reserve pit to control surface water runoff. Fluids within reserve pits will evaporate or be disposed of in accordance with applicable requirements. Roads will be constructed in a manner that directs surface water runoff to roadsides, where it will drain into the soil.

It is not anticipated that construction and geothermal drilling and testing operations will adversely affect existing surface and groundwater. Protection of surface and ground water is also addressed in the Patua Geothermal Project SWPPP, submitted by VPC December 19, 2008, and the Patua Geothermal Project Utilization Plan, submitted by VPC, revised February 2010. As discussed in these documents, VPC will utilize standard applicable BMPs for the protection of surface and groundwater and will adhere to all applicable federal, state, and local requirements.

A hydrologic evaluation program will be implemented, which will be site specific and its intensity will be commensurate with the level of development drilling. Such an evaluation will be developed in coordination with the BLM Carson City Stillwater Field Office hydrogeologist and will be implemented upon BLM consent.

4.4 Fish and Wildlife

In order to assess the possibility for environmental impacts related to the construction of well pads and access roads and geothermal drilling and testing operations on BOR lands, wildlife surveys by an experienced wildlife biologist are ongoing. These surveys include potential areas for well pads and access roads depicted on Figure 4. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the wildlife biologist, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed construction of well pads and access roads, and of the geothermal drilling and testing operations, on recognized special status or other species of concern, in the immediate vicinity of their proposed locations, and prepare appropriate mitigation measures as necessary. Wildlife field surveys are ongoing and subsequent report(s) will be completed in time for consideration in the EA.

4.5 Vegetation

In order to assess the possibility for environmental impacts related to the construction of well pads and access roads and geothermal drilling and testing operations on BOR lands, botanical

surveys by an experienced botanist are ongoing. These surveys include the potential areas for well pads and access roads depicted on Figure 4. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the botanist, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed construction of well pads and access roads, and of the geothermal drilling and testing operations, on recognized rare plants, invasive species, or other concerns, in the immediate vicinity of their proposed locations, and prepare appropriate mitigation measures as necessary. Although the botanical field surveys are not yet complete, it is preliminarily understood that various species of noxious weeds have been identified in the general vicinity of proposed well pads and access roads on BOR lands (Figure 4). As such, a Noxious Weed Abatement Plan is being developed for the Patua Geothermal Project. Botanical field surveys are ongoing and subsequent report(s) will be completed in time for consideration in the EA.

4.6 Cultural Resources

In order to assess the possibility for environmental impacts related to the construction of well pads and access roads and geothermal drilling and testing operations on BOR lands, cultural resource surveys by an experienced cultural resource consultant are ongoing. These surveys include the potential areas for well pads and access roads depicted on Figure 4. Additionally, in general compliance with requirements of Section 106 of the National Historic Preservation Act, cultural resource surveys are also being conducted on private lands where well pads and access roads are to be located. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the cultural resource consultant, BLM, BOR, SHPO, and other relevant agencies to understand potential impacts related to the construction of well pads and access roads, and of the geothermal drilling and testing operations, on recognized cultural resources of concern, in the immediate vicinity of their locations, and prepare appropriate mitigation measures as necessary. Cultural resource field surveys are ongoing and expected to be complete in time for consideration in the EA.

4.7 Air Quality Compliance

Air quality in the general area of the Patua Geothermal Project is designated as in "attainment" (U.S. Environmental Protection Agency, 2009). An attainment area is defined by Section 107 of the Clean Air Act (CAA) as one that meets national primary or secondary ambient air quality standards for criteria pollutants. Nevada Department of Environmental Protection (NDEP) Bureau of Air Pollution Control (BAPC) has been delegated responsibility by the EPA and the State of Nevada to regulate the emission of air pollutants throughout most of Nevada, which includes the general area of the Patua Geothermal Project. NDEP BAPC has set forth minimum standards for ambient air quality which incorporate EPA standards. In accordance with the requirements of NDEP BAPC a Surface Area Disturbance (SAD) Air Quality Operating

Permit (AP1629-2517) was obtained by VPC, for the Patua Geothermal Project on January 6, 2009. Conditions of this permit include the implementation of a plan for fugitive dust control.

4.7.1 Site Preparation and Construction

Site preparation will involve earthmoving activities required to construct geothermal well pads and associated access roads. Such activities are of a temporary nature and will result in non-point source emissions including fugitive dust and vehicular emissions. Fugitive dust emissions from these activities could contribute to the background level of Particulate Matter (PM) in the air. Additionally, gasoline and diesel fuel combustion vehicles will emit relatively minor amounts of criteria pollutants.

Several steps have been taken to maintain air quality compliance during site preparation including BMPs as outlined in the SAD permit. Where possible existing roads will be utilized, decreasing the need for new construction. Vehicle speeds will be limited to 10-15 miles per hour on unpaved roads. Dust will be suppressed by applying water to unpaved roads and other disturbed surfaces, on an as needed basis. Where applicable, vehicles will be maintained to comply with State of Nevada vehicle emissions standards as put forth by the Nevada Department of Motor Vehicles (NDMV) and with relevant EPA standards for criteria pollutants from diesel engines, including particulates.

4.7.2 Geothermal Drilling Operations

Drilling of geothermal wells will create temporary combustion emissions from diesel engines used on drill rigs and from vehicles accessing well pads. Such emissions will be of a temporary nature and should have a relatively minor effect on air quality in and surrounding the project area. Drill rigs used will be state-of-the art and certified to meet current EPA standards. Where applicable, vehicles will be maintained to comply with vehicle emissions standards as described above. Fugitive dust may be generated during access and will be controlled by applying water on an as needed basis.

Other potential emissions during drilling could be caused by releases of non-condensable gas (NCGs) during a loss of well control. Blow-out protection equipment will be installed on well heads during drilling operations to prevent such events from happening and drill rigs will be equipped with alarms to detect unsafe levels of NCGs. Anticipated geothermal fluid chemistry is such that temporary releases should not cause violations of Nevada Air Quality Standards.

4.7.3 Geothermal Well Testing Operations

The primary objective is to maximize the ultimate recovery of Geothermal with minimum waste, minimum adverse effect to the reservoir, and to establish the mechanical and physical condition of the wellbore and the connectivity of the producing formations. Vulcan Power plans flow tests to evaluate these conditions, by moving formation fluids to adjacent

wellbore's and monitoring all relevant field-wide wellbore's for pressure deviations. This will be accomplished by running a rain-for-rent water line, through previously disturbed areas, and transferring fluids using a high pressure pump and recording pressure deviations on all intrinsic wellheads. The duration of the test is dependent on the flow of the wellbore and the duration for equilibration.

4.8 Noise

Construction of proposed well pads and access roads and drilling and testing operations will result in temporary noise level increases. The temporary noise level increases will be minimal and should not have a distinctive impact. Actions that create unnecessary increases in noise will be avoided where possible. In the event that additional noise mitigation measures are deemed necessary they will comply with relevant standards and be determined on a case-by-case basis.

4.9 Public Health and Safety

An Emergency Response Plan and a Spill Prevention Plan will be maintained during and after project completion. Both plans will address procedures and notification requirements for possible emergencies that may affect the general public. Proposed activities at the project location will be completed so as to avoid creation of hazards to public health and safety.

4.10 Site Reclamation and Abandonment

Site reclamation will be conducted of the well pads and access roads when it is determined that the well pads will no longer be used for exploration, utilization, or any other purposes. During operations, interim reclamation will be conducted for the well pad areas no longer needed for operation or maintenance. The actual areas of the well pads that will undergo interim reclamation will be determined on a case-by-case basis and will be a function of the number of well heads and the configuration of pipelines and other required well facilities on each individual pad. All, reclamation will be conducted in general accordance with the Gold Book.

Native soil material and organic matter (topsoil) salvaged from site preparation operations will be reused as a top-dressing on berms and other areas requiring revegetation to the extent practical. Any topsoil stockpiles will be located on previously disturbed areas, such as portions of well pads, and will be situated so that wind and water erosion of the piles are minimized and the reclamation potential of the soil is maintained. Other erosion control measures may include surface seeding and moisture conditioning. In general, native topsoil contains native seeds and microorganisms essential for nutrient cycling and when reused should blend well with the adjacent undisturbed landscape. Any seed mix to be used for reclamation purposes will be developed by an experienced botanist in coordination with the BLM and will ultimately be based on seed availability and quality. Reseeding will not be undertaken in areas where

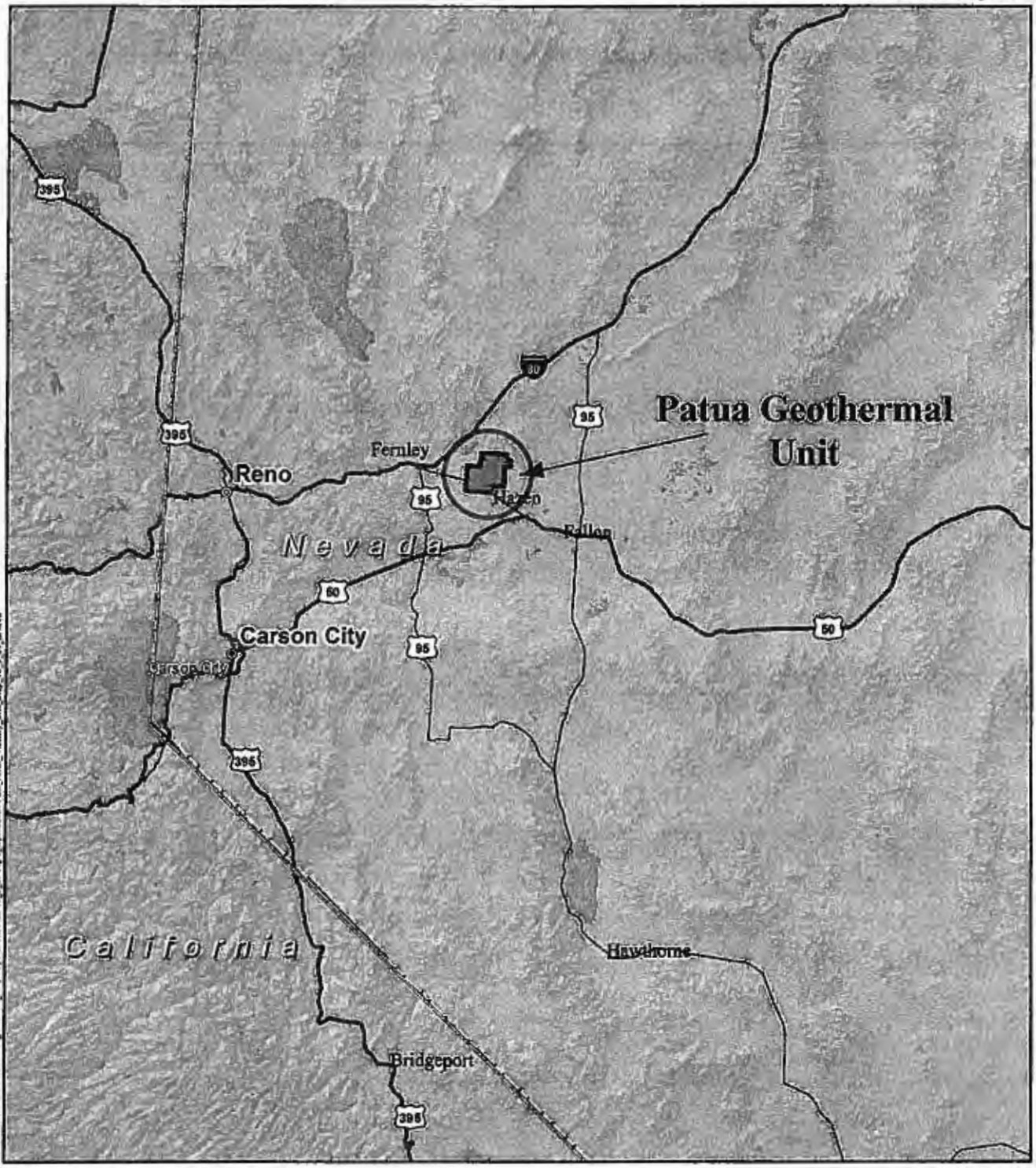
soil conditions are inappropriate or where the adjacent undisturbed land surface has little or no vegetation.

Patua Geothermal Project

General Vicinity Map

Confidential

Operations Plan
revised February 2010



Legend

Patua Geothermal Unit
(N-85168X)

0 12.5 25 Miles

N W E S

Figure 1

Base map from ESRI Software.
Section boundaries from USGS PLSS.
The contours of this map are approximate and subject to change.

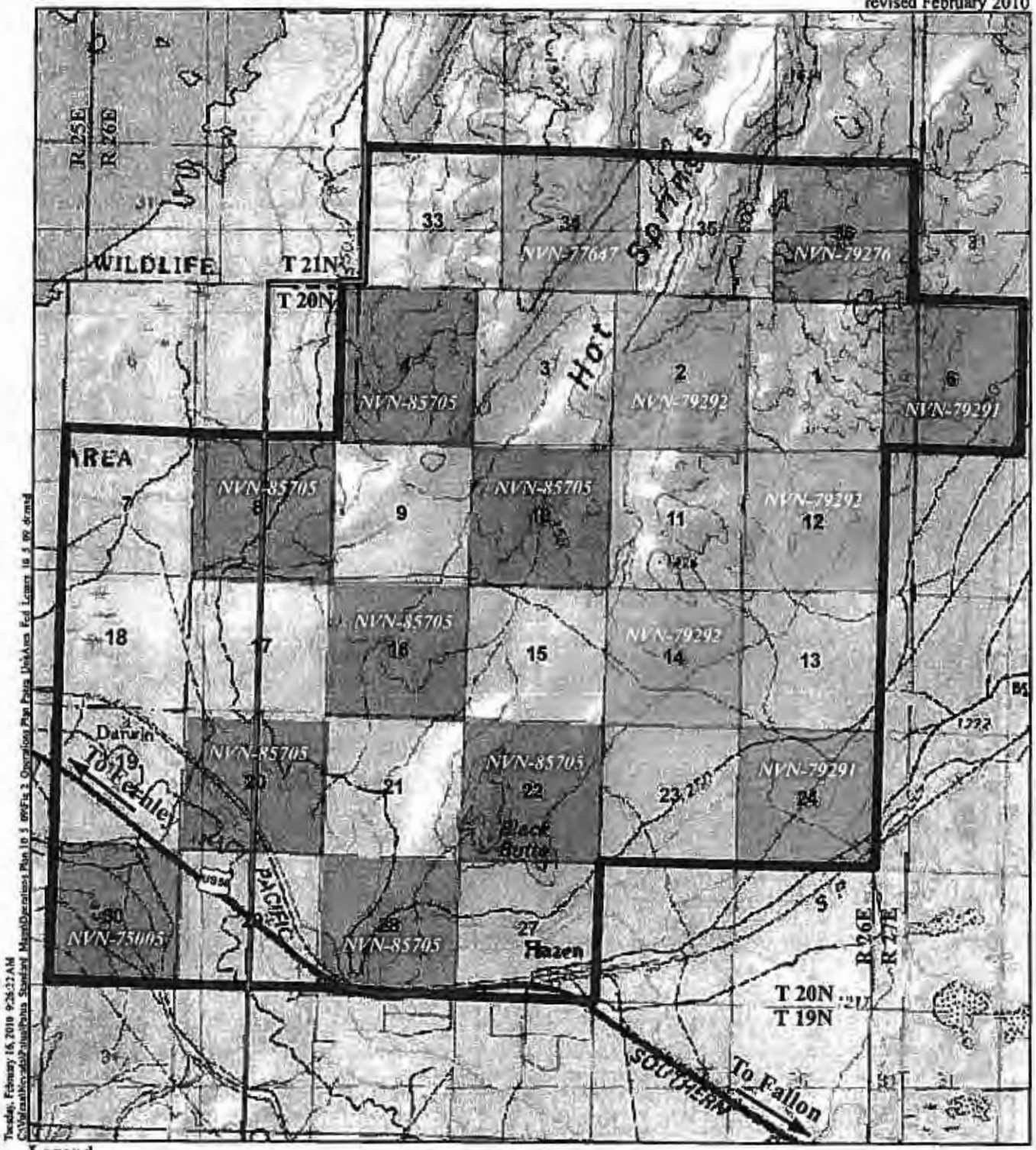
Patua Geothermal Project

Patua Geothermal Unit

VULCAN POWER COMPANY

Confidential

Operations Plan
revised February 2010



Legend

- Patua Geothermal Unit (N-85168X)
- NVN-79291
- NVN-85705
- NVN-79292
- NVN-79276
- NVN-75005
- NVN-77647

BLM Geothermal Leases

- County Line

0 0.5 1 Miles

N W E S

Figure 2

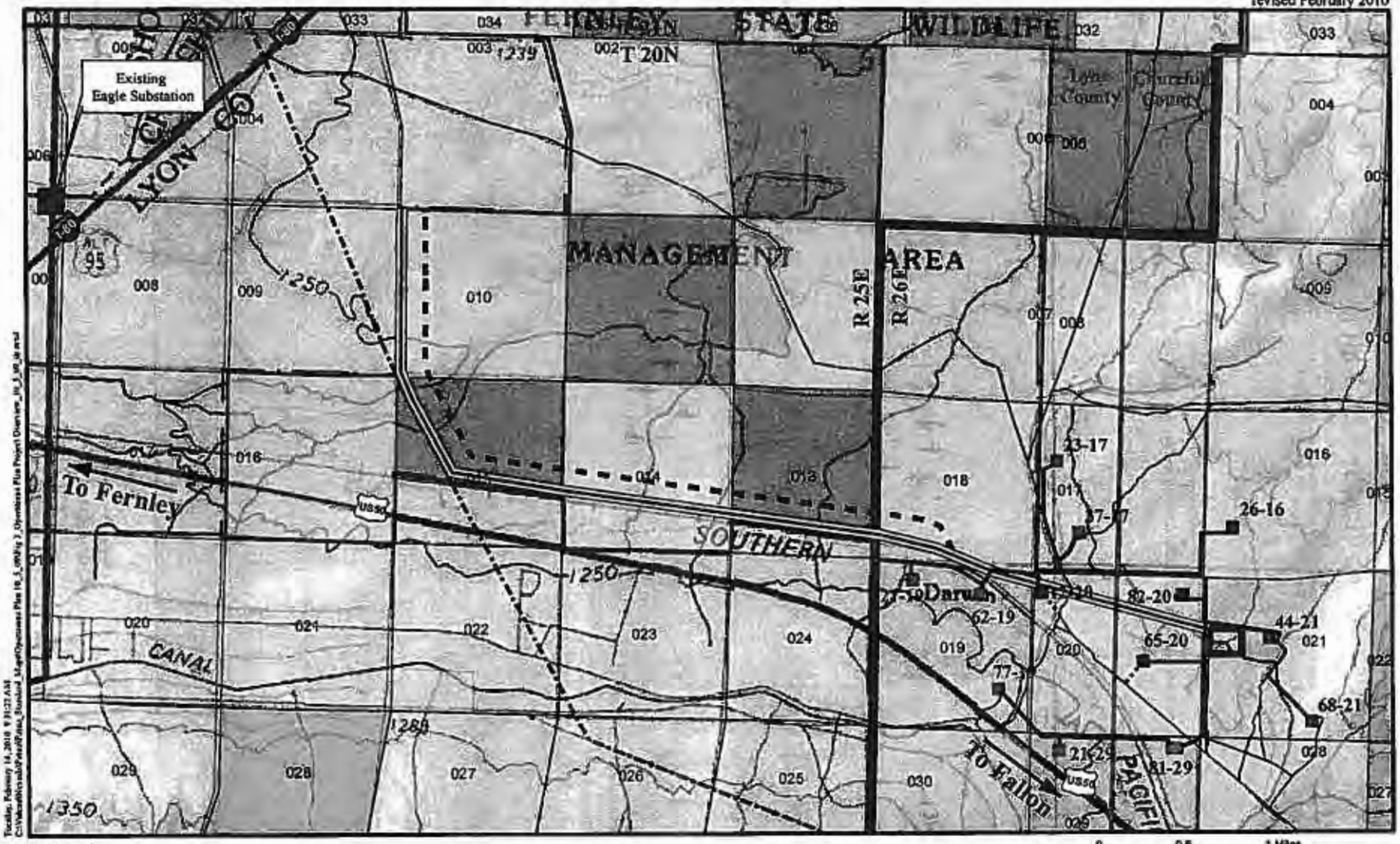
Basemap from USGS Topo.
Section boundaries from USGS PLSS.
The contours of this map are approximate and subject to change.

Tuesday, February 16, 2010 9:26:22 AM
C:\Vulcan\Nevada\Patua\Patua Standard_Maps\Operations Plan 10 5 09\Fig 2 Operations Plan Patua Unit Area Fed Leases 10 5 09.dwmd

Patua Geothermal Project
Project Overview

Confidential

Operations Plan
revised February 2010



0 0.5 1 Miles

Legend

- Geothermal Unit Boundary
- Existing Eagle Substation
- Existing PDCI Transmission Line
- Existing Transmission Line (Est)
- Existing Roads
- Proposed Roads
- County Line
- Proposed Transmission Line Route
- Alternate Transmission Line Route
- Proposed Well Pads
- Existing Well Pads
- Future Well Pads
- Proposed Geothermal Fluid Pipeline Corridors (Including Access Roads)
- Power Plant Location
- Bureau of Land Management
- Bureau of Reclamation
- State Wildlife Rec Area
- Private Lands
- Fernley Wildlife Management Area

N W E S

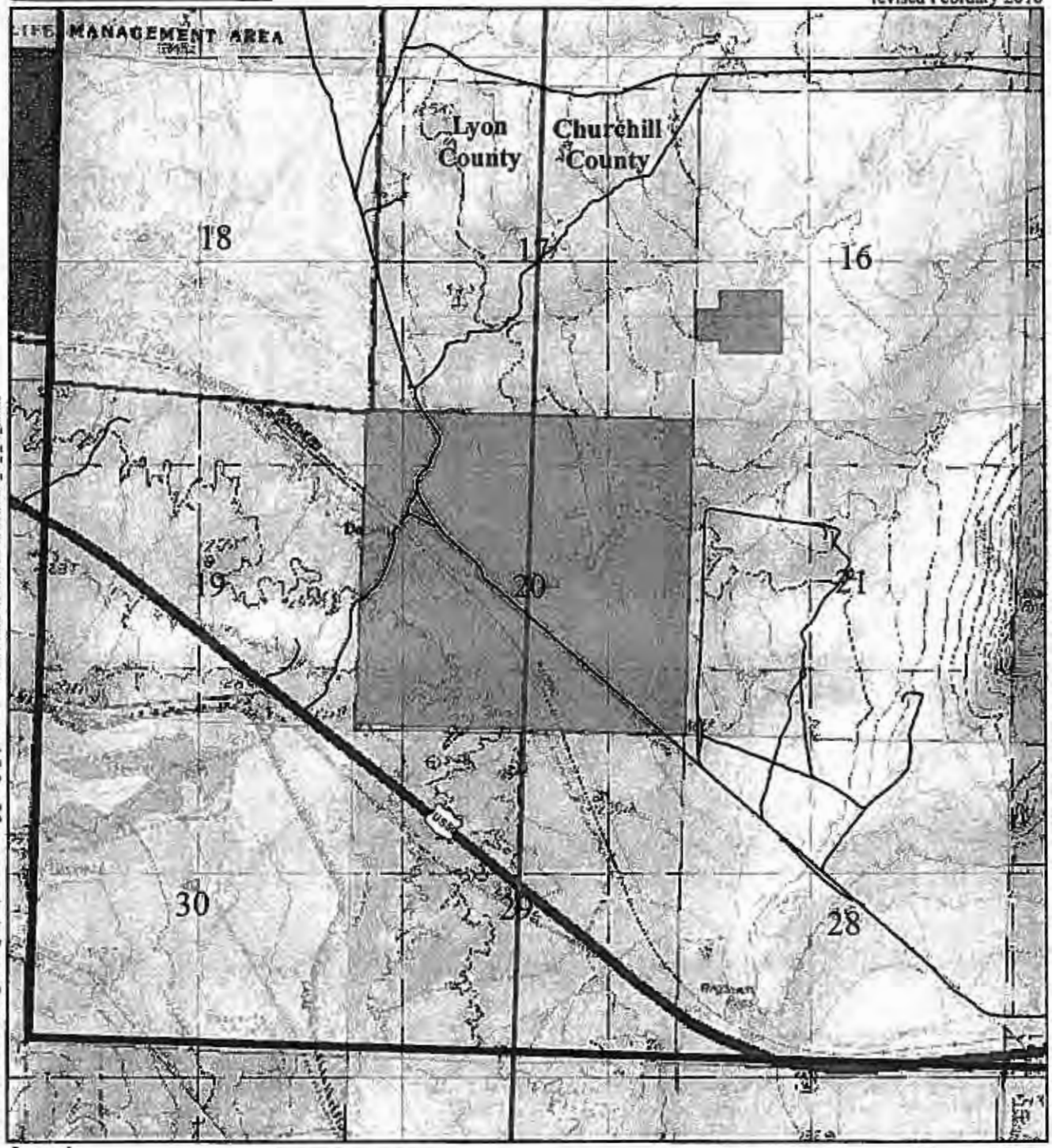
Figure 3

Patua Geothermal Project
Potential Areas for Well Pads and Access Roads on BOR Land

VULCAN POWER COMPANY

Confidential

Operations Plan
revised February 2010



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C:\Vulcan\Nevada\Patua\Patua_Standard_Maps\Operations Plan 10_3_09\Fig 4_Operations Plan Potential Areas for Well Pads on BOR Land_10_3_09_draft

Legend

- Patua Geothermal Unit (N-85168X)
- Potential Areas for Well Pads and Access Roads on BOR Lands
- County Line
- Existing Roads
- BLM Lands
- Bureau of Reclamation Land
- State, County, City Parks & Wildlife Land
- Private Lands
- Fernley Wildlife Management Area

0 0.25 0.5 Miles

N W E S

Figure 4

Base Map from BLM 2005 Reno Surface Management Status 1:100K.
Section boundaries from USGS PLSS.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Proposed Well Pads and Access Roads on BOR Land

VULCAN POWER COMPANY

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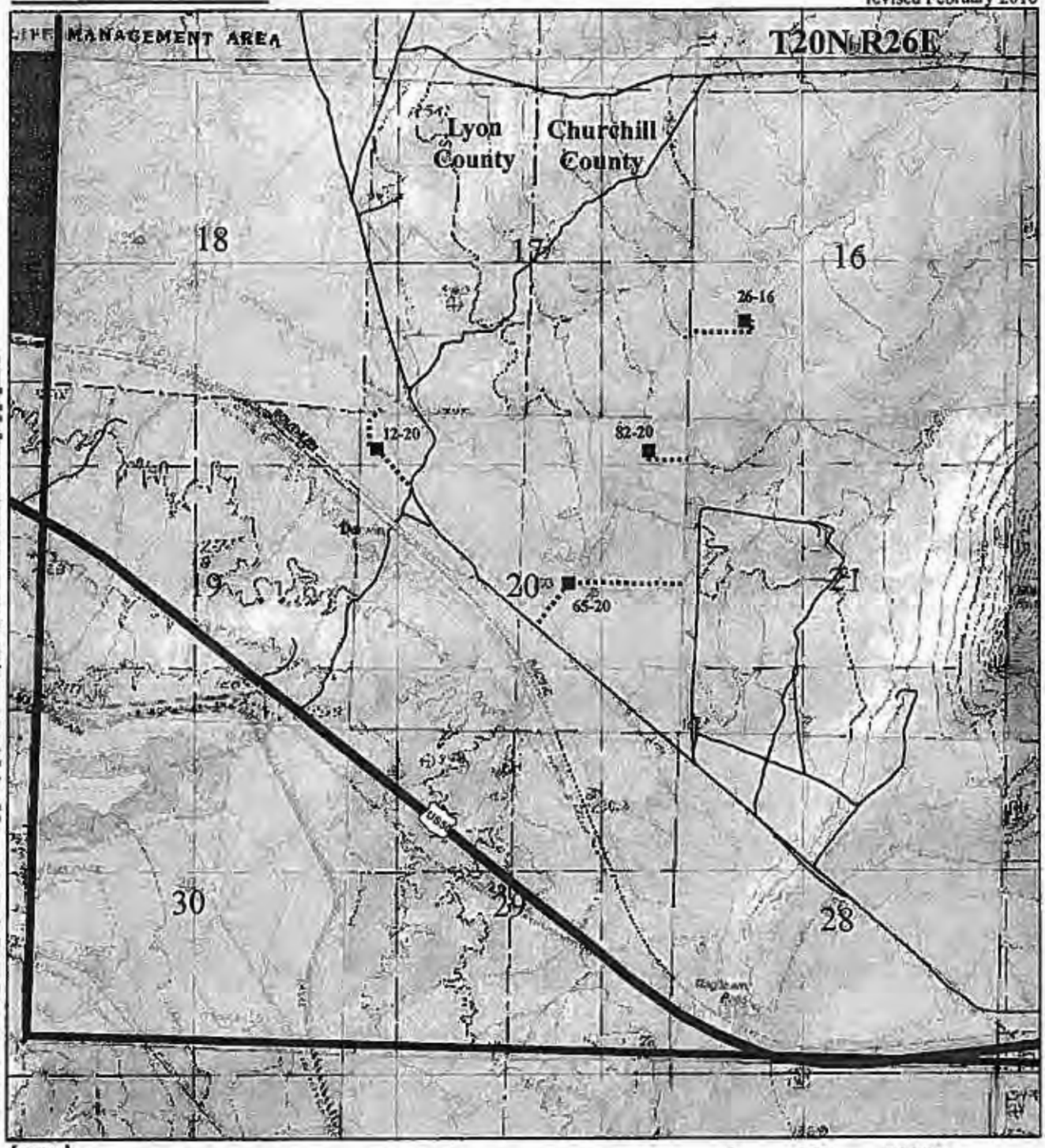
Operations Plan
revised February 2010



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Legend

- Patua Geothermal Unit (N-85168X)
- Proposed Well Pads
- Existing Roads
- Proposed Roads
- BLM Lands
- Bureau of Reclamation Land
- State, County, City
- Parks & Wildlife Land
- Private Lands

0 0.25 0.5 Miles

N W E S

Figure 5

Base Map from BLM 2005 Reno Surface Management Status 1:100K.
Section boundaries from USGS PLSS.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Typical Well Pad
General Arrangement

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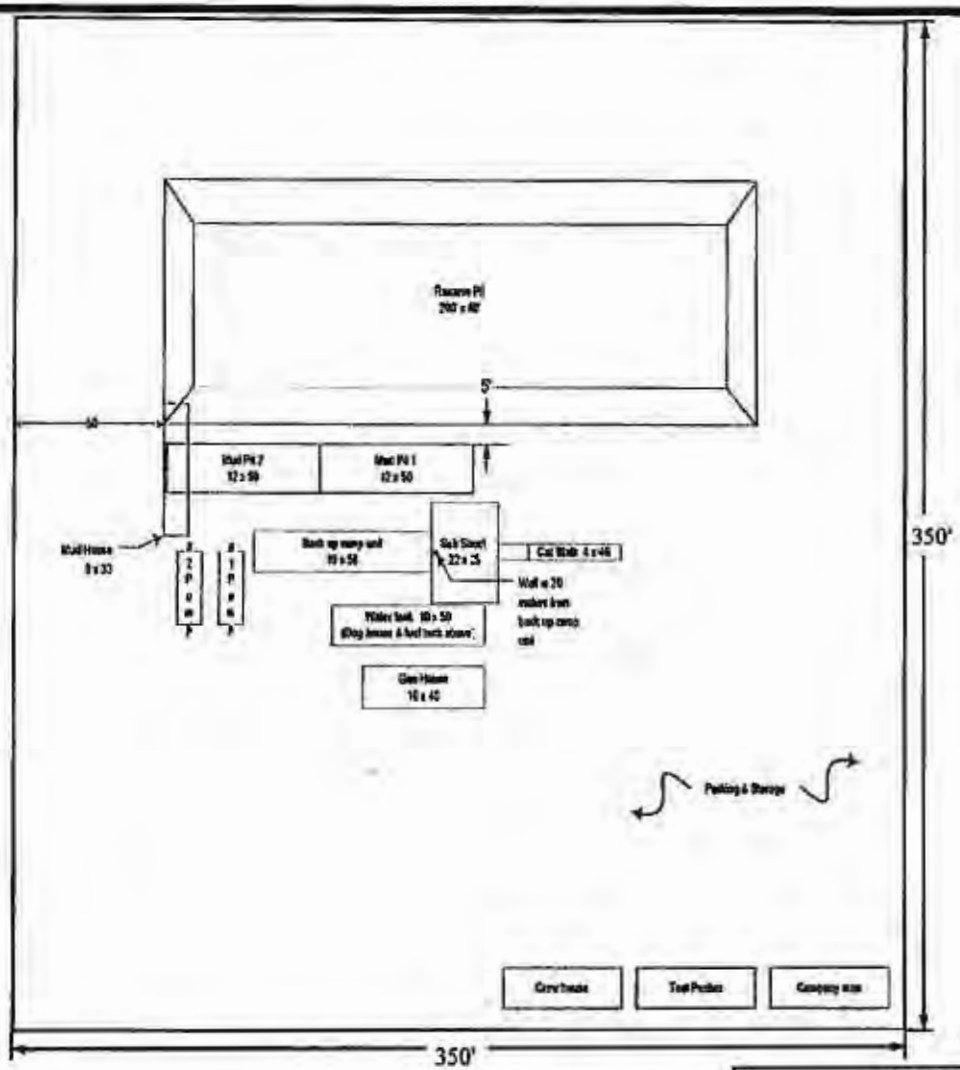
Operations Plan
revised February 2010



Note: Final Well Pad Layout design will be provided by Drilling Contractor.

Vulcan Power Company		
6	Well Pad Layout Concept	10/6/09

Figure 6

7. Patua Geothermal Project Plan of Development – February 2010

VULCAN POWER COMPANY

Patua Geothermal Project
Plan of Development

Revised

February 2010

Submitted to:

Bureau of Land Management
Carson City District Office
Carson City, Nevada

Bureau of Reclamation
Lahontan Basin Area Office
Carson City, Nevada

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1.0 INTRODUCTION

1.1 Background and General Project Location

Vulcan Power Company (VPC) has prepared this Plan of Development (POD) in order to describe the location and details of a proposed transmission line and its associated right-of-way needed to support the Patua Geothermal Project, located approximately 7 miles east of Fernley, Nevada, in Churchill and Lyon counties. See Figure 1- General Vicinity Map for the location of the Patua Geothermal Project.

Generally speaking, the approximately 6$^1/_3$ mile long, 120 kilovolt (kV) transmission line would be connected to a geothermal power generation facility, capable of producing 60 megawatts (MW) net of electricity, to be located on a privately owned section of land (Section 21, T20N, R26E, MDBM). The transmission line would terminate at another developer's substation to be located on a privately owned section of land (Section 9, T20N, R25E, MDBM). Figure 3- Transmission Line Right-of-Way Overview depicts the potential transmission line corridor. The exact location of the right-of-way is pending the results of ongoing environmental surveys.

For additional information regarding the Patua Geothermal Project, please refer to the Patua Geothermal Project Utilization Plan, revised February 2010, and Operations Plan, also revised February 2010, which describe the proposed utilization facilities and the proposed drilling and testing operations, respectively.

1.2 Purpose and Need

The purpose of the proposed 120 kV transmission line is to transport the electrical power generated at the 60 MW net geothermal power plant to another developer's substation in Section 9, T20N, R25E, MDBM. VPC has conducted geothermal exploration on privately owned sections of land within the Patua Geothermal Unit (N-85168X, see Figure 2) and plans to conduct further exploration and development of an identified geothermal resource. Development plans include the construction of geothermal well pads and wells, geothermal fluid pipelines, a geothermal power plant, and the approximately 6$^1/_3$ mile long, 120 kV transmission line proposed herein. The geothermal power plant will be located on private lands within the Patua Geothermal Unit near the western edge of Section 21, T20N, R26E, MDBM.

Geothermal power is just one of a handful of clean renewable energy technologies available to support the ever-increasing energy demands of the world. In the United States many states have implemented renewable portfolio standards (RPS), which are policies that require electricity providers to obtain a certain portion of the electricity they sell from renewable energy resources. Geothermal power is recognized as a baseload renewable technology because a geothermal power plant can typically produce electricity 24 hours a day, 7 days a week and

thus provide stability to the grid. VPC has an existing agreement to sell the clean geothermal power generated at the power plant to an electricity provider where it will be used to support stable electrical output to customers and assist in satisfying the provider's RPS requirements.

2.0 PROJECT DESCRIPTION

The proposed 120 kV transmission line route is approximately $6^1/_3$ miles long and crosses over private lands, State of Nevada lands, BOR lands, and BOR lands with Federal geothermal lease (NVN-085705). Figure 2 – Patua Geothermal Unit depicts VPC federal geothermal leases in the area. The proposed right-of-way width required for construction and operation of the 120 kV transmission line is 75 feet, however, at some angle change locations the right-of-way will need to be larger to accommodate necessary guying. The proposed route and alternate corridor were selected after consideration was given to it and three (3) other possible routes.

The proposed transmission line facilities will consist of approximately $6^1/_3$ miles of an overhead, 120 kV, single circuit transmission line constructed on H-frame ("HF") structures using either direct embedded wood poles or self-supporting, self-weathering, steel poles where guying room is unavailable. There will be approximately 50-60 such structures, typically 60-ft above ground. The conductor will be either 556 kcmil 26/7 ACSR ("Dove") or 795 kcmil 26/7 ACSR ("Drake"), one per phase; however, this is preliminary and subject to change based on more detailed engineering.

It is anticipated that construction of the transmission facilities would not begin until after the Third Quarter 2011. VPC plans to complete the construction of all facilities within the First Quarter 2012 timeframe. Figure 3 depicts the proposed 120 kV transmission line right-of-way. The proposed transmission line route and transmission line facilities are summarized in greater detail below.

2.1 Transmission Line Route

Figure 3 depicts the proposed transmission line route as well as an alternate 1000 foot wide corridor, through the Fernley Wildlife Management Area, wherein the required ROW could be relocated, if necessary, to avoid areas of concern. The proposed route and alternate corridor were selected after consideration was given to it and three (3) other possible routes depicted on Figure 4. Generally speaking, the transmission line route will be approximately $6^1/_3$ miles long, beginning at the proposed geothermal power plant on the western edge of Section 21, T20N, R26E, MDBM, and heading approximately northwest through Section 20 where it will cross into Section 19. The route will then run northwest through Section 19 and intercept the railroad right-of-way where it will continue generally to the west and parallel to the railroad ROW through the southwest portion of Section 18, T20N, R26 E, MDBM. The route will parallel the railroad ROW west through Sections 13, 14, T20N, R25E, MDBM and approximately two-thirds through Section 15, T20N, R25E, MDBM, where it will intercept the existing PDCI transmission line and turn approximately to the northwest running parallel to the

PDCI to Section 10. After crossing into Section 10, the line will turn north and run parallel along the border of Section 10 and Section 9 to its termination point where it will tie into another developer's new substation to be generally located in the NE¼NE¼, Section 9, north of the Fernley Wastewater Treatment Facility. The various segments of the route are discussed in greater detail below as they pertain to the different lands crossed.

2.1.1 Route Locations on Federal Geothermal Leases

The transmission line route locations on BOR lands with Federal geothermal lease NVN-085705 (see Figure 2) will include:

- An approximately 1 mile long segment running approximately northwest through the northern half of Section 20, T20N, R26E, MDBM.

2.1.2 Route Locations on Bureau of Reclamation Lands

The transmission line route locations on BOR lands within the Fernley Wildlife Management Area include the following:

- An approximately ¾ mile long segment running approximately parallel to the railroad ROW west through the southwest quarter of Section 18, T20N, R26E, MDBM;
- An approximately 1 mile long segment running approximately parallel to the railroad ROW west through the south half of Section 14, T20N, R25E, MDBM; and
- An approximately 1 to $1^{2}/_{10}$ mile long segment running north through the west quarter of Section 10, T20N, R25E, MDBM.

2.1.3 Route Locations on State of Nevada Lands

The transmission line route locations on State of Nevada lands within the Fernley Wildlife Management Area include the following:

- An approximately $^{8}/_{10}$ to $^{9}/_{10}$ mile long segment running approximately parallel to the railroad ROW west through the south half of Section 13, T20N, R25E, MDBM; and
- An approximately $1^{1}/_{10}$ to $1^{3}/_{10}$ mile long segment running approximately parallel to the railroad ROW west, then approximately parallel to the PDCI transmission line ROW northwest, through the center and northwest quarter, respectively, of Section 15, T20N, R25E, MDBM.

2.1.4 Route Locations on Private Lands

The transmission line route locations on Private lands within the Patua Geothermal Unit (N-85168X, see Figure 2) include the following:

- An approximately $^{3}/_{10}$ to $^{4}/_{10}$ mile long segment running approximately northwest through the northeast quarter of Section 19, T20N, R26E, MDBM to the railroad ROW.

2.1.5 Considered but Rejected Transmission Line Routes

The proposed transmission line route and alternate corridor depicted on Figure 3 were selected as the best routes for proposal, having the least potential for impacts and other concerns. Three (3) other routes that were considered but rejected are depicted on Figure 4. Below are brief and general explanations for their rejection:

- The North Route was rejected due to concerns raised by the Nevada Department of Wildlife;
- The South Railroad Route was rejected due to concerns raised by the City of Fernley, Nevada; and
- The Desert Shadow Lane Route was rejected due to concerns raised by the City of Fernley, Nevada.

2.2 Proposed Transmission Facilities

The proposed design, construction, and operation of the transmission line facilities are in general accordance with the 2007 National Electrical Safety Code (NESC), North American Electric Reliability Council (NEARC), Western Electricity Coordinating Council (WECC), operating protocols with interconnecting parties, and current standards of practice for the electric utility industry.

2.2.1 Facilities Design Factors

The proposed 120 kV transmission line will interconnect the generation substation to the power delivery point at another developer's new substation to be located to the west of the geothermal power plant. 120 kV is a nominal system voltage for NV Energy, grid operator. The approximate line length will be on the order of $6^{1}/_{3}$ miles depending on the final route alignment. The proposed alignment is depicted on Figure 3, in addition to a potential corridor where it could be realigned if necessary.

The maximum expected generation output from the Patua Geothermal Project is 60 MW. The conductor will be either 556 kcmil 26/7 ACSR ("Dove") or 795 kcmil 26/7 ACSR ("Drake"), one per phase; however, this is preliminary and subject to change based on more detailed engineering. This selection is common for this voltage level and limits energy losses and voltage drop to less than 1% under maximum load.

The line is situated in a National Electrical Safety Code ("NESC") Medium Loading Zone (NESC 2007 Rule 250B loads, 0.25-in radial ice, 4 psf wind, at 15°F) and the NESC extreme wind gust value is 90mph, leading to a basic design wind pressure of about 21 psf (NESC

2007 Rule 250C). NESC 2007 250D Loads, Combined Wind and Ice do not exceed those of the NESC Medium Load condition and will not control the design. NV Energy's weather loading experience in this area will be explored and a reasonable additional loading criterion, such as a heavy ice will be adopted, as warranted.

This transmission line is considered a critical line without which Project energy sales would not be possible. Therefore, the line will be designed and constructed using NESC Grade B load factors and strength reduction factors ("SRF"). SRF's greater than stipulated in the NESC will be used for extreme wind or ice loads.

NESC Rule 232 governs clearances to ground, and for 120kV this is approximately 20.5 –ft, to which a margin for design and construction variances is usually added for a design clearance of say 24-ft. Special and greater clearances will be required over railroads. For the maximum 60 MW transfer the maximum operating temperature of the conductor will be lower than 150°F. The line will be designed for providing the design clearance at a maximum operating temperature of 212°F, a typical temperature for ACSR conductor. This leaves additional capacity in the line for future generation growth.

Two shieldwires will be used for lightning protection. One of these shieldwires will be a steel wire (1/2-inch EHS or similar) and the other may be a steel wire or optical groundwire, containing optical fibers for project use only (e.g. SCADA, protective relaying, controls and communications with NV Energy).

In cross country sections, the line supports will typically be H-frame ("HF") structures with two wood poles, set about 14-feet apart. For a span of 800 feet, common for such construction, two 70-ft Class 1 douglas fir poles will be sufficient for clearance and strength. The poles will be embedded about 10-feet in soil and the above grade height will be about 60-feet. The structure will use single polymer suspension insulators to support the 120kV conductors. Its crossarm will be wood and approximately 28-ft long. Top bracing above the crossarm may be used for additional support of the arm on long spans. See Figure 5- Typical Wood Pole HF Tangent Structure and Right-of-Way for a typical HF Structure.

The route is relatively flat and the choice of a 2-70/1 HF structure for 800-ft spans is a reasonable assumption for typical structures. Special situations like crossing under the PDCI 500kV DC Line, going over hills, crossing major roads or railroads, and spanning topographic depressions will require a range of structure heights to achieve necessary clearances.

At angles in excess of about 5 to 10 degrees in the alignment (points of intersection, "PI"), guyed 3-wood pole structures will be used. This will require additional easements for driving anchors and guy installation. See Figure 6- Typical 3 Wood Pole Angle Structure and Right-of-Way. Where PI's occur in restricted areas, self-supporting, self-weathering (CORTEN®) steel structures mounted on concrete pier foundations will be used either in a similar 3-pole arrangement or as a single pole with stacked conductor positions. The pier foundation dimensions will be determined from physical loads at the structure base and geotechnical

soil investigations. Typically for the 3-pole option the piers might be 5-8 feet in diameter and 15-30 feet deep. For the single pole option these piers might be 6-7 feet in diameter and 20-35 ft deep. See Figure 7- Single Pole Steel Angle Structure and Right-of-Way and Figure 8- Typical 3-Pole Self Supporting Steel Structure and Right-of-Way.

Right-of-way (ROW) for a 120kV line using HF construction is typically 100-feet wide, with the line structures centered in the ROW. Determination of a ROW width depends on the nature of the land adjacent to the ROW, structure width, conductor blowout conditions, insulator articulation, and structure deflection. Design engineers can limit conductor blowout by increasing tensions and restraining the insulator component of swing by using so called V-strings or struts to keep suspension insulators from swinging out. By using cross braces, structure deflection (less than 1 foot) is lower than it would be if no braces were used. In all, if the structure is 28-ft wide, deflection is 2x 1-ft, blowout including insulator swing out is 2x10-ft, and we apply required NESC 2007 clearance to a building of about 2x10-ft, this results in a minimum ROW width of approximately 75-ft. Longer spans will increase this width. An additional consideration for ROW width is containment of access roads. Some additional width is useful to accommodate forced routing of such roads on steep contours. Refer to Figures 5 through 8 for typical right-of-ways associated with the various structure types.

Much of the proposed alignment traverses the southern extent of the Fernley State Wildlife Management Area, where raptors are known to habitate. The structures will be designed with sufficient phase spacing to make it improbable that the wing span of the typical raptor can contact two phases, thus avoiding electrocution. No special framing is necessary on the HF structures since they are inherently safe for raptors, which would most likely perch on the tops of the poles, high above the 120kV phases.

If top arm bracing is not used another perching crossarm will be mounted or the insulator strings will be lengthened so that raptors cannot not contact phase conductors upon taking off. Anti-perch spikes will be installed on the tops of crossarms if deemed necessary.

The flat, horizontal configuration of wires in HF construction also presents a smaller transverse profile (2 wire levels) to flying birds than single pole construction (4 wire levels).

Illuminated marker balls will be used on the shieldwires and phase conductors in special locations where raptor or other avian flight patterns warrant.

2.2.2 Access Roads

Access roads for the transmission line will be required during construction and during operation for maintenance purposes and will be located immediately adjacent and parallel to the transmission line. To the extent practical, the transmission line access roads will be shared with the geothermal fluid pipeline access roads discussed in the Patua Geothermal

Project Utilization Plan, submitted by VPC, revised February 2010. As described in the Utilization Plan, typical access roads will be approximately 14 to 15 feet wide.

2.2.3 Communications Facilities

Communications will include a dedicated land line telephone connection to the project site, with DSL service if available. A fiber optic connection will be installed via the optical groundwire between the power plant substation and the planned new substation where the line will terminate for the Supervisory Control and Data Acquisition (SCADA) system, control, protective relaying, and communications with NV Energy. Restricted access SCADA data on system performance will be streamed to the Project Control Center at the power plant for monitoring. The communication channels and network setup for the project will be coordinated with NV Energy and will adhere to the cyber security requirements of NAERC.

3.0 GENERAL SITE ACTIVITIES

3.1 Construction

3.1.1 Construction Approach

Before construction is started, all structure locations and right of way lines will be staked to delineate construction area boundaries. A professional land surveyor licensed in Nevada will stake the transmission line centerline and right-of-way lines. The surveyor will provide a digital terrain model for modeling the transmission line in PLS CADD, and will perform property boundary surveys to develop legal easement or right-of-way documents.

It will be stipulated that only certain designated areas will be available for staging and project offices. The contractor will be provided with right-of-way stipulations from lease or easement agreements. A full set of transmission line drawings showing structure locations, structure framing and assemblies, material requirements, conductor installation sag charts, and access notes will be developed under the supervision of a professional engineer licensed in Nevada and provided to the contractor prior to construction. Review sets of the drawings will be furnished to all interested parties for comment prior to finalizing the design.

Construction activities will include minor clearing, access road improvement or construction, pole setting, framing of structures, pulling in new conductor, sagging the wires to specification, clipping in the wires at each attachment, punch list remediation, clean up, and project energization. The latter will be closely coordinated with NV Energy.

A single staging and construction management area will be sited adjacent to the right-of-way on Project lands. It is anticipated that approximately 2 acres will be required for staging; the specific location will be identified upon final right-of-way determination. All materials would be stored, assembled and released for construction from this site. There will be 3-4 portable

trailer offices and locked storage containers for expensive and theft prone transmission line materials, such as copper grounding or aluminum hardware.

Major construction equipment will include 6-10 pickup trucks, 3-4 lineman bucket trucks, 1 pole truck for delivering poles at sites, a 20T crane, 2 bulldozers for grading in access roads and assisting with sagging, 2- pole mounted augers for drilling pole holes, 1 flat bed truck for delivering incidental materials to sites (e.g. insulator assemblies), 1-2 puller-tensioners for stringing new conductor, 1-2 3-reel trailers and 2-3 backhoes or excavators. Construction equipment is largely a choice of the line contractor and may be different from the above.

Construction activity along the line will require small and major equipment to frequently enter and exit the right-of-way. BMP's will be used to limit construction dirt from being carried on to public roads from which access to the line is required.

At each structure up to three (3) holes must be excavated for pole setting. These holes will be approximately 3-ft in diameter and 9-11 feet deep. Where anchors are necessary at angle changes, as many as eleven (11) anchors could be required. The excavated material will be scattered, if not contaminated, or hauled off and disposed of at a Project disposal site. The holes will be backfilled with either native soil, thus limiting spoils, or gravel if native soil is unacceptable.

Conductor stringing and sagging requires an open and relatively flat section of the right of way to set up conductor reel stands, pulling equipment and tensioners. These set up sites will be approximately ½ acre and will be largely confined to the Project right-of-way. These sites would be located a minimum of a conductor reel length apart, about 6000 ft. However, longer lengths can be pulled in by "double-socking" (i.e. splicing) to avoid difficult set up areas.

In wetland areas best management practices ("BMP") will be used to limit permanent damage to surrounding areas. These will include, if practical, construction in dry periods, use of construction mats, and use of tracked vehicles. The structure footings may have to be adapted to the wetland environment. Direct embedment may have to be enhanced with the use of steel caissons backfilled with gravel.

Since the proposed line traverses the Fernley Wildlife Management Area, access roads may need to be built for long term access to the structures. This will require importing, laying, and grading gravel-soil materials for a construction equipment access road 14-15-ft wide. Culvert drainage will be provided at frequent intervals to provide for normal exchange of water between sides of the road. Where the alignment runs through sensitive wetland areas temporary construction mats may be used for access.

The line contractor will be qualified in the business of line construction and have a working knowledge of the NESC rules and standard utility practice for safety. The contract will require safety meetings on a weekly basis which the VPC representative will attend. The contract itself will require the construction contractor to abide by requirements to maintain a

safe construction site, limit toxic spills (i.e. equipment oil or gasoline) and clean up properly if found, and notify emergency contacts for emergent situations. The contractor will be required to have high-level experienced staff monitor construction and supervise stringing operations.

3.1.2 Access Roads

The access road beside the transmission line will be improved, as necessary, to sufficiently allow negotiation by tracked and all-wheel drive construction equipment. The design will focus on minimizing damage to vegetation both during construction and during operations.

Some new access roads may need to be built for long term access to the structures if the right-of-way intercepts wetland areas. This may require importing, laying, and grading gravel-soil materials for a construction equipment access road 14-15-ft wide. Culvert drainage will be provided at frequent intervals to provide for normal exchange of water between sides of the road. Where the alignment runs through sensitive wetland areas temporary construction mats will be used for access.

3.1.3 Construction Schedule and Work Force

Construction will take 8-12 months and require approximately two full time line crews of about 6-8 persons. All activities would be under the direction of a project manager. Field activities would be directed by a line superintendent, fully versed in line construction methods and procedures. A typical crew would be comprised of 1-2 journeymen, 2-3 apprentice linemen, and 2-3 groundsmen. These staff would double as equipment operators. Activities will include minor clearing, access road construction, line and ROW staking, pole setting, framing of structures, pulling in new conductor, sagging the wires to specification, clipping in the wires at each attachment, punch list remediation, clean up, and project energization.

3.2 Estimated Surface Disturbance

At each structure up to three (3) holes must be excavated for pole setting. These holes will be approximately 3-ft in diameter and 9-11 feet deep. Where anchors are necessary at angle changes, as many as eleven (11) anchors could be required. The excavated material will be scattered if not contaminated or hauled off and disposed of at a Project disposal site. The holes will be backfilled with either native soil, thus limiting spoils, or gravel if native soil is unacceptable. The total disturbance per structure would be about 120 square feet. It is preliminarily estimated that there will be one structure per 650 linear feet of transmission line.

Each conductor stringing and sagging site will require approximately ½ acre. Conductor stringing and sagging sites will be required approximately every mile or at great changes in direction. Preliminarily, it is anticipated that up to ten (10) conductor stringing and sagging sites will be required along the approximately $6^1/_3$ mile long transmission line.

Access road construction will require minor disturbance to existing access roads and greater disturbance where new access roads are required. The new access roads will be approximately 14 to 15 feet wide and up to $6^1/_3$ miles long. The estimated total disturbance therefore is approximately 12 acres for the access road. The approximate estimated surface disturbance for the transmission line construction is described in greater detail below and is based on the following:

- Total Surface Disturbance per Structure is approximately 120 square feet;
- Access roads are approximately 14 to 15 feet wide;
- Conductor stringing and sagging sites are approximately ½ acre; and
- The staging area requires approximately 2 acres.

** It is important to note that the conductor stringing and sagging sites and the staging area are temporary and will be reclaimed after construction.*

3.2.1 Estimated Surface Disturbance on Federal Geothermal Leases

The approximate estimated surface disturbance distribution for the proposed transmission line segments on the Federal geothermal lease NVN-085705 (Section 20, T20N, R26E, MDBM) will be as follows:

- Nine (9) line support structures: 1,080 square feet;
- Access Roads: 1¾ to 2 acres.*

The locations of the proposed transmission line listed above, which provide the basis for the estimated surface disturbance values above, is tentative. Pending the results of various environmental surveys and engineering analysis, their locations could be slightly altered, but it is not anticipated to exceed approximately 2.5 acres of surface disturbance.

** It is important to note that the access roads for the transmission line segments on Federal geothermal lease NVN-085705 will be shared by the geothermal fluid pipeline access roads discussed in the Patua Geothermal Project Utilization Plan, submitted by VPC, revised February 2010.*

3.2.2 Estimated Surface Disturbance on Bureau of Reclamation Lands

The approximate estimated surface disturbance distribution for the proposed transmission line segments on the Bureau of Reclamation lands within the Fernley Wildlife Management Area (Section 18, T20N, R26E, and Sections 10 and 14, T20N, R25E, MDBM) will be as follows:

- Twenty (20) to twenty-five (25) line support structures: 2,400 to 3,000 square feet;

- Five (5) conductor stringing and sagging sites: 2½ acres;
- Access Roads: 5 to 5⅓ acres.

The locations of the proposed transmission line listed above, which provide the basis for the estimated surface disturbance values above, is tentative. Pending the results of various environmental surveys and engineering analysis, their locations could be slightly altered, but it is not anticipated to exceed approximately 10 acres of surface disturbance.

3.2.3 Estimated Surface Disturbance on State of Nevada Lands

The approximate estimated surface disturbance distribution for the proposed transmission line segments on State of Nevada lands within the Fernley Wildlife Management Area (Sections 13 and 15, T20N, R25E, MDBM) will be as follows:

- Fifteen (15) to twenty (20) line support structures: 1,800 to 2,400 square feet;
- Three (3) conductor stringing and sagging sites: 1½ acres;
- Access Roads: 3½ to 4 acres.

The locations of the proposed transmission line listed above, which provide the basis for the estimated surface disturbance values above, is tentative. Pending the results of various environmental surveys and engineering analysis, their locations could be slightly altered, but it is not anticipated to exceed approximately 7½ acres of surface disturbance.

3.2.4 Estimated Surface Disturbance on Private Lands

The approximate estimated surface disturbance distribution for the proposed transmission line segments on Private lands within the Patua Geothermal Unit N-85168X, see Figure 2, (Sections 19 and 21, T20N, R26E, MDBM) will be as follows:

- Approximately six (6) line support structures: approximately 720 square feet;
- Two (2) conductor stringing and sagging sites: 1 acre;
- Access Roads: 1¼ to 1½ acres;*
- Staging area: approximately 2 acres.

The locations of the proposed transmission line listed above, which provide the basis for the estimated surface disturbance values above, is tentative. Pending the results of various environmental surveys and engineering analysis, their locations could be slightly altered, but it is not anticipated to exceed approximately 6 acres of surface disturbance.

** It is important to note that the access roads for the transmission line segments on Private lands will be shared by the geothermal fluid pipeline access roads discussed in the Patua Geothermal Project Utilization Plan, submitted by VPC, revised February 2010.*

3.3 Operations and Maintenance

The transmission line itself will require little operational input. It will be monitored via SCADA from measuring points at the planned new substation where the transmission line will terminate and at the substation at the power plant. Operating staff will be trained to detect and respond to abnormal warnings and system abnormalities.

The line will be inspected thoroughly by experienced personnel on an annual basis and after major storm events. This inspection will take 1 or 2 persons a single day to complete. They will look for typical deformations of the line such as leaning structures, damaged insulators, and frayed conductor strands. Repairs will be scheduled for any detected adverse conditions. Vegetation encroachment will be noted and clearing scheduled. Every five years an infrared scan of deadend hardware will be done to determine if hot spots are developing.

Major failures of the line will likely be detected by protective relaying schemes and the line will be tripped and locked out until the failure is corrected and the line can be safely restored to service. An experienced line contractor in the area will be engaged to provide line maintenance activities on a continuing service contract.

It is unlikely that the line itself will be the cause of fires. Lightning, sustained ground fault arcing, or induction from nearby lines may ignite a pole fire. Fires in the surrounding vegetation may also occur from a variety of sources. Public notification that such a fire is occurring will be largely depended on to notify nearby fire departments and cooperate with them for access and safe operations around the line. The line will be tripped and locked out for such an event and not re-energize it until it is deemed safe to do so by NV Energy, fire officials, and VPC staff.

4.0 ENVIRONMENTAL PROTECTION MEASURES

VPC's goal is to develop a project that avoids creating significant environmental impacts. In addition to environmental protection measures discussed herein, VPC has reviewed the lease stipulations attached to Federal geothermal lease NVN-85705, which is included in the Federal lands along the proposed transmission ROW, depicted on Figure 3. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is planned for the project development proposed on BOR land, which includes the proposed transmission line described herein. Environmental protection measures relevant to the proposed transmission line are described in general below. These, as well as any other standard BMPs (Best Management Practices) will be implemented in order to mitigate potential environmental impacts.

Before construction begins, all structure locations and right of way lines will be staked to delineate construction area boundaries. A professional land surveyor licensed in Nevada will stake the transmission line centerline and ROW lines. The surveyor will provide a digital terrain model for modeling the transmission line in PLS CADD, and will perform property boundary surveys to develop legal easement documents.

Prior to transmission line construction, all construction personnel will be instructed on the protection of cultural, ecological and paleontological resources that could occur along the ROW.

4.1 Fire

An Emergency Response Plan will be maintained during and after construction of the proposed transmission line to address procedures and notification requirements in the event of a fire.

During construction, water trucks to be used for watering roads, or other earthwork purposes, could be available to provide water for fire suppression and control if needed. Should extreme fire danger conditions arise, construction operations may be suspended or limited in areas where they could pose a fire threat.

After construction of the transmission line is complete, it is unlikely that the line itself may cause fires. Should such an event occur, public notification will be relied upon for notifying nearby fire department(s). Lines will be tripped and locked out and not re-energized until deemed safe to do so by NV Energy, local fire officials and VPC staff.

4.2 Soil Erosion and Sedimentation

A Stormwater General Permit NVR 100000 was issued for the Patua Geothermal Project by the Nevada Department of Environmental Protection (NDEP), effective December 19, 2008. To obtain this permit, the Patua Geothermal Project's Storm Water Pollution Prevention Plan (SWPPP) for Construction Activities was submitted to and accepted by NDEP. The current SWPPP applies to the construction of well pads and access roads; it will be further updated to include the disturbed areas for the proposed transmission line described herein. The SWPPP includes Best Management Practices (BMPs) that will be followed in order to reduce soil erosion within the project area.

Access roads and other disturbed areas will be watered on an as needed basis. Where practical, transmission line access roads will be shared with geothermal fluid pipeline access roads to minimize surface disturbances. Roads will be planned, constructed and maintained in general accordance with guidelines of the Gold Book and standard construction BMPs.

4.3 Surface and Groundwater

It is not anticipated that construction and/or operation of the proposed transmission line will adversely affect existing surface and groundwater. Protection of surface and ground water is

also addressed in the Patua Geothermal Project SWPPP, submitted by VPC December 19, 2008, and the Patua Geothermal Project Operations Plan, submitted by VPC, revised February 2010. As discussed in these documents, VPC will utilize standard applicable BMPs for the protection of surface and groundwater and will adhere to all applicable federal, state, and local requirements.

Roads will be constructed in a manner that directs runoff to roadsides, where it will drain into the soil. Construction vehicle and equipment staging or storage areas will be constructed and located so as not to impact any streams, wetlands or other water features.

In wetland areas, BMPs will be used to limit permanent damage to surrounding areas. Where practical, these may include construction during dry periods, use of construction mats, and use of tracked vehicles. Direct embedment of transmission poles may be enhanced with the use of steel caissons backfilled with gravel.

4.4 Fish and Wildlife

In order to assess the possibility for environmental impacts related to development of the proposed transmission line, wildlife surveys by an experienced wildlife biologist are ongoing. These surveys include the potential transmission line corridor depicted on Figure 3. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the wildlife biologist, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed transmission line on recognized special status or other species of concern, in the immediate vicinity of the proposed ROW, and prepare appropriate mitigation measures as necessary. Wildlife field surveys are ongoing and subsequent report(s) will be completed in time for consideration in the EA.

During and after construction, appropriate BMPs will be implemented to avoid or mitigate impacts on wildlife. Open excavations which must be left unattended overnight will be guarded to prevent wildlife from falling into them using appropriate covering or fencing.

Transmission line structures will be designed and constructed using appropriate BMPs to reduce their impact on raptor populations. The overall structure of transmission poles allows for sufficient phase spacing, enabling raptors with large wingspans to pass through without being electrocuted. Specific design of transmission structures is discussed in further detail in Section 2.2.1 – Facility Design Factors.

4.5 Vegetation

In order to assess the possibility for environmental impacts related to development of the proposed transmission line, botanical surveys by an experienced botanist are ongoing. These surveys include the potential transmission line corridor depicted on Figure 3. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC

will work in coordination with the botanist, BLM, BOR, NDOW, and other relevant agencies to understand potential impacts of the proposed transmission line on recognized rare plants, invasive species, or other concerns, in the immediate vicinity of the proposed ROW, and prepare appropriate mitigation measures as necessary.

Although botanical field surveys are not yet complete, it is preliminarily understood that various species of noxious weeds have been identified in the general vicinity of the transmission line ROW. As such, a Noxious Weed Abatement Plan is being developed for the Patua Geothermal Project. Botanical field surveys are ongoing and subsequent report(s) will be completed in time for consideration in the EA.

4.6 Cultural Resources

In order to assess the possibility for environmental impacts related to development of the proposed transmission line on BOR land, cultural resource surveys by an experienced cultural resource consultant are ongoing. These surveys will include the transmission line corridor depicted on Figure 3. Additionally, in general compliance with requirements of Section 106 of the National Historic Preservation Act, cultural resource surveys are also being conducted on State of Nevada and private lands where the transmission line is to be located. It is VPC's goal to develop a project that avoids creating significant environmental impacts. Accordingly, VPC will work in coordination with the cultural resource consultant, BLM, BOR, NDOW, SHPO, and other relevant agencies to understand potential impacts of the proposed transmission line on recognized cultural resources of concern, in the immediate vicinity of the proposed ROW, and prepare appropriate mitigation measures as necessary. Cultural resource field surveys are ongoing and expected to be complete in time for consideration in the EA.

4.7 Air Quality Compliance

Air quality in the general area of the Patua Geothermal Project is designated as in "attainment" (U.S. Environmental Protection Agency, 2009). An attainment area is defined by Section 107 of the Clean Air Act (CAA) as one that meets national primary or secondary ambient air quality standards for criteria pollutants. Nevada Department of Environmental Protection (NDEP) Bureau of Air Pollution Control (BAPC) has been delegated responsibility by the EPA and the State of Nevada to regulate the emission of air pollutants throughout most of Nevada, which includes the general area of the Patua Geothermal Project. NDEP BAPC has set forth minimum standards for ambient air quality which incorporate EPA standards. In accordance with the requirements of NDEP BAPC a Surface Area Disturbance (SAD) Air Quality Operating Permit (AP1629-2517) was obtained by VPC, for the Patua Geothermal Project on January 6, 2009. Conditions of this permit include the implementation of a plan for fugitive dust control. The current SAD permit applies to those sections included in the Geothermal Unit and will be updated to include sections containing the proposed ROW upon the ROW's approval

4.7.1 Site Preparation and Construction

Site preparation will involve earthmoving activities required to construct the transmission line and associated access roads. Such activities are of a temporary nature and will result in non-point source emissions including fugitive dust and vehicular emissions. Fugitive dust emissions from these activities could contribute to the background level of Particulate Matter (PM) in the air. Additionally, gasoline and diesel fuel combustion vehicles will emit relatively minor amounts of criteria pollutants.

Several steps will be taken to maintain air quality compliance during site preparation including BMPs as outlined in the SAD permit. Where possible, existing roads will be utilized, decreasing the need for new construction. To the extent practical, new transmission line access roads will be shared with the geothermal fluid pipeline access roads. Vehicle speeds will be limited to 10-15 miles per hour on unpaved roads. Dust will be suppressed by applying water to unpaved roads and other disturbed surfaces, on an as needed basis. Where applicable, vehicles will be maintained to comply with State of Nevada vehicle emissions standards as put forth by the Nevada Department of Motor Vehicles (NDMV) and with relevant EPA standards for criteria pollutants from diesel engines, including particulates.

4.7.2 Transmission Line

During normal operation, transmission lines produce no direct air emissions. The transmission line will be routinely accessed during operation for monitoring and maintenance. Fugitive dust may be generated during access and will be controlled by applying water on an as needed basis.

4.8 Hazardous Materials

A Spill Prevention Plan will be maintained during project construction. This plan will address procedures and notification requirements to follow when handling hazardous materials and in the event of possible spills. Appropriate spill kits will be maintained onsite. Where necessary, containment will be provided for hazardous materials. No hazardous materials will be stored within the transmission line ROW after construction is complete.

Potentially hazardous materials that may be used onsite during transmission line construction may include but are not limited to the following:

- Acetylene Gas
- Air Tool Oil
- Antifreeze
- Automatic Transmission Fluid
- Battery Acid
- Brake Fluid

- Canned Spray paint
- Chain Lubricant (Methylene Chloride)
- Connector Grease
- Dry Chemical Fire Extinguishers
- Engine Oil
- Gasoline
- Insulating Oil
- Lubricating Grease
- Petroleum Products
- Safety Solvent

4.9 Noise

Construction of the proposed transmission line will result in temporary noise level increases. During normal operation of the proposed transmission line, noise level increases will be minimal and should not have a distinctive impact. Actions that create unnecessary increases in noise will be avoided where possible. In the event that noise mitigation measures are deemed necessary, they will comply with relevant standards and be determined on a case-by-case basis.

4.10 Site Reclamation and Abandonment

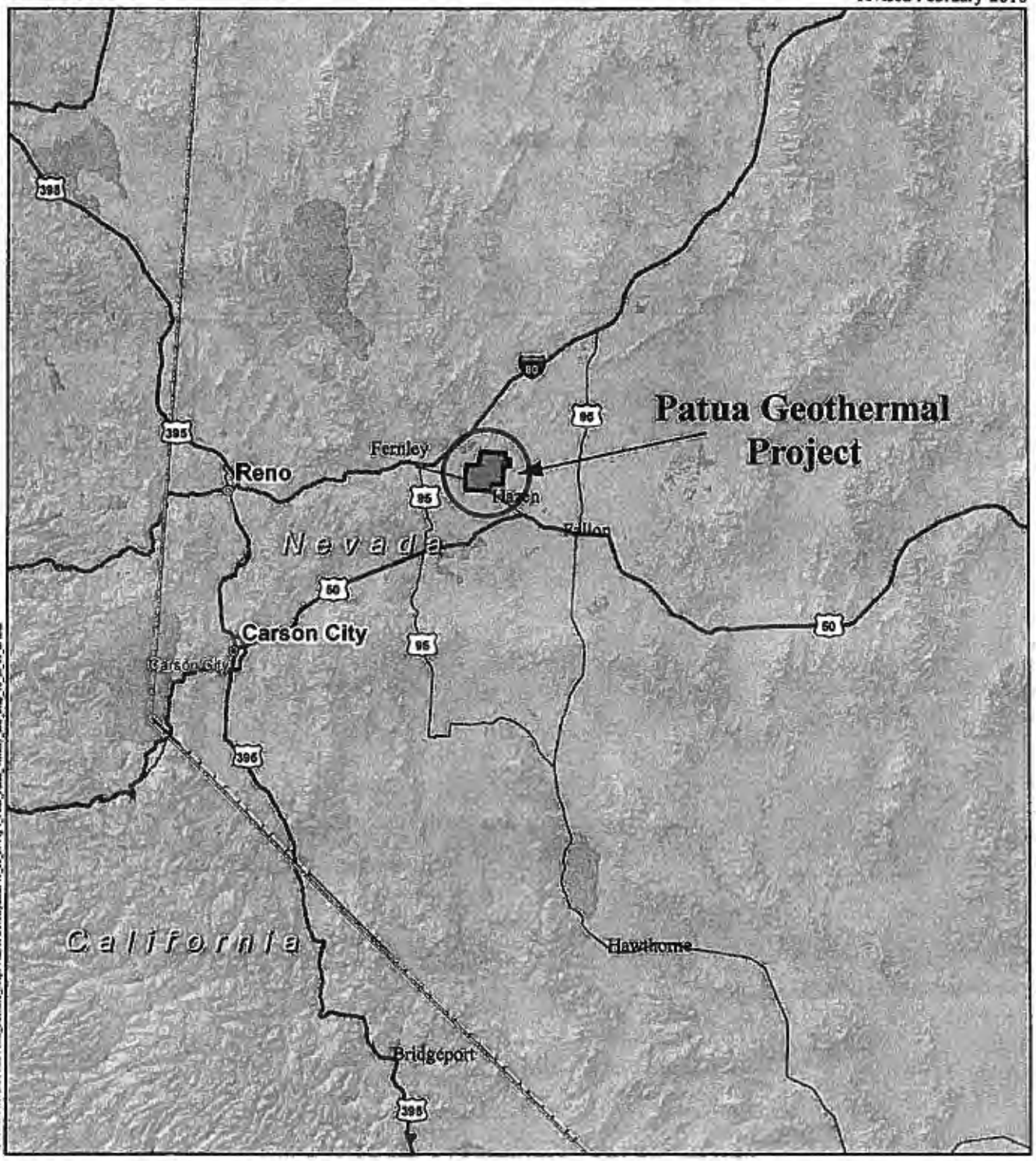
Commonly, geothermal power projects are designed for an expected lifetime of approximately 30 years. Therefore, 30 years or its useful life, whichever is longer, is the estimated life of this project. A final plan for site reclamation and abandonment will be prepared by VPC in coordination with relevant regulatory agencies prior to abandonment. The final plan will further address: removal of transmission line structures; obliteration of roads, tower pads, etc.; as well as stabilization and revegetation of disturbed sites.

Patua Geothermal Project

General Vicinity Map

Confidential

Plan of Development
revised February 2010



Legend

Patua Geothermal Project

0 12.5 25 Miles

N W E S

Figure 1

Data map from ESRI Software.
Section boundaries from USGS PLSS.
The contents of this map are approximate and subject to change.

Patua Geothermal Project

Patua Geothermal Unit

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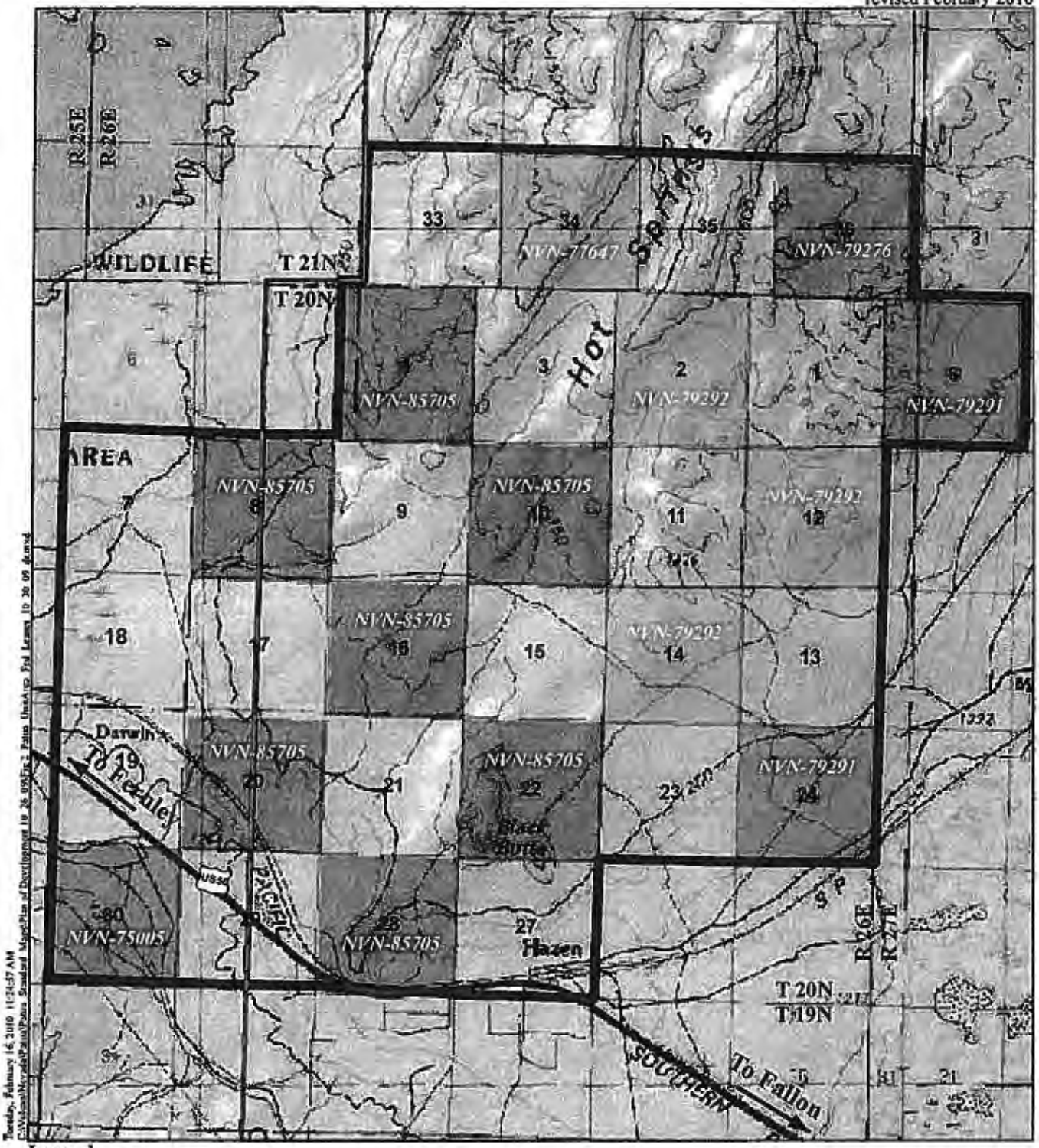
revised February 2010



Legend

- Patua Geothermal Unit (N-85168X)
- NVN-79291
- NVN-85705
- NVN-79292
- NVN-79276
- NVN-75005
- NVN-77647

BLM Geothermal Leases

County Line

0 0.5 1 Miles

N W E S

Figure 2

Base map from ESRI Software.
Section boundaries from USGS PLSS.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Transmission Line Right-of-Way Overview

VULCAN POWER COMPANY

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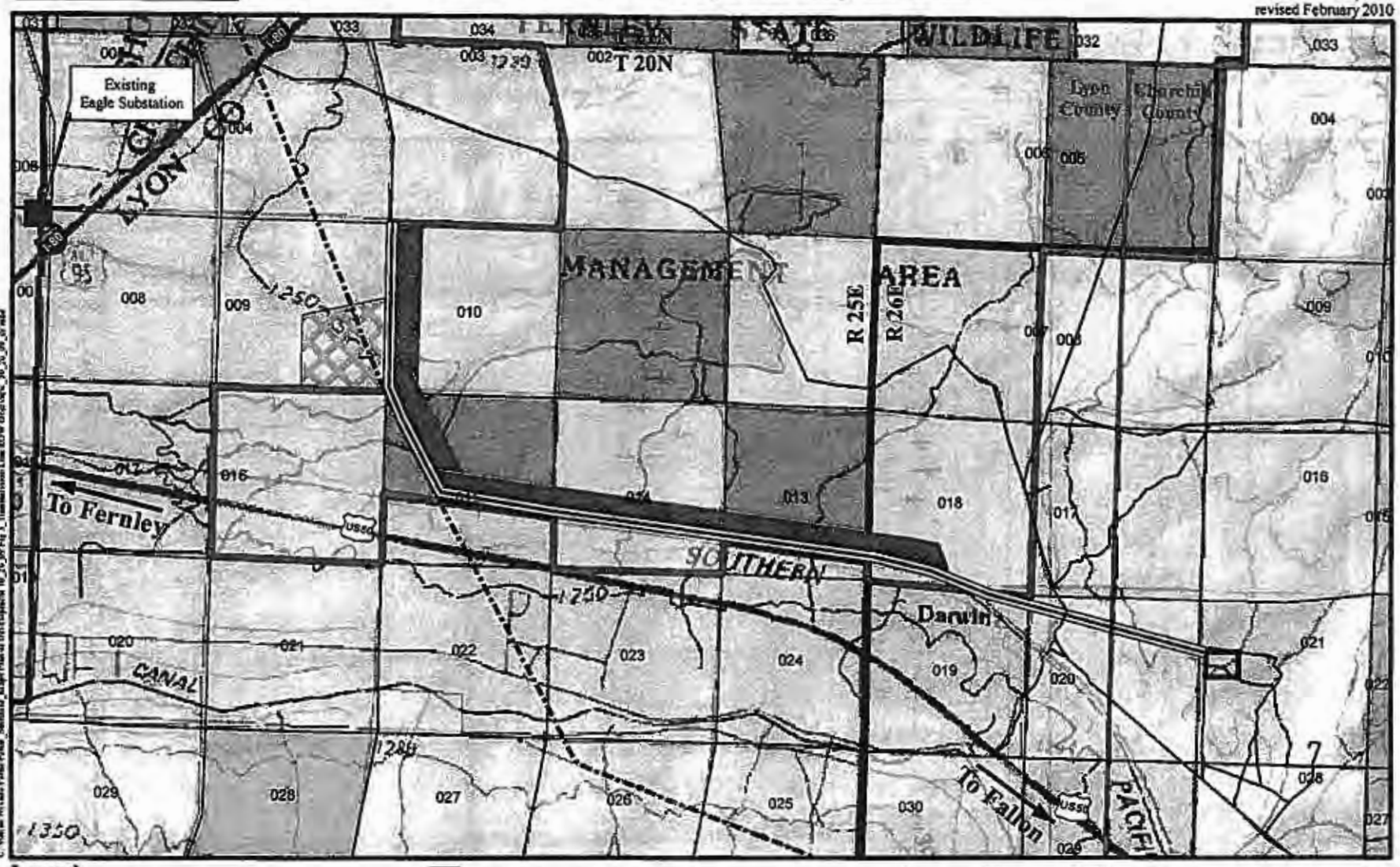

Legend

- Existing Eagle Substation
- Existing PDCI Transmission Line
- Existing Transmission Line (Est)
- Existing Roads
- County Line
- Proposed Transmission Line ROW
- Potential Alternate Corridor for Transmission Line ROW
- Power Plant Location
- Patua Geothermal Unit (N-85168X)
- Fernley Waste Water Treatment Facility
- Bureau of Land Management
- Bureau of Reclamation
- State Wildlife Rec Area
- Private Lands
- Fernley Wildlife Management Area

0 0.5 1 Miles

N W E S

Figure 3

BLM 1:24K PLSS http://www.geocommunicator.gov/GeoConnector.shtm
Base Map from BLM 2005 Reno Surface Management Status 1:100K.
Fernley Wildlife Management Area from NDOM.
The contents of this map are approximate and subject to change.

Patua Geothermal Project
Transmission Line Routes Considered and Rejected

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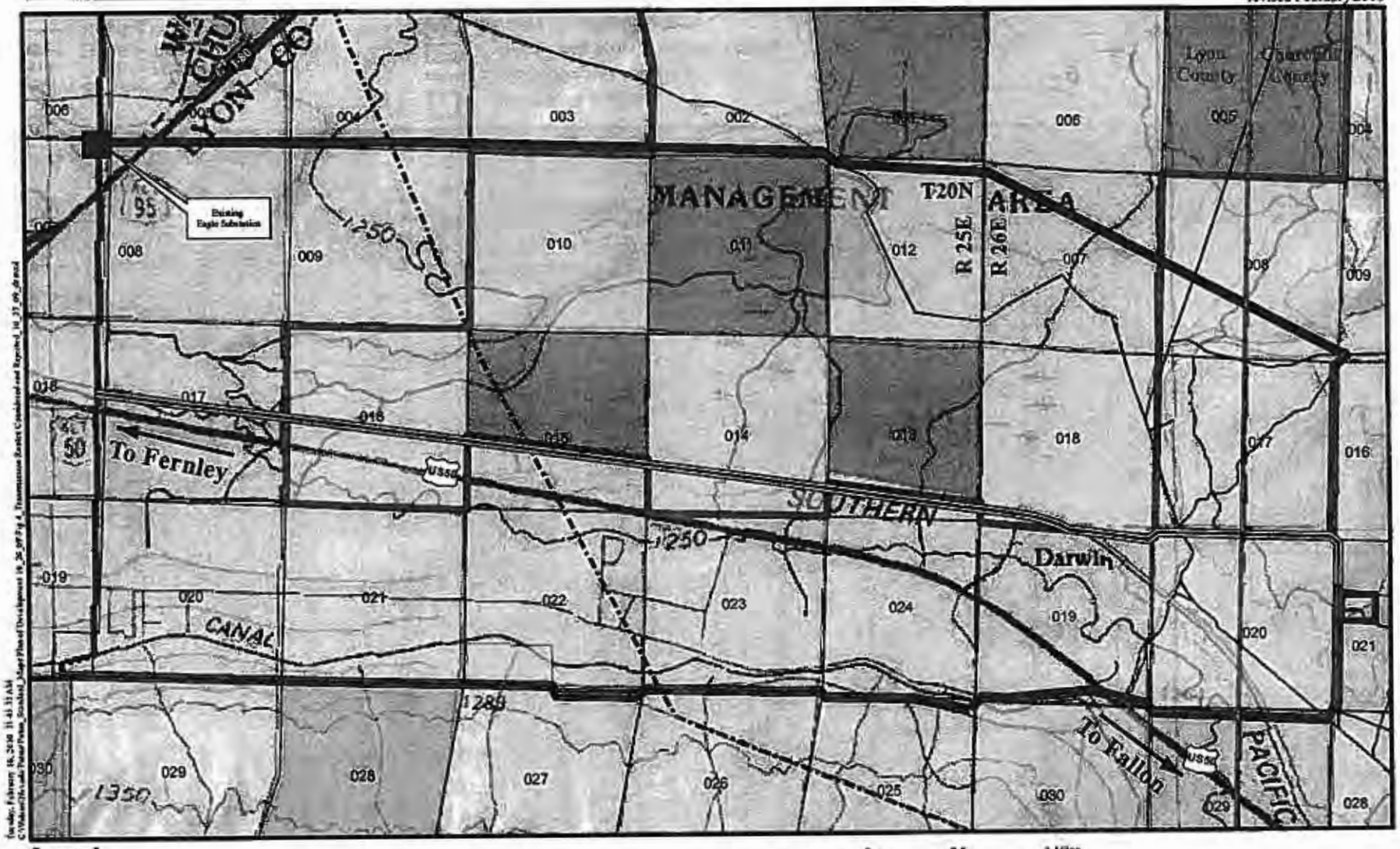

Figure 4

Patua Geothermal Project
Typical Wood Pole HF Tangent Structure and Right-of-way

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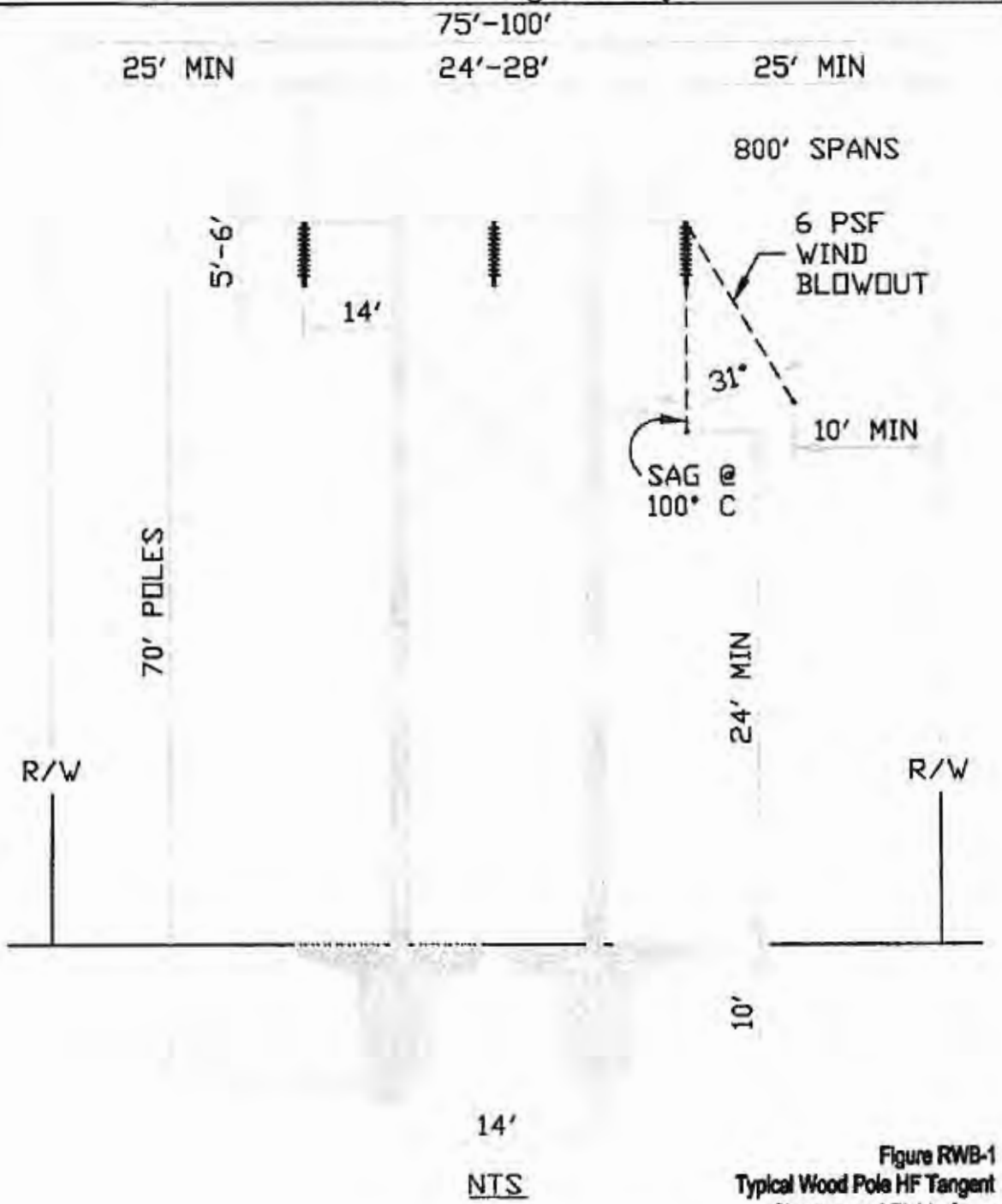

Figure RWB-1
Typical Wood Pole HF Tangent
Structure and Right-of-way
Patua Development Plan
Vulcan Power

Figure 5

Patua Geothermal Project
Typical 3 Wood Pole Angle Structure and Right-of-way

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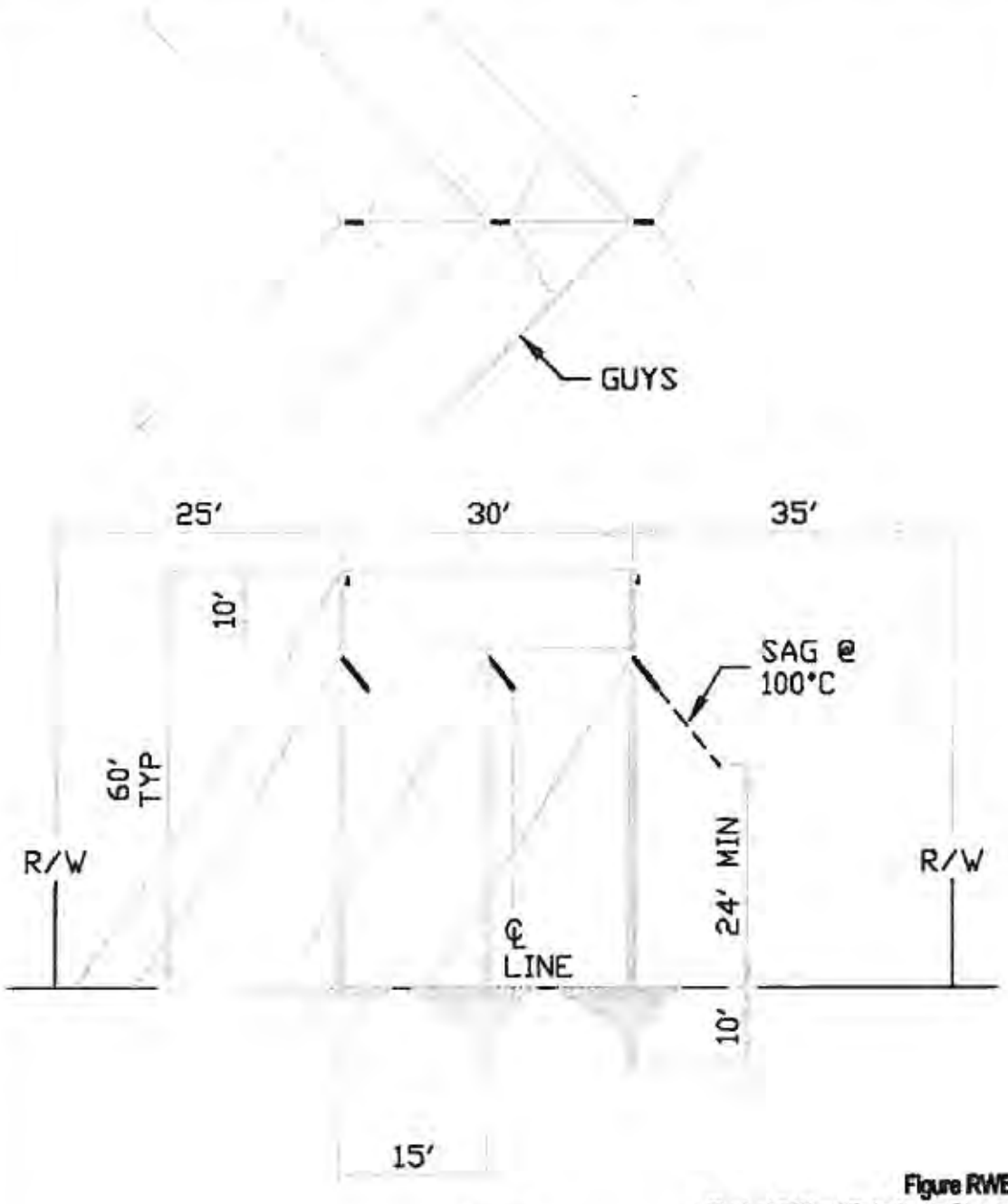

NTS

Figure RWB-2
Typical 3 Wood Pole Angle Structure
and Right-of-way
Patua Development Plan
Vulcan Power

Figure 6

Patua Geothermal Project
Single Pole Steel Angle Structure and Right-of-way

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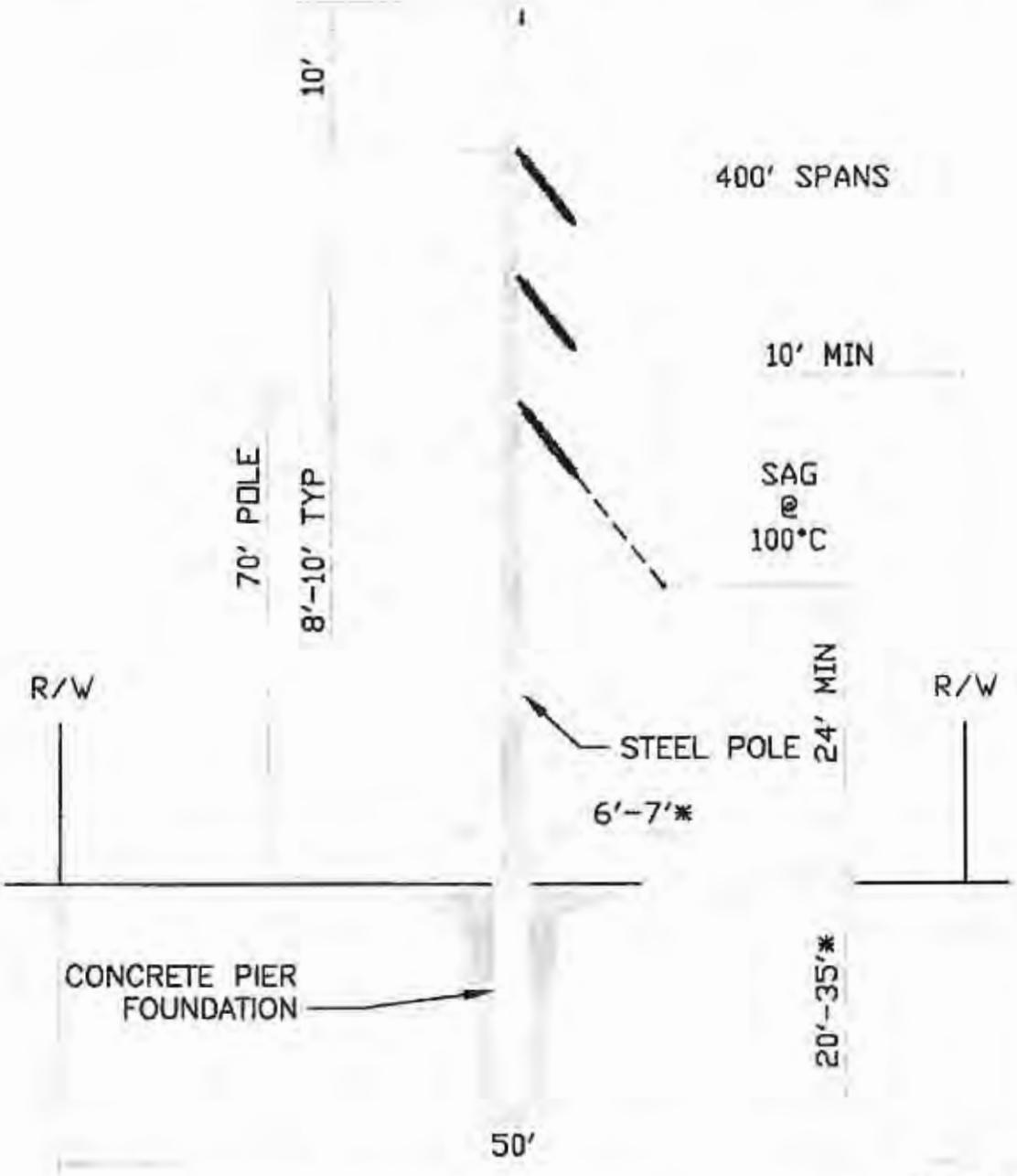

*DEPENDS ON LOADS AND SOIL CHARACTERISTICS

NTS

Figure RWB-3
Single Pole Steel Angle Structure and Right-of-way
Patua Development Plan
Vulcan Power

Figure 7

Patua Geothermal Project
Typical 3-Pole Self Supporting Steel Structure and Right-of-way

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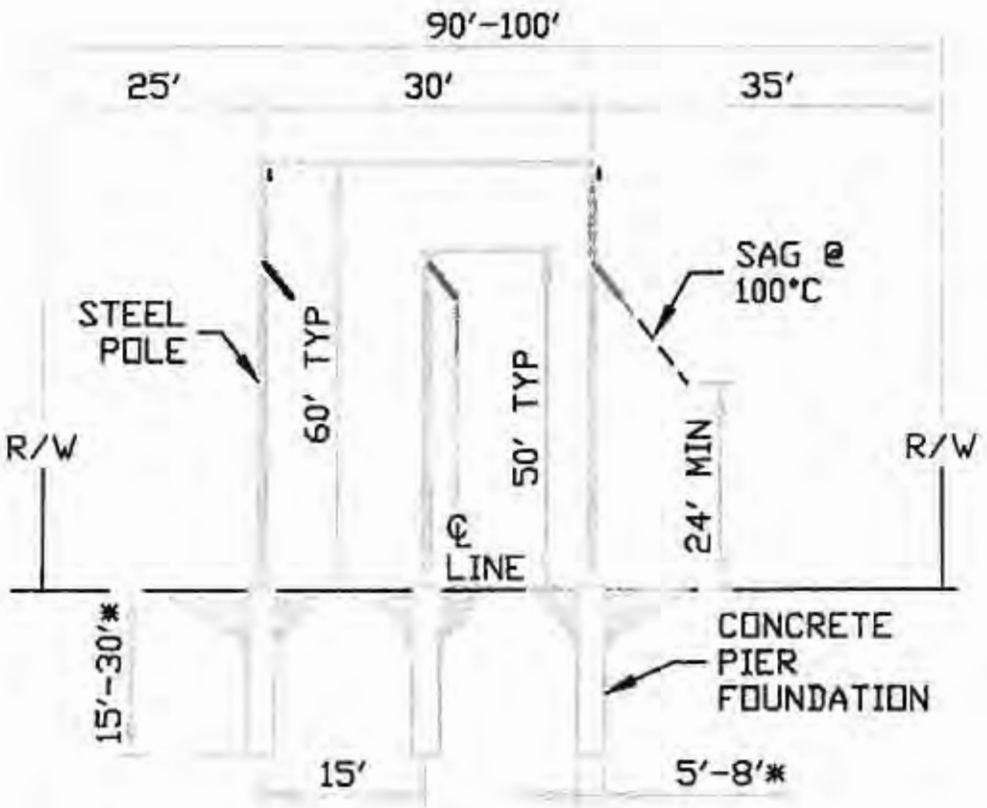

* DEPENDS ON STRUCTURE LOADS AND SOIL CHARACTERISTICS

NTS

Figure RWB-4
Typical 3-Pole Self Supporting Steel
Structure and Right-of-way
Patua Development Plan
Vulcan Power

Figure 8

EXHIBIT 6: COPIES OF PREVIOUS ENVIRONMENTAL DOCUMENTS

1. Patua Bypass Road Environmental Assessment – January 27, 2009

RECLAMATION
Managing Water in the West

Patua Bypass Road
Environmental Assessment

U. S. Department of the Interior
Bureau of Reclamation
Lahontan Basin Area Office
705 N. Plaza, Room 320
Carson City, NV 89701

October 2008

ENVIRONMENTAL ASSESSMENT

PATUA BYPASS ROAD

Churchill County, Nevada

U.S. Bureau of Reclamation
Lahontan Basin Area Office
Carson City, Nevada

October 2008

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Appendix B.

1.0 INTRODUCTION

1.1 Background

The Bureau of Reclamation (Reclamation) Newlands Project provides water for irrigation and wetlands purposes from the Truckee and Carson Rivers for approximately 57,000 acres in the Lahontan Valley near Fallon and Fernley in western Nevada.

Reclamation has withdrawn land in Churchill County, Nevada, for a Kinder Morgan gas pipeline right-of-way. Vulcan Power Company (Vulcan) is requesting authorization to construct a bypass road in section 28 township 20 north, range 26 east (T20N, R26E), Mount Diablo Meridian (MDM), northwest of Hazen, NV. The new right-of-way would be parallel to and up to 50 feet southwest of the existing Kinder Morgan right-of-way for a total length of 1550 feet (0.29 miles). Figure 1 shows the location of the proposed bypass road in Section 28. The road would be 15 feet wide over the length of this course. Road construction would consist of making a 10-15 foot deep slot cut for a maximum of 450 feet (0.085 miles) of the total 1550 foot proposed roadway. Grading of the remaining portions of the proposed road area would not require removal of additional soil material; the material removed from the cut area would be placed directly on the remaining portion of the improvement (0.205 miles/1,100 feet). As such, no stockpiling of material would be necessary for the project. Figure 2 shows a cross-section of the proposed work. The construction activity would occur within the 75-foot wide right-of-way and would not affect the Kinder Morgan pipeline. The duration of construction shall not exceed 21 days. No temporary work areas outside the right-of-way would be required. The improvement is intended for year-round use.

The Bureau of Land Management (BLM) has issued geothermal leases to Vulcan on 15 square miles of federal land in the Hazen area, held in a checkerboard pattern with private holdings. Reclamation has surface management authority over six of these sections and will review proposals for geothermal development on lands under its jurisdiction. The Kinder-Morgan right-of-way passes through two of these sections, sections 20 and 28.

The proposed bypass road would allow Vulcan to explore the potential for the geothermal resources in privately held portions of the Hazen-Patua lease area. Figure 3 shows the Vulcan leases in the Hazen area and the access road through Reclamation land to the privately held lease areas in section 17, T20N, R26E, MDM. Vulcan has two Nevada Division of Minerals permits for wells in section 17, Permit 826 and 827 for Industrial Production Wells 23-27 and 37-17. Vulcan has constructed the well pads at these locations in Lyon County, NV, using existing access road through private and Reclamation lands to reach these private holdings, but cannot use the 1500-foot portion of this road in section 28 to bring in heavy equipment, such as the drill rigs and large water trucks. The drilling rigs include a rotary drill rig and a triple rig. The large water trucks are necessary for compliance with atmospheric dust control regulations.

1.2 <u>Location of Patua Bypass Road</u>:

A strip of land extending from the Northwest Quarter of the Southeast Quarter (NW1/4 of the SE1/4) of Section 28, T20N, R26E into the Southeast Quarter of the Northwest Quarter of Section 28, T20N, R26E, MDM, County of Churchill, NV; said strip having a total width of 75 feet, lying within 35 feet on each side of the following described centerline.

The true point of beginning lies on the centerline of an existing gravel road (Kinder Morgan right-of-way), distant South 1°05'24" East, 2626.75' from a 2-inch iron pipe with a 2.5-inch U.S.

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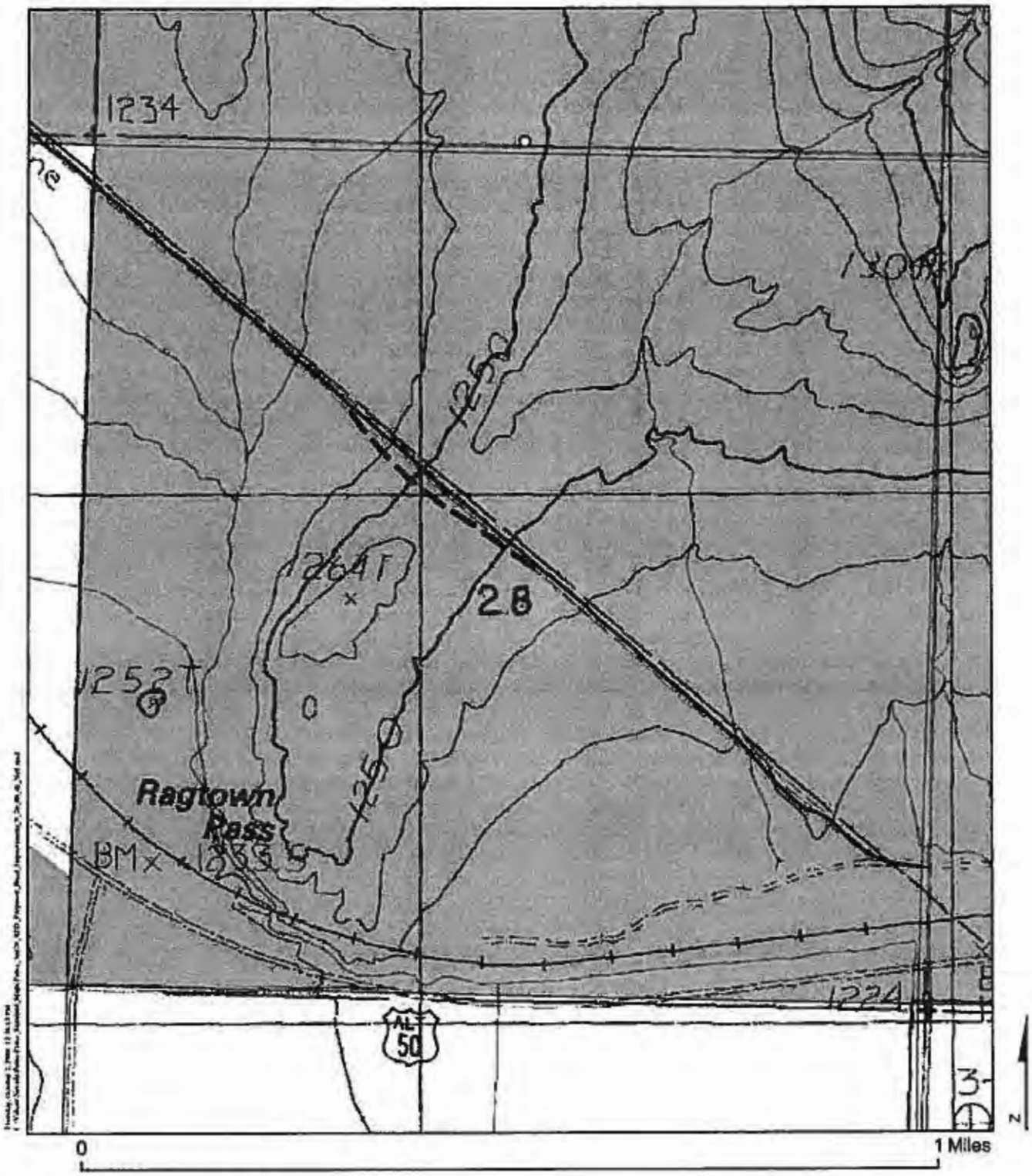


Vulcan Private & BLM Issued Leases

BLM & Private non-issued Leases

Roads

Proposed Road Improvement

Survey Monuments

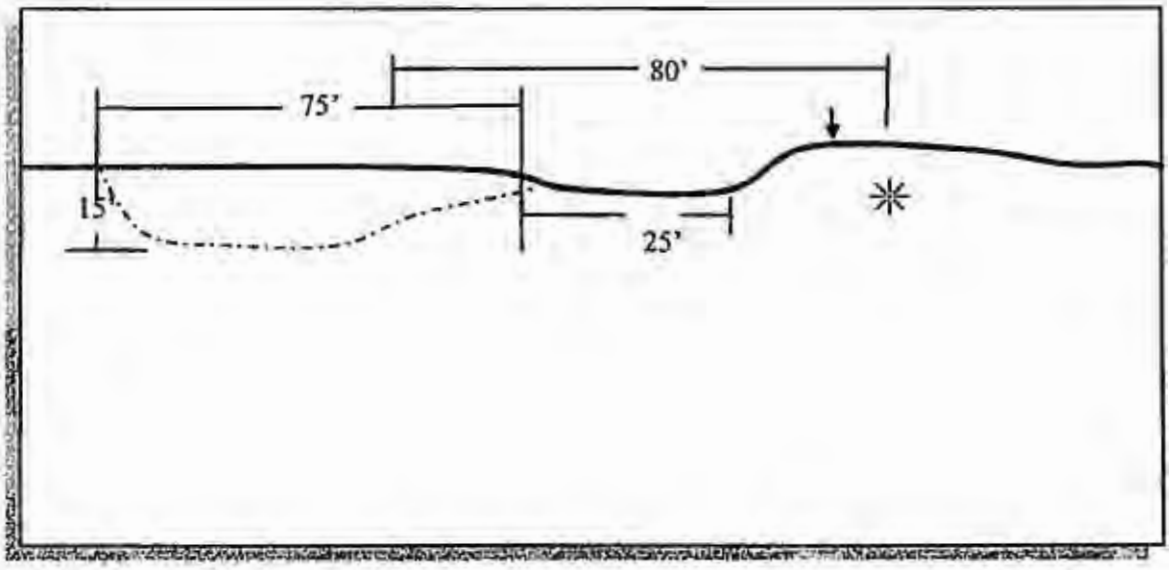
Boundaries from US PLSS.
Approximate.

Figure 1

Proposed Patua Bypass Road Location

Government Land Office (USGLO) brass cap set at the N¼ Corner of said section (28), thence along the following four (4) courses:

Figure 2. Proposed Patua Bypass Road North-South Cross Section at highest project area elevation.



Present Topography
Proposed Cut
Kinder Morgan Pipeline location

Figure 2
Proposed Patua Bypass Road Construction

1) North 55°24'36" West 705.09 feet.
2) North 49°09'36" West 303.35 feet.
3) North 42°25'22" West 378.90 feet.
4) North 33°27'22" West 140.47 feet, more or less, to the center of the existing Kinder Morgan road centerline at a point South 34°03'00" West, 1951.67 feet from said N¼ Corner of S28, T20N, R26E, MDM, in Churchill County, NV.

The sidelines of said strip of land being lengthened or shortened as necessary to begin in said existing road centerline and terminate in said existing road centerline. The approximate area of the strip of land is 2.6 acres.

The Basis of Bearings for the above described access road is a line between the NW Corner of Section 29 and the N¼ Corner of S28, T20N, R26E, MDM, in the County of Churchill, NV, bearing South 88°19'48" East 7967.979'. This bearing in reference to the North American Datum 1983 (NAD 83) Modified State Plane Coordinate System West Zone and GPS survey of the following USGLO Section corner markers:

	N Coordinate	E Coordinate
(1) N¼ Corner Monument (S28, T20N, R26E)	4382860 N	322113 E
(2) NW Corner Monument (S29, T20N, R26E)	4382930 N	319686 E

Said monuments being permanent survey markers located in the immediate project area.

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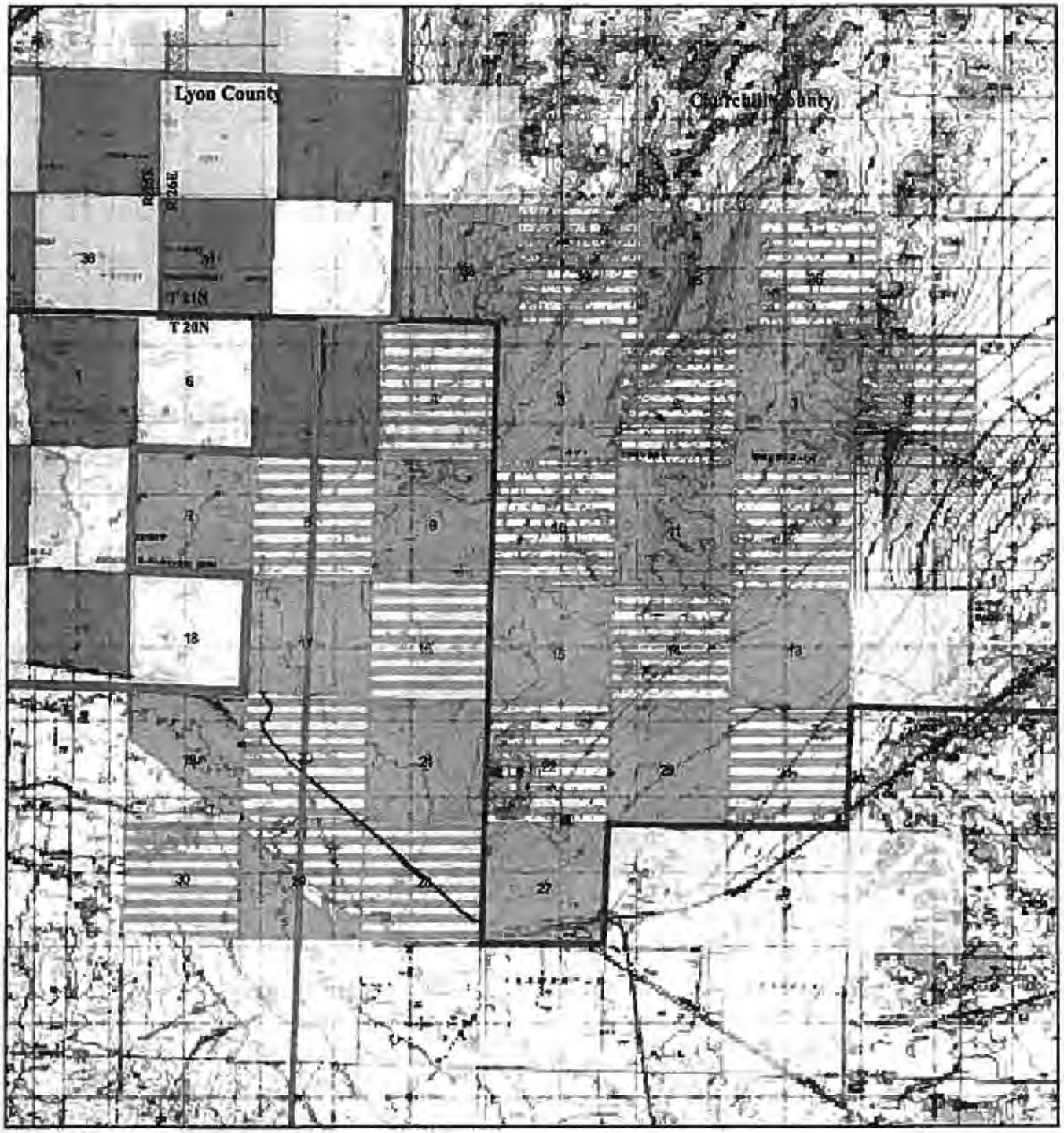

USBLM Leases

Private Leases

Bureau of Reclamation

Nevada Department of Wildlife

Fernley Wildlife Management Area

Lyon/Churchill County Line
(Lyon County to West)

Carson City/Winnemucca
BLM Field Office Boundary
(Carson Jurisdiction is south of line)

Existing access roads

Bypass Road

0 0.5 1 Miles

N

Figure 3

Vulcan Hazen-Patua Leases

1.3 Use Authorization

Reclamation Manual Directives and Standards LND 08-01 - Land Use Authorizations discusses Reclamation's direction related to use of Reclamation managed lands as follows:

Permit/License.

Use of Permit/License. The majority of use authorizations issued are generally in the form of permits and licenses as applicants seldom need greater (easement) interest, and granting greater land interest is often not in the best public interest. Authorizations for short-term (less than three years) or one-time short-duration use authorizations such as for recreation events, material storage, or for other miscellaneous temporary uses or privileges are the types of uses authorized through permits. Construction or placement of transmission or distribution lines, access roads, trails, pipelines, power lines, telephone lines, and other facilities involving installation or construction of longer-term capital improvements (requiring amortization periods over three years) are the types of uses authorized through a longer term license. Permits and licenses constitute a contract between the parties.

Term of Permit/License. All licenses, including permits, should be limited to a period of 25 years or less. Perpetual terms are discouraged except in limited circumstances where perpetual term is needed to comply with local statutes, financing requirements, or the like. In no case will licenses, including permits, be issued for more than the period required for the described purpose.

Terms and Conditions. Permits or licenses may, in some cases, be renewed upon expiration; however, in most cases a new permit or license should be prepared. Permits or licenses should be issued with clear language detailing under what conditions the permit or license may be renewed, terminated, amended, assigned or transferred, and/or have the rental rate adjusted, and should also include specific instructions on primary points of contact, service of notices, and administrative resolution of disputes.

As stated above for conditions to protect Reclamation's interests, 43 Code of Federal Regulations § 429.9 **Hold Harmless Clause** states:

(a) The following clause shall be a part of every land-use document issued by Reclamation:

The grantee hereby agrees to indemnify and hold harmless the United States, its employees, agents, and assigns from any loss or damage and from any liability on account of personal injury, or death arising out of grantee's activities under this agreement.

1.4 Purpose and Need for Action

The purpose of the proposed action is to allow water trucks and other heavy equipment to cross federal lands in the immediate vicinity to access the potential geothermal development of Vulcan's privately held leased areas in adjacent lands. The existing Kinder Morgan road in this location is too steep for large water trucks (necessary for compliance with atmospheric dust control regulations), transportation of drilling rigs and associated equipment, and other heavy equipment to access the privately held lease areas west of the Hot Springs Mountains.

The need for the proposed action is meet the requirements of Executive Order (EO) 13212 and the Energy Policy Act of 2005. EO 13212 directs executive departments and agencies to "take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy." The order further states that "(f)or energy-related projects, agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections." The Energy Policy Act of 2005 amends the Geothermal Steam Act of 1970 to facilitate development of new geothermal resources in an environmentally responsible manner to help meet the increasing interest in geothermal energy development on public lands in the western US.

1.5 Public Involvement, Consultation and Coordination

Consultation letters dated September 18, 2008 requesting scoping comments on the proposed bypass road were sent to the Fallon Paiute-Shoshone Tribe and the Pyramid Lake Paiute Tribe pursuant to federal legislation and executive orders concerning Native American government-to-government consultation, including NEPA and Indian Trust Assets. A letter dated XXXXXX was also sent to the tribes by Reclamation's Regional archaeology staff in accordance with 36 CFR Part 800.4(a)(4) requesting information regarding sites of religious or cultural significance. Reclamation did not receive comments from the tribes on either letter.

The draft EA and a letter requesting EA review and comments were provided to the tribes on XXXXXXXX. The tribes provided comments on the Draft EA (Appendix A). Reclamation prepared a response to the comments (Appendix B).

2.0 ALTERNATIVES

2.1 Alternative 1 - Proposed Action

Reclamation would provide concurrence for a bypass road to allow access for large trucks and other heavy equipment to the Vulcan Hazen-Patua lease area. Reclamation would not conduct an engineering review of the project and merely would grant concurrence for construction across Reclamation withdrawn lands.

2.2 Alternative 2 - No Action

Reclamation would not provide concurrence to allow a 0.3-mile bypass road in Section 28, and Vulcan would have to find an alternative route for large trucks and other heavy equipment to access pads 23-17 and 37-17 in section 17, T20N, R26E, MDM.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Environmental resources potentially impacted by the alternatives and other issues of concern are described in this section. The impacts include identifying any direct, indirect, or cumulative effects.

3.1 Site Description

The Vulcan Power Hazen-Patua lease area, approximately five miles east of Fernley, in Churchill County, Nevada. This area is in the Great Basin, characterized by low-lying alluvial-filled valleys, beach gravels, dune deposits, and north- or northeast-trending, fault-bounded mountain

ranges. The climate is arid with an average annual precipitation of less than eight inches on the basin floor to about sixteen inches on the surrounding ranges. Vegetation primarily consists of desert shrub. The soil is almost all Biddleman association in the western part of the lease area and Celeton very cobbly sandy loam in the eastern part of the lease area (USDA 2006).

The Vulcan Hazen-Patua leases are adjacent to the Fernley Wildlife Management Area (WMA), an area of low, marshy lands and wetlands that provides habitat for a variety of migratory birds. BOR manages the Fernley WMA pursuant to an agreement with the Nevada Department of Wildlife and the Truckee-Carson Irrigation District, dated March 3, 2008. As a wildlife management area administered by the Secretary of the Interior through BOR, the Fernley WMS is not available for geothermal leasing (43 CFR 3201.11(e)). Vulcan does not propose to construct any geothermal facilities within the Fernley WMA.

The Pyramid Lake Paiute Indian Reservation is approximately six miles northwest of the Hazen-Patua lease area, and Fallon Paiute-Shoshone Indian Reservation is approximately 16 miles southeast of the Hazen-Patua lease area.

The Churchill County Master Plan, which guides development on non-federal lands in the area, identifies the area as open lands (Churchill County 1990). Primary uses for open lands would include outdoor recreation, agriculture, or environmentally sensitive areas, such as wetlands.

The proposed bypass road is located in Section 28, T20N, R26E, MDM, approximately 1.5 miles southeast of the Fernley WMA, situated on steep terrain near Black Butte and the Hot Springs Mountains. The bypass road crosses a ridge, northeast of Ragtown Pass, that has an approximate slope of 9% and approximate elevation of 4,150 feet above sea level (asl).

3.2 Affected Environment/Environmental Consequences for the Proposed Action

Based on initial analysis impacts to economics, hydrology, climate, soils, floodplains and wetlands, fisheries, geology, mineral resources, recreation, land use, topography, energy, and hazardous waste are not considered in detail in this EA because the project would not affect them.

3.2.1 Wildlife

Affected Environment

Carter Schleicher of CSCON conducted a reconnaissance survey of the affected area on September 10, 2008, and reported that wildlife species that may inhabit the project area are typical of the little greasewood-shadscale vegetation community. These would include coyote, black-tailed jackrabbit, whitetail antelope squirrel, and red-tailed hawk.

The project area may support the presence of common migratory birds. The U.S. Fish and Wildlife Service has conservation and management authority for migratory birds under the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 *et seq.*). Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed.

Environmental Consequences
Consequences to wildlife resources generally result from impacts to individuals, populations, or from disturbance to wildlife habitat. The majority of potential impacts to wildlife are associated with habitat disturbance and vegetation removal. The 2.6 acres of wildlife habitat in the proposed right-of-way is sparsely vegetated and heavily disturbed. More dense habitat is found on the 3,840 acres of BOR lands in the Vulcan leases areas surrounding the bypass road. Construction activities, such as grading, digging, and the use of heavy vehicles, could result in short-term direct adverse impacts to some wildlife. The present wildlife that occupies the project area would be displaced during construction of the bypass road. No mitigation is proposed.

3.2.2 Threatened and Endangered Species

Affected Environment
The U.S. Fish and Wildlife Service identifies the Lahontan cutthroat trout as the only listed species under the Endangered Species Act of 1973 (Act), as amended, in Churchill County, Nevada (U.S. Fish and Wildlife Service, 2008). The Lahontan cutthroat trout is considered a threatened species under the Act. The nearest populations of the Lahontan cutthroat trout are in the Carson River and Lahontan Reservoir, approximately 11 miles south of the Vulcan leases at Hazen. The site survey reported that there are no perennial streams in the proposed project area or at the alternative road locations that would support the Lahontan cutthroat trout.

Environmental Consequences
The proposed action would not affect the Lahontan cutthroat trout since it does not occupy these areas.

3.2.3 Water Resources

Surface Water

Affected Environment

The site for proposed action is on high ground, in the southwest portion of the Hot Springs Mountains, approximately 2.5 miles from the wetland areas at Patua. The area for the proposed action has no perennial streams.

Environmental Consequences
Construction of the proposed bypass road could lead to an increase in soil erosion, but the proposed bypass site has no surface water sources and construction activity would not affect water quality. In areas with slopes greater than 5%, Vulcan would employ Best Management Practices (BMPs) to reduce sediment erosion, in compliance with non-point (stormwater) pollution prevention requirements of the Clean Water Act. Similarly, petroleum products or other chemical spills that may occur during construction would be isolated and any contaminated material would be treated appropriately or removed and disposed of, in compliance with state and local requirements. Water used for dust abatement would be trucked into the project area and would not affect surface waters in the project area.

Groundwater

Affected Environment
The western half of Hazen-Patua lease area has a shallow water table with relatively saline groundwater resulting from evaporation and concentration of salts in surface water derived from irrigation drainage. The groundwater hydrology of the basin is the result of a complex depositional history that includes periodic inundations by Lake Lahontan or smaller lakes, dry periods when sediments were reworked by winds and streams, and deposition of volcanic material, including ash. Depth to the water table ranges from 1.5 feet or less to about 15 feet in most of the area (Morgan 1982; SCS 1975). Confined groundwater is under artesian pressure in many areas. Groundwater quality tends to improve with depth. Deeper groundwater appears to be connected with, and mixed with, thermal water circulating at greater depths.

Environmental Consequences
The proposed action would not result in discharges to groundwater, and spills that could potentially infiltrate to shallow groundwater would be cleaned up in accordance with federal and state requirements to avoid contamination.

3.2.4 Air Quality

Affected Environment

The federal government has established ambient air quality standards for criteria pollutants, including ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), fine and inhalable particulate matter (PM2.5 and PM10), and lead particles. With the exception of the SO2 standard, the Nevada Division of Environmental Protection (NDEP), Bureau of Air Quality has adopted the federal standards to regulate air pollution in the state. NDEP has adopted an SO2 standard more stringent than the federal standards.

Nevada uses air quality data gathered by monitoring networks to determine the areas within the state that do not meet federal and state air quality standards, referred to as "nonattainment areas." There are no nonattainment designations for Churchill, Mineral, and Lyon counties, and conformity rules promulgated in accordance with section 176(c) of the CAA, USC § 7506(c) do not apply to the actions in nonattainment areas.

Environmental Consequences
The proposed bypass road would require 1.7 acres of disturbance that could potentially result in fugitive dust. The proposed construction activities would result in additional temporary impacts to air quality including construction vehicle exhaust emissions, diesel generators, power tool use, and worker vehicle emissions. Vulcan would implement the following BMPs:

- All areas to be disturbed would be watered on a regular basis.
- Vehicle speeds would be limited to 10-15 miles per hour.
- Construction equipment operators would be trained to recognize excessive fugitive dust generation and have the authority to shut down operations until a water truck arrives and sprays the disturbed areas.
- Subcontractors would be informed of their responsibilities to control fugitive dust.
- All equipment used would be maintained per manufacture's specifications and would meet all applicable emissions standards in order to minimize criteria pollutants (particulates, NOx, SOx) from diesel and gasoline engines.

These BMPs would reduce the temporary impacts associated with the grading, excavation, backfill operations, and vehicular traffic associated with the road bypass construction.

3.2.5 Noise

Affected Environment
The proposed project area is located approximately 0.6 miles north of Highway 50, which generates noise from vehicular traffic. The Fallon Naval Air Station is approximately 22-25 miles southeast of the project are and affects noise levels when aircrafts fly overhead.

Environmental Consequences
Construction of the bypass road and alternative new access roads would not result in a significant or measurable increase of noise levels in the vicinity due to the proximity of Highway 50. Noise generated by construction activities could potentially affect birds and other wildlife in the vicinity of the proposed location; these effects would be temporary and wildlife in the project area would habituate to the noise. The existing road alternative would not require construction of the road, but noise from trucks would have similar effects on wildlife.

3.2.6 Vegetation

Affected Environment
The project area lies in the little greasewood-shadscale association. It is the most extensive community in the region. It occupies the well-drained, broad, dry plains of the Lahontan sediments and the residual soils of the lower mountain ranges (Cronquist, et al; 1986). Well-worn ATV trails cross the Kinder Morgan right-of-way along the top of the ridge. There were no invasive, non-native species found at the project site during the biological survey.

Environmental Consequences
The proposed project would affect approximately 2.6 acres of the little greasewood-shadscale association. The road disturbance would be permanent, and the Kinder Morgan pipeline right-of-way would be preserved. Vulcan would revegetate the cut slopes within the right-of-way for the bypass road, where feasible. During clearing and grubbing, Vulcan would salvage any native material and organic matter and re-use them as a top-dressing for revegetation. Although poorly developed and shallow, the topsoil contains native seeds and microorganisms essential for nutrient cycling. A Noxious Weed Plan will be included in the revegetation specifications.

3.2.7 Hazardous Materials

Affected Environment
The proposed location is undeveloped and does not have facilities that store or use hazardous materials.

Environmental Consequences
Construction of the bypass road and the no action alternatives would involve the use of common hazardous materials, including, but not limited to, fuel, such as diesel and gasoline, oil, and lubricants. Vulcan would implement the following BMPs to reduce the risk of spills, fires, and release of pollutants:

- Gasoline, oil, and lubricants would be transported in approved containers in accordance with National Fire Protection Association Code,

- Sorbent material would be maintained on site to absorb petroleum products spills occurring during construction.

The risk of using routine hazardous materials during the construction of the road would be minimal.

3.2.8 Visual Resources

Affected Environment
The project area is characteristic of the Great Basin environment; desolate, sunny, and brush-strewn valley floors are bordered by often barren, but frequently colorful, elongated, and steep mountain ranges. Vegetation on the valley floor grows low and evenly and primarily consists of monochromatic desert brush (US Navy 2000).

The project area has an existing dirt road and is approximately 0.5 miles from the railroad and Highway 50. The road location is visible from Highway 50. The nearest recreational areas are Patua Hot Springs and the Fernley WMA, approximately 1.5 miles northwest of the bypass road location.

Environmental Consequences
The proposed construction of the Patua bypass road would not deteriorate the visual resources in the area, since there is already an access road immediately adjacent and parallel to the bypass road. The removal of less than two acres of sparse vegetation for the bypass road would not alter the character of the visual landscape.

3.2.9 Transportation

Affected Environment
Transportation in the proposed area is limited to Highway 50, which serves as a link in the interstate transport system, and the access roads north of the highway. The Southern Pacific Railroad also passes south of the project location.

Environmental Consequences
Construction of the proposed bypass road would temporarily increase vehicular traffic from Highway 50 to the Hazen-Patua lease area, but would not significantly affect the flow of traffic from the highway. The duration of the construction is expected to be less than 21 days.

3.2.10 Historic and Cultural Resources

Affected Environment
There are no historic or cultural resources in the proposed project location. Western Cultural Resources Management performed a class 3 cultural survey of the proposed project area on August 7, 2008 and encountered no cultural resources during the pedestrian survey. The records search revealed that no previously recorded sites or projects are located within the project area (WCRM 2008).

Environmental Consequences
Due to the lack of historic or cultural resources in the project area, no impacts are expected to occur. If cultural resources were encountered during earthmoving activities, Vulcan would cease construction in the area and have a qualified archaeologist evaluate the significance of the finding.

3.2.11 Indian Trust Assets

Affected Environment
Indian Trust Resources are legal interests in property or natural resources held in trust by the United States for Indian Tribes or individuals. Examples of trust resources are lands, minerals, hunting and fishing rights, and water rights. There are two tribes in the vicinity of the proposed crossings, the Fallon Paiute-Shoshone Tribe, approximately 16 miles away, and the Pyramid Lake Paiute Tribe, approximately 6 miles away.

Environmental Consequences
The proposed action and the no action alternatives would not affect Indian Trust Assets, since there are no trust resources within the project area.

3.2.12 Environmental Justice

Affected Environment
Executive Order No. 12898, Environmental Justice, requires each federal agency to achieve environmental justice as part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects, including social and economic effects, of its programs, policies, and activities on minority and low-income populations. EPA guidelines for evaluating potential adverse environmental effects of projects require identification of minority populations when a minority population either exceeds 50 percent of the population of the affected area or represents a meaningfully greater increment of the affected population than of the population of some other appropriate geographic unit.

Environmental Consequences
The proposed action and the no action alternatives would not disproportionately affect minority or low-income populations.

3.3 Affected Environment/Environmental Consequences for the No Action Alternative

The No Action Alternative would not result in any changes to the environment in Section 28 where the bypass road is proposed and would not have any direct environmental consequences. If the No Action Alternative were adopted, however, Vulcan would pursue with other options for bringing drill rigs, large water trucks, and other heavy equipment, which would result in indirect impacts at other locations. See Section 4.1.2, Indirect Impacts of the No Action Alternative.

4.0 OTHER NEPA CONSIDERATIONS

4.1 Indirect Effects

Indirect effects are effects that are caused by an action but take place later in time or farther removed in distance but are still reasonably foreseeable.

4.1.1 Indirect Effects of the Proposed Action

The indirect effects of the proposed action include the effects of bringing the drill rigs, large water trucks, and heavy equipment along the existing roads through Reclamation and private lands on the 3.4-mile route to the Vulcan well pad in section 17 and the effects of drilling of exploration wells at Vulcan's two existing well pads in Section 17. The pad for well 23-27 is

more than 1,000 feet from the boundary of the Fernley WSA, and the pad for well 37-17 is more than 1,500 feet from the boundary of the wildlife area.

Initial analysis indicates that the project would not affect the following resources: economics, hydrology, climate, soils, fisheries, geology, recreation, land use, topography, energy, and hazardous waste. As discussed above, the project would not impact tribal trust assets or have environmental justice concerns.

Wildlife
The passage of heavy equipment on the existing unimproved roads to the drilling area would not have a significant incremental effect on the small mammals, birds, and other wildlife along the route. Smaller equipment already uses this route. The water trucks may travel along the route several times a day, but the drilling equipment would remain on site for the duration of each phase of Vulcan's drilling program.

Drilling exploratory wells at the two existing pads in section 17 would not have an adverse effect on the wildlife in the vicinity of the pads. The drilling fluids would be contained within reserve pits, during drilling operations and subsequently drained and fenced after operations are completed to prevent avian use of the ponds. Drilling each well is expected to last up to 45 days. Noise levels from drilling are not associated with adverse impacts to wildlife.

Threatened and Endangered Species
No threatened and endangered species are found along the existing access roads or the well pads. Approval of the bypass road would not result in indirect effects to threatened or endangered species.

Water Resources
No permanent surface water features or major washes are along the route to the existing pad and the two existing well pads at section 17 are bermed to contain surface runoff and any accidental spills. Drilling fluids and rock cuttings would contained within reserve pits. Installation of industry standard blow out prevention equipment (BOPE) at the wellheads would prevent the escape of fluid pressure during drilling and well completion operations.

Up to 28,700 gallons of water per day would be needed for dust abatement and drilling. This water will be trucked to the project area from the Truckee-Carson Irrigation District in Fallon under an existing agreement; supplied from agreements with private parties who have water available for sale; or supplied from geothermal projects at other Vulcan leases. Vulcan does not expect to use water from surface or groundwater sources within the Hazen-Patua leases and would obtain a Nevada Division of Water Resources (NDWR) waiver if a water well is needed. The NDWR waiver would specify the amount of water allowed to be withdrawn to avoid adversely affecting the aquifer. Approval of the proposed bypass road would not result in significant indirect impacts to water resources.

Wetlands and Riparian Areas
The existing access roads and well pads are more than 2500 feet from the wetlands and surface water manifestations in the Fernley WMA, and the additional traffic and drilling that would result from the bypass road would not affect these sensitive resources.

Air Quality
The additional vehicular traffic along the 3.4 miles of existing unimproved road in sections 17, 20, and 28 would result in additional dust and emissions of criteria pollutants. Short-term

emissions would also result from the diesel-powered engines equipment at the drilling sites. Vulcan would water the entire length of the access road and well pads surfaces and apply the other Best Management Practices described in section 3.2.4 to control atmospheric dust and pollutant emissions.

Exploratory drilling would result in emissions of pollutants from the drilling equipment and worker vehicles. Operational emissions would consist of temporary venting of noncondensable gases, including hydrogen sulfide, and water vapor plumes during well testing. Based on previous drilling by Magma Corp in the area, the hydrogen sulfide concentrations in the geothermal resources at Patua are low and do not require abatement.

Noise
The increase in traffic along the route and the drilling activities at the well pads would result in temporary increases in noise levels at these remote locations. Based on previous data, noise levels at 1,000 feet from the drilling rigs are expected to be less than 57 dBA, a level typical of a routine conversation (California Energy Commission, Preliminary Staff Assessment, Salton Sea, 2003). Such noise levels would not have adverse impacts on the adjacent wildlife area.

Vegetation
The additional use of the existing access roads and well pads from the bypass road would not result in any further loss of vegetation or impacts to rare plant species.

Hazardous Materials
Well drilling requires the transportation and use of petroleum products and drilling additives. Vulcan would have tanks at the well pads for diesel fuel for the drilling equipment, surrounded by secondary containment apparatus, Additional well pad design includes a system of trenches to insure any other fluids present on the surface of the drilling location would be directed toward the reserve pit.

Visual
The temporary use of the existing roads and well pads resulting from the bypass road would not have significant visual impacts. The drilling locations would be more than 1.2 miles from Highway 50 and more than five miles from the entrance to the Fernley WMS from Interstate 95. While the derrick may be visible in the distance during drilling, it would be low on the horizon, approximately the same height as the transmission lines in the area, and would not interfere with the panoramic views of the distant mountains.

Transportation
The additional water trucks, six-person drilling crews, and other vehicles accessing the drilling sites would have a slight, but insignificant increase in traffic along Highway 50 and through the access roads at Hazen.

Historic and Cultural Resources
The use of the existing access roads the well pad sites would not affect historic or cultural resources. No such resources have been identified at the existing roads and pads, and use of the bypass road would not result in additional earthmoving at these locations.

4.1.2 Indirect Effects of the No Action Alternative

If the proposed bypass road is not approved, Vulcan would have to pursue other options for bringing large trucks and other heavy equipment to the existing well pads 23-17 and 37-17 in

section 17, T20N, R26E. Vulcan has at least two alternative options for accessing its existing pads.

> An existing road to the drilling area runs east of Black Butte Mountain and curves west along sections 8, 9, and 10 to the drilling locations. This existing road crosses approximately five washes, one ravine, and two areas on private land that topographically similar to the ridge where the bypass road is proposed. The road connects to other roads in the area for a route that is approximately 6.8 miles long, located in Sections 8, 9, 10, 14, 15, 23, and 27, T20N, R26E, MDM. Elevation at the base of the Hot Springs Mountains reaches 4350 feet that gently slopes toward the location of the well pad in section 17.
>
> Alternatively, Vulcan could construct a new road to the pads along a route that crosses diagonally through the private land and uses existing corner access approvals from Reclamation. The alternative new route would be located in Sections 17, 21, and 27, T20N, R26E, MDM. This route is 3.3 miles long and would cross at least two areas of steep terrain, in addition to ravines and washes. The access road would be steep near the base of Black Butte Mountain with an elevation of approximately 4500 feet.

Wildlife

If Vulcan used the 6.8-mile network of existing roads for exploratory drilling area in section 17, it would have to make improvements at three locations where terrain is similar to that at the proposed bypass location, resulting in greater loss of wildlife habitat than the proposed action. The vegetation and terrain along the existing roads is similar to the proposed route and wildlife use along the route is expected to be similar to that found at the proposed bypass road location. Use of the longer route, however, for heavy vehicles would have a greater chance of accidental loss of small mammals and other wildlife than along the proposed route.

If Vulcan were to construct a new road 15 feet wide along the 3.3-mile route through private lands, at least 5.9 acres of wildlife habitat would be lost, not counting the additional cuts and fills that would be needed in some areas.

Threatened and Endangered Species

No federally endangered or threatened species have been identified as potentially occurring in along either of the routes that would be used if the bypass road were not approved.

Water Resources

No permanent surface water features are located along either of the alternative routes, but both routes cross several dry washes. Erosion from the cuts and fills needed along the 6.8-mile route and new construction along the 3.3-mile route across private land would potentially affect surface water runoff during winter storms. If the 6.8-mile route were used, additional water would be needed for dust control. Using these routes, exploratory drilling would still proceed in section 17, but would not affect surface or ground water resources, as discussed above.

Air Quality

The no action alternative would result in cuts and fills in three area along the 6.8-mile route on existing roads or the construction of a new 3.3-mile road to the drilling area, resulting in fugitive dust and temporary emissions of pollutants from construction equipment. Use of either route for heavy equipment would result in additional atmospheric dust, which would be reduced by daily watering. Emissions from exploratory drilling and testing would still occur, as discussed above.

Noise
Construction along the 6.8-mile route on existing roads or the construction of a new 3.3-mile road to the drilling area would result in temporary noise levels in the immediate vicinity of the remote construction sites and at the drilling pads. Noise levels would not affect wildlife or recreational activity at the adjacent management areas.

Vegetation
If Vulcan were to use the 6.8-mile route of existing roads, cuts would remove vegetation at the three areas of steep terrain. If Vulcan were to construct a new road to the drilling sites, it would remove approximately 5.9 acres of greasewood-shadescale association vegetation. Vulcan would revegetate the cut slopes, where feasible.

Exploratory drilling and testing at the existing pads would not affect vegetation.

Hazardous Materials
Exploratory drilling requires the use of petroleum products and drilling additives. The 6.8-mile route that could be used if the bypass road were not approved would increase the distance required to transport these materials to the site and the risk of accidental spills.

Visual
The no action alternative new road site would be similar to the proposed action and would run parallel to the existing Kinder-Morgan R-O-W. However, vegetation removal would increase to 5.1 acres, but would not alter the character of the visual landscape. The existing road alternative would be less visible from Highway 50 and no construction would be implemented to alter the character of the visual landscape

Transportation
The additional water trucks, drilling crews, and other vehicles accessing the drilling sites would not result in a significant increase in traffic along Highway 50 and through the access roads at Hazen

Historic and Cultural Resources
No known historic or cultural resources are along the routes that would be used if the bypass road is not approved. Use of the existing roads would have less potential for impacts to cultural resources than construction of a the new road. If cultural resources were encountered during earthmoving activities, Vulcan would cease construction in the area and have an qualified archaeologist evaluate the significance of the finding.

4.2 Cumulative Effects

Cumulative impacts are "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time" (40 CFR 1508.7).

A reasonably foreseeable development scenario would involve the drilling and testing of additional exploratory wells to determine the capacity of the resource in the lease area. If the resource proves to be sufficient for power generation, Vulcan would develop additional well pads, pipelines, one or more power plants, and transmission lines to deliver electricity to the grid.

The environmental impacts of the reasonably foreseeable future development would depend on the temperature and extent of the geothermal reservoir; the success or failure of the phases of activity (i.e., exploration, development, production, and closeout); and the physical, environmental, and demographic characteristics of the local area involved.

As a result of these uncertainties, environmental impact analysis of cumulative impacts must be conceptual at this stage. Specific impacts and associated mitigation measures of subsequent activities would be addressed in the subsequent NEPA analysis and approval processes.

4.2.1 Wildlife

Initial exploration typically occupies a few acres for the well pads and access roads. If exploration is successful, the development of a complete geothermal project, including well pads, access roads, pipelines, power plants, and transmission lines typically occupies less than 5% of a productive geothermal area. Construction activities would result in temporary disturbance to wildlife and displacement of wildlife habitat.

Potential impacts from exploration and development may involve spills, leaks, or release of geothermal fluids which could result in discharges of mineralized, or saline water to surface features in the project area. The wetland habitats adjacent to the Hazen-Patua lease area provide habitat for a variety of migratory birds. Lease stipulations for avoidance of wetland habitat would reduce the potential level for impact.

Other resident wildlife species, such as the small to mid-sized common mammal species typically found in such areas, would not be adversely affected by this project activity. Overall, the potential risk for impacts on wildlife would be low.

4.2.2 Threatened and Endangered Species

No threatened or endangered species occur on the land leased to Vulcan, and geothermal exploration and development in this area would not result in cumulative impacts to threatened or endangered species.

4.2.3 Water Resources

The Vulcan Patua-Hazen leases have no reported wetlands are and no permanent surface waters features. The leased area, however, contains numerous washes and arroyos with runoff during seasonal storms.

Spills of fuels, geothermal fluid, or other substances, while not likely, could occur during the construction and operation of future projects. A Storm Water Pollution Prevention Plan would be implemented for each phase of each project, and any accidental spills that occur would be cleaned up as required by the plan.

Water use in the power plant would depend on the characteristics of the geothermal resources encountered at Patua. Water may be required for cooling in geothermal power plants and, if used, would likely be supplied by condensed steam produced from geothermal fluids. Most water used in power plant cooling would evaporate through cooling towers, but some cooling water must be discharged as blowdown, typically by injecting it back into the reservoir. Any surface discharges would require permits under the National Pollution Discharge Elimination System, and injection would require an Underground Injection Control permit. High quality groundwater is not abundant in the Fernley area; however, local groundwater supplies may be adequate for geothermal power production purposes. There is a low potential risk for impacts on groundwater supplies from the use of groundwater for geothermal cooling.

The power plant sites and well pads would have berms that would contain accidental spills and leaks. Oils and other products used for lubrication, water treatment, and other power plant uses would be stored in designated area and contained on site and would not affect surrounding resources.

4.2.4 Air Quality

Future exploration, development, and production would involve new structures, roads, and operations. Temporary construction-related emissions would result from ground-disturbing activities, construction vehicle exhaust emissions, diesel generator and power tool use, and worker vehicle emissions. Operational emissions would include releases of hydrogen sulfide and other noncondensable gases from wells during testing and from some power conversation cycles. Concentrations of hydrogen sulfide in geothermal resources in Nevada are typically low, in parts per billion, and do not require abatement. Emissions of would be subject to Clean Air Act permitting. The risk for potentially significant impacts to air resources would be low.

4.2.5 Noise

Future actions based on the reasonable development scenario could result in indirect impacts. Future exploration, development, and production would produce noise levels similar to those that would occur from construction of the bypass road and would not have adverse consequences in these remote locations.

4.2.6 Vegetation

Construction and operation on the leased sites in these areas would result in adverse, but not significant impacts on vegetation. The vegetation that would be removed from the Patua Hazen area is abundant throughout the region. Because development is expected to occur over a large number of years, the degree of surface disturbance at any given time would be considered less than significant. Impacts on vegetation could be mitigated by reseeding disturbed areas not needed for operation.

Proposed exploration and development in leased areas would be surveyed prior to ground disturbance to ensure that no sensitive plant species or riparian areas are found. Should such resources be found, the areas could be avoided. Reclamation activities following closeout would be implemented as required. As a result of these practices, impacts on vegetation would not be considered significant.

4.2.7 Hazardous Materials

Future actions based on the reasonable development scenario could result in potential impacts from hazardous materials during drilling and power plant operations. The transport, use, or disposal of hazardous materials could impact workers, the public, and the environment; however, training, experience, and knowledge of the drilling crews and plant operators combined with the use of BMPs (e.g. secondary containment) would reduce the impact. By adhering to proper regulations on hazardous material use and transportation, however, the risk for potential cumulative impacts from hazardous materials would be low.

Proper installation and operation of equipment, personal protective equipment, and worker training would reduce the risk to worker safety. The remote location, fencing of the power plant sites, and proper installation and operation of equipment would minimize impacts to public health and safety. The direct impacts of the construction and operation of a potential geothermal power plant to public health and safety would be low.

4.2.8 Visual Resources

Future exploration, development, and production would involve new structures, roads, and operations. The effects of these new structures, roads, and operations would depend on the location where the geothermal resources were sufficient for power projects and the risk for potentially significant impacts to scenic vistas, if any, would depend on the location and visual character of the sites.

4.2.9 Transportation

Future exploration, development, and production would involve increased use of construction equipment and delivery of materials. This would result in a slight increase vehicular traffic from Highway 50 to the access roads in the Hazen-Patua lease area.

4.2.10 Historic and Cultural Resources

Development of geothermal lease areas in Nevada has the potential to affect cultural and Native American resources. Previous work suggests that Patua Hazen leases have high potential to contain significant archaeological resources, including, but not limited to prehistoric use of rock shelter sites, rock art sites, open sites containing artifact scatters, pebble mound complexes, and historic-period resources associated with continued use of the region by Native Americans or as transportation routes and water conveyance. Based on the assessment of soils, elevation, topography, vegetation and water resources in surveyed areas with similar conditions, the potential for finding known or undocumented NRHP-eligible sites within the Patua Hazen lease parcels are high to moderate.

Geothermal lease areas that contain significant cultural resources that would be adversely affected by geothermal development may be mitigated through data recovery or other appropriate recording measures. Areas that contain significant cultural resources may be mitigated through data recovery or other appropriate methods. Future actions based on the reasonable development scenario could be mitigated by conducting cultural surveys of the areas to be disturbed and avoiding significant resources to the extent feasible.

4.2.11 Indian Trust Assets

Future actions based on the reasonable development scenario would not affect Indian Trust Assets, since there are no trust resources within the affected area.

4.2.12 Environmental Justice

No long-term increases in population or growth would be induced through operation of these leases, and demand for schools would not increase. Leasing could provide a beneficial impact to the state and counties in which leasing occurs, in the form of tax revenues and increased land values. The State of Nevada receives 50 percent of the revenues collected by the federal government.

Construction of a power plant and associated well field could require up to 200 workers; operations would have approximately 40 workers. Expenditures for equipment fuel, lodging, food, and other needs would provide a stimulus to the local economy over the duration of the drilling. The potential risk for impacts to environmental justice resulting from surveying of geothermal resources is expected to be low. No residents, minority or low-income populations, or businesses would be displaced.

4.3 Irreversible and Irretrievable Commitments

Irreversible commitments are decisions affecting renewable resources such as soils, wetlands and waterfowl habitat. Such decisions are considered irreversible because their implementation would affect a resource that has deteriorated to the point that renewal can occur only over a long period of time or at great expense, or because they would cause the resource to be destroyed or removed.

Irretrievable commitment of natural resources means loss of production or use of resources as a result of a decision. It represents opportunities forgone for the period of time that a resource cannot be used. Irretrievable refers to the permanent loss of a resource including production, harvest, or use of natural resources. For example, production or loss of agricultural lands can be irretrievable, while the action itself may not be irreversible.

The proposed bypass road would not result in any operational changes or other physical impacts that would irreversibly or irretrievably commit renewable resources from this federal action.

5.0 LIST OF PREPARERS

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6.0 REFERENCES

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Appendix A

Comments

Appendix A

Comments

Appendix B

Response to Comments

Appendix B

Response to Comments

EXHIBIT 7: CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

I hereby certify that I am a representative of Vulcan Power Company and that on this 9th day of March, 2010, I served each of the following persons with a copy of Vulcan Power Company's Application for a Permit to Construct the proposed Patua Geothermal Project under the Utility Environmental Protection Act upon the persons listed below either by messenger, electronic mail, U.S. Mail, first class postage prepaid or by overnight delivery service.

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Carson City, NV 89701-3109

Administrator
Nevada State Division of Environmental Protection
Department of Conservation and Natural Resources
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Carson City, NV 89701-5249

Nevada State Clearinghouse
Department of Administration
209 E. Musser Street, Room 200
Carson City, NV 89701

County Clerk

Churchill County

155 N. Taylor Street

Fallon, NV 89406

City Clerk

City of Fernley

595 Silverlace Blvd

Fernley, NV 89408

Kenneth Bonin, Sr.

Director Regulatory Affairs