SECTION 2

Proposed Action and Alternative

This section presents the Proposed Action and the No Action Alternative.

2.1 Proposed Action

TGP proposes to construct and operate a nominal 70-megawatt (MW), utility-grade geothermal power plant in Dixie Valley, Churchill County, Nevada (Figure 1-1). The power plant would generate electricity from the geothermal resources within the CC lease area. Once commercial operations begin, power would be delivered via the California Independent System Operator.

The Proposed Action consists of construction and operation of the following:

- A nominal 70-MW geothermal power plant facility
- Geothermal production and injection wells, pipelines, and support facilities
- A 230-kV gen-tie, less than 1 mile long
- A non-potable water well

2.1.1 Overview of Proposed Action

The following sections present information concerning components of the Proposed Action. TGP proposes to conduct geothermal utilization in a portion of the CC lease area called the Proposed Action area. The CC geothermal leases held by TGP contain 7,681 acres (see Figure 1-3).

2.1.1.1 Location

Figure 2-1 shows the approximate layout of the Proposed Action. To allow for flexibility, TGP has identified a portion of the lease area called the Proposed Action area where the proposed power plant facilities would be constructed. Four potential locations are shown for the proposed power plant facilities. Only one of the four locations would be constructed. The selected location would be defined by TGP upon completion of its exploration program. Up to 30 additional production or injection wells would be drilled at the 15 well pads previously approved by the BLM for a total of 45 wells. Potential gen-tie locations are shown for each of the four potential power plant locations. Table 2-1 summarizes the proposed facilities along with estimated area of permanent or temporary disturbance for each.

TABLE 2-1
Proposed Action Disturbed Areas

Facility	Number Required	Area/Dimensions per Structure	Disturbed Area (acres)
New Facilities Included in the Proposed Action			
Pipeline Supports[a]	1,692	Up to 0.70 sq. ft. per structure	0.03
Gen-tie Support Structures[b]	3	Up to 24 sq. ft. permanent disturbance per structure	Permanent: 0.002 acre
		Up to 13,200 sq. ft. temporary disturbance per structure	Temporary: 1 acre
Power Plant Facilities[c]	NA	1,170 feet by 2,240 feet	60
Total New Disturbed Area			**61**

[a] Pipeline support structures would be placed an average of 30 feet apart, for a total of approximately 1,692 structures along the expected length of pipeline.

[b] Gen-tie support structures would be placed at up to eight structures per mile, for a total of approximately three structures along the expected maximum length of gen-tie.

[c] Construction and operations of the power plant facility are expected to occupy the entire 1,170- by 2,240-foot area.

2.1.1.2 Proposed Action Facilities

The Proposed Action includes construction and operations of roads, parking and laydown areas; production and injection wells and associated structures; pipelines; power plant infrastructure; electrical systems, including substation, gen-tie and ring bus collector; and associated control and safety systems.

Roads, Parking, and Laydown Areas

Limited roads and parking areas would be required for vehicle access and parking within the fenced, 60-acre facility area. A parking area approximately 100 feet long by 25 feet wide would be constructed outside the maintenance building and a second parking area approximately 175 feet long by 25 feet wide would be constructed adjacent to the office building. Less than 2,500 feet of new access road would need to be constructed within the facility area to provide for safe and efficient movement of facility maintenance vehicles. These access roads would generally be 25 feet wide or less. All roads and parking areas within the facility area would have gravel cover to minimize the generation of dust and sediment. A laydown area of approximately 400 by 600 feet would be constructed near the parking area to store equipment and materials prior to or during construction activities.

The power plant facility would include the main plant components and support facilities, wells, gen-tie, and pipelines described above. Roads, wells, and well pads approved by the BLM for exploration purposes would be converted to permanent use for plant operations under the Proposed Action. Table 2-2 summarizes the conversion of exploration facilities included as part of this Proposed Action. Figure 2-2 shows the projected plant general arrangement. The entire 60-acre footprint of the plant site would be permanently disturbed by access roads, parking, and laydown areas.

TABLE 2-2
Coyote Canyon Facilities to be Converted from Exploration Use

Facility	Length (feet)	Dimensions	Disturbed Area (acres)
Facilities to be Converted from Exploration Use			
Well Pads	NA	15 well pads, 350 x 350 ft, plus one non-potable water well pad, 150 x 150 ft	42.7
Access and Branch Roads	50,754	25 feet wide, plus turnouts	30.3
Total Area to be Converted from Exploration Use			**72.5**

Production and Injection Wells

Up to 15 exploration wells and associated well pads were previously permitted for the Proposed Action site by the BLM. These exploration wells would be converted to either production or injection wells under the Proposed Action. In addition, TGP would drill up to 30 additional production and injection wells on the 15 previously permitted well pads (Figure 2-1). Multiple wells could be drilled on one well pad. The injection wells would be constructed to dispose of water into the geothermal reservoir to maintain pressure support for the resource. As described under Power Plant Infrastructure below, the total flow rate of geothermal fluid required for plant operation would be up to 5.9 million pounds per hour [19,050 acre-feet per year (afy)] of geothermal fluid. The actual number of wells drilled would depend on the well and resource productivity. If individual wells show higher production rates (fluid flow, temperature), fewer wells would be drilled because the total flow rate of geothermal fluid required for the plant operations would not exceed 5.9 million pounds per hour (19,050 afy).

A detailed geothermal drilling program would be submitted to the BLM for review and approval prior to beginning drilling operations. This section summarizes the well drilling activities for purposes of evaluating potential environmental consequences. If necessary, the BLM may include additional provisions or conditions needed to address environmental concerns or other site-specific issues with the geothermal drilling permit.

Each well would be drilled using a large diesel rotary drilling rig. During drilling, the top of the drill rig derrick would be up to 160 feet above the ground surface, depending on the rig used. The typical drill rig and associated support equipment (rig floor and stands; draw works; mast; drill pipes; trailers; mud, fuel and water storage tanks; diesel generators; air compressors) would be brought to the previously permitted pad on seven to ten large tractor-trailer trucks. An average of six to eight small trucks/service vehicles/workers' vehicles could be driven to the active well site each day throughout the typical 8-week drilling process. Drilling would be conducted 24 hours per day, 7 days per week by a crew of up to 12 workers per well. Typically, one drill rig would be onsite at a time but TGP may choose to drill up to three wells at once, bringing the total crew to as many as 36. Crews would include the drilling supervisor, geologists, suppliers, and operators.

Secondary containment structures would be provided for all chemical and petroleum/oil storage areas during drilling operations. Additionally, absorbent pads or sheets would be placed under likely spill sources and spill kits would be maintained onsite during construction and drilling activities to provide prompt response to accidental leaks or spills of chemicals and petroleum products.

Upon completion of the drilling operations, clean-out and flow tests would be performed on the wells to define the geothermal resource characteristics. Flow testing would typically run for an average of 3 days (24 hours a day) for each well, but the duration may vary depending on well characteristics. During these tests, the flow would be routed to the previously permitted reserve pits. It is anticipated that the initial flow rates of fluid from each well into its reserve pit would be approximately 500 to 1,500 gallons per minute (810 to 2,420 afy), on average, depending on the productivity of the well.

After completing and testing each well, it may be necessary to conduct well stimulation operations to enhance flow in the well bore, either from the well (production) or into the well (injection). Well stimulation operations could involve injecting a dilute mixture of 35 percent solution of hydrochloric (muriatic) acid down the well. The amount of dilute acid placed in the well bore could vary from 10,000 to 50,000 gallons or more based on well characteristics. Concentrated hydrochloric acid would be trucked to the site and diluted onsite. After well stimulation, the well would be back-flowed and the well flow would be tested, neutralized if necessary, and discharged to the reserve pit.

TGP may decide to conduct directional drilling at each site based on the location and extent of geothermal resources in proximity to the well site. Directional drilling would likely result in a deep bottom hole located under BLM lease areas. TGP Geothermal Drilling Permit applications would be submitted to the BLM for the drilling of these wells, pursuant to 43 CFR 3260.11.

A hydrological monitoring program has been developed to monitor potential effects to water resources on public lands caused by the Proposed Action. The BLM-approved monitoring program includes, but is not limited to, monitoring groundwater quality, levels, and temperatures. As drilling and development continue, data would be collected to establish hydrologic baseline characteristics.

Well-field Structures

Production Wells. Each production well would be designed to have a well head, geothermal fluid separation equipment, well pad services building with an associated emergency generator (diesel), and brine transfer pump that would be located within a fenced area of the pad. Equipment on the well pad would be less than 65 feet tall and would be painted to blend into the environment, consistent with BLM guidance.

During well start up or transient (or upset) conditions, geothermal fluid would be transferred to a one-million-gallon brine holding pond located adjacent to each production well (the reserve pits constructed during exploration drilling operations would be converted to brine storage ponds for facility operations).

Chemical scale inhibitors are anticipated to be at the production well pads. These inhibitors would be injected into the production wells to inhibit scale accumulation. The actual type and amount of inhibitors would be determined after the wells have been tested. The inhibitor injection system, including injection pumps and metering systems, would be stored in a tank in a bermed area on the well pad.

Injection Well Structures. The injection well pads would include a well head, a manual throttle valve, an isolation valve, a pump for injecting fluid, and connecting pipelines.

Well Connection Pipelines

TGP proposes to construct aboveground pipelines to carry geothermal fluids from production wells to the plant, and to return spent geothermal fluids (brine) for injection into the geothermal resource through injection wells. The aboveground pipelines would be in the Proposed Action area as shown on Figure 2-1.

The new aboveground pipelines would be constructed within the 200-foot right-of way (ROW) of the access roads built during exploration drilling operations. These access roads were permitted with a width of 25 feet, including a travel way, shoulder, and drainage swales on each side. The pipelines would be situated on the shoulder of the travel way, which would allow for sufficient travel way for vehicle traffic. Figure 2-1 shows the anticipated locations of the aboveground pipeline corridors for the Proposed Action.

The pipelines would be constructed of welded carbon steel pipe that would be covered with 2 to 3 inches of insulation. It is anticipated that the pipelines would range in diameter from 16 inches to 48 inches and would be constructed 2 to 3 feet above the ground surface with structural supports located about every 30 feet. Pipeline thermal expansion would be accommodated by a series of sliding pipe supports, expansion loops, and strategically placed anchored pipe supports. All expansion loops are expected to be horizontal outside the plant area (between the plant and the wells); vertical expansion loops may be required within the plant area where space may be limited and access required. Some portions of the pipe runs may need to be buried, especially at road crossings where safety is a concern.

Condensate "pots" would be installed in numerous locations under each new production pipeline to minimize the chance for inadvertent leaking of geothermal fluid from the pipelines into area soils. The exact location and the total number of condensate pots have yet to be determined.

Power Plant Infrastructure

The power plant would encompass an area of approximately 60 acres (or 1,170 by 2,240 feet), excluding the disturbed area for the gen-tie and pipelines. The power plant site would be confirmed as part of the facility's final design; Figure 2-1 shows the potential power plant sites.

A chain link fence would be installed around the main facility area to prevent unwarranted access to the facility by the public and to prevent wildlife from entering the facility/electrical generation area. The chain link fence would be equipped with controlled-entry gates to allow vehicle egress/ingress.

Existing access roads would be used to the extent possible, and upgraded as necessary to support construction and operational vehicle traffic. The primary access to the CC lease area would be via U.S. Highway 50. From Highway 50, State Route 121 leads to the lease area.

Limited roads would be required for vehicle access within the fenced, 60-acre facility area (Figure 2-2). Less than 2,500 feet of new access road would need to be constructed within the facility area to provide safe and efficient movement of facility maintenance vehicles. These access roads generally would be 25 feet wide or less. All roads within the facility area would be provided with a gravel cover to minimize the generation of dust and sediment. Roads within the facility area would be constructed in keeping with the BLM's Gold Book standards (BLM, 2007a).

The 230-kV gen-tie would be constructed within a corridor up to 200 feet wide between the proposed substation and the existing 230-kV transmission line. No new roads would be constructed for the gen-tie.

The construction and operation of the Proposed Action would require several types of structures and ancillary equipment, including steam separators, power turbine(s), heat exchangers, condensers and cooling equipment, and a 230-kV electrical substation. Additional communication lines, if needed, would be located on or near the existing transmission line within the existing ROW. Buildings required at the power plant include an office/control room and maintenance/storage buildings with associated parking areas. A gen-tie would need to be constructed at the site to interconnect the power plant with the existing 230-kV transmission line, which runs through the Proposed Action area. Table 2-3 provides a summary of the facility structures, dimensions, and a summary of their uses. The proposed plant general arrangement is shown on Figure 2-2.

TABLE 2-3
Facility Structures and Dimensions

Structure	Proposed Dimensions	Use
Office/Control Room	75 x 50 feet	An office and restrooms
Electrical Room/Control Room Building	75 x 50 feet	House switchgear, motor control center, the control room
Electrical Substation	175 x 125 feet	Voltage control and power distribution
Gen-tie	50 x 2,000 feet	Used to interconnect power plant to existing transmission line
Maintenance Building	75 x 100 feet	Storage and maintenance of equipment/vehicles
Electrical Generator Facility	250 x 150 feet	Converts steam into electricity
Binary Power System (Heat Exchangers and Power Turbine)	100 x 50 feet (up to seven required)	Transfer heat from brine to working fluid and converts to electricity
Air Cooled Condensers (Dry Cooling) or hybrid	325 x 60 feet (up to seven required)	Removal of waste process heat from system
Brine Containment Basin	~ 45,000 ft^2	Collect excess flows from rock mufflers, cooling towers, stormwater, and equipment drains
Septic Disposal/Leaching Field	100 x 50 feet	Disposal of sanitary wastes generated in typical office/plant setting
Water Storage Tank	30 feet diameter x 40 feet tall	Storage of water for fire suppression
Fire Pump House	25 x 25 feet	Houses fire control equipment
Lube Oil & Diesel Fuel Tank Secondary Containment Area	Tank size TBD; secondary containment area = 50 x 30 feet	Storage of lube oil and diesel fuel
Non-Condensable Gas Removal System	50 x 30 feet	Remove non-condensable gases from steam

The tallest permanent structure would be the electrical gen-tie towers (power poles) at 85 feet. If the flash technology is selected, the crane reaching over the steam turbine generator set would reach 75 feet and would be the second-tallest structure. Other plant equipment would have structures lower than 75 feet.

All power plant buildings (not including power plant equipment) would be rigid, steel-frame, pre-engineered structures with steel panel walls and steel roofs. The exterior of the buildings would be painted an appropriate color based on BLM's standards to blend in with the surrounding environment.

Lighting at the power plant and production and injection wells would be designed in compliance with the Federal Aviation Administration (FAA) requirements and other applicable laws and regulations. Additionally, lighting would be designed to effectively reduce light pollution wherever possible. Where practical, lighting would be directional and would be hooded or shielded.

Power Generation Technology

The proposed facility would utilize either a flash, binary, or combined-cycle technology to produce electricity from the geothermal resource. The final technology selection would be determined by TGP based on final resource evaluation and construction costs.

Flash Unit. Geothermal fluid (approximately 5.9 million pounds per hour or 19,050 afy), received from the production wells, enters the plant and moves through a series of high- and low-pressure separators where steam is separated from the geothermal fluid. The spent geothermal fluid (brine) is injected back into the geothermal resource. The steam is sent to a steam turbine generator where the thermal energy in the steam is converted into mechanical energy by rotating the steam turbine rotor, which turns a generator to product electrical energy.

The steam is then condensed back to a liquid state for reuse in the process and ultimately injected back into the geothermal resource. The steam can also contain gases (referred to as non-condensable gases or NCGs) that would not condense (primarily carbon dioxide). These gases are removed from the system using a vacuum pump and vented to the atmosphere. A variety of gases would be entrained in the geothermal fluids produced from the production wells. The majority of these gases separate into the steam phase during the flashing operations. The largest component in the gas stream would be carbon dioxide (CO_2), generally comprising greater than 95 percent of the total, with smaller amounts of other gases such as hydrogen sulfide (H_2S), nitrogen (N_2), and methane (CH_4). These gases would collect in the condenser and must be removed for proper operation of the condenser. Removed NCGs would be routed to the cooling system before being emitted to the atmosphere. Figures 2-3 and 2-4 illustrate the flash unit production and generation process respectively.

The cooling process used to condense the steam would be either a dry cooling system or a hybrid cooling system. The dry cooling system operates similar to an automobile radiator where steam from the steam turbine enters the cooling unit (or radiator) and a series of fans blow ambient air over the cooling unit (or radiator) to condense the steam. No water is used for process cooling.

The hybrid cooling system is being evaluated for possible use when ambient air temperatures are too high to efficiently condense steam. The hybrid cooling system uses a combination of water cooling and dry cooling technologies to accomplish the process cooling required. This hybrid cooling technology results in a significant reduction in water consumption over a traditional wet cooling system. If a hybrid cooling system is selected, the power plant is expected to use up to 550 afy (341 gpm) of water for cooling purposes. The process water would be obtained by drilling and permitting a non-potable water well with the Nevada Division of Water Resources (NDWR). The process water well is discussed in more detail later in this section.

As required to initiate well/plant startup or when upset conditions occur, produced steam would be vented to an abovegrade rock box, which is used to reduce the noise when the steam is vented off into the atmosphere, located adjacent to each plant site.

Binary Unit. The binary unit uses a secondary organic working fluid, such as pentane (C_5H_{12}), isopentane (C_5H_{12}), butane (C_4H_{10}), isobutane (C_4H_{10}) or a refrigerant such as R245fa, to extract heat from the geothermal fluid. The working fluid is vaporized, due to a lower boiling point, in a heat exchanger to drive special organic fluid turbines (similar to the flash unit described above). The working fluid is condensed in an air-cooled condenser. It then repeats the process as it is operated in a closed-loop system. The Organic Rankine Cycle technology is expected to use the same quantity of geothermal fluid as the flash system.

The binary cycle would also produce NCGs similar to the flash technology and the NCGs would also be vented to the atmosphere. Figures 2-5 and 2-6 illustrate the binary unit production and generation process respectively.

Geothermal Combined Cycle. The geothermal combined cycle utilizes both flash and binary technologies combined in a single power plant. The steam and geothermal fluid that exits the flash unit's steam turbine generator would be directed to the binary unit (as described above) to generate additional electrical power. The combined cycle system would use the dry cooling technology to condense the steam for injection into the geothermal resource.

The combined cycle would produce the same amount of NCG as the flash and binary systems. Figures 2-7 and 2-8 illustrate the combined cycle production and generation process respectively.

Process Water

Depending on the cooling technology selected, up to 550 afy (341 gpm) of water would be used in the operation of the power plant. An approximately 500-foot-deep, non-potable water well would be constructed at the plant site. Applicable authorizations would be requested from the NDWR. The operations of the hybrid cooling system would not be restricted by the water quality of the non-potable water well and water with high salinity and levels of dissolved solids could be used.

In addition to cooling, process water uses at that plant site would include fire suppression, general maintenance water, water for dust suppression, water for the domestic water system (up to 50 afy) and water for operation of the hybrid-cooling system (up to 500 afy). Drinking water for onsite personnel would be provided from bottled water. Water for the domestic water system (emergency showers, eye wash stations, toilets, etc.) would undergo basic treatment with chlorination as needed to prevent bacterial growth but it would not be treated to meet drinking water quality standards.

Electrical Substation

The power plant facility would include an electrical substation that would convert the electrical power generated to a voltage of 230 kV. The substation would include circuit breakers and transformers, which would contain insulating gases and oils. A main control building would contain instrumentation and telecommunications equipment.

The substation would measure up to 250 by 175 feet and would be surrounded by an 8-foot-tall chain link fence with vehicle and personnel access gates.

Interconnection Line

The power plant facility would connect to TGP's existing 230-kV transmission line via a 0.4-mile-long 230-kV gen-tie. The proposed gen-tie routes are shown on Figure 2-1. Only one route would be selected based on the final location of the power plant. The gen-tie would consist of a single 230-kV circuit on H-frame or three-pole wooden structures that would be approximately 85 feet tall. Figures 2-9 and 2-10 show examples of the H-frame and three-pole structures, respectively. Construction of each gen-tie pole would require a temporary disturbance of 0.5 acre and an approximately of a 30- by 40-foot area for installing the electrical conductors or line. Installation of each wooden pole would require a permanent disturbance of approximately 6 to 8 square feet per pole.

The gen-tie would interconnect to the existing 230-kV transmission line via a ring bus collector that would measure up to 250 by 175 feet and would be surrounded by an 8-foot-tall chain link fence with vehicle and personnel access gates. A summary of the proposed interconnection line structures is provided in Table 2-4.

TABLE 2-4
Proposed Interconnection Line Structures

Feature	Description
Maximum line length	0.4 mile
Type of pole structures	Wood pole structures; either H-frame or three-pole
Structure height	80 feet to 85 feet
Span length	Approximately 800 to 1,200 feet depending on terrain
Number of structures/mile	5 to 8 depending on terrain
ROW width	Up to 200 feet
Voltage	230 kV
Circuit configuration	230 kV, three-phase, single conductor per phase
Conductor size	954-kcmil ACSR, 1.716-inch diameter
Ground clearance of conductor	35 feet minimum
Structure foundation depth	7 to 14 feet depending on structure location, geology and structure type
Temporary work areas required	220- x 60-foot work space; 30 x 40 feet for line construction equipment

Project Construction Schedule

TGP anticipates construction would begin in spring 2011, and the power plant facility would be operational in summer 2013. TGP would need to test facility equipment and operations for approximately 3 months prior to commencing commercial operations.

Site Preparation and Mobilization Activities

Site preparation and mobilization activities would include setup of temporary onsite lodging and transport and staging of equipment required for construction to a laydown area in the power plant area. Onsite lodging would be used to supplement lodging in nearby communities; however, construction workers would stay in surrounding areas as much as possible.

It is estimated that up to 150 workers would be involved during the 24-month construction of the power generation facility with the onsite workforce ranging between 80 and 100 during the initial 12 months; peaking at about 150 from month 13 to month 18; and gradually reducing during the last 6 months of construction. Operation of the power plant following construction would require a permanent workforce of up to 16 professionals in addition to regular maintenance activities supported by outside contractors.

Table 2-5 details the total number of onsite personnel that are estimated to be required during construction and operation of the facility. TGP has also provided an estimate of indirect and/or induced jobs that could result from the construction of the facility, including permitting professionals, jobs created or maintained from manufacturing of facility building components and equipment and jobs created offsite during construction activities based on established data provided by the Geothermal Energy Association (Kagel, 2006).

TABLE 2-5
Estimated Workforce for Construction and Operation

Project Phase	Onsite Workforce Requirements	Indirect/Induced Jobs	Duration of Jobs (months)
Permitting	0	4	18
Power Plant Equipment Manufacturing	0	60	18
Construction	150	60	24
Operation and Maintenance	16	15	360
Total Jobs Created	**166**	**139**	

Waste and Hazardous Materials Management

Secondary containment structures would be provided for all chemical and petroleum/oil storage areas during drilling and construction operations. Additionally, absorbent pads or sheets would be placed under likely spill sources and spill kits would be maintained onsite during construction and drilling activities to provide prompt response to accidental leaks or spills of chemicals and petroleum products.

Solid wastes generated by the Proposed Action would be stored onsite until transported offsite to an appropriate landfill facility in accordance with BLM and Churchill County regulations. A septic system would be installed in accordance with BLM and Nevada Division of Environmental Protection (NDEP) regulations and requirements.

A project hazardous material spill and disposal contingency plan would describe the methods for cleanup and abatement of any petroleum hydrocarbon or other hazardous material spill. The hazardous material spill and disposal contingency plan would be submitted to and approved by the BLM and made readily available onsite before operations begin.

Handling, storage, and disposal of hazardous materials, hazardous wastes, and solid wastes would be conducted in conformance with federal and state regulations to prevent soil, groundwater, or surface water contamination and associated adverse effects on the environment or worker health and safety.

Plans for Surface Reclamation

The estimated life of the project is 30 years or its useful life, whichever is longer. TGP would prepare site reclamation plans for BLM approval prior to plan implementation. The reclamation plans would conform to BLM and Nevada Division of Minerals (NDOM) requirements, including BLM Gold Book recommendations (BLM, 2007a). Final drill site/access road reclamation plans would be developed for the Proposed Action depending on final well locations (BLM, 2007a) and as required by BLM. The following information is provided for purposes of evaluating potential environmental impacts from the Proposed Action.

The plans would address restoring the surface grades, surface drainage, and revegetation of cleared areas. Project-related equipment and machinery would be decommissioned and, where possible, reused or sold as salvage. Wells would be plugged and abandoned as required by BLM, NDEP, and NDOM regulations. Equipment with no resale value would be sold or given as scrap. Additionally, aboveground pipelines would be removed. Prior to removal, pipelines would be flushed and any remaining fluids would be properly disposed of. TGP would restore the area to the original landform or, if restoration of the original landform is not feasible, recontour to blend in with the surrounding landform. Salvaged topsoil would be respread evenly over the entire disturbed area to ensure successful revegetation. Disturbed areas would be reseeded with a mix specified previously in this section, and erosion-control measures and measures to control invasive non-native plants and noxious weeds would be implemented in accordance with appropriate BLM guidelines. To help mitigate the contrast of recontoured slopes, reclamation would include measures to feather cleared lines of vegetation. Other techniques to improve reclamation success could be implemented at BLM's direction.

2.1.1.3 Standard Operating Procedures, Best Management Practices, and Proposed Mitigation

TGP would comply with the special lease stipulations attached to federal geothermal leases (see Appendix A).

Standard operating procedures and BMPs would reduce the effects on the human and natural environment. In addition to procedures identified in The State of Nevada State Conservation Commission's Best Management Practices Handbook (1994) and the conditions of approval identified in the *Coyote Canyon and Dixie Meadows Geothermal*

Exploration Environmental Assessment (BLM, 2010), Finding of No Significant Impact and Decision Record, 2010, the following mitigation measures would be followed to reduce any impacts:

- TGP would comply with any requirements prescribed by the Nevada Division of Environmental Protection-Bureau of Air Pollution Control.
- Dust abatement techniques, such as watering on unpaved, unvegetated surfaces, would be used during construction to minimize airborne dust.
- Speed limits would be posted and enforced during construction and operation to reduce fugitive dust (speed limit of 25 miles per hour within the project site, as necessary).
- Equipment and vehicle idling times during construction activities would be minimized.
- The Proposed Action would be designed to avoid sites determined eligible for listing on the National Register of Historic Places (NRHP).
- A 30-meter buffer would be placed around identified historic properties to avoid adverse effects.
- Wells would be grouted and cased so that flood water could not penetrate if well pads are inundated.
- Weed infestations would be mapped and treated prior to disturbance or during construction, using certified weed-free seed and mulching materials.
- The underside of all heavy equipment would be cleaned by water before entering public lands. Driving through or parking on noxious weed infestations would be avoided.
- Implement a noxious weed control program consisting of monitoring and removal of species listed on the Nevada Designated Noxious Weeds List (NRS 555.010).
- Components of the Proposed Action that would result in direct habitat loss within migratory bird nesting habitat would either occur prior to the nesting season or nest surveys would be conducted by a qualified biologist acceptable to the BLM prior to implementation. If nests are found, coordination with the BLM would occur to develop appropriate protection measures, which may include avoidance, timing constraints, and/or buffers.
- Adhere to Suggested Practices for Avian Protection on Power Lines (APLIC, 2006) guidelines for design overhead utilities such as installation of perch deterrents.
- Hazardous materials would be properly stored in separate containers to prevent mixing, drainage or accidents. Hazardous materials would not be drained onto the ground or into streams or drainage areas.
- A Spill Prevention, Control, and Countermeasures (SPCC) plan would be developed, secondary containment structures would be used on site, and workers would be trained in spill prevention and cleanup methods.
- Solid wastes would be transported offsite to an authorized landfill.

- Provide and maintain temporary sanitary facilities maintained by a contractor during construction.
- A hydrologic evaluation and monitoring plan would be submitted to the BLM for approval prior to drilling and implemented once approved.
- Monitor flow and pressure of pipelines and well pumps.
- Install pipeline valve shutdown features.
- Piping would be routinely maintained to ensure reliability and integrity, and would be predominantly located above ground, so that leaks, if any, can be visually identified more quickly than with buried piping.
- Engineer and construct pipes to current industry standards to handle anticipated temperature, pressure, and corrosion potential of the fluids being transmitted.
- Condensate "pots" would be installed in numerous locations under each new production pipeline to minimize the chance for inadvertent leaking of geothermal fluid from the pipelines into area soils.
- A BLM-approved grouting and casing program for well construction would be implemented to prevent water quality effects on groundwater during or after well installation.
- Borehole geophysics analyses (cement bond logs) would be conducted to document that well-casing grouting activities provide an effective seal, isolating the geothermal aquifer from shallow alluvial aquifers.
- All semi-permanent and permanent facilities would be painted to blend with the natural surroundings using standard environmental colors.
- Soils and rock excavated but not used to backfill or restore contour would be evenly spread onto cleared areas.
- All lighting would be limited to that required to safely conduct operations, and would be shielded and/or directed in a manner which focuses direct light to the immediate work area.
- Erosion control measures, including but not limited to silt fencing, diversion ditches, water bars, temporary mulching and seeding, and application of gravel or rip rap, would be installed where necessary immediately after completion of construction activities to avoid erosion and runoff.
- Temporarily disturbed areas would be reseeded where previously vegetated using a BLM-approved seed mixture.
- Topsoil would be salvaged and reused whenever possible and in a timely manner.
- Following project construction, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of native plant and wildlife habitat.

- All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available on the active sites. Water used for construction and dust control would be available for fire fighting. Personnel would be allowed to smoke only in designated areas.

2.2 No Action Alternative

Under the No Action Alternative, a power production facility at the CC lease area would not be constructed and the geothermal resources would not be utilized.

Insert Section 2 figures (10 total)